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Proceedings of the Cumulus Conference Swinburne University of Technology and RMIT University, Melbourne, Australia Edited by Liam Fennessy, Russell Kerr, Gavin Melles, Christine Thong and Emily Wright

Published in Melbourne, Australia by Swinburne University of Technology and RMIT University, for the Cumulus 38° South 2009 Conference

www.cumulus09.com

ISBN 978-1-921426-52-0

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38° SOUTH

On behalf of RMIT University and Swinburne University of Technology, it is our pleasure to welcome you to Melbourne and to our conference, Cumulus 38° South: Hemispheric Shifts Across Learning, Teaching and Research.

Swinburne and RMIT were among the first universities outside Europe to join the Cumulus family of art and design schools and we are delighted to have you here. Melbourne is the design capital of Australia. Our robust professional community sets the pace for Australian design practice and the great universities of this city lead Australian design education. Our galleries, museums and art schools make this a cultural centre as well.

Our two universities differ in the scope of our education. RMIT offers architecture, urban planning and art along with design. This conference takes place as RMIT inaugurates the landmark building of the Design Hub, a jewel in RMIT's vibrant city centre campus. Swinburne is unique among Australian design schools in its exclusive focus on design, emphasising sustainability, research and the role of design in the global knowledge economy. The academic staff at both universities maintain active professional practices at the international level and both conduct advanced research around the world.

As Nobel Laureate Herbert Simon said, design is the process we use to change existing situations into preferred ones. To do so, we create products and services that do not exist today. We imagine and build the future. This requires creativity, experience and skill, along with strategic thinking and tough-minded analysis.

Art is the process that allows us to give voice to human experience. The philosopher Paul Ricoeur described the artistic process as a way to bring symbolic, structural and temporal resources together to narrate our experience, telling stories that call out to be told, shaping our world as we tell them.

In the current Australian context, both art and design are framed within the creative industries. There is more to creation than creativity, though. In design, we evaluate creative work to see what works and what doesn't. In art and design alike, we look beyond industry and economics to greater questions of human value, to the quality of life and to the contribution we make to our fellow human beings through the skills and services we offer the world.

Some of you are only here for Cumulus in Melbourne. Others started in Aotearoa, New Zealand, at the Unitec conference, and some will go on to the Monash–Swinburne–Victorian College of the Arts conference - Writing Intersections. Whether you've come for a few days or a few weeks, we welcome you.

This nation is a great island in the sea, a home of memories, a home to many peoples. When you leave us, we hope you'll take with you your memories of Australia and the people you meet here. To borrow Shakepeare's words, we hope that you 'carry this island home in your pocket ... and, sowing the kernels of it in the sea, bring forth more islands'.

Ken Friedman, PhD, DSc (hc) FDRS Professor and Dean of Design

Swinburne University of Technology

Harriet Edquist, PhD, MA, Hon FRAIA Professor, School of Architecture and Design, and, Director, RMIT Design Archives RMIT University

Chairs Cumulus 38° South Conference

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67 Hours at Apliu

Hong Kong through the lens of a street

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Abstract

Apliu Street is one of those creatures, which men not only create but in this case live in and some live for. Apliu has come a long way from being a duck farm, fishing village, cargo pier, home to travelling merchants, manufacturing centre, and nowadays, residential and a thriving centre for retail. Apliu today seems to be a minor reflection of Hong Kong itself. It's character, past and flavours are all reminiscent of those of Hong Kong and where it stands in today's crossroads. As we understand and try to get a grasp of the many forces at work and the personality of the place itself; there are many questions that emerge from the churning in the melting pot that is Apliu. A poesis of arguments and findings work out of our hypothesis: "The Informal, Unplanned, Unsupported activities of Apliu Street are essential for its Survival".

Why Apliu St?

A street is more than a place or a piece of road, it's more than a space defined by its architectural surroundings; it's a space that is constantly evolving and morphing. As all forms of life have some factors that gather to bring them to life; at birth, infancy, maturity and even towards death. Apliu Street is one of those creatures, that men not only create but in this case live in and some live for. This paper gathers the historical research from a documentary perspective of Apliu street and stresses the factors that have fed the creature from infancy to maturity. Afterward some questions will be raised about its future since we have encountered that Apliu being old in the context of Hong Kong, having particular strengths, refusing to give up to market forces, globalization, political decisions and cultural influences.



1.1 Brainstorming approach at start of the research project

1. Early days of Apliu Street: Birth and Infancy

From a duck farm, a fishing village, a cargo pier, a home to travelling merchants, a manufacturing centre, and nowadays, a residential and a busy retail area. It is believed that Sham Shui Po was named after a deepwater pier located at the present Pei Ho Street. The Chinese words of Sham Shui Po literally means "deep-water pier". Apliu Street's (鸭寮街) name was formerly known as Ap Liu (Smith, 1995), which means a duck shed, thanks to the numerous duck farms located between Ap Liu and Sham Shui Po.

1.1 Historical, Social and Economical factors in Urban Development

Global cities such as Hong Kong are prominent centres for trade, finance, tourism and innovation. Within these global cities emerges a new pattern of spatial settlement, altering the social structure of society. The new patterns of spatial settlement are the result of the city's increasing land prices, the rezoning of land usage for industrial activity, political and economic driven forces and/or the availability of buildable landmass. The colonial government of Hong Kong had practised a 'Victorian laissezfaire' policy. The ideology of a laissez-faire economy was an economy where business decisions and the market forces ruled (Ng, Mee Kam., 2002). And it still remains the predominant philosophy of how Hong Kong works today.

1.2 Hong Kong Urban Development 1950s, 1960s and 1970s

Throughout the 20th century, urban development and urban renewal in Hong Kong was shaped around its economic and political forces. The government saw modernisation and urbanisation as core factors to the city's economic growth after tragic fire that destroyed Shek Kip Mei squatter area in New Kowloon in 1953, which left 50,000 people homeless, forced the government to play an active role in the city's urban planning and public housing development. The development of public housing and the 'standardised urban block' in the 1950s and the 1960s represented the functional principles of modernism from the west (for example Unite D'Habitation), and rationalised development for the Colonial government. The government adopted the ideals of modernist urban planning as a practical and economically viable solution to provide housing to those who couldn't afford accommodation during the population boom of the 1950s and 60s. In the 1950s and 1960s; Sham Shui Po transformed itself into an industrial clothing and textile base, with the setting up of mills all over the district. As a result, local industries such as fabric, embroidery, buttons and buckles also flourish. The introduction of electronics to Apliu Street began in the 1960s. The street grew to become a popular place for the concentration of electronic retail business. According to Cheong In the 1970's, the electronic retail business became paramount in Apliu Street as a result of the flourishing electronic industry in Hong Kong. At the same time, Sham Shui Po became Hong Kong's largest textile centre with Yu Chau Street, Ki Lung Street, Tai Nan Street, Apliu Street, Shek Kip Mei Street, Nam Cheong Street, and Wong Chuk Street lined with fabric shops. The more recent electronic goods cluster in Apliu Street, started with electronic component retails, soon evolved into outlets of computers and high-tech equipment. Apliu Street grew to become a popular place for the concentration of electronic retail business, where traders (shops and hawkers) sell electronic goods and services which range from: electronic equipment to components and accessories. (Mahtab, Lau and So, 2000).



1.2 Street pattern of Hong Kong island Street pattern of Kowloon

2. Commons | Appropriation

Appropriation of commons is one of the first stage in creating commerce and flow of commodities from production to point of sale.

2.1 Relationship | Institutionalization

For Politics and the Powers that be appropriation of commons have yielded more power and effect over a larger segment of society... often mirroring a feudal domination over the rural folk. But in today's world it is far less direct and domination is played out through policies and nstitutionalised systems whereby the oppressor has no identity for the oppressed. The appropriation of meaning and values has lead to society being more dependent on systems than each other. This has given rise to an increased isolation of the individual in more and more spheres of society. Ivan Illich claims, "Institutionalization of values leads inevitably to physical pollution, social polarization, and psychological impotence: three dimensions in a process of global degradation and modernized misery" (Illich, 1971).

2.2 Social | Cohesion | Stratification

The behaviour of people is significantly different is public spaces. The park, the streets and the town square have people engaged in an unseen order that goes to make up the culture of that specific locale.



1.3 Apliu Street Signage

Asia has evidenced a huge change in culture especially in the markets during the past fifty years. The public spaces and the street culture are also affected by the culture that pervades the market sphere; since historically the street has always been the agglomerate of many facets of culture including the market.

"Space is inherently political; politics is inherently spatial." (Elden, 2001).

The flux in politics of a locale will continue to cause the change in the patterns of tapestry of the space in the locality.

3. APLIU STREET TODAY: A melting-pot of residents, locals, hawkers and tourists

Nowadays, Apliu Street is predominantly a residential area with retail shops and hawkers stalls at the ground level. As a result of the flourish of the electronic industry in Hong Kong in the 60s and the 70s, Apliu Street grew to become a popular place for the concentration of electronic retail business, where traders, from noon to midnight, sell electronic goods and services which range from: electronic equipment, components and accessories, antique watches, old coins and other old items. The flow of Sham Shui Po develops in two layers mutually supporting one other: The Residential fabric located in the upper levels. Businesses and retail on ground level. On the residential level (residents: ordinary people, hawkers and retail sellers) The residential level is known as a home for new immigrant families, singletons, streetsleepers, newly emerged underprivileged groups and ethnic minorities. It can be broken down into three segments; caged homes, partitioned rooms and rooftop. This multi-use

street market structure represents an informal means of trading with an inherent flexibility to adjust and physically adapt in response to changing circumstances. Apliu Street is a multi-functional and multicultural space. It is a place to walk, to chat, to stay and to bargain.



1.4 A typical day along Apliu Street

Street markets can provide an opportunity for the local residents to participate as both players and audience. "The daily metamorphosis associated with the construction of stands and stalls for night markets, are expressions of public ritual geared to a short-term urban landscape of varied and overlapping activities. These embody an intrinsic uncertainty, allowing users to interpret undifferentiated spaces in their own way. Intensely used urban spaces therefore become realms of interaction which facilitate incremental change and interconnection. " (Smith, Cookson., 2006) Apliu today seems to be a minor reflection of Hong Kong itself. It's character, it's past and it's flavours are all reminiscent of those of Hong Kong and where it stands in today's crossroads.

3.11 Culturally:

What beliefs, habits, behaviours, relationships and interactions affect vending, business, sharing, learning and responding to change?

What are all the communities and people groups in Apliu; What do they share and what brings them together and keeps them together?

What are their Historical Roots? What are the people groups and their story of immigration if any?

How do they see themselves? and How are they seen by others, including their peers and surrounding communities?

3.12 Politically, Socially and Economically:

What is the government's perspective to these systems of local of economics? What are the patterns of political flux and the ensuing policies affecting Apliu?

How is Conservation and Preservation of Street Markets addressed by the Government of Hong Kong?

What are the threats of the Street Market in the context of Hong Kong, in Sham Shui Po and Apliu in particular? Can we as a society afford to loose our Local Street Markets?

What are the long term strategies of the government of Hong Kong towards Street Markets in general and Apliu in particular?

3.13 Locally:

Amidst the forces of the Economy, Government Policy and it's Image Expectations: What are the Internal Forces emanate from the people of Apliu?



1.5 Research Framework for Apliu Street

3.14 Onset of Observations

The hours and the days of observation opened our eyes to a world within the street, the evidence of which we have recorded, in words and images; more importantly in conversations and friendships. This was an experience that took us from being distant observers towards being immersed to the depth of peering into the lives, stories and the fabric of the street that is Apliu. This process engaged us with reality not as with abstract elements but placed us in a live theatre with players involving a huge crosss-section of humanity, indiscriminate of age, culture, social roles or convention. The distinct roles of each player and their sphere of engagement gave the street an identity that grew and diminished through the course of the day in various forms. This can be understood through the social, economic and political flows that bring it alive to behave as a living, moving, breathing creature. Our hypothesis at the finish of our background study was:

The informal, unplanned, unsupported activities of Apliu Street is essential for it's survival

What are these activities?

What are the threats?

Why are they essential?

For whom are they important?

The hypothesis demands answers to these questions through the observations. These questions are explored in detail through categorisation of the aspects observed



1.6 Boundaries of Observation



1.7 Categorisation of Observations

3.15 Apliu Space Components

In all streets it is possible to observe its components and functions; a street where vehicles transit, a footpath or sidewalk dedicated to pedestrian mobility and physical structures such as buildings On Apliu spatial complexity and function help give the street its richness and support diversity and people activities.



1.8 Apliu Street Anatomy

3.16 The Street

The street's function can vary depending on the time of the day. It access as a pedestrian mobility path that distributes pedestrian traffic and can support motor vehicles stopping or passing though the street. It is a connection between other main roads, with one exception found on the northwestern side of Apliu where it is possible to find trucks that move and "feed" merchandise to the shops at designated hours.

3.17 Stalls Line

One of the components not usually present to a regular concept of street is the temporary street market stalls. Situated on both sides of the street following its axis, the stalls are predominant and provide a green line during the day and a light strip at night. It is the first line of commerce on Apliu. Stalls are distributed in groups of two, with spaces between that can serves as pedestrian connectors for the next component.

3.18 Footpath / Sidewalk

Leaving the street and passing the stalls, pedestrians can find the footpath. Located on both sides of the street with a restricted space for the pedestrian traffic, the footpath serves as transit way between the centre of the street and the sides. Although on Apliu the street is accessible to walking mobility, there are some physical factors that distinguish a street from a footpath.

3.19 Retail Stores

Located at the opposed side of the road next to the sidewalk. Conformed by empty volumes on the first level of the buildings. Ranging 2,5 and 8 meters along the sidewalk, some of them internally connected and are the place of the formal commerce on Apliu. Could be perceived by the pedestrians as the background.

3. 20 Back Stall Surface

The temporal hawkers. It's true that this category may not fit the other physical components, The temporal hawkers demands space, and that is why is considered here. Could be seen as a strip line on both sides of every sidewalk. Hawkers use stalls backs sides and shop walls specially lower areas as their display surface for their merchandise or services they offer. May be perceived as a side extension of almost every stall.

3.21 Focal Points

From the entrance points of Apliu one of the main visual attractions are the cloud of signs located along the street. Then is also noticeable the two strips of stalls during the day. At night the 4 lines formed by the continual array of lights on the stalls and lights from the formal shops are the central attraction for the eye. Corners are special places for local people congregation.

3.22 Perception of Aesthetics

Early in the morning, Apliu gets ready for a new day, is cleaned and could receive a shower from the cleaning machine. Stalls start to be unfolded, expanded unpacked, the goods are deployed on all possible surfaces of stalls and walls. The entire street colour changes every morning from grey and green to multiple brilliant couloirs. Formal shops open doors and windows to exhibit but not to touch, stalls are ready to be touched, seen, hear and smelled if the buyer wants.

3.23 Multi-functional Scheme.

In force since 2001, the part-time pedestrian scheme was created to regulate and systematise the flow of people and traffic, coordinated with the market and its time cycle through the day. The scheme is active from 12 noon to 9:00pm daily. From around 7:00am, there is the occasional truck or heavy

vehicle and more regular passage of cars. These trucks carry goods in boxes and large bags dropping them off at stalls and shops as they pass through Apliu As the market start shutting down from about 8:30pm to 9:00pm, there is a very different people group that appear on and pass through Apliu to start buying and selling second-hand goods of various kinds in adjacent streets. After 10:00pm, there is a dwindling population scattered, scurrying for whatever spoils of the second-hand market are left. It is also a time when the street is at its filthiest, with evidence of the whole day's consumption and disposal flowing from the bins onto the street and scattered around.

3.24 The Stall Anatomy

Stalls might be one of the more important visual components that involves at the same time an extreme geometrical simplicity and high complexity in it use and relation with the environment. Apliu's dynamics demands describing the design of its stalls on two stages. The Standardise original design and the appropriation that hawkers has implemented on the appropriation process during the daily use. A Stall is configured following an orthogonal pattern by square volumes and planes. Basically there is a main volume that serves as a storage compartment That is fixed to the street and defines the placement of every stall on the street. On top there a cover (find the right word) that is an inclined plane that functions as a rain and sun protection.

3.25 Physical Attributes

The street is a stage where life is played out everyday. It is a theatre for the senses where various activities unfold, emerge and develop before your eyes. The colourful unique characters begin to appear, socialise and interact. A mélange of elements and influences give the street its character. Some elements are static and fixed; being its physical structure, while others are constantly changing, morphing and moving; the people, activities and the patterns of their behaviour.



1.9 People - Time - Space Cycle Observed on Apliu Street

3.26 Area Ambience

The street is a place where people walk, shop, meet, exchange and generally engage in the diverse array of social, economical and recreational activities that, for many, are what makes it alive, liveable and enjoyable. The overall ambience of Apliu Street is best described as an energetic, informal, dense, unstructured yet functional, colourful, layered and textured space. The combination of visual noise and distinctive sounds work together to enhance and enrich the street.

3.27 People

Apliu Street is host to a diverse, colourful array of individuals and groups; locals, ethnics, tourists, students, elderly, children, families, men, women, stall vendors, law enforcement, street cleaners, care takers, informal vendors are just some to mention of a few. Each activity or action they informally play out or participate within the space, helps give the street its unique character and identity.

3.28 Characteristics/ Behaviour:

On the go, Lively, Colourful, Curious, Tacit Understanding, Vibrant, Freedom, Quirky, Observing. Interacting. Chatting. Individual.

3.29 Activities of People

Various roles and patterns of activities unfolded, emerged and developed in the street over an over our entire observational period. These activities are a part of peoples' daily life and well-being. These activities include the setting up and closing down street stalls, cleaning, working patrolling, socially gathering and shopping.



2. Factors influencing 'safety'

4. Appropriation of Space - The Need for Casual Social Gathering

There are people and communities in Sham Shui Po who are totally dependent on the locality and the sustaining ecosystems of the places. If there is a threat to the livelihood of the street there is a direct threat to the people of Sham Shui Po.

Waking up in the morning the old people are up on the street early with groups of their friends and buddies looking into the bleak with their sleepy eyes full of reflection and afterthought. There is much unspoken and much thought scripted on their faces. Time stands quite and passes by with their looking into the space and the time's collective dilation impresses on through the morning. This collective behaviour is un-orchestrated or deliberatively purposeful.. But rather a happening that is consistent with the everyday passage of time. This is not something which results in any direct activity of trade or exchange of commodity but it rather builds bonds that are not seen or directly evidenced. This happening day after day builds a pattern of exchange of intangibles that reinforce the model in which their sociability functions.

4.11 Flocking

Informal Street Vendors bearing similarities in the commodities they trade... Such as goods that can be kept in small bags or even the pockets of their clothing, usually congregate with each other and small talk and check out each other's goods and exchange the day's news. There is also the non-peak hour behaviours that are more informal and not centred around the goods or their trade.

4.12 Familiarity

There is evidence of acquaintance at a deeper level among the people one to another. This results in behaviours and practices that are not always self-evident or plain to see but that which goes into a more sophisticated and analogous mix of modes of communication and engagement.



2.1 Multi-Cultural huddles are common on Apliu Street

4.13 Context Sharing

The people of Apliu bear a larger sense of what they are part of in the context of the district of Sham Shui Po and the differences there are in their livelihood as compared with those of other places and the rest of Hong Kong.

4.14 Common Behaviours

Behaviours that are coordinated and synchronized are seamless in the course of a day within the whole hustle and bustle of people flowing through and into the street. But during the course of the observations over many days we see a clear pattern of behaviours that coordinate across different people groups that engage the in mutual fashion without much apparent coordination or synchronisation.

4.15 Acknowledgement/Acceptance

There are those on the street that may look totally out of place in the social sphere of the city and may look homeless and derelict, who usually sit around the MTR exits and frequent the surroundings of the corners; but a closer look will show the social significance of even their lives in Apliu.



2.2 Generations of street merchants

4.16 Sharing

The street itself being commons provides a viable and comfortable atmosphere to practice the most basic act of selflessness. People living in Sham Shui Po share most commonly a cultural history that often goes beyond the boundaries of the district itself. Sharing as a human behaviour is to hold in common and provide by exclusivity.

4.17 Experiences

Engagement with the affairs of the street is for mutual benefit and collective effort. There are distinctions in the roles but a commonality towards the overall purposes and functions unfolding. Shared experiences are of vending itself where a vendor is usually supported by his partner and others related to the transport of goods and the service of the customers.

5. Common Values

5.11 Intangibles Support Systems

Though there is much diversity in the social roles; there is a close system of working which keeps them within a tight knit support system that creates an atmosphere of solidarity. This keeps them in a common understanding together through the activities of each day. The diversity of activities of each actually sustains each other in their respective roles.

5.12 Solidarity / Sustenance / Moral Responsibility

The moral framework of the people of Apliu is significant to mention. There is a friendly fidelity that can be experienced in all the interactions on the street. Be it with the stall vendors or even the retailers who are very obliging even beyond the parameters of their stalls.

5.13 Respect

There is a level of respect that comes across consistently across even the different economic strata on the street. Strong mutual consent at a tacit level and unspoken understandings are part of the exchange of respect that goes on constantly between different layers and zones of interaction. There is not only a respect for the roles that each plays... But also one for the space and the appropriation and the varying uses one subjects them to.

5.14 Appreciation

There are mutual exchanges of complimentary behaviours that indicate acknowledgement for their actions and activities towards one another. There are also regular smiles and kind behaviours that indicate appreciation while undertaking tasks within the cycles and exchanges.

5.15 Looking after each other

While enforcement officers and officials frequent a stall or engage in suspicious behaviours... There is a lot of activity and communication that are centred on a mutual concern towards each other. There are day to day practices and habitual exchanges between the families dwelling in and around Apliu too that provide for each other's social and economic situations.

5.16 Necessary Interrelationships

Sham Shui Po has a diverse social spectrum that accommodates people within it's community from many other cultures, languages and territories. This has not only brought about change from without; but the response of the locality has also brought within it a climate of Economic Mutual Benefit.

5.17 Symbolic Resonance

Within the street and upon the stalls can be seen repeated patters of images of gods from mythology... Icons and idols signifying such characters that are believed to bring good fortune, luck and prosperity etc.. There are verses and words too that are hung on the stall fronts and the facades to affirm their beliefs.

5.18 Balance of Power

Through the street is a flow of power, hierarchy and authority that is evidenced through all the behaviours and interrelationships of the various people groups in the street. There is a power scheme that works through all the governmental departments and their enforcement officers.

5.19 Confederacy

Evidence of collaboration and unspoken alliances towards activities that challenge the law or it's enforcement can be observed on the street. There are also activities of constant monitoring and passive regulation that are evident through the day over the length of the whole street.

5.20 Keen Scent

Enforcement officials also possess a highly selective nature in the way they frequent the street and their mannerisms are particular towards certain kinds of activities taking place on the street.

5.21 Equilibrium / Polarity

These exchanges of power between the people and the enforcement authorities yields a balance of power and achieves a suitable equilibrium to maintain continued activity.

5.22 Threats and Supports

The habit of enforcement deliberately threatens certain kinds of activities which may be harmful to the community; at the same time providing ambiguity and protection for other kinds of engagements on the street.

5.23 Mental Image from the perspective of local Hong Kongers

Projected Image from external influences such as the government, media, law enforcement Ground Reality from what we saw and experienced

We find that there is a mental image that Hong Kongers have of Sham Shui Po that is often different from the Sham Shui Po that has been impressed in our memories from the days of observation. There is a projected image of Sham Shui Po, influenced by the government, the media and law enforcement.

5.24 Perception of Safety

Apliu Street has a strange, suspicious atmosphere that gives no assurance of safety It is a distant, familiar, understandable, yet friendly candidness of Apliu that is inviting not superficially

6. Dilemmas

Balance of Power / Regulation of practices and behaviours Maintenance of order / Monitoring and control What is legal? What is not? / Where do the authorities draw the line?

7. Poiesis

Change comes in two forms. There is the social fabric that itself creates the change through highly complex motions within its ecosystem and there is the change that is seen as necessary by authorities to bring about order and control. This imposed change on the social fabric reacts to create voids and dead spaces of social meaning and interaction. This in turn, results in a withdrawal of certain functions and realities within the social sphere affecting economic and cultural flows.

7.10 People Systems

There is an essence of Sham Shui Po that runs through Apliu and it has to do with the way they community structures itself and functions together. This is a synthesis of the identity of the people, the values they share and the coexistence that results from this. This synthesis is unseen, unscripted, undermanned and constantly adapting to the changes in the economics, social strata of the street over time; yet retaining values of moral responsibility, solidarity, acceptance and mutual respect etc.. On the other hand, in the face of such change, there is an interest that is evidence through the laws and the practices that are enforced through various authorities on the street. The laws, though they maybe responsive to maintain safety, hygiene and order; in there execution and sphere of influence can challenge the existing order and interactions within this society.

7.11 Preserving Character

From the observation we can find a distinct character that is Apliu Street. We have seen it as an organism that awakes, sleeps, breathes, consumes and sustains. Its distinct character can be traced to many of the spatial features and the practices surrounding them. Features of the space that encourage and stimulate practices resulting in the social well being of different people groups need to be preserved. The perception of aesthetics can often result in the perception of the functions of a spatial configuration. The commons of what a street is supports the practice of appropriation. This is unsupported by the plan or structuring of the street. Appropriation happens with both people and objects. The purposes for each differ according to the character it brings to the street, which is both at the level of formal and informal, structure and unstructured, deliberate and spontaneous practices. There is also a scope for open-ended design or provision in the public space of Apliu to facilitate appropriation and unscripted activities.

8. Limitations

Time Constraints

- Unable to test our hypothesis in other Hong Kong street markets to do a comparison

- To see if these patterns occur during different seasons and/or festivals

Language Barriers

- Engagement with people

- Understanding signage

Cultural Barriers

- Understanding cultural symbols

9. Advantages

Preconception of Apliu

- Locals had a different perspective of us - they didn't question our presence

- We connote the notion of being tourists

- Our preconception of the space - INNOCENCE

Conclusion

From the historical research we came to an understanding of Hong Kong, Sham Shui Po and Apliu Street from which we embarked on a schedule of observations over nine days, extending to 67 hours in total. This gave us much to chew on and loads of images to analyse and large base of understanding to build our insights and inferences upon. Through the sessions of correlating our observation notes with the many schemes of images of various layers and fluxes of the street, we started categorising our understanding and perception into these four broad spheres; Spatial Identity, Temporal Flux, Physical Attributes and Underlying Realities. Though the project has been a focus on research and analysis for design, it has also provoked us to look deeper into the context that we have been involved with that is Apliu Street. We have not only exercised the process of research and analysis, but we have also gained a better understanding into people, their culture, the rhythms of their reality, the space that flows with the changes occurring within the many layers in the street. It has not only been a process that we consciously undertook, it is also being a tapestry that we have started becoming a part of, such that it gave us a vivid experience of what it means to live, to find livelihood and be sustained within the framework of such a street. A passive outlook on life happening around us was not always what it seemed. We were taken into being a part of the scenes unfolding on the street, such that engagements and relationships that are unperceived at first glance started becoming apparent. Rhythms started to appear and we could almost predict sequence and events. This did not create a mundane a routine that we saw, but rather took us beyond the layers of the fabric of activities that happened at first glance. It provoked questions, conversations and mutual understanding that made our own presence a part of the life we observed on the street. Each of us having been from a different continent made up for over eight languages and varied depths and perspectives on the whole process.

Acknowledgment

We are immensely grateful for the opportunity that we had to do this project as one of the learning exercise as well as an experience of a very unique and beautiful setting. We would like to thank Dr. Jackie Kwok for her insight into the areas of design research and ethnography than helped start this project. Dr. Sandy Ng has given us a perspective into visual methodologies that is very useful for our progress. We are grateful to Louis Poon for his assistance and advice in the progress of our exploration into Apliu Street. Dr. Eva Yuen and her work in the area of Phenomenographic approaches towards research inspired us in the observation stages.

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TRANSITIONS IN ART + DESIGN EDUCATION, BALANCING TEACHING, LEARNING AND RESEARCH

FROM VIRTUAL 3D MODELS TO PAPER-CRAFT MODELS: IN THE SEARCH OF A WAY TO TRANSFER DESIGNS FROM VIRTUAL TO REAL

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Abstract

In 3D applications, capabilities of zooming, panning, scaling and the need of making the real-products fit inside smaller screen which make designers disconnected from real-world facts as form, proportion, material and scale. Intangibility of virtual designs draws a border line between the design on screen and the possible-real-physical production. This difficulty is higher for the learners who confronted 3D virtual design for the first time. Transfer of 3D designs on screen to physical 3D real-world-objects could help learners to concretize the process.

In computer-aided-design class which is held in Interior Design Department of Anadolu University, an approach of realization of computer aided 3D design into physical models is experimented. Easier and economical ways of realization process is researched in order to make learners understand differences between physical- and virtual-modeling.

In this study, results of this research will be presented by examples of student works and explanation of the techniques.

1 INTRODUCTION

In many fields of design, computers are used for their accuracy, productivity and speed in repeating works. In practice, most of the design process is undertaken by computers, from the initial idea to the production-line control and production of the end-product. CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) applications are the environments for these processes.

Design environments are shifted from pencils and papers to monitors, keyboards, mice and CAD, CAM applications driven on them. Physical drawings are virtualized as CAD files, physical scalemodels are virtualized as photo-realistic renderings. Design education is also affected from this change. Most of the design schools included CAD classes to their education programs. 3D modeling features of CAD applications aided designers to simulate the product being designed. Photo-realistic (PR) CAD renderings which are produced with 3D CAD applications are preferred by students for simulations of their designs for presentation and testing purposes.

1.1 Problem

In most cases, CAD classes are held complimentarily for other design classes. Design education is not held in computer environment. Computers are used as visualisers for end-product assumptions. Design starts on conventional tools like paper and pencil and continues in physical-environment. For preparation of PR-renderings, which are used for presentation of end-product, the design is transformed into CAD drawings and 3D virtual-models. Especially in architectural and interior design the process is taken in this order. On the other hand, in most cases manufacturing capabilities of computers, which include many original ideas, are discounted and not taught [1].

Institutions tend not to teach CAM capabilities of computers due to some reasons:

• Demand from the market: Design practice in the market is mostly divided into two concepts: Design and Manufacturing. They are usually separated and mostly controlled by different people.

• Missing teaching staff capable of CAM.

• Tools which are needed for CAM education are expensive and mostly produced for manufacturing more than educational purposes.

The highest barrier in front of CAM education for design students is that CAM is thought to be a profession out of design which is involved in machine-operation. It is in no doubt that designers should operate neither CNC (Computer-Numerically-Controlled) machines nor program NC codes. But they should know what could be done by using them, their limits and capabilities. By knowing these they will achieve original design ideas. It is obvious that the highest improvements in technology are actualized for production and novel ideas come out of these new technologies.

A. Virtual Space and Physical Space

For ages, 2D-3D drawings and physical models are used for data transferring, simulation, testing and presentation purposes of designs. Depending on the physical dimensions of the designs, these aids needed to be scaled and abstracted in materials. Physical models of designs are preferred for their tangibility. They also serve as study models for pre-mature tests of designs. Production of scaled-physical-models gives clues for production of the real-design and materials [2].

In conventional methods, 2 dimensional drawings are produced on paper unlike the production of CAD-drawings. They are scaled during the production. Drawings are instantaneous, designer draws with the idea of scaling. Drawing medium, the paper could be as small as notebook pages or as big as A0 normed sheets. Designer could get close to a portion of the drawing to see closer that part or get far to see the whole drawing. All the movements are physical.

In CAD production, drawings are pre-produced and after they are printed-out on paper as scaleddrawings. During the pre- production phase the physical-drawing process is simulated. Drawings are needed to be fit inside the screen, for this reason navigation becomes a key-factor. The whole drawing is navigated with aids of zooming, panning and in 3D applications screen-rotating. Instant zooming, panning and screen-rotating occurs more in faster drawing sessions. Unlike the limited physical-space, in the vast space of virtual-environment, designers loose the connection with the reality and the real-product. The feeling of scale disappears and sometimes causes vertigo to happen. It would not be a big problem if the design is finished in another platform and the CAD application is used to visualize and simulate the end-product. But if the design itself is going inside the CAD environment, it occurs as a problem [3].

Designing in CAD environment is an economical and practical way for design education. No materials are used for experimentation, the data could be transferred electronically and very fast, accuracy in drawings makes more reliable designs. But above mentioned problems are also valid for education.

B. The Hybrid Way

CAD environment is preferred for economy in education expenses, accuracy and speed in design and better quality in presentations also for future benefits to the graduates who will take part in the field. At the other hand physical-drawing and -modeling is preferred for tactility of the products and better perception of scale. A hybrid way can consist both of the concepts in education. CAM could help to connect these two diverse approaches in one program. Designs which are being grown in CAD applications could be sent to rapid-prototyping-machines, CNC-machines or laser-cutters to have the tangible real-models.

Above mentioned devices are expensive to obtain and maintain for institutions. Especially for design education, where lots of experiments and study models are produced, a low cost and practical alternative is needed.

2 BACKGROUND

In Anadolu University, Fine Arts Faculty, Interior Design Graduate Program, Computer Aided Design Class is held in the 3rd year for two terms. The main aim in the class was to teach a popular CAD application, AutoCAD. In 2005 a different approach was experimented. Another popular application is taken in the curriculum, 3D Studio Max. 3D Studio Max is a widely used application for its 3D-PR-rendering capabilities. Students are encouraged to create their own designs during the class. The lessons continued as in class works and home works. Students had to solve certain problems of design which are related with the taught features of the CAD application. Class had 3 main environments: classroom activities, web site activities and video tutorials. Classroom activities consisted of knowledge transfer and instant aiding. Web site activities consisted of virtual part of the classroom where students had to upload their home works, ask questions in digital forum and reach to

web links and knowledge about CAD, CAM [4]. In the web site, new designs which are selected especially for their relation in CAM concept have been published by the tutor. Video tutorials were complimentary environments for students, some of the knowledge given in the classroom is repeated in the videos and some extra knowledge was also given. In video tutorials home works were explained and some extra techniques were shown.

In order to show students, differences between designing in virtual-environment and physical environment, a couple of workshops and experiments have been done [5].

3 METHOD

3.1 Introduction

The most difficult problem in transfer of 3D virtual-models into physical-models is to find the appropriate medium and technique. Especially for educational purposes where lots of experimentations are done, using an economical technique is very important. Most of the rapid-prototyping and 3D-printing methods are depending on very expensive machines and consumables. CNC-machines and laser-cutters are using ordinary materials as consumables but are difficult to maintain. Specialized operators and special spaces are needed for these noisy and dusty tools. The medium is mostly depending on the selected technique. Rapid-prototyping usually produces finished-models out of expensive resin or powder. Models produced by CNCs are usually needed to be assembled and post-processed in order to create 3D-forms.

An old and familiar medium and technique is lying in the kindergarten memories. Draw on paper, cut and glue. In most design schools paper-using-techniques are taught in basic-design classes in the first years of graduation-programs. Apart from the design-profession most of the students are familiar with techniques of paper-cutting and -gluing. Transfer of 2D data from computer to paper is a ubiquitous technique, driven on plotters or printers, well known by every computer user and usually freely provided for use of students by institutions.

In order to use paper as a medium, a technique is needed to transfer 3D data on 2D paper-platform. 3D models have to be unfolded into 2D-drawings in order to be printed on paper via 2D-printers or plotters. Unfolding is separating and nesting mesh structures of 3D-models into 2D-patterns. After, unfolded 2D-pattern can be printed out on paper and cut out. Separate pieces can be assembled and glued.

At the end of the research for an economic and user friendly way to transfer 3D virtual-models into 2D physical-patterns on paper, we have found "Pepakura Designer 3" from Tama Software [6]. It is hobbyist-software focusing on creation of paper-craft models out of digital data from 3D applications. Pepakura Designer allows import of files from a wide variety of 3D file formats which makes it a flexible environment. 3D models created in the 3D software are saved in accepted formats. They are

imported in Pepakura Designer. Pepakura Designer then unfolds them and shows the results. The unfolded patterns are then printed out on paper, assembled and glued (Figure 1).





Realization of virtual-models is also important for making students understand the logic of 3Ddesign -software. 3D Studio Max is a polygon based modeling software in which the models are created out of a mesh of polygons and triangles. Pepakura designer is working on an algorithm in which all the models are divided into small triangles or polygons made up of triangles. This algorithm is very suitable to demonstrate the logic of polygonal-modeling. For other modeling techniques like NURBS (nonuniform rational bi-spline) modeling popularly used in other modeling-software, Pepakura Designer uses models converted to polygonal-models [7]. There are also other softwares in order to transform 3D Models into 2D patterns. One of them is Lamina Design [8]. Lamina Design is suitable for NURBS-modeling-software; it allows import of 3D files directly from NURBS based modeling- software without the need of any conversion. Lamina Design seems more sophisticated in comparison to Pepakura Designer which aims to serve to hobbyists. Lamina Design aims customized small scale productions and is not as easy as to learn as Pepakura Designer.

3.2 Experiment

Experiments are continuation of a series of workshops which are started in 2005 [5]. In all the experiments ways of improving student awareness to the mentioned problem is researched.

The experiment is held in two terms with two diverse groups of students but in the same context of CAD class. The first phase of the experiment is held in January 2008 as a short-time workshop when 3D modeling knowledge of the students are more matured and they could model polygonal-meshes in 3D Studio Max. In the first phase students are asked to assemble a previously modeled, unfolded and printed-out-model. A 3D model is created by the tutor in 3D Studio Max application and unfolded in Pepakura Designer into 2D patterns. Then these patterns are printed out on paper and given to students for cutting out. Without any knowledge about what they will do next, students started to cut out and

stack the separate pieces of the big assembly. When all the pieces are cut out students started to find adjacent pieces and glue them corresponding to the numbers showing connected edges. The result was an unstable paper form due to the low strength of the paper used and the loss of stability of the created 3D model. The form was not able to self-maintain the desired shape. After finishing the assembly the desired 3D form and the technique used to create it was presented to the students. The aim was to create consciousness about the differences between the virtual- and physical-model, the importance of the material in design, to create awareness of the size and scale while designing in virtual-environment. The unsuccessful model yielded a successful experiment in the end (Figure 2).



Figure 2

The second phase was about making students create their own 3D models in 3D Studio Max then unfold them in Pepakura Designer and create the paper-craft-models (Figure 4). Students are asked for the models to be limited in size and number of polygons which also indicates the complexity of the model but they were not limited in subject of the model. The use of Pepakura Designer is shown in a previously prepared video-tutorial. Students used paper thicker and heavier than the ones used in the workshop for better stability and strength. Some students used a plotter-service in order to print on big size papers and some used small and divided papers. Students are asked to create a presentation-board showing the 3D virtual-model, unfolded 2D pattern and photos from physical-model. An exhibition of the works is held in the faculty.



Figure 3



The third phase of the experiment is held in 2008 with another group of students taking the same CAD class. The experiment is repeated like the previous one except the workshop-phase. Students are again asked to create a 3D model in 3D Studio Max. In this phase students are directed for creation of their models. They were limited neither for the size nor the number of polygons used in model. The results were fascinating. Students tried their best to model their desired objects. They created very complex forms; some could not achieve to assemble because of the complexity of the model and the tininess of the pieces to be glued. Some of the students tried second alternatives in color. The models are exhibited in an exhibition.


Figure 5

4 **RESULTS**

Experiments have shown that students have a great intention to work in physical-environment with the aid of computer. They have found computer-environment providing more freedom for creation of their desired forms and liked physical-environment to touch their dream-models. The failures in transferring from virtual to physical due to loss of material strength and differences in scale made them to be conscious about the differences between virtual- and physical-design. The physical-models were enough sophisticated, even some artists liked them as standalone-sculptures. The approach was a

transition from design to art. The hand-craft side of artistic works expressed in transferring data from digital- to physical-environment. Because the physical-models are made out of paper which is not a tough material for functional use of models, students tended to express more artistic shapes rather than functional models.

The experiment was a good clue for students to understand the logic of polygonal-modeling in 3D Studio Max. The models which are on the screen were exactly in their hands except on-screenillusions like material, color, lights and edge smoothing. Failures in transferring virtual-illusions on screen to physical-models made students to understand computer's augmentations to digital-models. While modeling in virtual-environment it is a well known procedure to add faces to make the models look smoother but in return more rendering time is needed. The same has occurred for the physical-modeling the more added faces made students cut and glue more edges and consequently time for completion is increased. At the other hand if the faces are too low the model seems to be a low quality production.

5 CONCLUSION AND FUTURE WORK

The experiments in finding economic ways of improving under-graduate student awareness to the differences between computer aided design and the real-physical-product shown that students could be aware of the problem even with short-time, easy and entertaining workshops. The awareness is also helpful for understanding the logic of polygonal-modeling.

This approach could be an initial study in the problem of integration of CAD-CAM concepts in project classes or design studios in industrial-design, architecture and interior-design disciplines. The experiments shown that the methods are economic, but they are time-consuming because of cutting and gluing processes. Some easy to use and economic tools may help the process be faster to be applied to project classes or design studios of industrial-design, architecture and interior-design. Some vinyl cutters are capable of cutting thick card boards and small scale laser cutters are safe and less expensive, they can cut a wide variety of materials like wood and acryl. Even without these tools low-poly-models could be realized on paper for study-models. The process will be useful also for students to find new methods in hand crafting and make them useful for their projects.

In continuation of this study, new methods will be researched in order to integrate CAD-CAM concepts in project classes. One future method will be slicing virtual-model into sections and printing and cutting them out on cardboard and stacking in order to create the physical-model in a new scale. Other virtual modeling techniques like NURBS and other software will also be researched. Integration of CAD classes to project classes is also a future project. This could be initiated as a project session in CAD class.

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Futures West: A Design Research Initiative Promoting Sustainable Futures for Western Sydney

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Abstract

How will life in Western Sydney change over the coming decades? What will be driving the changes? What kinds of responses to these changes will be appropriate, desirable and sustainable? These are questions that a new design research initiative at the University of Western Sydney titled *Futures West*, seeks to respond to. *Futures West* aims to exercise the creative and practical capabilities of design to generate alternative visions of the future of Western Sydney, and to develop the means to bring these visions into being through targeted, community-relevant projects. This paper will outline the initiative, discuss the outcomes of the first *Futures West* event held in June this year, and present ways forward that raise promising questions about the role of the university in preparing for a climate-changed future.

Keywords: Design futures sustainability

All of us, everywhere in Australia and in the rest of the world confront serious environmental changes which will challenge our everyday lives and aspirations for the future. The formation of communities that can recognise and apply themselves to the task of preparing for change is perhaps one of the most radical challenges we face. *Futures West* seeks to bring design to the challenge of community formation in response to the problems and opportunities presented by a climate-changed future in Greater Western Sydney (GWS).

This paper provides background to the *Futures West* initiative, the role of design in the communitygenerating project and tells the story of the first event, *Futures West 2031*, and its outcomes. In this event the creative and practical capabilities of design were exercised to generate alternative visions of the future of Western Sydney, which were then showcased at a community forum. The intention of the *Futures West* project is however to move beyond design's capacity to inspire imaginations and evoke desire through images – the objective is to develop targeted, community sponsored projects to bring these visions into being.

We don't expect this to be an easy process, but we have much to learn about how change can be made real and sustained in our particular context. We take on board Manzini's and Jégou's (2003) understanding of the transition to more sustainable ways of living as a "complex, social learning process" in which chances have to be taken and failures documented and learnt from. The role of design in supporting 'social innovation' is critically important to our approach and informs how we understand the connection between design and sustainability. Thus we turn for inspiration locally to Chris Ryan's Victorian Eco-Innovation Lab (VEIL) project (Ryan, 2008, 2008b, 2009; VEIL 2009) and internationally to projects such as John Thackara's City Eco Lab project on display in St Etienne in 2008 (Caines, 2008). We also seek to embrace the emerging theory of redirective practice (Fry, 2009), in which the design-practitioner is able to reflectively interrogate what already exists in order to effectively and strategically mobilise change processes for the future.

1. Futures West 2031 background and context

Futures West is focused on Western Sydney primarily because that is where we are. Every region has its particular issues and future pressures that will characterize how global changes will emerge locally. Western Sydney is unique in several important respects that are meaningful in light of a climate-changed future.

It is geographically and demographically dispersed, and has a strong agricultural history that has been rapidly encroached upon by suburban and industrial development in recent years (Gilbert, 2007). The manufacturing base of Greater Western Sydney is, however, now eroding due to local and global

economic pressures and consequently there has been a significant loss of jobs in this sector. In addition, a third of its inhabitants have to leave Western Sydney for work (O'Neill et al., 2008). These factors have drawn attention to the extremely car-centric nature of the development of transport infrastructure in the region to date (O'Neill et al., 2008). The Urban Research Centre's recent comprehensive study of Employment in Western Sydney highlights both manufacturing and transport (including commuting and freight) as key areas which would face major adjustments in a climate-changed future (O'Neill et al., 2008).

The University of Western Sydney is not immune from these issues with six campuses spread across six Western Sydney suburbs. The vast majority of students are drawn from Greater Western Sydney and most travel to, from, between and within campus via car. A recent study addressing the accessibility of open public space in Penrith, which included university students, found that the dominance of car transport has a significant impact on the experience of place and is a natural inhibitor of community (Sofoulis, et al., 2008).

These regional characteristics highlight the importance of exploring change opportunities both within and outside the university and the critical significance of community engagement and development.

In light of these base-line issues we identified four areas of focus for the *Futures West* initiative: 1) mobility and industry in Western Sydney, 2) energy, water and food security, 3) the regeneration of public life, & 4) the future role of the university. In terms of the projected date, 2031, we took our cue from the Urban Research Centre report, which proved invaluable in identifying significant trends and implications for the Western Sydney area.

2. The potential of Design

One of the underlying agendas of *Futures West 2031* was to shift community perceptions of design: what it is, what it can do, what it has done, who does it. This is a complex and difficult task not least because there exists a popular perception of design as a style driven activity perhaps more in the business of providing finishing touches than generating new projects in response to complex problems. So we had to both strategically work with and attempt to transform this perception. Our strategy was one of seduction – first to generate visually and conceptually compelling alternative future scenarios for Western Sydney based on our four areas of focus, and then to follow this up with an invitation to collaboratively develop projects with specific community partners in order to bring the changes represented by these visions into being. Our approach is based on the correlation of design and planning activity (Fry, 1999) and the need to learn to think and act forward (Slaughter, 1999) in relation to the futures that design has already put in place (Fry, 1999) and 'what is coming to shape the future' (Fry, 2009). We have for some time worked with a hybrid model of scenario planning for sustainable futures in our industrial design program, drawing on a range of theoretical sources from Futures Studies and Strategic Foresight (Marsh, McAllum & Purcell, 2002; Fry, 1999; Slaughter, 1999); Fry's (1999) theory of defuturing and designoriented scenario planning (Manzini & Jégou, 2003) which is elaborated elsewhere (Lopes, Clune & Andrews, 2007).

3. The Futures West 2031 workshop and forum

The *Futures West 2031* initiative emerged after we were invited to participate in Tony Fry's Design Futures workshops held over a weekend at Griffith University in Brisbane. This involvement underscored the significance of transforming "the practice the designer inhabits as much as the application of this practice" (Fry, 2009) as well as the considerable challenge of learning to 'think together' in collaborative teams. It is clear that sustainable futures will depend upon collaboration between many divergent disciplines toward common goals.

We invited Dr. Tony Fry to lead the first *Futures West* workshop, and invited participants from varied disciplines within academia, industry, government and the non-government sector all with a stake in the future of Western Sydney. A critical recognition in the planning of the workshop was the importance of designing some way to facilitate participants' ability to design together. Rather than working with a traditional brief, participants were presented with two prefabricated and relatively coherent future scenarios for the Western Sydney of 2031, developed by Tony Fry. Both scenarios addressed the local impacts of global climate change and engaged all areas of focus that emerged from the base-line research. They also represented significant capacity for ongoing biophysical, economic and socio-cultural sustainment. With a view to the region's history, the first scenario envisaged Western Sydney as the 'new' Sydney 'food bowl', both generating and supplying sustenance within the region and utilising existing rail infrastructure to transport food to Sydney and compost out, with a proposal for extending farmers' markets along the rail line.

The second scenario was based on the idea of the 'unsettlement' of human populations as a key consequence of climate change (Fry, 2009). This scenario envisaged a significant influx of environmental refugees into Western Sydney in the future, generating the need for rapidly constructed sustainable cities and the means for creating homes and starting new lives in unfamiliar places.

The group was briefed on the scenarios and then put into teams, each with a designer-visualiser whose role was to synthesise the idea-generation process into visual concepts and storyboards. Teams were invited to pull these scenarios apart, reinvent them or throw them out and start again, as long as another was put in its place. The key design task was: how could these scenarios be made better, more realisable and more workable? A series of questions were posed to assist the process: What are the existing 'enablers' and 'disablers' of change? What is flowing out and what is coming in to the region? Where is there excess capacity and where are the hotspots of limited resources? These orienting questions recognize that design is energetic – it has creative and destructive potential. Design concepts therefore needed to be presented in a way that shows this; design not as object, but as a structuring process that responds to anticipated problems which may not yet have arrived in the public imagination. This represented a significant creative challenge.

More reflectively, we were challenged to optimize the creative capacity of the moment. What means could be designed by these teams working together in this intensive way, within the limitations of a weekend workshop? And would we be prepared to take responsibility for what we designed; to bring it into being? While many good ideas emerged as a result of the team work, it was felt that one weekend was not enough to capitalize on the richness and substance of the internal team dynamics. The experience was exhausting but really highlighted the exhilaration, pain, difficulty and necessity of learning to work together.

A strong lesson of the weekend was that there are various initiatives spread out across Western Sydney, and even within the University, that could be and should be learning from one another and building upon each others' capacity to enable change. Research projects developing new knowledge in much needed areas, farming communities changing their practices to be far less resource intensive, food initiatives employing and experimenting with alternatives to the industrial system of supply and demand, manufacturers retooling for more sustainable outcomes and even manufacturers wanting to initiate product-service system solutions, but without the means to explore how this might be effectively done. In this regard design could work as an enabler to build connections between these dispersed projects.

Elaborating on the scenarios with design ideas was straightforward and a task that the designers present embraced. To take responsibility for our designing and to create immediate starting points for the scenarios was far more challenging and led us frequently to the recognition of the unique position of the University and its capacity to identify, leverage and support the region's innovation.

4. **Project result dissemination**

The outcomes of the workshop were presented at the *Futures West 2031* forum to which a range of guests from industry were invited. The most promising workshop proposal offered a strategic vision of a reinvented university that could enable the region to learn to change in response to the coming conditions of the future. This vision was elaborated in four key roles that our particular university could play.

5. The Applied Research and Knowledge Hub (ARKH)

5.1 Snapshot of regional expertise and resources

In order to respond to the need to have a better and more accessible picture of the existing resources of the region, we thought the university could play an important role in creating coherent pictures of regional expertise. This was conceived as an auditing exercise, which could be performed as part of research training curricula.

5.2 University as Knowledge Hub

The interdisciplinary expertise of the university could be mobilized in direct response to problems that are being experienced by people in a scattered and fragmentary way. In this sense, it can act as a place of the reception of problems that can be developed into briefs and actioned in curricula, in on-site demonstration and research projects or regional research partnerships. In applying ourselves to real community problems, we learn how to deal with them and as a region take leadership in adapting to changes. This idea has been explored by Penin and Vezzoli (2004) in a European context, in which the 'peculiar community' of the campus functions as preparatory ground for the dissemination of change strategies. Our proposal views the university as more of a conduit for community relationships, as a hub and repository of shared knowledge.

5.3 University as Risk Absorber

There could be change initiatives that members of the regional community would like to explore, but they may be perceived as too risky or time intensive. The university could be the ideal place to do this exploration, to roll out community pilot projects and trial those ideas – such as the product-service system design for the local manufacturer mentioned above – as part of our core business of knowledge generation. In this capacity the hypothetical status of the university is more properly embraced.

5.4 Information Visualiser

Finally, the university could have a role in creating regional snap shots of how we are travelling as a community. These could be in the form of visual attractors, such as the Finnish 'Green Cloud' project which projected the energy consumption of an entire town on the smoke stack of the town's power station, and changed over time according to this quantified consumption (Evans & Hansen, 2009).

This was a proposal that we were certainly willing to take responsibility for – to develop a 'roll out' strategy with community partners. In this respect the university could become a lead agent in the formation of a change community, but not without the participation and input of community partners.

The aim of the Forum was to invite participants into a process whereby design-led *Futures West* projects that are proactive, foresightful and immediately useful could be collaboratively developed. This invitation is to a round table 'brief development' workshop participants prepare for by addressing three questions:

(i) What are your aspirations for the future of your sector?

(ii) Are you currently planning any changes in response to future pressures such as that presented by climate change?

(iii) Do you have any ideas for change in your sector that you would like to explore, but perhaps do not have the time or means to do so?

The ARKH proposal gives these projects an initial place to go – to be fed into research and curricula. As a starting point for the Futures West project, the ARKH provides a platform to explore our other areas of focus including: 1) the future of education, 2) mobility and industry in Western Sydney, 3) energy, water and food security, and 4) the regeneration of public life. These are themes we intend to develop in future events.

6. Sustainable Design Education

A further consequence of the ARKH proposal is the potential impact on design education at our university. A curriculum reflects a proposal for what sorts of graduates are needed. The future context raises questions about what should be taught and how it is taught under the rubric of 'design'. The *Futures West 2031* initiative fundamentally challenges the traditional role of designer as client service-provider by embracing redirective practice. The 'redirective practitioner' is one who becomes practiced in recognizing the consequences of design's energetic potential, and who is able to mobilize

this potential for sustainability: "Redirective practitioners become key team leaders, potentially designing and directing programs of change" (Fry, 2009, p.172).

The ARKH could therefore be the testing ground for the graduate sustainable designer in a region where manufacturing, a traditional destination for the design graduate, is in decline. The development of a reinvented design discipline via curricula would also respond to calls for the university sector to deliver sustainability literacy. Such calls have been international, such as the Talloires Declaration (USLF, 1990), and more locally the green skill shortages have been highlighted in a study by the Dusseldorp Skills Forum and CSIRO Sustainable Ecosystems (Hatfield-Dodds et al., 2008). The nature of the ARKH proposal provides a platform where meaningful links can be developed between research, curriculum, and community and industry engagement.

What the first of the *Futures West* events has highlighted is the unique opportunity in Western Sydney for design futures to be deployed to enhance the relationship between the region and its university in order to advance sustainability as a social learning process. Whilst envisioning sustainable futures is crucial to projecting desirable alternatives, the real creative challenge is to action the scenarios and deliver the means to their realisation. This was the most significant of Tony Fry's challenges to the event participants and one that as design educators in the region we can pursue via community and industry engagement, research and education.

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The Multi Dimensional Scaling: An Interactive Method for Establishing Perceptions of the Appearance of Product

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Abstract

In order to design successful products it is essential to gain feedback from potential users. Normally, this is accomplished through market research that feeds back into the product development process. Market research relies heavily upon two distinct methods, the focus group and the questionnaire survey. The former delivers qualitative information in the form of language, while the latter delivers quantitative information in the form of numbers. Neither fits comfortably with the designers' preferred mode of communication: the visual. In addition, neither method is designed to illuminate fine distinctions amongst the visual appearance of products. Finally, neither involves users in an interactive task that deals directly with the visual, and does so in a way that requires only visual judgements. A method is presented that overcomes these limitations. It derives from the Semantic Differential (Charles E Osgood, 1952), but rather than relying upon statistical Factor Analysis, instead uses a visual field format whereby participants manoeuvre and position products relative to one another in a visual space. The examples presented are from the car and motorcycle industries, with the participants from Australia and Malaysia. The resulting Semantic Differential profiles indicate user perceptions of the products on the dimensions of interest, and the cross-cultural differences in such perceptions. A distinctive feature of this technique is the ease with which similarities and differences can be quickly assimilated and understood.

Keywords: Research method; Aesthetics; User perception; User experience

Introduction

In order to design successful products it is essential to gain feedback from potential users (Engelbrektsson, 2002). This is particularly important for high volume manufacturing and service industries that target users with known demographic profiles. And increasingly, markets are segmented into such demographics and products-services are designed for them. Normally, this is accomplished through market research that feeds back into the product development process (Engelbrektsson & Soderman, 2004). Market research relies heavily upon two distinct methods, the focus group and the questionnaire survey. The former delivers qualitative information in the form of language, while the latter delivers quantitative information in the form of numbers. Neither fits comfortably with the designers' preferred mode of communication: the visual. In addition, neither method is designed to illuminate fine distinctions amongst the visual appearance of products-services.

The shortcomings of traditional methods of market research such as surveys, interviews, questionnaires and focus groups are well known (Hannington, 2003). They have proven ineffective in

providing the type of information required by designers (Griffin & Hauser, 1993). The focus group is by far the most popular and well-established technique in market research (Bruseberg & McDonagh, 2001). Its major advantage is that detailed feedback can be obtained from a small sample of the demographic population of interest, usually around eight to 12 participants. It also has the considerable practical advantages of being cheap to run and requires a minimum of skill to conduct. As such, almost anyone can set up a business conducting focus groups. The disadvantages are numerous, including small sample sizes, dependence upon the ability of participants to verbally articulate their responses, and the capacity of the leader of the group to distil the group's reactions (Pullman & Robson, 2007). Also, the feedback is verbal and not visual. The other most favoured method, the questionnaire-survey, is much more expensive to run, requires data handling and statistical analysis. Its major advantage is that hundreds of participants can be involved, particularly if the survey is conducted over the Internet. Its disadvantages are that it generates statistical analyses that require a high degree of sophistication to understand, and it provides limited insights into visual productsservices. Finally, neither method involves users in an interactive task that deals directly with the visual, and does so in a way that requires only visual judgements.

A method is presented that overcomes these limitations. It derives from a combination of the Semantic Differential (Charles E. Osgood & Suci, 1955) and Multidimensional Scaling (MDS) (Antikainen, Kälviäinen, & Miller, 2003). However, rather than relying upon statistical Factor Analysis as is normal with the Semantic Differential, instead it uses a visual field format whereby participants manoeuvre and position products relative to one another in a visual space. Essentially, it adopts the format of Multidimensional Scaling, whereby products are positioned in a proximities space: the closer together in the space, the more similar the products. However, unlike Multidimensional Scaling, the dimensionality of the proximities space is predetermined. And it is here that the dimensions commonly identified in Semantic Differential studies can be used. Alternatively, different dimensions can be imposed according to the interests of the designer-researcher. While the above may sound complex, in practice it is extremely easy to set up, to understand the output, and participants find it convenient to use. From the standpoint of both the designer and the participant, it requires neither verbal articulation nor an understanding of numbers-statistics. It generates visual output. To illustrate the use of this method, examples are drawn from two doctoral research projects. These focus upon the Malaysian motorcycle and car industries.

Malaysia is unique in both South-East Asia and Islamic countries in designing and manufacturing its own cars and motorcycles. Proton is perhaps its best known brand of car, and this is exported to Europe and Australia (Rosli, 2006). Its major motorcycle is Modenas (Modenas, 2005). Both Proton and Modenas are experiencing difficulties due to the globalisation of trade, leading to greater import penetration into Malaysia's automotive market and increased competition for their export markets. Neither has the financial muscle for product development of automotive giants such as Toyota, Volkswagon, and Yamaha. Inevitably, neither has the financial budget for extensive market research in either Malaysia or in their export markets. In consequence, both are losing market share locally and internationally (Bernama, 2005). While the take-up of new technology in the automotive industry is tangible and easy to comprehend, the acceptability of styling is much more difficult, and particularly when foreign markets are involved. Complicating this further are the demographic shifts in taste that take place whereby a vehicle intended for one demographic in country A may be unacceptable to that same demographic in country B. One such demographic is the emergence of women as a significant market for both cars and motorcycles, particularly in South-East Asia for the latter. This requires major changes in the styling of both cars and motorcycles. For example, in South-East Asia the traditional motorcycle must contend with sophisticated models of motorcycle-scooters that clearly appeal to women. Initially, these came from Japan.

In order to assess user requirements and to establish how they perceive competing models, methods were required that could be easily and cheaply used in different markets. As indicated, the major problem lies in the styling of vehicles, whereby designers require feedback, and preferably in a visual form (Hwei, 2006). The method described here is one of a suite of such techniques being designed for this purpose. To illustrate its use, we present results from both Malaysia and Australia in which both nationality and gender differences are explored. Essentially, we want to know to what extent to which the Malaysians and the Australians share common perceptions, and similarly for gender. Do women and men agree in their evaluations, and if not, where do they differ?

1. The Semantic Differential

The Semantic Differential was developed by Osgood and his colleagues to measure the meaning of concepts, and to what extent such meanings are shared (Charles E Osgood, 1952; Charles E. Osgood & Suci, 1955). It has proven to be a flexible and reliable instrument for measuring attitudes to a wide range of stimuli. The instrument normally employs rating of stimuli by using bipolar scales. Each bipolar scale is defined by a pair of adjectives with contrasting meanings such as Fast - Slow, Cheap - Expensive, etc. The stimuli rated have been wide-ranging from consumer products such as automobiles, household goods, and gardening tools to attributes of objects such as colour. A study of the influence of image congruence on consumer choice obtained significant relationships between the self concept and several automobiles makers (Birdwell, 1968). The results showed a highly significant degree of congruity exists in the way respondents from four groups perceive their cars and themselves. The result appears that automobiles are extensions of the owner's image of self. It also appears that an individual's cognitive structure, their self-image, and their environment are major influences on their perception of automobiles.

Also, study showed some correlation of personality variables with product usage (Tucker & Painter, 1961). The questions included the use of everyday products that commonly purchased by college students. The results clearly indicated that there are relationships between product use and personality traits.

Factor Analysis is normally used to identify underlying communalities amongst the scales employed. The most frequently obtained communalities – or factors – are (1) Evaluation, defined by adjectives such as liked – disliked, positive – negative, honest – dishonest, (2) Potency, defined by heavy – light, strong – weak, hard – soft, and (3) Activity, defined by adjectives such as active – passive, hot – cold, fast – slow.

One advantage of the Semantic Differential is that scales can be used that are specific and appropriate to the object or product of interest. Such scales can help to insure that one taps into particular facets of attitudes that may be important for the specific product (DeSarbo & Harshman, 1985). In product design, semantic differential is a measurement tool particularly used in the fields of product semantics for measuring affective and emotional value of products (Akay & Kurt, 2007). Research by Alcantara, Artacho, Gonzalez, and Garcaa applied product semantics technique to structure the semantic space of casual shoes in order to assess users' perception (Alcantara, Artacho, Gonzalez, & Garcia, 2005). The results showed that comfort and quality were independently perceived by consumers, while comfort was clearly identified by users, quality was not. This research again extended by using semantic differential to assess user's perception of products and the influence of design changes on it. Moreover, research by Shang, Ming and Chien employed semantic differentials to examine the relationship between the subjects' evaluation of telephone samples and form design elements (Hsu, Chuang, & Chang, 2000). Regarding the application of the Semantic Differential in the automotive industry, few studies have been carried out. Malhotra (1981) used the Semantic Differential to measure self-concept, person-concept and product concept, using automobiles that had a distinctive image and were well known to the respondents. Research by Steg, Vlek, and Slotegraaf employed the Semantic Differential for evaluating unattractive aspects of cars (Steg, Vlek, & Slotegraaf, 2001). In a related field, a similar method called the Semantic Environment Description has been specifically developed for architecture and car interior analysis (Karlsson, Aronsson, & Svensson, 2003).

In cross cultural research, the Semantic Differential has proved particularly valuable for examining attitudes in different cultures. One advantage is that the bipolar adjectives chosen can be directly translated into the relevant language. Because of the short words and ease of use, they normally translate well into other languages (Shields, 2007). As early as the 1960s, a number of cross-cultural studies were conducted. For example, Tanaka and Osgood (1965) investigated affective meaning

systems. In this study, perceptual signs were used and the generality of the affective meaning systems was tested across three different subject groups, namely Americans, Finns and Japanese. In another study, Lorimor and Dunn (1967) measured the effectiveness of cross-cultural advertising with French and Egyptian respondents.

2. Method

A total of 32 subjects participated in the study, consisting of 16 from Malaysia and 16 from Australia. They were given two identical tasks, one involving motorbikes and one involving cars. The stimuli were pictures of motorbikes (Figure 1) and cars (Figure 2). The participants were asked to position the product pictures on the visual axis of a plot that was proved.

The first plot used an Evaluation axis consisting of like – dislike and a Social axis consisting of cheap – expensive, positioned orthogonal to one another. The second plot used a Potency axis, strong – weak and an Activity axis, slow – fast. The results from each participant were combined into the mean position for each of the stimuli. They are shown on the respective plots.



Figure 1: Pictures of selected motorbikes



Figure 2: Pictures of selected cars

3. Results

3.1 Motorbikes

Plot 1 (Figure 3) and plot 2 (Figure 4) presents the results for the Evaluation and Social factors by Malaysian and Australian participants. Malaysian participants exhibit less agreement than the Australians for both factors. This is shown by the degree of scatter around the axes. There is however strong agreement that the scooters are cheap and disliked. This contrasts with the perceived expensiveness and liking for motorbikes. Unsurprisingly, motorbikes with an engine capacity of more than 200 cc were rated as expensive, with Italian motorbikes being most expensive and most liked. Bolwell's *Sym* scooter was highly evaluated and outperformed the other scooters. This may reflect the design which was retro and mimicked Italian styling (Johnson, 2006). In contrast, Modenas's scooter *Karisma* was rated as cheap and disliked.

Plot 3 (Figure 5) and plot 4 (Figure 6) presents the results for the Potency and Activity factors by Malaysian and Australian participants. As with the results above, the Malaysian participants exhibited less agreement than the Australians. There was agreement that scooters are weaker and slower than motorbikes, and also that the Italian motorbikes were faster and stronger. Into this category also came the Honda *DN-01* and Harley Davidson. Modenas's scooter *Karisma* was consistently rated as slow and weak even compared to the other scooters.



Figure 3: Plot 1 - Evaluation (like-dislike) and Social (cheap-expensive) -Malaysian Participants



Figure 4: Plot 2 - Evaluation (like-dislike) and Social (cheap-expensive) -Australian Participants



Figure 5: Plot 3 - Potency (strong-weak) and Activity (slow-fast) - Malaysian Participants



Figure 6: Plot 4 - Potency (Strong-weak) and Activity (Slow-fast) - Australian Participants

3.2 Cars

Plot 5 (Figure 7) and plot 6 (Figure 8) presents the result for the Evaluation and Social factors by Malaysian and Australian participants, and plot 7 (Figure 9) and plot 8 (Figure 10) the results for the Potency and Activity factors. By combining them it is clear that both Malaysians and Australians regard the luxury makes of Ferrari, Mercedes Benz, Volvo and BMW as strong, fast, expensive, and preferred. Malaysian and Chinese cars fared poorly and occupied lowly positions on each factor. Interestingly, the latest car export from China, the low priced *Cherry*, was perceived as weak, slow, cheap and disliked. Given its expanding sales in Malaysia, its price appears to compensate effectively.

Two cars that Malaysia exports to Australia are the Proton *Waja* and *Savy*. The *Waja* received a uniformly negative response from the Australian participants, while the *Savy* fared much better. Although the *Savy* was seen as cheap, weak and slow, it received a higher like rating. This may reflect its adoption of retro Italian styling.



Figure 7: Plot 5 – Evaluation (like-dislike) and Social (cheap-expensive) –Malaysian Participants



Figure 8: Plot 6 – Evaluation (like-dislike) and Social (cheap-expensive) –Australian Participants



Figure 9: Plot 7 - Potency (strong-weak) and Activity (slow-fast)
- Malaysian Participants



Figure 10: Plot 8 - Potency (strong-weak) and Activity (slow-fast) – Australian Participants

4. Discussion

The purpose of this pilot study was to assess the feasibility of using this technique to gain insights into products. Effectively, is it a meaningful task for participants to position products within a two-dimensional space characterised by two orthogonal scales? Furthermore, is the task meaningful cross-culturally; in this case to both Malaysians and Australians? For the task to lack meaning there would be a fairly random spread of products (cars and motorcycles) within the two-dimensional spaces. Instead, there is a clear pattern of placements that makes intuitive sense. For example, we would expect the likes of Mercedes Benz and Ferrari to be positioned high in expensive and Chinese imports low in expensive. On the basis of earlier research using the Semantic Differential we would also anticipate higher agreement amongst participants for the Potency-Activity factor than for the Evaluation-Social factor. From inspection of the plots this is apparent for both Malaysians and Australians; that is, the spread within the space is less for the Potency-Activity factor than for the Evaluation-Social factor. That the above effects occur for two distinct products, cars and motorbikes, gives further confidence in the meaningfulness of the task. The presence of such effects for the two distinct national groups, Malaysians and Australians, lends further weight.

The next stage of the research is to develop software whereby the participant can 'click and grab' individual products and locate them within a digital space. The dimensionality of the space can be quickly configured to incorporate a range of factors such as those used in this pilot study. Such factors can be tailor-made according to the product category and the interests of those commissioning future applications. Finally, the software will identify the position where each product is located in the space and provide numerical coordinates corresponding to the factors underlying the space. Theses coordinates will be amenable to analysis by such statistical packages as SPSS. The output therefore will consist of both graphic representations as illustrated in this paper and statistical analyses that will enable more specific questions to be answered. The power of both Factor Analysis – the normal accompaniment to such a task – and Multidimensional Scaling can then be harnessed.

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Spatial Conceptions

Cross-disciplinary research situated at the intersection of space, furniture and human activity.

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Abstract

Generally speaking, the field of furniture design is based on a limited conceptual framework: furniture is framed as a set of conceptually detached and typologically predefined objects.

The present study amalgamates architecture, furniture and industrial design in a programmatic attempt to address current changes in spatial culture. The study subsumes fieldwork and theoretical reflections in areas as diverse as education, health care, workspaces and the home.

Results suggest that new demands are emerging in every one of these fields. All of these demands pertain to increased dynamics in daily changes in human activities. These demands challenge well-established categories of material culture and the constructed environment and they point toward the need for increased flexibility.

On this basis, a new theoretical foundation has been developed. This foundation as well as the curriculum derived from this basis are conceptually open. They focus on semi-mass-customizing, small-scale, specialized and sub-supplying industries – and frame *furniture* as the major link between body, space and activity.

Keywords: furniture design, interior architecture, architecture

1. Introduction

Material culture, or the man-made world of objects, can be regarded as an eco-system – as the (artificial) ecology of artifacts (Krippendorf, 2006). In this realm of artifacts, objects define and occupy niches that have meaning for users and they do so in relation to other artifacts which, in turn, occupy their own respective niches. As in the 'real' eco-system, niches might stay open for some time but they eventually become closed by other (or new) artifacts that take over their function, or a new artifact might create niches for yet other new artifacts to grow. The history of material culture is rich in examples, some driven by technological innovation, others by cultural changes: The invention of

the car took the wind out of saddle-making but it certainly gave rise to a need for gas stations. The invention of the computer might have made typewriting superfluous and redundant but it certainly created new demands for software and printers. Changes in work-life and body-culture created needs for gymnastic equipment and the like: needs that are new to us.

Furniture belongs to a slow-moving category of artifacts – archetypes (Sudjic, 2008) – that adapt nevertheless to changes in, for example, body culture, technological developments (in other fields) and so on. The niche occupied by furniture is situated between two other elements of artificial ecology: on one side, the environment – space, or the architectural realm – and on the other side, manufacturing technology – the materials and processes available for the making of furniture (Brix, 2008). Furniture is employed in the context of space and is produced by means of technology. The third component of major importance to furniture is the cultural aspect: the activities we wish to have accommodated in space.

2. Spatial context

Articles of furniture are plastic objects used as mediators between physical space and the human body. They take over where the architectural realm leaves off and they supply functions that space itself does not provide. This shared affordance (Gibson, 1979) with architecture is a constituting fact of furniture.

The functions or activities for which a specific space is designed are always resolved in a relationship between fixed and mobile elements. The surfaces of the room as well as the various items of fixed inventory are immobile features, whereas articles of furniture and related objects are mobile and can be rearranged by users. Some functions are associated with or resolved by the shape of the room while others are linked to or resolved by the mobile elements.



Figure 1: This room, inside a school designed by architect Herman Hertzberger, illustrates the principal interlocking of space and furniture: When the furniture is put away, space emerges. When the furniture is put to use, the form of space organizes activity (notice the recess in the floor).

Usually, the relationship between what is solved in the fixed and what is solved in the mobile is based on convention and habit – and in many cases, excellent solutions are attained. However, greater clarity and creativity in the assigning of functions to either the fixed or the mobile realm might open – and give rise – to richer interactions. Consider, for example, the shop design by architect Rem Koolhaas for Prada illustrated in figure 2. The form of the space – featuring a stepped recession in the floor – is multifunctional: the various uses are supported by a series of sliding elements. The configuration of the shop can be changed, as it were, from being a space for daily use to a space for events (see figure 3) by moving the sliding elements, respectively, to accommodate the desired form of space.



Figure 2: Two configurations of the movable elements (showing the fitting rooms, display units and light and sound equipment).



Figure 3: Two uses of the recessed stairs: event and display, respectively.

When addressing questions of flexibility of space and furnishings, considerations regarding the relationship between the fixed and the movable seem to generate a promising implement. This idea can be regarded as a variant of the generally accepted architectural adage that tells that flexibility of space can be achieved through two overriding strategies: one being to design so generically that space becomes multifunctional and the other to design everything so that it is movable and re-configurable. The distinction here can be illustrated by Verner Panton's designs, as shown





Figure 4: Furniture designs by architect Verner Panton, providing flexibility by means of fixed, generic surfaces (left) and by means of movability (right).

in figure 4.

These examples reveal that the relation of the fixed/generic on one side and the movable/adaptable on the other is being put to use in current design efforts to generate spaces of increased flexibility. The relations and elements discussed thus far have been gathered together in figure 5.



Figure 5: Elements of space and furniture. The conventional/ordinary/usual dichotomy is blurred in the middle.

While these elements are new tools for flexible environments, changes in human activities, social organization and cultural habits are the very materials for which the tools eventually prove to be relevant or not. Let's consider, then, how such changes currently impose new needs on human environments.

3. Furniture in the context of human activity

Furniture supports people in their desire to perform and engage in different activities, whether socially or solitarily. The character and demands of these activities constitute a fundamental feature of the 'program of furniture' – i.e. what furniture ought to supply for us. This may sound trivial; furniture, of course, has to accommodate sitting or lying, dining or sleeping. But when studied in detail, the formulation is far from trivial – in fact, it is quite complicated. Human activities change rapidly and more than ever, pre-assumed 'functions' are becoming mixed.

We can see this happening in:

3.1 Rooms for education

New pedagogical approaches to the education of children and young people call for cross-disciplinary and differentiated approaches to teaching (Robinson, 2001). Accommodating this is a difficult task; it may even be impossible within the existing physical frames. The classic classroom – regarded as an institution for years – has now been retired; instead, we need multi-functional spaces that will be able to handle diverse activities simultaneously and will enable rapid changes in diverse settings.

Contemporary theories of education suggest that the way we have been considering intelligence until now has been far too narrow. For many years, analytical and intellectual approaches to teaching have been assigned precedence in favor of the more creative regions of the brain. There is much to suggest that creativity needs to be reinforced and challenged. This will require spaces that can be constructed and reconfigured by users and for the situation. The classroom should perform like a theater-room, with props and scenery, fostering the capability of adapting to rapid changes of the stage set-up.

The sketch in Figure 6 shows a concept for a classroom in a primary school. It suggests that the usual, mechanical 'up-march' manner of alignment of chairs and tables could be exchanged with 'places' in space: places for individual work (niches), places for joint activity (squares) and places for workshop activity. The movable cart marked 'event' could hold paraphernalia related to the study of physics, biology or music, etc. Instead of requiring a permanent room, items associated with these subjects are simply rolled onto the stage. This line of thinking could free up the space in the plan-layout of the school. Specific space becomes generic and function is assigned to a set of objects (carts) instead of different rooms.



Figure 6: In schools, rooms usually assigned to and equipped for specific subjects like biology, physics, etc. can be converted into movable objects, bringing the subject as an event into the generic space of the classroom. In this way, space accommodates rapid, spontaneous changes in activity as well as the diversity and differentiation of groups in the class. Sketch: Anders Brix.
3.2 Rooms for health care

Increased knowledge and technical capabilities are making it possible to treat more and more different kinds of illnesses, resulting in a never-ending demand for resources. Recent focus on this issue has opened a discussion on ways to optimize the use of resources and a discussion about whether or not untapped resources can be found in the patients themselves, in their relatives or in the physical environment.

The traditional hospital is organized around medical expertise. Patients are being moved around a lot. However, current discussions are breaking down these silos and motivating a shift in the paradigm from 'expertise' as the organizing principle to a greater emphasis on the patient and the patient's experience. This has been found to prove beneficial in terms of faster healing which, in turn, saves hospital time and costs (Ulrich and Zimring, 2004). Segments of the treatment can even be re-located to the patient's home, resulting in new interactions between hospital rooms, medical items and rooms inside individual homes.

In the future, spaces for health care will need to allow the spaces to change according to the patient's needs instead of requiring patients to adapt to the space: spaces are thus going to need to have a high degree of flexibility.

3.3 Rooms for meetings

Conferences are typically organized in such a way that several different types of adjoining rooms are requested by the organizers – even though it seems that, as things come to pass, half of the rooms are almost always empty: participants meet in plenum inside a large conference room, which is often furnished with immovable chairs. After a few introductory presentations, the participants split up into smaller groups and move off into a series of smaller rooms to work, leaving the auditorium empty. After some time, they meet up again in plenum, leaving the group-rooms empty.

If one large, generic room could be furnished and equipped to accommodate both plenary discussion and group work, the demand for space would, in theory, be halved.

Such an approach raises a series of questions, since the functions of the specific rooms would have to be solved by objects instead of spatial layouts. Certain kinds of moveable screens or the like would presumably be necessary; these would have to satisfy the acoustic demands of group work. The different lighting associated with plenary versus group work would have to be taken into account and accommodated, perhaps, by battery driven LED lights that could be moved freely. The tools – black/whiteboards, pens and stickers, etc. – usually supplied in group-rooms would also have to accessible. And tables and chairs would have to be moveable, adjustable and adaptable.

All of these new design tasks have solutions, though. Two potential benefits of finding new relations between objects and space in this field would be conserving space and increasing the conference's dynamics and sharing of knowledge.



Sketch for a temporary meeting room formed in textile. The tent is hoisted to the ceiling when not in use. Sketch: Anders Brix

Figure 7:

3.4 Rooms for living

Our homes have become 'mini-worlds' connected to the global network. We are not necessarily tied to a certain geographical location to perform our work; we can choose to work at home. Households are increasingly becoming diverse and subject to change as the incidence of mixed families and single living expands.

Such changes serve to render the home more porous as the distinction between the public and the private becomes blurred, and these changes introduce new demands for flexibility in both the short-term and the longer span of time. A single parent working at home, for example, requires a domestic environment that is capable of fluctuating rapidly between fulfilling personal and professional roles – for example, between preparing meals for the family and preparing a set of client reports (Sanders, 2008).

These functional demands give way to new expressions and possibilities in furniture. Furniture does not necessarily need to be designed to fit into rooms with specific functions like the living room or the dining room. Functions can freely overlap from one to another and this 'functional merging' could be reflected in more open and generic furniture.



Figure 8:

Sketch for 'seamless living.' Design: Linda Korndal.

3.5 Open source environments

In all these different fields of human endeavor – teaching, caring, meeting, working and living – new demands for multifunctional, adaptable environments arise: environments that can enable sudden shifts in activities and in the social as well as the spatial organization.

Borders are becoming more and more blurry. Activities cross and overlap. Formerly rigid typologies mutate and are superimposed on top of each other.

4. Furniture in a technological context

In the ecosystem of objects, the manufacture of furniture is facilitated by and restricted to available materials and production technologies. In the historical tradition of furniture design, few materials and technologies were considered. Today, furniture technologies offer a large array of different approaches.

Methods of production and materials suited appropriately to manufacturing furniture are complex. Furniture consists of elements that are larger than what most of the tasks in industrial design work with – and, for that matter, what most sub-supplying industries, that characteristically fabricate machine parts of some kind, work with. Moreover, it is often the case that articles of furniture are manufactured in quantities that are smaller than what industrial design work generally produces. However, furniture production is more industrialized than are many architectural objects, which are generally produced for a specific building in a limited batch series.

That is to say, furniture is an overlapping technological field. It is hardly substantial enough – or sufficiently coherent in terms of the materials and methods supplied – to generate a technology of its own: a technology that would be tailored to this class of objects. That being said, the field of furniture production is substantial enough to support the hybrids/crossings of technologies from adjacent fields. Furniture is accordingly a testing-ground and a hot-pot for new approaches to materials and

technologies. The fact that furniture is used in direct relation to the human body as well as the fashionlike focus on furniture's form corroborates this. Programmatically equivalent objects – like chairs – can be produced in materials as diverse as wood, plastic, textile, steel, aluminum, glass-fiber, carbonfiber and so on.

Business strategies and strategies of production are subject to change. New materials and technologies arise and new economic structures emerge. In the furniture industry – as in many other industries – this had led to outsourcing and to the situation that many 'producers' of furniture do not actually produce the items themselves. For the teaching of technology and for the knowledge necessary for a designer to get started working with furniture, new knowledge is required.

Because of these trends in businesses (outsourcing) and these characteristics of the scale involved (physically and industrially), furniture technology is going to have to seek out sub-supplying industries and look for niches and ways to side-step materials, methods and technologies.

5. Conclusion

The field of furniture design is changing rapidly and is merging increasingly with the fields of architecture and industrial design. New approaches are needed to address the demands of a changing culture. And furniture is central and crucial in the effort to enable the organizations and the life-forms of the twenty-first century.

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Teaching Teachers: Learning through Graphic Literacy

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Abstract

Graphic design education has a long history of practitioners leading the development of teaching environments. While these practitioners may develop innovative teaching methods during their educational career, many will never engage with the discipline and literature of pedagogy.

Ramsden (2003) asserts that pedagogical principles can help create deeper teaching/learning environments, but this research is all too often disseminated in a lexicon that is not familiar to new graphic design teachers. The research just does not get the message across to those who could benefit most from it.

It is time to take our skills as excellent visual communicators and use them to help translate this research for the graphic design community. This paper will discuss how graphic literacy can by used to help facilitate pedagogical awareness to new graphic design teachers.

Keywords

Graphic Design, Pedagogy, Design Research, Graphic Literacy

(1) The Problem

"Changing students' approaches to the subject matter they learn is the key to improving their learning...in turn, the key to improving teaching is changing the way in which the process is understood by its practitioners" (Ramsden, 2003).

Throughout its history, graphic design education has had an inconsistent relationship with pedagogical theory and principles. Early educators positioned graphic design as a trade activity (Buchanan, 1998) and schools were formed around 'commercial art' skills required for practice. Many educators followed a 'master and apprentice' teaching model; relying on their own experiences in practice to educate neophyte designers (Thompson, 2006). A substantial pedagogical shift occurred in the 1980s as educators started to introduce concepts from other disciplines such as sociology, literature and architecture to help students analyse and discuss how design was developing within practice (Heller, 2006). Semiotics and deconstruction were employed as approaches to enable more critical engagement with graphic design's use of aesthetics and function (Heller, 2006).

At this time theory also became an important part of graduate studies that helped fuel the design language. In the late 1990s, the movement of authorship started to advance graphic design from being a trade activity towards the notion of using research to justify design solutions. Educator Steven Heller argues that authorship enabled educators to help students break away from the conventions of graphic design with the aid of the desktop publishing revolution because the movement described designers as creators, rather than merely 'stylers' of artefacts (Heller, 2006).

Looking back to the 1970s, graphic design institutes began to multiply, especially in North America and Europe. Decreasing enrolments in the fine arts fuelled institutions to market towards the graphic design sector and enrolments have been increasing ever since (McCoy, 1997). Unfortunately for this new wave of students, the limited number of qualified teachers became a problem.

Many institutions hired, and still hire recent masters graduates with little professional experience to teach entire programs (McCoy, 1998). At the same time the number of 1-2 year design programs increased, claiming to teach graphic design while in reality only teaching software skills. This was partly due to the desktop publishing revolution starting in 1985 where the accessibility of software and reproduction technologies led to a great shift in practice but also created difficult challenges for graphic design educators. Now everyone could become a graphic designer! Educators were suddenly forced to incorporate an increasing range of technical software skills in their graphic design curricula to keep up with the 'design' skills of the public. The professional role of the graphic designer, printer and publisher became blurred and anyone with a computer, a layout program and some templates could produce a brochure, a catalogue or create a logo (Garland, 2005). For practice, this revolution also changed the expectations of clients. The quality of a design was now in the hands of a non-designer and its value shifted in the eyes of the client. Educator Meredith Davis (1997) explains that some clients could not see the difference between an educated graphic designer and non-designers' work and clients were not willing to pay for the difference.

While some educators and institutions believe that the education of graphic design students should transform and focus more on changes in social and communication environments, many design schools continue to promote the ideology of desktop publishing as graphic design. This has led back to a situation where graphic design curricula is informed primarily by technique and an increasing amount of new teachers are unaware of preceding theoretical dialogue, or teaching and learning principles that can aid in the development of positive learning environments. Consequently, even if some teachers want to engage more critically with their students and curriculum, they find it difficult to encourage process-led enquiries and deep learning approaches in the classroom.

How are we to facilitate this pedagogical awareness to educators? This paper discusses how graphic design can use its expertise in visual communication to communicate pedagogical theory and principles to support better teaching and learning environments. The research focuses primarily around how the visual language of comics can be used to communicate pedagogical situations & scenarios that may be more easily understood by graphic design teachers with little spare time for professional development. We describe a series of comics that draw on pedagogical research and insight gleaned from reflective teaching practice in order to demonstrate how theories of teaching and learning could be accommodated into graphic design curricula.

(2) Research and Pedagogy

In the late 1990s educational theorists such as Sharon Poggenpohl Helmer, Linda Drew and Paul Nini raised their voices to the call of research methodologies in design education and practice (Throop, 2006). Practice was calling for graduates to be able to solve complex communication problems that went beyond technical skills and precision form making. These educators did research on the importance of research methods, many of which come from the humanities and social science disciplines, and discussed why their implementation is crucial for graphic design education. In undergraduate design education, studies have shown that research methods within enquiry-based learning facilitate cognitive learning outcomes (Shreeve, et al, 2004). Institutes such as the Ohio State University communication design department adopted user-centred research within their undergraduate curricula to help develop design processes through the involvement of a greater number of stakeholders in teaching and learning projects (Nini, 2004). Thus, research methods are helping shift the idea that graphic design is not only the communication of image and text but also carries the ability to help develop strategic solutions in complex environments.

Hattie and Marsh (1996) discuss the strong link between research and teaching and how research can lead to the stronger development of good teaching practices. Increasingly graphic design programs are integrating design research in their curricula because it helps students develop process-orientated knowledge within a design problem. Research also allows students to view design problems within a complex environment where different skills are needed to visually communicate possible solutions.

(2.1) How does research help teaching?

Research methods such as human-centred enquiries, literature reviews, reflective practice and ethnography have become part of the learning activities within graphic design institutes. Enquirybased learning methods have helped students become more responsible for their learning because the process is student-centred, thus students develop knowledge through experience (Drew, 2007). Through these research methods, graphic design students can widen their understanding of design and help drive more process oriented outcomes.

It is not just research integration that can help facilitate a good learning environment. Since the late 1970s, educators and researchers have been highlighting aspects of pedagogical principles and theory. In 1976, Ference Marton and Roger Säljö (1976) introduced the idea of surface and deep approaches to pedagogy. They discussed that these two approaches were not personality traits or learning styles but different approaches that students may adopt depending on their perception of the task. The same students can adopt either a surface or deep approach to different tasks and swap between the learning styles. It is also important to note that teachers also may adopt either of these 'styles' within their teaching activities. Through casual discussions and interviews with educators in both public and private graphic design institutions, there were many teachers who did not understand specific pedagogical terminology such as "surface and deep" learning but they did recognize the concept once explained. They could also pinpoint and visualize scenarios that depicted various teaching and learning approaches.

What are surface and deep learning and teaching approaches? Educator Paul Ramsden discussed how deep learning involves the critical analysis of new ideas, linking them to other concepts and principles and the theorizing of abstract relationships to be used in problem solving and process- orientated skills. Surface learning is even more recognizable especially in recent graphic design enrolments because it describes how students unconditionally accept and memorise theories, principles and practices without the discovery of their meaning. "Surface learning leads to superficial retention of material and does not promote the understanding of knowledge long-term" (Ross, Bell, 2007). Many new and established graphic design teachers can spot a surface approach right from the first class. While identification of surface learners is important, the difficult task is helping students make the transfer towards a deep approach and the design of the teaching and learning activities to facilitate this transition.

(3) The Role of Graphic Literacy in Education

Recent studies have found that, the use of visuals in teaching can result in a greater degree of learning (Stokes, 2001). Educator Susan Stokes also states that "visualisation helps make sense of the data that may have seemed previously unintelligible." Many disciplines, especially the social sciences have found that the use of the graphic language to communicate complex information is a method that increases the facilitation of learning. Even business has seen the value of the graphic language. Johnny Bunko (Pink, 2008) is a bestselling business and career guide delivered in Manga format. Its author Daniel Pink, describes the format as quickly accessible and a method of visual literacy that captures the attention of the audience immediately at the same time communicating strategic theories otherwise lost by its complex formation.

"I'm not going to tell you all the answers but I will help you see them for yourself" (Pink, D.H., Johnny Bunko, 2008)

Comic books and graphic novels have been increasingly incorporated into teaching and learning materials because they promote multi-modal literacy (text and image) (Jacobs, 2007). Scott McCloud's seminal text, Understanding Comics is a required reading in some design foundation courses. Visual literacy encourages a critical engagement of the text and creates a cognitive learning environment (Yannicopoulou, 2004). Comics have moved from being marginal and labelled as detrimental to learning towards a tool that encourages deep learning. Scott McCloud (1994), states that cartoons resemble our non-visual self-awareness, we inherently identify with them, whereas we react to a more realistically drawn character as being apart, other from ourselves. He also describes that cartoons are conceptually closer to words than realistic portrayals are, and therefore words and cartoons are closer to a 'unified language'.

Using comics and graphic literacy as a way to engage educators in an awareness of pedagogical principles may be a logical step in the development of graphic design education. The comic may allow for the flexibility needed in the hypothesizing of various teaching and learning scenarios that tie in directly with key pedagogical literature. Through the visual sequencing, and development of narratives they also create a familiarity with educators and encourage deep teaching approaches (Biggs, 2003). Gene Yang's (2003) online guide Comics in Education embodies a thinking that is typical of many educators who advocate the use of comics. Yang claims that the educational strength of comics is that they are motivating, visual, permanent, intermediary and popular. However some educators feel that the use of comics as merely a stepping-stone to the acquisition of other higher skills is limited (Jacobs, 2007).

There is an increasing role for educators to prepare visually literate learners. Contemporary culture is dependent on the visual but more importantly; students need to have the capacity to communicate instantly and universally (Metros, 2008). With culture being constantly enriched through the visual language including social networks, the web, photos, video and motion graphics, more institutions are re-evaluating their curricula to include visual literacy requirements. The idea here is that students learn to deal intelligently with graphic and visual literacy in a manner that they are able to use them as a parallel method of communication.

Many students lack a vocabulary of vision that supports them to communicate non-verbally and to express themselves visually. While in the faculty of communication design, we pride ourselves in the development and nurturing of this very ability, we do not share it with others. Perhaps visual communicators can take their knowledge and help other disciplines to communicate more clearly. Design students have the ability to analyse, interpret, create and compose visual images using strong communication methods that are necessary today.

(3.1) But why Visualize?

Hicks and Essinger's (1991) research into cognitive science suggests that users prefer visual displays of information rather than verbal descriptions. Studies also reveal that "visualisation" reduces the cognitive load by simplifying meaning and providing clarity to complex concepts. Although here it is important to note that the ability to "visualize" and understand graphic/visual images is not a matter of solely simplification or "dulling" of a highly cognitive concept in order for an easier translation. Being graphically literate creates new paths for students to design multi-modal communications, which would be otherwise missing, in many learning situations.

Comics and graphic novels provide a framework for the facilitation of multi-modal literacy, which can be used as a tool in teaching to engage students and teachers with the skills necessary to understand systems of knowledge (Jacobs, 2007). They also provide teachers with an environment to explore various teaching methods, principles, theories and ideas through a narrative re-enactment of their own teaching experiences. Not only can they be used as a tool to engage educators in using a literacy common to their practice but also may be used as a reflective space where teachers can better understand their own perceptions and conceptions of the learning environment.

(4) Following, are links referencing the application of graphic literacy to communicate pedagogical theories including:

- the principal of constructive alignment
- how teaching and learning activities can help in curriculum alignment
- how well developed assessment can initiate a deeper approach to learning

(4.1) The Aligned Curricula

Biggs (2003) describes constructive alignment as a method where students build their knowledge through the manner that they approach the learning activity and that the intended outcomes need to be present in the teaching/learning activities and assessment to see if the outcome has been achieved.

One of the major steps in building an aligned curriculum is understanding the surrounding forces that affect its design and implementation. Forces may include institutional criteria, teaching and learning support within an institution, departmental/institutional perceptions of the learning environment and the physical teaching environment.

Please view page (19-39) at: http://issuu.com/designteachers/docs/gdt

(4.2) Teaching and Learning Activities

Many new or sessional teachers in private colleges seem to be the backbone of the teaching of technology related courses. For the unexperienced, this may cause the educator to rely on tutorials as the method of transmission because of experiences in their own education and because of institutional pressure of technology related graduate capabilities. For many sessional teachers a whole re-structuring of a program or even a curriculum might be entirely out of reach but there are ways through modifications in TLA to help students learn technology through active problem solving that treats technology as a partner in the design process.

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(4.3) Reflections on Assessment

Graphic design education has been predominately a practice-based, project-based format with few, if any, formal examinations (Ehmann, 2005). This has caused some pedagogical problems with the learning framework and has neglected the importance of a well-designed assessment (Davis, 1997). Consequently, outcomes have concentrated on the artefact rather than the process of learning. This may have been acceptable in the early days of design as a commercial art but if we are to challenge students to be capable of handling today's complex social and global problems and at the same time help transform practitioners to be excellent communicators then a different approach to learning is needed. Although artefacts are important, the 'final project' must be placed in a realistic context for an increase in student participation and learning (Brew, Boud, 1995). A well developed assessment can initiate a deeper approach to learning where students are encouraged to discover new possibilities and reflect on their actions, rather that apply a surface approach to please the teacher (Gibbs, Thompson, 2005).

Please view page (73-85) at: http://issuu.com/designteachers/docs/gdt

(5) Institutional Support

With large numbers of casual teachers in study-abroad programs, institutions need to create teaching and learning support systems to help facilitate better learning environments. In a recent response, one director of a private college stated that pedagogical approaches are not discussed amongst staff nor is there any teaching support at the institution because of the short learning time for the students, How then can casual teachers be introduced to pedagogy in an explicit manner that is essential for helping facilitate good learning in design education?

Unfortunately, through experience as a casual teacher within the private sector, few external organizations aid in any pedagogical support. Various graphic associations do provide information on teaching through seminars, blogs and journal articles but there could be a greater effort in this communication towards casual educators who begin their teaching experience from practice environments and are not within any research culture. Commonly, practitioners learn how to teach by using their knowledge of practice to help create learning environments, developing pedagogical methods along their career. This knowledge gap could be lessened through the communication of pedagogical principles that can help create a foundation to their teaching practice.

Information from graphic associations and educational theorists is often discussed and disseminated using a language that is not familiar with new/casual teachers. The onus is often on the teacher to discover and reflect on the issue. Although there are many graphic design university environments where a pedagogical culture is richly supported, there are still thousands of design students that graduate each semester from institutions where teaching and learning principles are not adequately considered. Ideally, a pedagogical foundation of learning and teaching within graphic design education may be set as universal information for all institutions; graphic literacy can be used to create (and communicate) a pedagogical foundation for casual design teachers in both the private and public sector.

(6) Moving Forward

It is time to take our skills as excellent visual communicators and use them to help the design education system. Typically pedagogical texts are written in language that is not commonly used in design education. This makes the knowledge quite inaccessible to many new teachers. Although graphic design has had difficulties in translating the pedagogical lexicon to its context, it could use its expertise in the visual language to help create a broader understanding of teaching and learning theories and principles for itself and others. The very visual communication skills that we teach could be a more effective way to communicate to educators the necessary pedagogical theory that is to be used in the classroom.

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MARK BURRY: SUPPORTING THE SILOS: TRANS-DISCIPLINARY DESIGN RESEARCH AS DEFENDER OF THE DISCIPLINES

With pride design disciplines have risen above the status of ancient guilds to that of professions, but how relevant are disciplines today when global challenges are emerging with dimensions and demands that we have not been able to contemplate hitherto? How might design research meet these challenges more effectively by looking beyond the silos without necessarily dismantling traditional discipline strengths?

Within the 'guilds' the distinctiveness of analogue practice is threatened by digital design's universality and ease of application. Digital tools and processes are now common across craft domains that were previously highly specific in their needs and expertise, and the presumptions that went with them. Within their discipline silos designers risk remaining unfamiliar with innovative approaches to teamwork in which creative thinkers, diverse in their makeup, can unify through alternative approaches to creative leadership.

It is not clear that the old has to be thrown out in favour of the new. Digital and analogue approaches to design as synthesis do not need to form a mutually exclusive dialectic. The tensions between senior designers experienced in one medium for one task and the new generation of designers fresh from college, digitally adept and possibly dismissive of tried-and-tested approaches to design exploration, are age-old. These tensions need not be exacerbated by the new technologies at our disposal. How do design practices keep abreast of shifts in technology and the implications for their practice, and how do design schools ensure that they remain fresh and alert to the unexpected opportunities that are there to be taken-up? How do we maintain design competence at the right level to ensure there is the necessary confidence for creative risk-taking? And how might design schools and design practices look to each other for leadership, and not stall further in their discipline-protectionist quandaries?

Burry's keynote address will focus on these contemporary dilemmas and will consider three important messages for design researchers and their funders. Firstly, creative exploration and experimentation are the natural inclinations of designers, and design research begins with design education with a greater trans-disciplinary approach. Secondly, design researchers need to aim collectively for a louder voice to announce our potential contribution to enriching human experience while protecting our degraded planet from further assault. Thirdly, we might make more of that 'difficult nexus' between design education, academic research and design practice. He will argue that a trans-disciplinary approach to art and design research in all three domains undergraduate, postgraduate and practice is the most appropriate mechanism today to participate in the quest for solutions to problems more typically tackled exclusively by scientists and technologists. In so doing he will posit that to worry about the benefits (or otherwise) of maintaining or dismantling discipline silos, on the one hand, and the advantages of digital versus traditional design practice, on the other, are relatively trivial concerns. Of greater urgency is the task of finding ways for designers to assert the wider value of their creative activity as a research goal in its own right - that is, design as research.

Putting backbone into art, architecture and design teaching and research: The Theory Spine

Bу

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Paper presented at 'Transitions in art and design education', Cumulus 38° South: Hemispheric shifts across learning, teaching and research, RMIT University, Melbourne, November 12-14 2009.

Abstract

Currently art, architecture and design education encourages studio learning and practice-led research. While a positive development in the recognition of creative arts research, history and theory may have become even more peripheral in some universities. The Theory Spine initiative addresses this issue by offering a backbone of history and theory which connects various strands of practice and research. This project offers *more* than a conventional history and theory program; it provides individual research-defined pathways towards postgraduate study for undergraduate and Honours students. The Spine (in the form of a lively provocative website, connected courses, a teaching network, and 'Spinal Rap' seminars) provides an innovative arterial system with which to navigate and build an individual degree and/or career in art, architecture and design.

Key words: Theory Spine; Art theory; Research; Pathways.

Introduction

The topic 'Putting backbone into art, architecture and design teaching and research' seeks to build an internal scaffolding of theoretical strength across undergraduate art, architecture and design degrees at the University of South Australia (UniSA). We will begin by outlining the situation at UniSA and explaining the structure and workings of the Theory Spine project in this, the first year of its implementation. At the time of writing, this project is in its initial stages and therefore it is too early to be able to include the results of staff and student focus groups or formal evaluations. Nevertheless, some early indications of embedding research skills in the undergraduate curriculum are becoming apparent. We are also undergoing a school merger between Louis Laybourne-Smith School of Architecture and Design and the South Australian School of Art, hence the inclusion of art, architecture and design in the overall focus of the Theory Spine. Consequently at this stage, the Theory Spine is a 'work in progress'.

Nevertheless, we consider it important to discuss the aims and developments of this project to date in order to seek critical feedback on the possibilities of and/or need for such projects in similar degree offerings across Australia. As such, the Theory Spine will be discussed in the local context of UniSA but also within the broader background of changing climates in Australian higher education. Therefore, whilst the primary aim of this paper is to present the Theory Spine as a strengthening device to support/reinforce both studio and theoretical studies, it is also argued that it may be a possible remedy to what could be perceived as a "dumbing down" of recent university education (Clarke, 1998; Gilbert, 2000; *The Guardian*, 2004). Such a project could well provide staff and students with more appropriate tools for a renewal of AAD (Art, Architecture and Design) curricula.

This is not to suggest that what may be the case in one scenario, i.e. at UniSA, necessarily applies to others. We are offering for discussion a particular Theory Spine model that embeds theoretical and research skills across, as well as within, a number of undergraduate and Honours programs. Hopefully, aspects of this fledgling project will resonate with other schools' experiences and provide useful points of comparison towards further, and perhaps, collaborative development.

Consequently, an interpretative methodology will be used to investigate the literature which has been collected thus far and collated under particular headings. These include: the teachingresearch nexus; academic staff expertise; degree structures and a small body of pedagogical literature specific to theory and research in Australian tertiary art, design, architecture programs.

An overview of the Theory Spine at UniSA

Historically, programs and courses in art and design as well as architecture have had a strong focus on professional and/or vocational training in art, architecture and design practice. The vocational/professional approach is intrinsic to the mission of the University which claims

[R]eal-world experience while studying means UniSA graduates are equipped with the qualities employers look for. UniSA graduates become significant contributors to their chosen professions - people who are instrumental in reshaping the nature of contemporary Australian and regional society (UniSA, 2007).

However, in terms of the University's corporate priorities this pragmatic focus may be promoted at the expense of critical thinking and theoretical depth in both studios and "other" subjects such as theory. Theory departments have been marginalised within Australian art schools (Zeplin, 2002), with diminishing ratios of studio: theory contact in recent times. Nevertheless, there are students more inclined to follow theoretical and artistic paths than those designed only for art and design's so-called professional 'industries'. Increasingly, these include those students with curatorial, art history and art administration aspirations as well as those with broader theoretical areas of interest rather than careers per se.

With compulsory theoretical studies occupying only 20% of the UniSA art curriculum (compared to 33% in the 1980s), increasingly large studio and theory class enrolments, and shrinking studio contact hours, students now receive little opportunity to engage meaningfully with theoretical/conceptual ideas. School leavers are at a particular disadvantage, having had limited access to practical studies of art or design at high school, which, in and beyond South Australia are often "based neither on theory nor critical reflection" (Haynes, 1999, p.6).

Moreover, with Year 12 English now a non-compulsory subject in South Australia (SACE, 2009), recent education policy emphasising "creative" and "community based literacy" rather than expository writing and a marked decline in student reading (SACE, 2008) first year university students in art, design and architecture, like other students, are often ill equipped with, and oblivious of the need for, basic written language and reading skills (Herington & Weaven, 2008) – and, even worse, intellectual curiosity. In the last three years, the number of fail grades, including 'drop outs' in the first year art and design theory course, "Representing Visual Culture" has risen by 30%. How then, in less than two hours per week, do staff go about "reorienting students from an existing surface learning predisposition to a deeper learning approach?" (Herington & Weaven 2008, p. 112).

A nationwide survey of design theory teaching in 2002 found that

[t]he challenge is to establish a balance between maintaining the students' interest and teaching them what they need to know. There is the need to employ innovative teaching approaches such as interfacing theory with practice and studio work, integrating the requirements of industry (such as a knowledge of design styles as well as culture as a whole) with the standards of university education (Connellan, 2002).

In 2009 the challenge to articulate theory with studio concerns remains but it is possible.

The students themselves expressed the opinion that links between theory and practice are constantly possible if the theory lecturer is aware what is being taught in the studio and vice versa. The liaisons with the studio staff revealed a constant acknowledgment of the students' difficulty with theoretical language; this presented and continues to present an enormous challenge for theory lecturers. On the one hand there is a need to make the information accessible and on the other hand it is necessary for the students to develop their vocabularies to incorporate the words and ideas of design theorists and historians (Connellan 2002).

This research is also relevant to the visual arts but less to architecture where more integration of theory and practice occurs in the studio. In some of the Architecture and Interior Architecture studios at UniSA theory and practice based lecturers team teach in order to bring theme, philosophy and design outcomes together. This works well when there is a special synergy between the practice-based and theory-based lecturers, a situation where they come in 'on cue' in the studio space. That synergy is usually built up over a number of years and is based upon trust and respect for the individual as well as for the different aspects of the discipline. It is also arguable that architecture as a profession is more team oriented than art but this is a model that requires emulation and further research. It is likely that the merged SASA and LLS will benefit from these 'pedagogies' and incorporate similar modes of team teaching in visual communication and art studios in order to bring theory and practice together and indeed to highlight the importance of theory.

To date, numerous attempts at actively encouraging theoretical foci have been made by individual academics who teach in Art and Design History and Theory (ADHT) through, for example, individual mentoring of students, master classes and postgraduate symposia. Feedback and testimonials by successful theory graduates attesting to the benefit of these efforts are posted on the ADHT/Theory Spine website._Furthermore, because of workload issues (+1000 enrolments for 4 full time continuing ADHT staff, excluding Architecture) and minimum UniSA enrolment requirements in theory courses, the number of available theory electives is

often unpredictable; these are often cancelled if class numbers are insufficient. Working under individual supervision, students have, in spite of positive experience or outcomes, felt frustrated and isolated in their endeavours to sustain their theoretical focus. They require more support by individual lecturer/mentors to effect a sense of belonging to a theoretical and research culture even though numerically, theory constitutes the largest unit in AAD. Unlike a number of other studio specialisations, pathways for (very few) students specialising in history and theory must be individually negotiated - usually without the opportunity to participate in elective classes. To compensate for this sense of 'alienation', considerable input from supervising staff is required. However, as mentioned in the section below on 'academic staff expertise', the staff needs to have their OWN research foci in place to ensure strength in a Theory Spine approach.

Thus it has been difficult for students, firstly, to *see* theory as an attractive specialisation and secondly, to navigate a viable theoretical pathway to postgraduate level. Similarly, students with a practice focus are not encouraged, through declining studio contact hours, to embrace theory as a complement to, or extension of, studio work; this invariably affects research skill acquisition at Honours and postgraduate levels.

We are, however, finding that increasing numbers of students are displaying a particular interest in history and theory as a basis for curatorial and art history careers, design theory and design, arts administration, and personal interest. We need to provide reliable *structural* pathways for students to combine courses and areas of study which suit their individual needs and aspirations, to articulate their own 'spinal column' of individuated 'discs'. Hence, it is our belief that students who are guided by clear choices that are made attractively visible via a 'spine' of theory-based courses with additional 'seminars' options will be better placed to design and control their progression towards postgraduate study. Consequently, they will also have more opportunities to develop transferable skills applicable to the job market. These include sharper critical thinking, research experience, problem solving, time management, and various types of communication, as well as a deeper knowledge of historical, cultural and contemporary art and design. At present the paucity of information and support available to students who might wish to enrol in courses across programs, especially those who realise that a theoretical pathway would serve them better, means that without a clear pathway (spine), they are often 'lost' to the university.

To make these options firstly, visible and secondly, attractive to both theory and studio-focused students through the Theory Spine, a suite of measures has recently been 'inserted' into

university information systems and courses. A series of lunchtime seminars (a lecture one week, followed by a tutorial the next week) - additional to theory courses and drawing on the research expertise of staff - provides an 'extra' means of acquiring theory engagement; these seminars outside of the normal theory program also offer an assessment option. To date these have been well attended by students who welcome the opportunity to discuss each lecture after reading articles posted on the Theory Spine website. These activities are reinforced by a 'publicity campaign' designed with a top flight PhD design student and a web designer and disseminated via attractive online and hardcopy posters (see fig.1) and articles in student magazines (*Entropy*). Featuring a funky skeleton wearing iPod headphones, this image links to information on theory courses and seminars, etc via restructured ADHT and School homepages. The ubiquitous 'bare bones' have even enjoyed pride of place on the University's 'splash page'.



Fig. 1. Theory Spine image. Designer: Gjoko Muratovski, 2009.

In addition, during 2009 specifically designed research exercises and vocabulary have been introduced into targeted core theory courses, 'Representing Visual Culture' (first year) and 'Australian Art, Craft and Design' (second year). Even without conclusive evaluation, early results indicate that while first year (assessed) tasks requiring students to: (a) use data bases to access journal articles (as opposed to relying on the web and the university library catalogue); (b) utilize semiotics in their analysis of artefacts; (c) identify a topic of their own for an essay; have been less successful than expected. However participating staff have noticed a growing awareness of research terminology and the confidence by more theory oriented students to undertake self instigated assessment topics. In 'Australian Art, Craft and Design' a new

assessment component is currently being trialled where, supported by library staff, students conduct extensive data base searches, using key words to find a range of research materials. These are then linked to specific course lectures. To date, student response to this exercise has been positive.

Teaching-Research Nexus

One of the primary aims of the Theory Spine is to embed research into undergraduate teaching and learning so that research is understood as part of everyday practice - in and out of the studio. The embedding of research skills means an integration of critical thinking and referencing whereby students learn how to make connections between ideas and synthesise these into 'research questions'. It is probably safe to say that a majority of school leavers are not certain of their focus but they do have a few unformulated ideas about what they would like to do when they enrol in AAD degrees. Therefore identifying interesting ideas, connecting them and turning them into research questions or problems is a process that needs a clear and visible structure. Students need to know that they are not working in a vacuum but in a community of creative people who, past and present and across time and place, have constantly used art, architecture and design to shape the sensory world.

The sensory world is however balanced by the pragmatics of research and despite the obviously positive aspects of embedding research into teaching, Wareham and Trowler (2007) also reveal drawbacks. They drew up a table delineating the "meaning of nexus", "practices", "suggested benefits" and 'possible dysfunctions" of the TRN (teaching research nexus). In this table they point out possible future dimensions for the TRN in art and design as a result of an extensive literature search which formed the basis of their paper 'Deconstructing and Reconstructing: The Teaching Research Nexus: Lessons for Art and Design'. These authors point out the enthusiasm for the TRN but also the slowing down of learning tasks with the added research factor taking up time in an already loaded course structure and curriculum. This paper is the third in a consecutive study Wareham and Trowler have conducted since 2007 and builds upon the findings of the previous two. Interim results from our own Theory Spine students in first year echo these authors' findings, with particular regard to insufficient 'space' in the theory curriculum. Embedding of research skills may well extend to studio teaching in future trials.

The Teaching Research Nexus: A guide for academics and policy makers in higher education (trnexus.edu.au) is an especially useful resource, as it includes real case studies of how research has been incorporated into different disciplines by a variety of different lecturers. One particularly interesting example from Swinburne University with researchers, Simon Jackson

and Kate Bisset-Johnson poses the question: "What will Melbourne be like in the year 2030?" The project relates to the Victorian government's infrastructure planning and in this way places Industrial and Interior Design students in a realistic situation with possible long term research outcomes involving government and industry partners. There is a general emphasis in the literature and resources on the TRN that students need to have the term, meaning and requirements of 'research' consistently reinforced. A questionnaire developed by the University of Gloucester (Healy, Jordan, Short, 2002) provides a telling list of questions that compel students to identify research in their university experience. These and many other case studies focus upon the efforts taken to isolate and nominate research as an activity that can be lost in undirected practice.

Academic staff expertise

Concomitant with the above issue of a lack of student research focus, there are also a number of lecturers teaching across AAD who are unsure of their precise research focus. Art, architecture and design schools are full of multi-talented individuals and it is not always simple to identify one area for research. Stephen Naylor (2006) comments on the move from staff expertise to student outcomes in our sector and notes the way in which older style art and design history and theory morphed in a "seemingly natural way" to emphasise studies in visual culture as opposed to the canon (2006, p.1).

It is clear that there are many uncertainties amongst academic staff. Until recently few senior academics in the field of art, architecture and design held PhD qualifications and if they did it was usually in the field of history and theory. Things have changed:

Prospective art and design school academics are now generally expected to have a PhD, indeed, it is not uncommon for a Dean or a Pro-Vice Chancellor with responsibility for art school recruitment to insist that only applicants with a PhD are interviewed for vacancies. This requirement and the processes of generational change as senior art and design school academics retire, is dramatically re-profiling our schools (Frankham, 2006).

Therefore it is a mixed bunch when all art, architecture and design academics are combined in one school. There are (hypothetically) those academics who hold their specialised history and theory PhDs, the older studio heads who hold a wealth of practical experience and the new academics with a diverse range of PhDs which incorporate anything from a Heideggerian angle on kitchen appliances to a Deleuzian approach to space and surface in galleries, to a questioning of nihilism in installation art. How in all of this do students know who is best suited to advise them on a particular interest they may want to pursue? For example, this might manifest in a particularly niggling question that could turn into a well rounded research question if they have the appropriate kind of encouragement and guidance from early on. It is hard enough for the staff to align their apparent areas of expertise with the research priorities that filter down from Federal government to university to faculty and ultimately to the schools. The creative arts, architecture and design are, after all, eclectic disciplines but whilst this makes the study rich, it can also make research foci difficult and confusing for those trying to find a pathway.

ERA (Excellence in Research Australia) is collecting details about each academic's contribution to Field of Research Codes (FoRs) and this means that whilst 1905 (Visual Arts and Crafts) may have a strong showing, other related codes such as Cultural Studies (FoR 2002) which are important in the climate of multi and cross disciplinary research, also include work published by academics in AAD. The same can be said for Architecture (1201). On the one hand staff try to meet the research demands whilst remaining close to their own areas of expertise, and on the other hand they try to satisfy the demands of course related scholarship. The evaluation of research via the ERA and the evaluation of teaching via course evaluation instruments and graduate evaluation instruments (no matter how flawed) both affect the funding of art, architecture and design schools. Frankham notes that declining funding, coupled with expensive contemporary technologies, increased administrative budgets and inefficient studios, have put many art school programs in particular at risk (2006). Declining budgets mean staffing is tightened, courses are cut and enrolments increase so that there are fewer options and more students. How can staff make the most of their expertise in this ever tightening climate? It is vital that staff know and name what their expertise is so that they can structure ways for visible implementation and be proactive in providing channels for research along something like the Theory Spine. It is no longer sufficient (if it ever was) to "convey strategies, such as critical thinking, to ... students almost by a process of osmosis, simply on the basis of "that's what artists do" (Carroll, 2003). Osmosis is the biological term for the movement of molecules through membranes; however, they are driven by internal energy. To extend this metaphor, internal energy is not sufficient for students to develop their potential, they need to have the assistance of staff research expertise to help them identify their pathway and guide them along a carefully structured spine. In this sense it will be interesting to see how the ERA process will help staff to crystallise their own areas of research strength.

Degree structures/ curriculum

In a national curriculum study entitled *Opening Pandora's Paintbox: Curriculum research into history and theory of design Australian Universities* (2001-2002), twenty seven Australian universities were identified as teaching art, architecture and design, eleven of which taught art and design history and theory (Connellan, 2003). That scoping study of the state of (specifically) design history and theory in Australian universities is now out of date and another more comprehensive study of the history and theory in art, design *and* architecture is probably timely at this stage. Whereas a decade ago, there was a need to recognise the different theoretical needs of students enrolling in design (as opposed to art) degrees, it is quite possible that the advances in design theory and research over the past decade - internationally and in Australia - have made sufficient impact for a reassessment of overtly separate emphases upon 'design' and 'art' theory in the undergraduate curriculum. With the growth of visual culture studies in the place of traditional art history and theory (as mentioned above) and the increased use of digital technologies by 'artists', there is arguably less distinction between design and art.

A preliminary look at the focus given to art and design history and theory in Australian universities via literature searches and the scoping of website information shows (not surprisingly) that the more established universities such as the University of New South Wales with the College of Fine Art, have a strong history and theory presence. Others that can be included in this preliminary list where the web presence of history and theory appears strong are: Australian National University; Monash University; University of Western Sydney, The University of Melbourne and University of Queensland. This visibility must attract students who are interested in pursuing studies in history and theory of art, architecture and design but these options are not necessarily situated within dedicated art, architecture or design schools. They appear, for example (in University of Queensland) in 'English, Media Studies and Art History'.

Putting students at the centre of their own learning in higher education is not new in Australia or overseas and has resulted in all kinds of re-curriculation across the university sector. This has been the result of outcomes-based education (getting a job, working towards a career) as well as the bigger issue of rationalising 'unproductive and expensive' art schools. Within all of these changes, practice and not theory has played a primary role. 'Traditional' ways of learning in the visual arts in particular is a phrase that usually seems to mean dedicated and specialised studio and material based study on the one hand, and art history and theory as a supportive arm on the other. In the 1980s there were consistent attempts to 'make theory more relevant' to studio. At that time studio needed to be made more relevant to employment and life, so somewhere along

the way, theory became the least favourite limb. For design, theory has been even more estranged. Ken Marsden notes:

For a significant number of design students, the position of theory within the predominantly practice-based degree courses, has been a difficult one for them to comprehend. This is, I believe, apparent for a number of reasons which include:

- Non-traditional entry
- Practically orientated skills
- Time-management priorities
- *Psychological barriers* (2002, p.288)

Conclusions

Despite Marsden's paper being written seven years ago, the problems and solutions Marsden discusses in relation to key thinkers in design theory and research in higher education in the U.K. and U.S. are still with us today. He suggests ways in which studio based projects can incorporate theory and vice versa so that the entire process becomes *research* based upon critical integration. Marsden cites Joanna Drucker's words, "design doesn't need theory ... designers need theory" (p. 291). Indeed, while some might argue that "[d]esign seems to be getting along fine [and] buildings get more architectural every day" (*Cumulus 38° South* referee, 2009) despite a paucity of theoretical education, this is about the person, the living, thinking being; it is not entirely about the discipline, the curriculum, the institution or the final product, although these educational aspects shape the experience of design, art and architecture – which, after all, are all about people. Leaving theory out or <u>stretching it around to be something else entirely</u> may not result in 'relevance' but instead, in 'severance'. And we all know what happens to the brain when the spinal cord is severed. It is surely time to stop, massage and perhaps, reinsert that necessary articulated backbone into art, architecture and design teaching and research.

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Resuscitating Dying Urbanisms

The Critical Role of Recent Public Art and Design Interventions.

Abstract

This paper considers the role of public art and design in a changing South African society. In a focus on recent urban development in Johannesburg a critical investigation is launched into the role of public art and design as part of an urban renewal agenda. The argument in this paper follows that public sculpture specifically, signals a changing urban environment. Projects commissioned by the Johannesburg Development Agency through the commissioning agendas of visual arts administration and consultancy organizations such as The Trinity Session form the focus of this study. The research investigates to what extent recent public art and design projects in Johannesburg, South Africa catalyze social change? Whose interests do they serve? How do these projects make a difference to the social organization, rejuvenation and re-culturation of inner city space? Do we need to revisit prevalent attitudes to the inner city and thereby consider a new type of spatial politicization? A key theme in this paper is a renegotiation of what we consider to be historically "old" (death / decay) and "new" (revived / resuscitated). To address this, the author posits that the new and old merge and circulate in an uncomfortable visual tango of embedded disillusionment and subsequent / emergent jubilation and celebration. Public art and design carry agency and provide the necessary momentum in this circularity in the way elements of decay and rejuvenation signify past and possible future historical trajectories.

Keywords: Public art and design, inner city, urban public space, urban rejuvenation

Paul Stephen Cooper Greenside Design Center, College of Design, South Africa 2009 This paper considers the role of public art and design in the changing South African city of Johannesburg. A critical investigation is launched into the role of public art and design as part of an urban renewal agenda. Part of the discussion questions the extent to which public sculpture specifically, signals a changing urban environment. As a potential catalyst for social change, public art is prefigured as an integral (and possibly integrating) spatial element. To address this, I consider the purpose of public art in the call for a new type of spatial politicization that begins with a critical appraisal of urban renewal agendas. The purpose of creative interventions in the inner city also prompts a discussion of bodily relations through which one may begin to negotiate the significance of community, self, identity and memory. In so doing, work could begin on a re-culturation of the inner city by exploring conflicting notions of ownership and agency; place and placeless-ness. This debate plays out against the backdrop of a contradictory and conflicting city space: a dystopic entity through which elements of ruin and decay interweave with moments of growth and renewal.

Too often the trope of the dystopic is conceptualized as a lateral historical phenomenon; one that signals the demise and final end of idealism and utopianism. This relation can be understood as a complex equation through which uncertain relations unravel. Naively put: dystopias evolve from utopias with an ambivalent outcome. Often coupled with a call for regeneration in its broadest sense, this process involves a tangible production and re-production of spatial elements, identities and histories. In relation to Johannesburg, this resulted in calls for a re-negotiation of the city as a dystopic phenomenon; a city in which notions of ruin and decay mingle (often not so comfortably) with a new seemingly `utopian' identity embedded in a broader initiative of resuscitation and rejuvenation. I want to refigure this idea in relation to a notion of circularity to suggest that a circulaic process can never be an end in itself and that as time progresses the circularity of cultural output and a growing sense of spatial awareness becomes integrally part of what we now can understand to be the often disquieting "...entanglement of the modern and the African – the African modern" (Mbembe in Mbembe and Nuttall 2004, p.376). In this paper I argue that this `new' entity is neither utopian nor dystopian but rather part of a bigger and on going cultural cycle of decay and renewal; an integral consequence of history and time through which these

elements periodically (and for different reasons) bob and weave. An important part of the discussion will also revolve around two main areas: the city as a dystopic space, on the one hand, and drawing on what Lefebvre (2001, p.93) has identified as an all consuming social space, on the other.

1. Johannesburg: A Dystopic Urbanism

In describing Johannesburg as an African city, Mbembe (in Mbembe and Nuttall 2004, p.399) alludes to the idea of a fractured or splintered urban space:

Johannesburg is nowadays a metropolis increasingly forced to construct itself out of heterogeneous fragments and fortuitous juxtapositions of images, memories, citations and allusions drawn from its splintered histories. Some of its fragments seem to recall the postcolonial city form in Africa. The latter is characterised not so much by decay as by the coexistence of divergent elements of different origins brought together in a space whose limits are constantly made and remade... (producing) ...qualities of flexibility and resilience.

Mbembe's reference to the city as a public space in a perpetual state of regeneration highlights a possible problem. How do disparate and often incongruent elements synchronize and synergize in an urban public space characterised by complex and often conflicting relations? New urbanist thinking superficially resolves this conflict into a homogenized social space prescribed through notions of social status and class; one far removed and insulated from the material excesses of the city street. In my view this points to a certain conceit or deception: dystopia veiled not so eloquently in a visceral and transparent blanket of utopianist aesthetics realised through new urbanist rhetoric.

An integral part of understanding the city as a dystopic space would follow a questioning of the recycling of utopian ideals as realised and implemented in new urbanist agendas. Dirsuweit (in Farber 2008, p.57) provides a stinging but nevertheless relevant critique: "...the city is becoming a privatised new urbanist archipelago." Dirsuweit (in Farber 2008, p.57) problematizes new urbanist outcomes emblazoned in "...the garden city recycled as the solution to urban problems such as insecurity, alienation, urban decay and inadequate transport infrastructure... new urbanism is perturbing, as this planning style frequently results in homogenous and insular communities." The emergence of new urbanist ideals in the city may have consequences for the way urban space is conceived as comprising disparate and multifaceted elements that often come into conflict with one another. In many ways this disjunctive

correlation of parts stems from historical circumstances that are deeply ingrained in the city's fibrous identity. One may identify a dynamism and diversity that finds resolve in its apparent lack of cohesion. Mbembe (in Mbembe and Nuttall 2004, p.400) expands this point when he writes: "Contemporary downtown Johannesburg visually resembles other African cities in the aftermath of decolonization: a matrix of plural styles, a striated, striped city that concatenates the most formal and modern with the most informal." Mbembe (in Mbembe and Nuttall 2004, p.400) concludes that these, "…instances belie any notion of the city as a symbolic totality…" For me this signals a certain conceptual disembodiment which in turn opens up a debate around the city as a personified entity metaphorically framed as a social `body'.

2. The Corporeal City

2.1 Secretion and Conflation: Heterotopia

An important part of what brings into effect the city as a "fragmented and kaleidoscopic..." (Mbembe in Mbembe and Nuttall 2004, p.400) social space is the fact that it is uneasily peopled. I am not referring to the literal uneasiness brought about through congestion, violence, crime, alienation and human degradation (although this is relevant here too). Rather I wish to focus on a more conceptual thinking of the city in bodily terms to unravel a metaphorical relation underpinning the city as a social space. One might acknowledge a simultaneous two way process of spatial `secretion' as well as spatial `conflation' in the way city space is metaphorically conceived of as a `social' entity in its conflicting sanctioned and unsanctioned aspects (Deutsche 1998 & Dirsuweit in Farber 2008).

In many ways the city space as a site of conflict (Deutsche 1998, p.270) correlates powerfully as a space of emergent and rejuvenated democratic values that play out most emphatically in the (often not so) gentle conflation of body and space. Dirsuweit (citing Lefebvre 1991 in Farber 2008, p.57) uses an analogy to bodily functions when she makes the point that "...the city is produced through the workings of a particular society, `a society secretes that society's space." Conversely urban matter also gravitates centripetally within a tightly contained urban context; following established and emergent processes and actions. The city space, "...consumes (in both senses of the word) truly colossal quantities of energy both

physical and human..." and becomes intrinsically public in the way it "absorbs" and integrates aspects of the city including disparate peoples, sites, identities, histories and cultures (Dirsuweit citing Lefebvre 1996 and Mitchell 2003 in Farber 2008, p.52). In my mind this porous exchange of secreting and conflating social phenomena foregrounds the modern city as an awkward heterotopia.

It is useful to conceive of Johannesburg as a heterotopic space – a space of shifting dynamisms and multiple rationalities. Bruno (2002, p.147) corroborates this in her description of heterotopias as: "other spaces,' they are permeable systems of opening and closing, a type of space that refers to all other spaces and, ultimately, to every space imaginable." In this sense Mbembe's "modern African" city is heterogeneous. What interests me here is the extent to which heterotopic characteristics suggest a dystopian spatial relation of `secretion' and `conflation' inscribed in transgressed binary oppositions of formality and informality, rationality and irrationality, official culture and unofficial culture. Simply put: these seemingly oppositional elements are unstable; perpetually gliding and intersecting with each other in a constant and persistent regeneration of spatial identity. Dreyer (2009, p.15) explains this idea in relation to a post-utopian context as involving "...an interplay of space, site and modes of spatial and social ordering in contemporary life, especially with regard to cities and the globalising world. Post modernity today is conceived as entrenched in heterotopic spatiality where difference and Otherness are articulated as post-utopian space." These spaces become "liminal sites of marginality" as well as "carceral institutions... where physical boundaries are installed" for purpose of surveillance and monitoring signalling a dysfunctional city deeply at odds with itself (Dreyer 2009, p.15).

2.2 Aimless wandering

A major consequence of this sense of a seemingly failed social space is the notion of an "aimless wandering" in public space. Johannesburg is an `uneasy' city. Populated as a systemic by-product of delirious and frenetic occupation, the city is peopled without any particular recall for agency or ownership. Deeply embedded in the city's tumultuous history is an ambivalent sense of self, identity, community and memory. Dreyer (citing Hetherington 2009, pp.16-17) locates this as a functioning characteristic of heterotopic relationships that "…unsettle because they have the effect of making things appear out of place. The juxtaposition of the unusual creates a challenge to all settled representations: it challenges order and its sense of fixity and certainty." For Dreyer (2009, p.17) this condition follows a "…deferral or defamiliarisation…" that in turn suggests or implies a "…loss of teleology, a directionless-ness and a desperate consideration of a chaotic host of alternatives and possibilities." This sense of aimless or directionless movement signals an absurd and existential space: an important theme in the imaging of Johannesburg as a dystopian city.



Figure 1 Steven Hobbs and Andre Pretorius. Stills from *Out of Order: A User's Guide to a Dysfunctional City*, 1997-2000. Reproduced courtesy of the artists.

With reference to a collaborative video project between himself and Andre Pretorius called *Out of Order*: *A User's Guide to a Dysfunctional City* (1997-2000), Stephen Hobbs brings attention to the city's dystopian character. The work was conceived as an interactive game with a landing page from which participant viewers could propel themselves into the labyrinthine city space by activating the `click through' screen option. In this video work,

... an `other' Johannesburg was conceptualised and digitally constructed. This `other' city, whose primary point for orientation is a turning circle, is suggestive of a repetitive and absurd space. This notion of absurdity is reinforced by the repeat return to the landing page, where one sees a yellow Volkswagen City Golf spinning around the turning circle'' (Hobbs in Farber [Ed] 2008, p.136).

2.3 Hysteria and Delirium

In its dystopic state of repetitive and a-tangential motion, the city is an extreme space. A nebulous collation of mis-placed and mis-registered identities, histories and memories is articulated through differentiated, diverse and multivalent surfaces and elements that speak to a spatial psychosis of hysteria and delirium (Mbembe in Mbembe and Nuttall 2004, p.403). This seemingly chaotic spatial phenomenon is framed by Mbembe (in Mbembe and Nuttall 2004, p.383) as a crucial consequence of Johannesburg's historically racially divided past: "This delirium was of both a political and a psychic nature. And in both cases, it had a paranoiac and schizophrenic dimension. Because of this dual structure, delirium at times manifested itself through the production and over coding of fears and fantasies, faked objects and images."

It was against this back drop of a necessarily hysterical city of paranoia, gloom, loss and delirium that a new energy emerged opening up a forum for creative intervention into spatial and social upliftment. The task of recreating Johannesburg as an accountable and democratic space needed the negative political foundations of a `lost city'. The disquieting conditions for confrontation and conflict ironically, are essential ingredients in the process of bringing into play an effective rejuvenation of public space. Public sculpture would form a significant part of this re-politicization process: "Art that is `public' participates in, or creates, a political space and is itself a space where we assume political identities... Conflict, division, and instability, then, do not ruin the democratic public sphere; they are the conditions of its

existence" (Deutsche 1998, p.289). Deutsche's somewhat controversial critique of democratic public space resonates strongly in the work of a South African arts collective known as the Trinity Session.

3. The Trinity Session: Circularity and Rejuvenation in the Inner City

The Trinity Session is a visual arts collective initiated as a response to emergent opportunities for the promotion of the visual arts in Johannesburg. The Premises Gallery (the Trinity Session's hired exhibition space and offices - until recently - located at the Johannesburg Theatre in Braamfontein, Johannesburg) was launched in 2004 against the backdrop of a severely impoverished post apartheid visual arts network. It soon became apparent however, that the work of the Trinity Session as a promoter and facilitator of local visual arts practice would quickly evolve into "…an interesting new force that would soon influence an entirely new trend in artistic production in Johannesburg namely urban regeneration" (Hobbs and Neustetter 2008, np).

The Trinity Session's work hinges almost exclusively on the city and its dynamic but often heavily compromising, aggressive and destructive vitality. Part of this work necessitates an engagement with an urban public space that is often in deep conflict with itself and those using it. Their methodology evolved as an immediate reaction to notions of `public' and `public-ness'; an action-based interrogation of what it means to be in the urban domain.

3.1 Upheaval and change

Perhaps one of the most significant (and exciting) periods for The Trinity Session was the challenge of a city in a state of upheaval and change. It is this trigger aspect of the city that I want to focus on in this part of the paper.





Figure 2 Dorothee Kreutzfeldt, *no condition is permanent*, 2005. Four views of installation at The Premises Gallery, Braamfontein, Johannesburg, South Africa. Reproduced courtesy of the artist.
The idea of change featured strongly in one of the first art exhibitions organised by the Trinity Session. In the press release to Dorothee Kreutzfeldt's 2005 installation entitled *no condition is permanent* at The Premises, the artist writes: "In Johannesburg, like in many cities, anything that is visible seems to be in constant change, in constant movement" (Hobbs and Neustetter 2008, np). This two dimensional installation recalls the impermanence of palimpsestic imagery that signals the verticality of repetitive layering in the use of both formal and informal visual communication in the city. Relating her work specifically to a sense of subliminal impermanency, Kreutzfeldt (in Hobbs and Neustetter 2008, np) describes the work as having to do with "…instabilities, catastrophes, and ultimately conflict… (a) …witness to the city's temporal rhythms." However, it is arguably outside of the officially sanctioned `white cube' art gallery that notions of public-ness are most powerfully confronted and contested.

3.2 Public-ness and public agency

Sculptural installations play a pivotal role in dismantling the repressive political frontiers of previously entrenched urban public expression. Of particular interest to me here is the manner in which public sculpture becomes a mode of exchange: public space is not only interrogated but also activated and in so doing defined and constantly re-defined. Art and design elements acquire a powerful agency in the production of a dialogical and relational emphasis in the re-spatialization and re-culturation of public space.

Issues around representivity, interactivity and historical accountability contribute significantly in any planning towards a public art intervention. Part of this conversation would naturally include a definition of what constitutes notions of `public-ness' and public agency. Deutsche (1998, pp.269-270) posits that: "How we define public space is intimately connected with ideas about what it means to be human, the nature of society, and the kind of political community we want." The purpose of public art would understandably need to play a significant, if not critical role in confronting and negotiating these issues by invoking "...the principles of both direct and representative democracy" (Deutsche 1998, p.269). A possible means through which this objective is enacted stems from integrated and purposeful

community involvement in the conceptualization and production process. Do we naively accept the terms of this seemingly mutual exchange? How does a community's active involvement realistically translate into mechanisms of ownership? These and other questions require closer scrutiny of what is popularly known as `public'.

Deutsche (1998, p.270) warns that complacent attitudes to public action may inadvertently inhibit the purpose of a democratic intervention to "...settle rather than sustain conflict". In other words, conflict and confrontation become necessary processes in the relational intentionality of a democratically produced `public-ness' and vital ingredients in the regeneration rather than stagnation of society. Opening the debate even further Deutsche (1998, p.278) insists that conflict is a necessary integral part of urban regeneration: "Urban space is the product of conflict... urban space is produced by specific socioeconomic conflicts that should not simply be accepted, either wholeheartedly or regretfully, as evidence of the inevitability of conflict but rather politicized – opened to contestation..."

3.3 Ownership through community participation

In light of these conflicting notions of what it means to be `public', it is worth revisiting the idea of the urban public space as a space of inherent contradiction. A space where congeniality meets conflict and place-ness (ownership / agency) is off set against a very real and tangible sense of placeless-ness (alienation / otherness). This relational approach is arguably most apparent in the work of Brenden Gray and Mpho Molikeng. Their project involved the democratization of selected inner city public children's parks through the active participation and input of children living in and around the area. This is significant because traditionally children would be excluded form the regeneration of a space designated for their usage. This project foregrounded the input of a historically excluded community.



Figure 3 Brenden Gray and Mpho Molikeng, 2007. Workshops held with children to develop designs for the upgrading of inner city park play areas, Johannesburg, South Africa. Donald MacKay Park (first row), JZ de Villiers Park (second row), Le Roith Park (third row), Pieter Roos Park (fourth row). Reproduced courtesy of the artists.



Figure 4 Brenden Gray and Mpho Molikeng, 2007. Proposed layout designs for the Le Roith Park and the Pieter Roos Park play areas. Johannesburg, South Africa. Reproduced courtesy of the artists.



Figure 5 Brenden Gray and Mpho Molikeng, 2007. Selected Views of installed Masterfibre motifs. Johannesburg, South Africa. Reproduced courtesy of the artists.

The brief required that the artists produce designs that could be applied in the resurfacing of the play areas thereby adding to the overall restructuring of these parks complete with new play equipment. Through this intervention, the children's parks (initially neglected open patches of grass and earth) become not only more visually stimulating and pragmatically functional but also more durable and safer through the Masterfibre applications. As part of their planning for this project, Gray and Molikeng designed and facilitated extensive workshops with children living in and around each play park area. From these workshops emerged specific designs that then became the templates for the Masterfibre surfaces.

3.4 Self and community

A debate on the politicization of public space through artistic intervention fuels questions around the awareness of self and community. Deutsche (1998, p.286) interrogates this notion further: "How do images of public space create the public identities they seem merely to depict? How do they constitute the viewer into these identities? How, that is, do they invite viewers to take up a position that then defines them as public beings?" The development of public art in the public city space not only speaks to a political agenda of community awareness and ownership but may even more significantly assist in shifting our thinking of what we understand to be public space in the first place. Deutsche (1998, p.288) explains that: "Since any site has the potential to be transformed into a public or, for that matter, a private space, public art can be viewed as an instrument that either helps produce a public space or questions a dominated space that has been officially ordained as public." This I maintain becomes emphatically resolved in the work of Gray and Molikeng through not only the prerequisite rejuvenation of the public play areas but most importantly through the community's direct and innovative involvement in this process of creative intervention.

3.5 Eland





Figure 6 Clive van den Berg, *Eland*, 2007. Selected views. Braamfontein, Johannesburg, South Africa. Reproduced courtesy of the artist.

Clive van den Berg's *Eland* (2007) presents what I feel is a refreshing look at the purpose of public art in bringing new meaning to an otherwise dead and empty public space. *Eland* (2007) is not a political sculpture in the sense that it refers to South African party politics. If any thing van den Berg was very calculated in avoiding this in the conceptualization of this work. For van der Berg, the sculpture evokes relationships far beyond the immediacy of a political intervention. In so doing it calls to attention a space that (through the presence of an emblematic symbol) becomes loaded and charged with social and cultural significance. Positioned at the northern gateway to the city, it underscores the realization of a shared space by recalling, "...the relationship we have to land, our need to find ways to share it, to understand its resources and capacities as well as its historical, economic and cultural meanings" (Hobbs and Neustetter 2008, np). Unlike the often disquieting effects of a political memorial or the utopian ideologies evoked in figurative public sculptures of cultural or political heroes, van den Berg presents us

with a fugitive; a "...slightly forlorn image of a majestic animal..." (Hobbs and Neustetter 2008, np) that becomes political in the self-reflexive, relational and social dynamics that it prompts.

3.6 Juta Street Trees

Johannesburg is a city in a perpetual state of seemingly infinite reconstruction. It is a work in progress. From this state of constant making and re-making one sees the emergence of a city built on notions of difference; "...the site of interaction between different urban identities. It is where a range of urban identities may regard each other... a state where difference is unexceptional and left unassimilated" (Dirsuweit in Farber 2008, p.52). To plot out and map an understanding of the ever shifting, ever changing nature of Johannesburg as a public space assists in rationalising the role of public art to facilitate notions of difference in relation to a space that is inherently contradictory. Hobbs reminds us of this when he describes the city as a "...complex space of uncertainty and contradiction...a place of enormous beauty and generosity, yet one of anxiety, fear and pain" (Hobbs in Farber [Ed] 2008, p.134).

An expression of difference in this sense becomes the starting point for urban public interventions that service a collective identity. Dirsuweit (citing Amin 2006 in Farber 2008, p.52) comments on the importance of public space as enabling, "...a sense of urban solidarity..." which, she argues, "`...comes from particular forms of gathering in public space." Public art and/or design located in the context of the city street is a primary motivating factor in this process. The urban inner city street is a space of rapid transit and at the same time a social space – the outside, the pavement, the city street; a fleeting or transient place in which interrelations are momentarily shaped and relationships forever forged. But it is also a space of ambiguous ownership. The citizenry own the space in the sense that it is public but also relinquish this ownership on an individual level through the trope of a shared space.



Figure 7 Claire Regnard *Trees*, 2006. Selected views. Juta Street, Braamfontein, Johannesburg, South Africa. Reproduced courtesy of the artist.

In 2006, The Trinity Session commissioned the designer Claire Regnard to produce a series of steel laser cut trees in response to an otherwise dead side walk area along Juta Street in Braamfontein, Johannesburg. The project evolved as a collaboration between Regnard and a group of students from the Imbali Visual Literacy Project. Each `tree' is powder coated and painted. Some include movable parts that pivot on central dials as part of the design, making for a dynamic kinetic element. The `trees' not only fulfil the city administrator's objectives to create an "attractive and accessible" public space (Dirsuweit in Farber 2008, p.56) but more importantly they become significant urban city markers signalling places for pause and rest but also objects of fascination prompting interaction, conversation and play. What becomes important in this kind of public intervention is the collective forum from which these works `grow'. Like the designs produced by Gray and Molikeng, Regnard's *Trees* are products of a shared creative impulse that manifests itself in the resuscitation of an urban space through the auspices of a collective public identity.

Conclusion

I agree with Mbembe (in Mbembe and Nuttall 2004, p.404) that the city will always be a site of "...excess, of hysteria and exclusions." It is a public space that will not likely ever see a finite or static form. "The metropolis, just like the modern city, reveals itself first and foremost through its discontinuities, its provisionality and fugitiveness, its superfluousness" (Mbembe in Mbembe and Nuttall, 2004, p.404). For me, this is an integral part of the circularity and recyclability of an African city such as Johannesburg. It speaks to the catalysing function of public art to reinvigorate dead and dying city spaces; to agitate for dynamic change against a mixed political and social backdrop of segregation and repression. The city evolves into a restless place of innovation, reinvention and renovation. New York may be the city that never sleeps but Johannesburg is the African city that never rests. The city, rooted firmly in its persistent drive to transform, becomes a dynamic public urban space through which identity, meaning and memory are progressively generated and circulated.

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Achieving a Balance Between Teaching, Learning and Research in Art and Design

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Keywords: Art and Design, Teaching, Research, Nexus, Leadership, Management

1 Abstract

This case study considers actions taken by the University for the Creative Arts (UCA) to provide specialist art and design education, in which students' learning is informed by academics' scholarly activity, research and professional practice, including their engagement with the Creative Industries in the UK and internationally.

The University is building a culture that supports, yet challenges, academics to progress their research and make strong connections to their teaching. The difficulties of achieving a proper balance between teaching and research are described and examples are given of approaches that have proved successful. The quality of academic leadership and management is identified as a key issue in determining the success of the relationship between research and teaching. A key recommendation is that a broader range of academic activities, not just research, should be valued and supported for their contribution to teaching and learning.

2 Introduction

UCA is a specialist creative arts university in the South East of England, in the United Kingdom. UCA offers a wide range of undergraduate and postgraduate art and design courses. The results of a peer evaluation of research outputs from UK universities determined that over 40% of research outputs at UCA were "recognised internationally in terms of originality, significance and rigour", a further 25% were "internationally excellent" and 5% were "world-leading", and recognised UCA as one of the top ten largest research communities in art and design in the UK (Research Assessment Exercise, 2008).

One of UCA's strategic objectives is "To develop an active research culture that measurably advances subject knowledge and impacts fully on student learning". In this regard UCA is not unlike a number of other universities studied by Taylor where "the inter-relationship of teaching and research is expressed explicitly ... and thus formed part of the underlying philosophy of the institution" (2006, p. 870). Jenkins and Healey reported the use of such statements by universities to develop a shared sense of purpose but advised that "such fine words need to be implemented through a range of strategies" otherwise there could in fact be 'very little systematic reflection ...about just what was meant by the claimed interdependence of research and teaching" (2005, p. 25).

Taylor noted that "this relationship – the so-called teaching:research nexus – is commonly misunderstood and/or is based in unconvincing or conflicting evidence, both theoretical and empirical" (2006, p. 865). Wareham reports attempts to develop "a more nuanced understanding of the nature of teaching and research in the way that academics and students conceive of and engage in these two areas" (2008, Nexus Debate section, para. 3).

3 Key Questions

This case study set out to explore a number of key questions:

- 1. Do UCA academics, that are research active, link their research to their teaching?
- 2. What are the barriers and enablers experienced by academics when linking their research to their teaching?
- 3. How successfully is UCA achieving its objective that the research culture should impact on student learning?
- 4. What actions could academic managers take to remove barriers faced by academics so that they could be supported and challenged to link their research and teaching?

A project was devised in 2007 to collect, analyse, summarise and reflect back to UCA academics their own descriptions of the purposes, outcomes and organisation of research and its impact on teaching. The project proceeded from the "ground up", seeking the views of individual academics in their own words and reflecting back to them, for their validation, a summary of their collective views. This method was chosen in an attempt to gain honest views that might then inform academic managers as to the real issues that face academics in undertaking research and linking it to their teaching, and thus allow managers to reflect on what interventions they might make to support academics. Taylor noted that "few researchers have considered the management implications of the teaching:research nexus" (2006, p. 868).

4 Gathering the Data

All academic staff at UCA are expected to undertake a minimum of 5 weeks of scholarly activity and research during student vacations. Academics self-manage their time during the 5 weeks, determining what work they will undertake and to what purpose. Time, money, space, materials, and equipment are all resources that may be needed to undertake research in creative disciplines. Feedback from academics, in ongoing discussions within UCA, consistently shows that time is the resource they value most.

In addition to the first 5 weeks, academics may also make a request to spend an additional 5 weeks of the student summer vacation undertaking research. They make this request by filling out a form and submitting it to a panel for its consideration and approval. To assist the panel to make its decision, academics who have made successful applications in the previous year are asked to explain how they used the additional 5 weeks and what outcomes they achieved.

This case study collected its data by adapting the form which academics had to use to apply for the additional research time. Supplementary questions were added including one which asked academics to describe what impact their research had on their teaching. Recognising as Taylor does that "the meaning of research would vary between different staff" (2006, p. 878) the form did not constrain academics by framing its requests for information using research terminology but instead used open-ended questions written in "plain English" that would allow applicants to describe the research:teaching nexus in their own words.

The redesign of the form attempted to achieve a trade off between collecting useful information (e.g. to enable evaluation of the request, as well as collect information for this case study) and minimising bureaucracy, since it was thought that if the form had been too time-consuming to fill in then academics would not complete it comprehensively.

5 The Allocation and Management of Academics' Time

In answering the question about how they had used the additional 5 weeks, UCA academics reported they found it difficult to retrospectively account in any detail how they had used that time in the year just gone. In addition, some academics reported that they were suspicious of the purposes of collecting such data about how they were using their time and others complained that the procedure for applying for additional research days by justifying the use of their time was "unnecessary bureaucracy", "crude measurement", and that the process demonstrated a "lack of trust" by managers.

Coate et al also cited the resentment that academics can feel towards overt management of their time. On the other hand Taylor noted that "several academic staff expressed concern that the absence of strong management meant that poor performance could be tolerated" (2006, p. 882). Feedback from UCA research active academics strongly showed that they would like to see their less active colleagues challenged by academic managers. The case study noted the tensions that exist between academics that are more or less active in research. Reflection about the application process for the additional 5 weeks research, concluded that applicants derived no significant advantage by being allocated this time as other academics who did not apply for the additional days were also free to self-manage that period of time. An administrative view of this problem might instinctively seek solutions that introduce tighter regulation of how academics are spending their time. The case study reflected on whether there would be more benefit in either a) increasing regulation so that staff had to account in greater details for their time or b) not requiring more justification of how the time was used but instead asking academics to consider how they could provide evidence of the impact of their research on teaching.

Academics reported that it was burdensome to try to record on an ongoing basis how they were spending their time and that the alternative of periodically and retrospectively accounting for their time was also not easy. UCA academic managers have reported that it is time-consuming to implement systems that monitor how academics are spending their time.

The case study, therefore, questioned the costs and benefits of the time spent by both UCA academics and managers in accounting for research time. As a result the requirement for staff to apply for the so-called "additional" research days has been dropped. Instead, UCA is exploring how academics should have to self-evaluate the outcomes and impact of their research activities on teaching and student learning. Where no suitable evidence can be provided by an academic then a manager could be authorised to check what use an academic had made of their self-managed time during student vacations.

6 Evaluating the Impact of Research on Teaching

Although UCA has not systematically monitored the use of research time by academics, there is an assumption that activities undertaken during this time will ultimately impact on student learning. UCA's approach could be described as fitting within Taylor's definition of "passive management" which he defines as "leaving the main responsibility for interpreting and delivering the teaching:research nexus to individual staff" (2006, p. 876). This case study found that the quality of the descriptions by UCA academics of the link between research and teaching varied in the amount of detail and the robustness of the evidence. However, the willingness of UCA academics to address this question is at odds with Taylor's finding that academics often judge that the research:teaching relationship "did not need to be amplified or qualified" (2006, p. 871).

The many examples given by UCA academics of how research impacts on teaching were examined, and grouped into 6 key themes. Each of the 6 themes is listed below together with two examples from the many statements made by academics that describe the impacts of research.

1 Impacts on the Curriculum e.g.

- a. The research supports my teaching as there is as yet limited literature and I aim to use lecture and seminar content as a means to address this gap
- b. The research enabled me to support international students through the development of an inclusive curriculum

2 Impacts on Teaching Materials e.g.

- a. The research directly impacts on my approach to teaching as I aim to seek new ways of engaging students to support their learning.
- b. The research led to development of teaching materials for specific units with new lectures and seminars.

3 Bringing Currency/Real World to Teaching e.g.

- a. The research led to connections to industry staff who subsequently I invited in to give master classes to the students.
- b. The research has enabled me to witness other kinds of teaching and educational practices in China and America, which I have added to my repertoire and knowledge.
- 4 Enabling Staff to Act as Role Models to Students e.g.
 - a. The research enables me to provide a role model of an active and successful practitioner.
 - b. The research enables me to talk to students about my own work.
- 5 Staff Development
 - a. The research will give the opportunity to work with new technologies
 - b. It is important for lecturers to update and synthesise new ideas with more established theories.

6 Improving the Authority/ Motivation of Staff

- a. I am able to talk to students with the authority and confidence of a practitioner who is alive to practice.
- b. The excitement and involvement I gain from my research is communicated to students.

Once the detailed statements had been grouped into the 6 themes they were validated in a variety of ways. Firstly, they were shared with the academics who had participated in the study who were asked to confirm the validity of the groupings. Academics did confirm that they recognised the descriptions as both valid and useful.

The case study was then presented at one of the regular research seminars held at UCA so as to test the findings with a wider constituency. Feedback through the discussion at the seminar confirmed the descriptions made by academics of the links between research and teaching. Finally, the case study was presented at UCA's annual Teaching & Learning conference which was held at the British Library in London in January 2008.

The issues identified within this UCA case study were subsequently validated by reference to published research on the connection between research and teaching. However, it is important to recognise that many studies in this area do not deal with art and design specifically. So care must be taken to understand whether the published findings from other disciplines are relevant. Nevertheless many of the beneficial connections between research and teaching identified in this case study are similar to those found in a variety of other studies. Taylor also found that staff emphasised the benefits of research e.g. in ensuring that teaching was up to date. Coate noted the impact on academics' authority to teach and the generation of up-to-date material. Wareham noted the development of an academic's passion for the subject which was then communicated to learners.

However, an additional and significant feature of the impact of research on teaching at UCA is the connection their research enables them to make to a "real world" experience, the Creative Industries and the potential for future employment when they are teaching students.

7 Engaging All Academics in the Research: Teaching Nexus

The case study identified the tensions that exist between academics that are more or less active in research. This factor was seen as a potential barrier to engaging all staff in debates about research and the connection to teaching. In order to facilitate the reflection on these questions in a manner that would be inclusive of all academics, whether they were research active or not, the use of the metaphor of "a journey" was adopted to describe the process that leads to increased research activity.

A 3-level model of scholarly activity (Trigwell, 2004) has proved successful in framing the discussion of these issues at UCA, especially when combined with the metaphor of journey. The 3 levels are:

- 1. Scholarly i.e. reflective approach to practice, internally verified and which contributes to personal theory and supports personal action.
- 2. Scholarship i.e. internally verified, contributes to local theory, supports local action and may be broadly disseminated.
- 3. Research i.e. externally verified, contributes to theory, and may support action locally or elsewhere

Consideration is being given by UCA academic managers to the types of support that individual academics may need to progress from scholarly activity to scholarship, and then from scholarship to research. It is recognised that this 'journey' takes time, resources, support and encouragement. Individual academics are at different stages on the 'journey' and their particular needs to be understood and provided for.

Nevertheless, for some academics years have gone by and they have no research outputs to show. This raises the question of what they are doing within the time available for research. The question of why not all academics are research active is a legitimate one given UCA's goal that research will support student learning and it raises further questions such as whether some students are disadvantaged, in comparison to their fellow students, if the staff who teach them are not research active.

Feedback from non research active staff is that they are using the time to undertake other activities which should be judged legitimate by virtue of the fact that, as with research, their impact is to underpin the quality of student learning. These activities might include, for example, working with the creative industries, whether with large employers or micro-businesses, agreeing live projects for students or overseeing work placements, or keeping up to date with latest creative industry practices.

These other activities are sometimes referred to using the term "teaching" where the term is understood to mean "not research". A significant question is how these other activities are valued in themselves and also in relation to research. Taylor noted the "Widespread view that teaching was under-valued relative to research" (2006, p. 873). Feedback from the wider academic community to the preliminary findings of this case study indicated that there is no doubt that research is perceived as highly valued and rewarded within UCA. UCA academics reported that participation in research activities carries with it an increased status for an individual and implied a hierarchy that was seen as divisive by some, in the sense that "non research active staff" or "teaching only" staff felt that their contribution was not equally valued.

Taylor found that whilst "institutions emphasised the importance of teaching as well as research, many staff took the view that the main factor driving promotion and peer esteem was achievement in research. Significantly, it wasn't apparent in any of the four universities that the actual integration of teaching and research was a critical factor in the assessment of staff performance; officers in one university were aware of this apparent shortcoming given the institutional commitment to the teaching:research nexus but felt unable to develop effective criteria with which to monitor staff performance" (2006, p. 879).

Coate et al noted that "What seems to be missing is a managerial strategy that promotes the intellectual perception of teaching and research as integrated. For example, we visited many departments where research committees and teaching committees had been established but these two bodies worked independently of each other" (2001, p. 162).

8 Conclusions and Recommendations

This case study has attempted to take UCA's strategic goal "To develop an active research culture that measurably advances subject knowledge and impacts fully on student learning" and ensure, as Jenkins and Healey said, that the goal is more than just fine words. Care needs to be taken in applying the lessons from published research in this area which often are not specifically related to art and design. Wareham notes that research within creative disciplines "may be intuitive, playful, experimental, unconscious, eclectic, and sensory rather than verbal and goal-oriented in the way that, say, scientific research may be designed with clear research questions, literature review, methodology and reporting process" (2008, Meaning of Research section, para. 1). The implications for the management of research and teaching in art and design may, therefore, be different to those relevant to other disciplines.

The approach to this case study aimed to create a shared understanding and ownership of issues by managers and academics and subsequently use this as a foundation for a more strategic and managed approach to integrating research, teaching and student learning. It is hoped that the conclusions from this case study will be seen as valid both by academics, who hopefully recognise their own views and real issues, and by senior managers, who will accept the validation by external published research findings. A key conclusion is that academic managers need to demonstrate the highest skills of leadership and management if they are going to engage the academic community, in a manner which both supports and challenges academics, so as to establish effective criteria by which academics' research activities impact on student learning. The case study has demonstrated the need for a more integrated approach which might address Taylor's identified need for academic managers "to recognise, promote and reward the interaction of teaching and research" (2006, p. 875). A key recommendation is that a broader range of activities undertaken by academics should be supported and valued, not just research, as long as these activities impact on student learning, their preparation for employment and the exposure of students to cutting edge practice relevant to the Creative Industries. In order to understand which activities should be judged legitimate, academic managers will need to collaborate with academics to establish the key activities that can be evidenced as supporting learning in these ways.

9 Making the Value of the Research: Teaching Nexus Explicit

The need to be clear about these issues is an imperative as the purposes and funding of higher education become more contested. Universities need to better understand the changing expectations of higher education held by Government, the Creative Industries and the Public. A PA Consulting Group report notes that "The pendulum of public policy towards universities has swung from funding increased provision to extending the public benefits generated by higher education, in terms of social inclusion and mobility, business innovation and competiveness, and most recently to the skills of the professional workforce...this pendulum is most unlikely ever to swing back to the protection and subsidy of provider interests" (2008, p. 5). Jenkin and Healey's identify the need to "Explain and involve students and parents in the university's conception of teaching-research relations" (2005, p. 24). Brew argues that "the old model of the relationship between teaching and research was essentially a static one, focussed on the individualistic actions and assumptions of academics. The new model, in contrast, is dynamic, focused on the socially related meaning-making processes of all participants as learners and knowledge builders" (2006, p. 31). "Students are not simply apprentices in this model; rather, they are viewed as equal partners bringing different levels of knowledge and understanding to it. A radical reconceptualization of higher education is implicated" (2006, p. 35).

Wareham asserts that "Any civilised society needs creative, imaginative, reflective people to question its practices and values and that the creative disciplines in higher education help to develop and foster these attributes" (2008, Creative Graduates section, para. 1) and he recommends that "in developing links between research and teaching we need to ask certain questions about the nature of the research and how this will equip our students for life beyond graduation as practitioners or in other roles within the creative industries" (2008, Meaning of Research section, para. 8).

UCA academics are undertaking research that is recognised internationally as original, significant and rigorous. They are connecting their research to their teaching in ways that develop students' understanding and skills in ways that are relevant to their future employment in the Creative Industries. The challenge now is for academic managers to develop their leadership and management skills so as to enable academics to derive the maximum benefits from research:teaching nexus and for Higher Education to explain these benefits in a convincing manner to students, parents, graduates, employers, the Creative Industries and governments.

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The Commodification of H₂O: How Water Became a Designed Product

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Abstract

Bottled water is one of the great success stories of the design industry. The design brief could have been written quite simply as: 'Add value to a *colourless, transparent, odourless, tasteless, liquid compound of oxygen and hydrogen* (Oxford Dictionary 2008) that is freely available virtually everywhere.' It appears an impossible challenge. However, due to a clever combination of branding and packaging, H₂O is now transported around the world, and is available as a differentiated product at distinct price points, even on the same supermarket shelf. The research project traces the evolution of this phenomenon and the factors that led to its success. One key factor is the social symbolism contained in the packaging, and its capacity to confer status. As the contents, H₂O, are completely undifferentiated, the packaging assumes an importance perhaps unparalleled in consumer product design. The environmental, economic, and social factors that result from the success of bottled water are explored.

Keywords: Bottled mineral water, product symbolism, packaging design, consumerism, spa

The pursuit of purity

In medieval Europe drinking the water in towns or cities was a potentially dangerous act. Urbanisation had lead to it being polluted and undrinkable, making water a dangerous commodity. Instead, wine, beer and ale were the customary choice of hydration, as water lacked the prestige of these much safer and often medicinal liquids. During his notorious reign leading up to the French revolution, King Louis XVI drank a litre of Champagne for breakfast (Andrew 2007; Taylor 1997), although, fortunately, it was common for beverages such as these to be brewed with a low alcohol content where they were to be regularly consumed (Gately 2008; Mascha 2006). Fortunately, the problems with polluted communal water in medieval times were eventually solved by advances in capturing, filtering, storing and distributing water that had been active ever since the appearance of agriculture an estimated ten thousand years ago (Mascha 2006).

Bottled purity

The commodification of water was achieved with advancements in all of these areas. However, this paper treats single-use bottled water as the ultimate form of water commodification. Bottled water embodies commodification via the use of design, symbolism and mass production.

The bottle, the packaging of this essential element, began through the transportation and storage of water. The source of Apollinaires, a luxury mineral water brand from Germany, is a spring in the volcanically active Eifel region. Its mineral enriched waters have been valued as a luxury drink since Roman times. The ancient society distributed the water across the empire in clay jugs. The waters were sold in earthen jugs during the nineteenth century, and later in glass bottles, which also became popular for most other distributors of bottled water (Mascha 2006).

Possibly the most vital type of vessel in history is the water storage pot, a product of the 8000 year old craft of pottery (Hopper 2000). It was probably similar to the earthen jugs that contained Apollinaires water and is the founding ancestor of today's bottled water packaging.



Figure 1. Collard stone water jar, Greece, 3200 – 2700 B.C. Source: Hopper, p. 39 (2005).

Mineral springs like Appollinaires have had their waters transported in vessels throughout Europe since classical antiquity (8th Century BC – 5th Century AD) (Mascha 2006). However, the mass production and commercialisation of bottled water didn't occur until spa culture came to the apex of its popularity during the 18^{th} and 19^{th} Centuries (Dege 2005; LaMoreaux & Tanner 2001; Mascha 2006). Appollinaires was one of many bottled mineral water brands that were made famous though spa culture, as well as global brands including Evian, San Pellegrino, Perrier and Spa (Mascha 2006; Royte 2008). The history of spa culture is a story that tells of a pursuit for the purest water, a story that eventually lead to bottled water becoming a highly designed commodified product.

Spa Culture

Within recorded history, the search for pure, clean water was driven by the desire for health and well being. Through this search, many ancient civilisations came to believe in the healing abilities of mineral springs and pools. Chinese emperors bathed in mineral waters to remedy such ailments as dermatosis and malaria. Their Greco-Roman counterparts built baths that were highly regarded social hubs and, in the case of the Romans, the baths transcended social boundaries in bringing the different classes together in social and intellectual interaction. Meanwhile, over the Atlantic, Native Americans bathed in mineral pools to treat a range of ailments, especially rheumatism, for hundreds of years before the colonists introduced spa culture to America (Arvigo & Epstein 2003; LaMoreaux et al. 2001)

As the cultural significance of mineral springs and pools continued into the medieval ages, the poor quality of municipal water at the time continued to drive the search for pure water, particularly in Continental Europe (Dege 2005; Finlayson 2005). There, great spa towns were established, boasting of their pure springs with unique mineral compositions that could cure ailments and maintain health. Elaborate *water hospitals* such as Contrex in France and Fiuggi in Italy were established (Mascha 2006) as the different waters became known for their own particular health benefits (Dege 2005).

In the valley of Ardennes, Belgium, a mineral spring became famous for its therapeutic qualities. It was first used by the Romans and called Sulus Par Aqua, "health through water". The town has subsequently became known as Spa, derived from the spring's original name (Crebbin-Bailey, Harcup & Harrington 2005). In establishing Spa as an international mineral water brand, the waters were first bottled in 1583 and regularly exported to the King of France himself, Henry II (Bottled Water Web 2008).

Through its popularity and subsequent exports to other parts of Europe and eventually the world, the name 'Spa' became synonymous with the natural springs and health resorts (Bottled Water Web 2008;

Crebbin-Bailey et al. 2005), ultimately creating a milestone in the commodification of water. Spa's story tells of an evolutionary development in the culture of water from hygiene and health to a highly commercialised product.

Initially the act of bathing in the pools and drinking from their source was a healthful practice that became known as "taking the waters", a phrase that encompassed the medicinal values and well-being of spa culture. An opulent marble drinking hall in San Pellegrino, the Fonte Termale (Thermal Fountain), is a tribute to the glamour of "taking the waters". The town itself was put on the map when Leonardo da Vinci sampled its spring water during his time in nearby Milan (Hordon 2005; Mascha 2006). Spas become increasingly popular during the 18th and 19th Centuries, even allowing visitors to take the healthful waters home with them, a significant step towards the commodification of water. The development of machines that could manufacture and fill the bottles meant bottled water suppliers were able to cater for this emerging market (Fletcher 1976; Hordon 2005; Royte 2008). Bottled water had been commodified and carried with it the symbolism and culture of the spas that it still retains today.



Figure 2. San Pellegrino early 20th Century Print Ads (c. 1899). Source: sanpellegrino.com.

A further development in the narrative of packaged water was the invention of artificial carbonation in the 1760's. This eventually lead to a temporary fall of the popularity of bottled mineral water towards

the end of the 1800's when flavoured soda waters or *soft drinks* became the consumer's favoured beverage of choice (Finlayson 2005). The revival of sales of bottled water is ascribed to the Evian company that during the 1950's pioneered the advertising claim that Evian can "help lactating mothers and (provide) important minerals for infants" (Mascha 2006, p. 19).

From pure ignorance to pure hype

In the industrialised world of the twentieth century, reliable sources of clean water in consumers' homes led to different approaches to the marketing of bottled water. It became a "lifestyle" product, and the health issues it promised to counter were obesity and not disease, as they had been in medieval times. Busy lives left consumers little room for opportunities to engage in healthy activities let alone seriously consider their personal health (Caballero 2007). In this environment, sugary soft drinks were the refreshment of choice, contributing to the industrialised world's growing obesity problem. In 1989, the new half litre PET bottle was introduced to the bottled water industry (Royte 2008). At a time when convenience was in high demand, the portability of the new bottle acted as a catalyst for change. Bottled water became a mandatory accompaniment in sports clubs and at the workplace. The value of health and well being, as it had been in the spa era, was the prominent factor for the rising popularity of bottled water (Euromonitor International 2008; IBIS World 2008).

The global consumption of bottled water has almost doubled since 1997 from 12 litres per person to 23 litres in 2006. Bottled water has overtaken soft drinks to become the world's most popular beverage. From 2002 to 2007 the global bottled water market value increased from 15.3 billion to 66.6 billion with consumption forecast to continue rising (Datamonitor 2008; Euromonitor International 2008; IBIS World 2008).

Branded water

Much has changed in the 400 years of commercially bottled water, except for the primary incentive motivating our need for the perfect water, *health*. Intensified attention to health during the 1980s and 1990s was encouraged by government health campaigns and was given an extra boost by heavy campaigning from the bottled water brands.



Figure 3. Evian L'original Print Ad (1999). Source: hometheaterforum.com.



Figure 4. Evian L'original Print Ad (1999). Source: crisisville.com.



Figure 5. Aquafina Pure Water No Attitude Print Ad (1999). Source: coloribus.com.



Figure 6. Apollinaris Print Ad (1999). Source: coloribus.com.



Figure 7. Dasani Treat Yourself Well Everyday Print Ad (1999). Source: stanford.edu.



Figure 8. Sole Print Ad (1994). Source: coloribus.com.

The popularity of bottled water had always been supported by the historical narrative of spa culture. This story of tradition and health is apparent in advertising which emphasises the particular analysis of minerals and natural filtering processes, the source stories, social symbolism and lifestyle.



Figure 9. Health themes – Evian Source of Youth Print Ad (2005). Source: adme.ru.



Figure 10. Purity themes – Fiji What Ecosystem Does Your Water Come From? Print Ad (2005). Source: abc.net.au.



Figure 11. Lifestyle themes – San Pellegrino Live in Italian (2004). Source: sanpellegrino.com.



Figure 12. Youth culture themes – Cool Ridge, Getting Things Out of Your System. Source: adshelcreate.com.au (2009).

With the expanding market and increasing competition, the role of advertising in differentiating products is essential with brands going to extreme lengths to bring attention to their products. In Australia, Mount Franklin grabbed viewers' attention and curiosity in the late 1990s with a detailed sequence of two Franklin Mountain Woodland snails mating! That was then followed by the otherwise innocent tag line "Another feel good moment".



Figure 13. Mount Franklin Another Feel Good Moment Television Ad (1999). Source: coloribus.com.

With this extreme advertising accompanying more traditional imagery of snow-capped mountains adorning bottles with healthy, happy people drinking from them, consumers flocked to "take the waters" once again. This search for the most perfect, pure water is seemingly without limits. Branded bottles of the humble fluid are shipped over oceans, all around the world, so we can consume our favourites and try new ones...



Figure 14. Shipping water over water (n.d). Note: Copyright Bruce Perry

Evian, Spa, Tynant, San Pellegrino and Voss are popular European brands that are shipped 17,000 km to Australian shores. The search for the perfect water has even extended to the depths of the oceans. Brands such as Kona Deep and Mahalo Hawaii are piping deep sea water from 3000 meters below to the surface before desalinating it. Brands like these are marketed as the only sustainable source of pure, fresh water left as our environmentally damaging lifestyles pollute ground water and thin out other fresh water resources (Mahalo Hawaii Deep Sea 2007). Icebergs are harvested and melted for similar reasons by brands like Berg and Naeve Water.

Ritzy bottled water bars have appeared in modish locations from Paris to Los Angeles. Patrons are invited to taste waters from branded bottles that look more like collectors' items, while learning of their source and mineral contents. From Via Genova in Cappaqua, New York, to Colette's Water Bar in Paris and Aqua Store in Rome, these water bars elevate bottled water to a status that rivals the symbolically layered culture of wine (MacLean 2004).



Figure 15. Acqua Panna A Water that Belongs on the Wine List. Source: Wine (2009).

In the water version of this sophisticated culture, the word 'sommelier' is no longer reserved for wine experts. Water sommeliers can now be found in fine hotels advising discriminating customers on their choice of branded fluid (Howard 2003; MacLean 2004). Filip Wretman, acclaimed as the world's first water sommelier in 2002, educates patrons of the Ritz-Carlton Hotel in New York on the mineral composition of various brands and assists with their water-food paring.

The mineral composition of water is of particular interest today just as it was during the days of spa culture. Today, water brands have taken advantage of rising health concerns and regularly boast of unique mineral contents that suit particular health needs of consumers, whether it is to look younger or assist in mineral deficiencies. *Beauty to Go* takes the age reversing claims of bottled water head on with its brand name and declaration of "rich silicon quantities, which improve moisturising and enhances the tension and elasticity of the skin" (Christidis 2008).



Figure 15. Daily Beauty To Go (2008). Source: dailybeautytogo.

While many bottled water brands turn to unusual and extreme promotional material in this crowded market, some even expand their business beyond humans. After conducting research for a new product line, Charles Calise, Director of Innovation for Cotts stated, "We know that trends in the pet category quickly follow trends in the human category" (Zmuda 2008, p. 4). Fortifido, fortified water for dogs, was created by Cotts in order to compete in the saturated bottled water market (Prepared Foods 2008; Zmuda 2008), with a number of companies following suit.



Figure 17. Fortifido pet water (2008). Source: blisstree.com.

Perhaps as a result of this bombardment of advertising and increasing consumption, concerns arose. As advertising hinted that bottled water was healthier than tap water (Hordon 2005; Royte 2008), consumer advocates began questioning the differences between the two leading to an increase in the speculation of water's homogenous nature (Ferrier 2001; Howard 2003; IBIS World 2008).

A number of scientific studies indicate that despite some differences in mineral content, there is little difference in actual health benefits derived from bottled and tap water, as well as little difference

between waters of individual brands (Ferrier 2001; Howard 2003; IBIS World 2008; Olson 1999). In fact it can be argued the high levels of advertising in the bottled water industry are a result of water's homogenous nature! (Ferrier 2001; IBIS World 2008).

Critics have begun to term the success of the industry as "one of the greatest marketing coups of the 20th and 21st Centuries" (Royte 2008). Such assessments are part of the "tap vs. bottled water" debate that includes regular flurries in the popular media of statistics, environmental reports, spoof ads and highly criticised claims about these two forms of water consumption.

Environmental organisations such as the EPA (Environmental Protection Agency) urge consumers to avoid the bottle and drink from the tap at a fraction of the cost to the environment and to their wallet. While bottled water can cost 240 to 10,000 times more than tap water in America (Ferrier 2001; Li 2008; Royte 2008), Clean Up Australia Chairman, Ian Kiernan, claims Australians pay around 2500 more for bottled than tap (Allen 2002). By contrast, the bottled water companies point out the importance of providing bottled water for its convenience and capacity to give consumers an alternative option where tap water is not suitable (Logomasini 2009).

Naturally, the environmental issues are a major focus in this ongoing battle and it turns out that the plastic bottle, after contributing to the boom in bottled water sales during the 1980's, is now the primary source of environmental criticism for the bottled water industry. While bottled water providers uphold their position as advocates for recycling initiatives (Australian Bottled Water Institute 2004; International Bottled Water Association 2001), many consumers shun bottled water since the plastic packaging is labelled as an unnecessary contributor to plastic waste, when you can get water that is of similar quality from the tap – the 35% recycling rate of plastic bottles in Australia is a common statistic used in media coverage on this controversial topic (eg: Koutsoukis 2007).

Environmentalists' attempts to ween consumers off plastic have used the allure of the bottle and its associated marketing against the bottled-water industry. An example comes from Italy where citizens drink more bottled water than in any other country – up to 40 gallons per person (Rosenthal 2009). This poses a real problem in Venice where discarded bottles end up in the canals, difficult to collect. City officials have taken a unique approach to solve this problem by branding their tap water *Acqua Veritas* and readily applying a form of advertising that mimics the global multi-billion dollar bottled water industry. This included a bottle for Acqua Veritas in the form of a stylish carafe that was distributed free to households (Rosenthal 2009).



Figure 18. Acqua Veritas , a poster promoting Acqua Veritas with the mayor of Venice, Massimo Cacciari (2009). Source: nytimes.com.

Yet, despite the uprising against bottled water, it is now recognised by consumers as being healthier than any other beverage (Brent 2003; Grunwell 1999; Heeringa 1996) and advertising has led people to believe bottled water is healthier than tap water (Ferrier 2001; Royte 2008). Bottled water has become a social phenomenon, with advertising and changes in social and cultural behaviour creating a mass market for an undifferentiated, otherwise freely available product. Yet there is one more element of bottled water that not only defines it as a commodity but plays a significant part in its success as a highly desired product.

Would you like some bottle with that water?

For homogenous products, the design of packaging acts as the primary point of differentiation (American Marketing Association 1998; Spethmann 1994; Underwood 2003). There is also evidence that consumers are increasingly making non-durable product buying decisions at the point of sale where the packaging is the primary point of brand communication (Prone 1993; Underwood 2003; Vartan & Rosenfeld 1987). So for bottled water, the packaging plays a particularly important role in gaining market share (Ferrier 2001; IBIS World 2008; Som 2008).

Bottles now come in an ever expanding array of shapes, sizes, colours and materials...



Figure 19. Designer water packaging.

The regular glass and plastic bottles are now rivalled by Tetra Pak cartons and flex packs while exclusive bottles created by celebrity designers such as Phillip Stark and Ross Lovegrove attract consumers' attention with luxury appeal.

As bottled water suppliers use high levels of advertising to create symbolic meanings of health, purity and social status, it is plausible to assume that consumers use the symbolism of bottled water to express their self-identity (Ferrier 2001; Royte 2008; Yu 2006). While consumers still consider taste and convenience when it comes to bottled water (IBIS World 2008; Logomasini 2009), these symbolic meanings have a particularly strong effect on consumer choice, making bottled water more of an accessory, than just another beverage (Arnould & Thompson 2005; Euromonitor International 2008; Evans 2007; IBIS World 2008; Yu 2006).

In *Selling Dreams* Longinotti-Buitoni (1999a) explains how *dreamarketing* appeals to consumers' imaginations and emotions, turning the ownership of a product into a dream experience. Longinotti-Buitoni (1999b) describes bottled water as a *dream product*; it is not designed to quench our thirst, but is a representation of acceptance from peers, and a representation of the fountain of youth.

The role of the bottle for branded water is made highly unique by its social symbolism, as consumers use it to create and communicate self-image. Product symbolism studies focus on the abilities of products to encompass abstract ideas and associations with values and characteristics, as well as consumers' beliefs about the kinds of people who use the products (Allen 2002). Symbolic messages may include those of convenience, environmental consciousness, quality and health (Underwood 2003).

While product symbolism studies have shown that consumers draw on the values and emotional messages encoded in products to form their self-image (Belk 1988; Levy 1959; Strizhakova, Coulter & Price 2008; Underwood 2003), it has also been established that product values and characteristics are reflected on their owners by other consumers (Allen 2002; Escalas & Bettman 2005; Holman 1981; Wackman 1973). Belk (1982) introduced this process as *consumption decoding*.

The designer's ability to differentiate such a generic product as water via the appearance and symbolism of packaging is a trait that is perhaps unparalleled in consumer product design. This makes water packaging a highly suitable candidate for studying how product values and characteristics are reflected on their owners by other consumers. In an effort to understand the bottled water phenomenon and the effects of its packaging on consumer personality, a pilot study was conducted involving stimuli images of a male and female person shown with two different bottled water packages.


a. Male with Aroona water bottle.



b. Male with *Bling H2O* water bottle.



a. Female with *Aroona* water bottle.
b. Female with *Bling H2O* water bottle. *Figure 20.* Models with water packaging (2009). Source: Images created by the author.

Creation of the images was a multidisciplinary collaboration between a designer and psychologist. The designer obtained a series of stock photographic images of male and female people or *models* through an extensive internet search. With advice from the psychologist the designer conducted a survey intended to identify which male and female models' faces were of average attractiveness. It is important to use models of average attractiveness as the focus of the final images is to be the bottled water products. A person who looks overly attractive or unattractive may distract from the products. A nine point, attractive to unattractive, semantic differential scale was used to rate the attractiveness of the faces in order to find those of "average" attractiveness. In other words the closer a face is rated to a '5' on the scale the more "average" the face is presumed to be. With knowledge about human perceptual behaviour the psychologist advised on composition while the designer digitally superimposed the chosen faces with parts from other images to create four new images that were similar in terms of appearance and attractiveness of the male and female model. These images were used in a pilot survey along with a set of questions about the models' personality and social traits in the form of nine point disagree to agree scales (Sekaran 2003).

Question example:

1. He/she looks friendly.

Disagree 1 2 3 4 5 6 7 8 9 Agree

The 9 point scales were designed according to previous research by (McCrae, John & Oliver 1992) on the 5 factor model of personality. This model is a hierarchical organisation of personality traits in terms of five basic dimensions (also known as the Big 5): Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience (McCrae et al. 1992). These five factors had been obtained in different cultures, with different languages, using different instruments and with different theoretical frameworks (Mount 1998; Paunonen 2003).

The 23 questions were randomised. The personality traits of the five factor model for use in the questionnaires are given in Table 1.

Agreeableness	Extraversion	Conscientiousness	Neuroticism	Openness to Experience
Friendly	Masculine/feminine	Positive Attitude	Unstable	Creative
Trustworthy	Elegant	Reliable	Anxious	Stylish
Generous	Sporty	Efficient	Venerable	Open to new ideas
Kind	Attractive	Organised		

Table 1: Five factor model classification for the questionnaires.

Results from the pilot survey showed that the perception of the models' personalities changed significantly when pictured with the different brands of water. Personality traits and social aspects that changed significantly for both models included their *elegance*, how *sporty* they looked, how *stylish* they were and how much they looked *open to new ideas*. There were more significant differences in the perception of the male model's personality than there were of the female model. While the male model had 16 significant changes in personality the female model only had 10. This pilot survey led to the development of a larger, revised, survey currently being undertaken.

As a successful marketing tool, packaging is a key element in many industries, none much more so than the bottled water industry. It has elevated bottled water to the prestigious position of the world's most popular beverage. While many environmentalists and consumer advocates are alarmed by the growth of this industry, the sales of bottled water are forecast to continue increasing, as people continue the pursuit for pure clean water.



Figure 21. Wet bone pet water. Source: Brand Packaging (2008).

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Designing Information, Experience and Presence: An Interdisciplinary Approach to Virtual Heritage

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Abstract

Digitisation, combined with the Internet, offers new access to heritage sites. However, overcoming the intrusion of the mediating technology to give people a feeling of 'being there'— a psychological phenomenon known as presence — is a fundamental challenge in developing Web-based virtual heritage environments. Design is important to the communication of presence, but its role is not considered in the literatures of virtual heritage or presence. In crossing matters of form, content, people and technology, issues in virtual heritage resist the processes of reduction that characterise traditional disciplinary research. This paper combines ideas from information and experience design, presence and virtual heritage to investigate how the demand for historical accuracy and heightened audience experience can be balanced in creating virtual heritage environments. Conversely, it also discusses the risks for design researchers in drawing on heterogeneous sources of knowledge, but argues that this is a way to see larger issues in design.

Keywords: virtual heritage, presence, phenomenology, information design, experience design, interdisciplinarity, practice-based research.

Introduction

The Western scholarly tradition has supported interdisciplinarity since the time of the Greek Sophists, when the idea of the well-rounded education exposed students to all existing disciplines in turn. In modernity, however, the disciplines progressively became more separate and specialised (Latour, 1991), Lyotard (1984) depicting the rise of modernist empiricism as prompting 'a multiplication of argumentation and a rising complexity level in the process of establishing proof (p. 41)'. Recent interest in interdisciplinarity seeks to redress the problems caused by specialisation. For Gusdorf (1977), 'As specialization has brought about the advancement of learning, so the concern for unity has fostered a desire for a bringing together again, a reamalgamation to remedy the intolerable fragmentation both in the fields of knowledge and in the men of science (p. 581)'. Aside from the idealism of reunifying fragmented spheres of knowledge, there are pragmatic reasons for

interdisciplinary research. Ideas and methods from one discipline can aid the identification, understanding and solution of problems in another (Aram, 2004, p. 382). Sourcing knowledge and methods from other disciplines is sometimes the only means of progress in research, Bruhn (2000) arguing that interdisciplinary research has proved its value 'when traditional research approaches have failed to come up with answers to common problems (p. 58)'. Interdisciplinary research is almost inevitable in design, design research questions typically emerging from a combination of human, economic and technological factors.

Even so, research conducted between disciplines raises basic questions about the nature of the relationship between bodies of knowledge and methods, namely whether the research is multidisciplinary, interdisciplinary or transdisciplinary. Each category of research crosses disciplinary boundaries, but through a different order of exchange. Choi and Pak (2006) argue that multidisciplinary research happens without a merging of disciplinary boundaries, problems being worked on sequentially or in parallel. Interdisciplinary research is interactive, blurring the boundaries between disciplines to create 'new common methodologies, perspectives, knowledge, or even new disciplines, where transdisciplinary research views complete systems in a holistic manner (Choi & Pak, 2006, p. 359)'. Aram (2004) writes of 'instrumental interdisciplinarity', which seeks to build bridges between fields in the search for answers, 'epistemological interdisciplinarity', where other disciplinary knowledge redefines a field of thought and transdisciplinarity, which seeks 'coherence, unity and simplicity of knowledge' (p. 382). For Thompson Klein (2004, p. 515), transdisciplinary research produces general concepts that drive a range of disciplines and is reflected in the rise of transcendent intellectual paradigms such as Marxism or feminism, or fields like cultural studies that exceed one discipline, or general studies such as philosophy or religious studies that exist concurrently over a broad fields of scholarship.

Design research is already conducted in a range of disciplines. The synthesis of different disciplinary knowledge has brought new ideas and methods to understanding design. However, in traversing disciplinary boundaries, design researchers risk appropriating knowledge without understanding the full meaning of the borrowed ideas. Before a researcher can apply new ideas or methods in their home discipline, they need to understand their meaning in their original disciplinary context (Lauer, 1984), otherwise the exploration of research questions may be superficial rather than deep. Indeed, Durling (2002, p. 82) cautions that where a researcher's limitations and personal interests frame the combination of knowledge in design research rather than specific research problems or questions, the resultant study may be a loose collection of methods and ideas. Golde and Gallagher (1999) warn that research conducted in the gap between different fields means the researcher has no established frameworks or models to guide them.

'Knowledge' in a substantially vocational field such as design is mostly practice-driven not evidencebased and there is heated debate about the role of practice in design research (Friedman, 2003; Downton, 2003; Candlin, 2000; Pedgley & Wormwald, 2007; Pedgley 2007). However, Samraj and Swales (2000, p.52) argue that where a contextual problem frames multidisciplinary research, the application of theory to practice may result in the successful synthesis of disciplinary perspectives and ensure the relevance of any new knowledge produced. This paper reports on research that used a real world project from the area of virtual heritage to investigate the design of affective information, highlighting the convergence of the fields of information and experience design. In exploring how to balance audience experience and historical accuracy in the development of a virtual heritage environment, the research incorporated ideas and evidence from the fields of information and experience design, presence and virtual heritage. Our paper shows that where a design project contextualises a research investigation, providing the source and justification for its questions, real world factors can have a positive effect in defining the ambit and validity of a research investigation.

1. Design research, interdisciplinary by nature?

Design research is inherently interdisciplinary in seeking to understand important aspects of the human world. Cross (1999) cites Simon's argument that, 'The proper study of mankind is the science of design (pp. 7-8)'. Simon argues that since design is intrinsic to the production of the artificial world, the investigation of design automatically crosses into other knowledge areas and can also provide the overarching impetus for communication between creative fields as disparate as engineering and music. Design may be a transcendent area of human activity fundamental to the production of the artificial world, but this does not answer the problem of how design researchers can negotiate interdisciplinary knowledge. A basic struggle exists between disciplinarity and interdisciplinarity in design research. Cross accepts there is growing recognition of design as a rightful academic discipline and increasing awareness of the applicability and strengths of design thinking within the context of design research; this builds the argument for an independent design research culture, but the role of design practice in design research remains vexed for the design research community, being bound up in questions of rigour.

Downton (2003) argues that the activity-based nature of design validates the idea of designing as research. Others contend this does not stand up to the exacting needs of research (Friedman, 2003; Durling, 2002). Indeed, Archer expressly warns against designers becoming researchers, and vice versa, since the demands of the two fields are very different (see Pedgley & Wormwald, 2007, p. 71). Design practice alone is not generally regarded as a strong enough research method (Candlin, 2000; Pedgley & Wormwald, 2007; United Kingdom Council for Graduate Education, 1997), but design practice can form part of a valid research investigation if combined with other aspects of research such

as logical argument to enable hypotheses formation, theory building and to enable research dissemination. For Cross (1999), however, a line needs to be drawn between works of practice and works of research given that the purpose of research is 'to extract reliable knowledge from either the natural or artificial world, and to make that knowledge available to others in re-usable form (p. 9)'.

Rigour is risked when other disciplinary knowledge is added to design research investigations. For Buchanan (2001), applied research allows the proposition of general theories and models from the conduct and reporting of individual cases. However, he recognises that the multitude of other factors that can enter the investigation of real world products or activities can compromise the scope for generalisation (Buchanan, 2001, p. 18). The requirement for theory building may not be possible in individual design research investigations, especially where applied research and interdiscipinarity are central to the study, the specificity of the real world problem perhaps proving resistant to the proposition of hypotheses. For, Cross (1999) the main challenge for design research is finding 'a way of conversing about design that is ... both interdisciplinary and disciplined. We do not want conversations that fail to connect across disciplines, that fail to reach common understanding, and that fail to create new knowledge and perceptions of design. It is the paradoxical task of creating an interdisciplinary discipline (p. 8)'.

2. The applied project as a research question

In this research, the use of design to convey the feeling of presence in an online virtual heritage environment framed the research investigation. It set key research directions and influenced conceptual frameworks and methods and also identified important issues and questions for the fields of information and experience design, suggesting their convergence where presently they are largely separate fields of design practice and thinking. Virtual heritage is an increasingly important area within museums and cultural heritage, mixing sites and artefacts with information technology to provide new ways for people to access heritage information and experience. It is an emerging area of research, focused on issues associated with the digitisation, preservation and dissemination of information on cultural sites and objects. By its nature, virtual heritage is transdisciplinary, combining elements of archaeology, heritage studies, information technology and design among others. The applied project, a digital reconstruction of a temple complex, is an online companion to the exhibition 'Ancient Hampi: The Hindu Kingdom Brought to Life', Melbourne Immigration Museum (2008-2010). The Ancient Hampi exhibition sought to give the viewing audience an experience of being at the temple sites of Hampi, sparking their interest in the area and its rich cultural background, an objective heavily reliant on creating the psychological feeling known as 'presence'.

One of the purposes of the Place-Hampi installation is to give the audience the feeling that they had been transported to India and are viewing the scene directly. This is done through journey, by 'virtually' moving from one viewing space to another, through interaction with the platform itself, giving agency to the person driving the experience, through stereoscopic visuals and sounds, and through interactive relationships with avatars representing the gods of the temples (Kenderdine, 2007). The accompanying website supplements the experience with contextual information and with additional multimedia content. A digital 3D reconstruction of the Vitthala temple was created to explore the design of presence in online media. Although a home computer cannot give the same experience as the installation piece at the Ancient Hampi exhibition, a computer screen being a far more restrictive viewing area than a 360 degree PLACE screen, it has the benefit of allowing the viewer to have an experience of Hampi from their own home. The challenge was to bring the feeling of 'being there' to the online environment.

Presence is a term used to describe the feeling of 'really being there' that arises when a person operating in a digital environment ignores the mediating technology of the experience and directly processes the visual, auditory and haptic stimuli. Biocca (1997) identifies presence as "the illusion of 'being there' whether or not 'there' exists in physical space (p. 18)." Within the research, the development of a digital reconstruction of the Vitthala Temple, situated near the village of Hampi in the Indian state of Karnataka, highlighted the challenges involved in achieving presence through design. The causes and effects of presence are widely debated, there being no agreed position in the broad literature on presence to account for its nature and thus no established criteria for recreating it. Different researchers conceptualise presence in different ways. Some describe it as the feeling of being there, the feeling of being in a mediated environment, a uni-dimensional experience, or something experienced on many different levels. Some even argue that presence research should not be limited to digitally mediated environments, but has an equal place in the consideration of human cognitive experience in physical environments. There is wide debate on the causes of presence; whether it is a perceptual failure, a perceptual illusion or a side-effect of immersion and involvement (Bracken, 2005, p. 192; Carassa, Morganti & Tirassa, 2005, p. 384). Many writers highlight that presence is also a highly subjective and variable experience (Bracken, 2005, p. 193; Herrera, Jordan & Vera, 2006, p. 548), Heeter (2003, p. 336) arguing that it depends on an individual's reception of sensory data in any instance and also on people's past experiences.

Contention over the characteristics and causes of presence is a matter for presence researchers to solve, not design research. Design research investigates matters of design, the inherent emphasis in this research being the challenge theories of presence offer to existing design practices and their understanding. In this research, the diverse theories within presence research are not weighed against one another, but rather applied on the basis of their relevance to design. The research approaches

presence as a design issue after establishing common axioms and theoretical connections between presence research and design research. The way forward resides in how people process information, building on connections between phenomenology, presence, interpretive archaeology and information design to create new frameworks for the design of virtual heritage environments.

Floridi (2005) sees presence as an epistemic failure that creates a false psychological impression. Rather than seeing presence as a psychological mistake, the research addressed it as a feeling that adds to the overall experience and understanding of a virtual environment; in fact a message that adds environmental data that influences the way the viewer processes information, if not data in its own right. Cognitive psychology already views feelings as a type of information, allowing the feeling of 'being there' to be approached as such (Ortony, Clore & Collins, 1988, p. 66). As with other types of information design, the designer selects the data and treats it in the best way to convey the intended message, the viewer taking in the data, filtering it and combining it with their pre-existing thoughts and experiences to create understanding. Figure 1 represents the theoretical parity between presence and information design.



Figure 1. The theoretical parity between presence and information design.

If the research only concerned presence as a form of information design, interdisciplinary investigation could stop there. However, a key argument for attempting interdisciplinary research is the capacity to address the complexity of questions in the contemporary world. Issues of presence in virtual heritage do not only concern the forms of delivery. They also touch on issues of content that the design researcher needs to understand, the value of synthetic design research arguably being the useful connections it identifies between other areas of research. Key to processing environmental data to create a new understanding about a heritage site is the question of user experience. The theory of experience, or phenomenology, and the design-focused practice of experience design are two integral fields in respect of the applied project and the research questions. There is a negligible scholarly literature on experience design, demonstrating the benefits of interdisciplinary research in building

knowledge and understanding in design. By contrast, psychology provides a rich body of knowledge on human experience. Previous researchers incorporated cognitive psychology into information design to strengthen the field. There is potential to incorporate phenomenological psychology into experience design to create stronger theoretical research in this area. The fields of human computer interaction (HCI) and interaction design already look to phenomenology to address issues of user experience and design (Blythe et al., 2007). HCI and interaction design are not synonymous with experience design; rather experience design can be viewed as an overarching transdisciplinary field defined by the common goal of creating experience that encompasses some of the literature in these fields.

3. Emerging issues of the applied project

In considering how to design presence into digital 3D virtual heritage environments various bodies of research are relevant. Kenderdine's paper (2007) on Place-Hampi introduces the idea of interpretive virtual heritage, which synthesises aspects of archaeology, cultural heritage and interpretive archaeology, the practice of interdisciplinary research potentially suggesting diverse new areas to explore and leading the researcher into areas progressively more tangential to the original research question. In this research, the needs of the applied project established a cogent set of questions that suggested which areas of scholarship outside design were relevant to the investigation. Virtual heritage has to meet the needs of art, entertainment and science. It must be entertaining enough to capture and hold an audience's interest (Mosaker, 2001, p. 23), but accurate enough to present a reliable representation of a site (Mosaker, 2001, p. 21). Authenticity occurs on two levels in a virtual heritage model: believing by seeing and believing through authority. An audience can maintain scepticism when reading a description of a place, but providing a visual interpretation adds believability, the audience trusting the evidence before their eyes (Mosaker, 2001, p. 21). There is additional trust if the model is created under the auspices of a museum, which adds a sense of authority not present in a medium such as a computer game (Walsh, 1997).

Yet, the concept of truth is problematic. Truth in virtual heritage may initially seem to dwell in the physicality of a site, the notion being that the more visually accurate you make a model, the more truth it contains (Roussou & Drettakis, 2003, p. 2). But the nature and meaning of a heritage site reside not only in bricks and mortar. It involves the context of its cultural significance, the historical interaction of groups of people with the site, the experience of the individual and the changing nature of the site over time; all elements that form a subjective narrative in constant flux (Champion, 2007, p. 6; Champion & Dave, 2007). The problem for the virtual heritage designer is that the technology that creates, transmits and displays a 3D digital model constrains its form. The changing nature of a site over time is complex, difficult to program and results in huge file sizes that are slow to download. People interacting with a digital environment bring different cultural expectations to the experience to

those of a site's previous inhabitants. This is problematic enough with a single user, but hosting large numbers of virtual visitors creates additional problems of authenticity. People interacting with a site and each other according to modern cultural norms will erode the character of the original and create a feeling of digital tourism (Champion, 2007, p. 2).

4. Interdisciplinary solutions

Various non-design fields shed light on these problems. Presence research and interpretive archaeology identify the gap between contemporary viewers' experience of a site and that of previous inhabitants. They suggest the viewer will filter what they see through their personal experience, resulting in very different understandings of a site (Champion, 2007, p. 5; Hodder, 1991, p. 8). Interpretive archaeology argues that commonalities in human experience mean the emotional impact of a site is often similar. People will move through the site in certain ways due to the geography and architecture, causing them to see the same things, be overwhelmed by the size of objects in the same way or be captured by a site's details (Brück, 2005). This offers a potential solution for the designer seeking to enhance presence through design.

In the conduct of the design project, technology both solved research questions and created additional problems. Co-presence, or the experience of being there with other people, is possible using the ExitReality 3D Web browser plug-in (ExitReality, 2009). However sharing the ExitReality experience with others requires that files are uncompressed, resulting in excessively large files. It promises a valuable tool for co-presence in less detailed virtual heritage environments, but for virtual environments with large file sizes it is better to compress the file for download. The need to transmit the 3D digital file over the Internet presents intrinsic challenges, but also opportunities to explore the creation of presence within real-world limitations. The project uses X3D because of the availability of plug-ins for viewing X3D files on commonly used Web browsers. However, its modelling language meant a lack of bump maps and shadows for most plug-ins; ensuring small file size necessitated reduced model complexity, resulting in reduced photorealism and detail. To disguise the lack of detail, the scene was set at twilight, highlighting one of the striking details of the temple, the darkness of the site enabling the columns to be lit from below as happens at the actual site.



Figure 2. Screen capture of the view from inside the central monument in the virtual Vitthala temple.



Figure 3. Screen capture of the central monument of the virtual Vitthala temple.

The technical limitations resulted in a scene that felt quite austere. This was in keeping with the photographs on which the virtual environment was based, but resulted in a reduced audience experience. Viewers could navigate through the scene and explore various parts of the temple, but there was no other incentive to interact with the environment. An intuitive design response is to increase photorealism through additional detail, but produces files that are far too large in size. Rather than look to design research for a solution, the answer was found in presence and interpretive archaeology. The next phase of the project will draw on co-presence and include a narrative

exploration of the site's cultural context. X3D allows for movie files to be used as textures in a digital environment. The plan is to create movies of people interacting with the site according to the changing cultural context of the temple. These movies will briefly flicker in and out, creating a ghost-like effect. The characters in the movies will be drawn from the site's long cultural history—priests, gods, religious pilgrims, groups of contemporary school-children visiting the temple—and will create a story of the site's unfolding use over time. This will give additional understanding of the site's context for its audience, add to the historic and spiritual atmosphere of the virtual environment and avoid the typical pitfalls of non-person controlled avatars: the lack of potential interaction with viewers, obstruction of the viewer's navigation should they bump into a character, or conversely the unnatural experience of walking through a character that is supposed to be representing a solid person (Champion, 2007, p. 2).

5. Conclusion

This project demonstrates that interdisciplinary research offers new opportunities and knowledge for design researchers. By qualifying the research question, the applied project makes design issues central to the study, suggesting new solutions to the problem of designing virtual heritage within real-world parameters that might otherwise not be considered. Further research into the convergence of experience design, presence, phenomenology and information design has the potential to reveal more evidence about how to design digitally responsive environments in diverse public contexts given the expanding role of information technology in society, its increasing capabilities meaning fewer limitations constraining digital design in the future.

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Recognising and Developing Social and Environmental Ethics within a Visual Communication Programme in South Africa

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Abstract

Visual Communications at the Nelson Mandela Metropolitan University (NMMU), incorporating graphic design and photography, aspires to instil social, environmental and ethical sensitivity within students in order to meet a perceived increase in demand for these issues to be addressed at local and global level. To meet this imperative students are required to produce visual communications solutions for charitable organisations and participate in community-linked photographic excursions that expose them to social and environmental issues within real life scenarios. Anecdotal evidence suggests that students do develop a strengthened sense of awareness within the current approach, given that the research and design process facilitates exposure to and interaction with people and environments on a personal level. However, the teaching and learning approach, including assessment and feedback, tends to emphasise the creative end-product over personal social and environmental sensitisation. Furthermore, this approach neglects to make explicit the importance of developing awareness as part of a personal and enduring value system within the student. As such the focus of this paper is to describe a proposed project framework and a set of criteria appropriate for emphasising social, environmental and ethical consciousness in visual communication students. A qualitative research approach is used, drawing primarily from literature and experiences within the teaching and learning environment, and incorporates student reflections. The paper contextualizes social and environmental ethics within visual communications at the NMMU. Aspects of Robinson's Seven Doors Model for behavioural change (2007) are incorporated and research highlighting reflective journaling strategies is explored in the development of the framework and the criteria. It is vital that the personal development of social and ethical sensitivity within the student is made explicit and is recognised, particularly in the current climate of social, environmental and ethical imperatives within visual communications at the NMMU, to avoid a window dressing approach.

Keywords: design, education, social environmental and ethical sensitivity, social consciousness, environmental consciousness

Contextualising Social and Environmental Ethics in Design

There is an old Chinese curse: may you live in interesting times. No one could deny that the times we are living in would qualify for that description. Perhaps that's why many of us yearn to temper the increasing pace of life with a return to gentler values and a world where a desire for the greater good underpins all thoughts and actions. (Witepski, 2008, p. 24)

Debates surrounding social and environmental concerns permeate contemporary life at many levels, highlighting important issues such as globalisation, consumerism, the changing environment and the exploitation of natural resources (Diamond, 2005; Klein, 2001; Kovel, 2007). These issues are becoming increasingly significant within the field of visual communication and, as such, also within visual communication education. AIGA (American Institute of Graphic Arts) has established a Centre for Sustainable Design to address the growing concern surrounding sustainable design within the industry (AIGA, 2008). Social and environmental ethics can be linked to sustainability, an important, though perhaps overused term. Benson (2009) following the United Nations World Commission on Environment and Development (WCED) defines sustainability as follows:

Sustainability is a systemic term that means "meeting the needs of the present without compromising the ability of future generations to meet their own needs." It demands that society strives to reach a collective balance called the triple bottom line. This is the overlap where we intelligently mesh the economy, environment and equity for all our species.

Although social and environmental design consciousness in South Africa is perhaps still in its infancy compared to more developed first world countries, a growing awareness is steadily emerging. This is becoming particularly evident through an increase in debate at educational conferences, in the media, and in literature. The 5th International Design Education Forum of South African (DEFSA) Conference held in Cape Town in 2007 focused specifically on a sub-theme 'Design for/and Development' (DEFSA, 2009). A 2008 volume of the *Design> In Business* magazine, dedicated itself to exploring the status of social ethics, sustainability and environmental issues as it relates to the design profession and to design education in South Africa. Sensitive to growing social and environmental concerns, the February 2009 Design Indaba Conference promoted the question, "What can your creativity do?" and featured a number of people in Africa who have made significant impact within their own communities through creative thought (Design Indaba, 2009).

Post-apartheid South Africa has made positive design contributions, particularly in the field of socially conscious design, for example in the public spaces that have been created in the Apartheid museum, the Red Location Museum and Freedom Square. However, in general, South Africa does not yet have a strong history and developed culture of social and environmental ethics and much still needs to be done, especially at educational level, to address this. Lange, president of the International

Council of Graphic Design Associations (ICOGRADA) interviewed by Witepski (2008, p.26) comments:

The education foundations provided by the South African design education system have not appropriately accommodated for enough training on ethical practice issues in the past and currently remain insufficient. Financial profits, titles and the number of awards that you have won dominate the minds of the majority of the profession.

It is not difficult to appreciate that social and environmental action, as a largely personal value-driven activity, needs to be preceded by sensitisation, increased awareness and the will to change. Szenasy (2004) accordingly comments, "ethical decisions are personal. It is you—each one of us—who has to decide to do the right thing". People have to be persuaded by a personal conviction to change ideas, behaviour and take action, unless of course policies exist to enforce and impose behavioural change. Gardner & Stern (2002, p. 27) highlight government, or law-based interventions, community-linked mediations or processes, moral, religious or ethical appeals and education as one of four possible approaches used to address environmental sustainability. Although it is important that the design sector equip students with knowledge, skills, and resources to facilitate the practical implementation of sustainable design, a vital step in the process is the cultivation of a personal value system that incorporates social and environmental ethics. Benson (2007) in his course goals for EDGE (Ethics of a Designer in a Global Economy) refers to this personal component as building "the foundation for an evolving code of personal ethics". Without this fundamental personal ingredient, social, environmental and ethical awareness is in danger of being reduced to a purely theoretical proficiency, to factual knowledge, where no long-term influence or impact can be expected. Schmidt (2004, p. 19) explains how personal experience is able to bring authenticity to social and environmental issues:

I had already studied globalisation prior to meeting our visitors. But listening to Ms. Hernandez made me realise something new. For the academic means we can employ to discuss globalisation, the only way I can see our field achieving a more substantial understanding of the relationship between globalisation and design, is if we first come to the subject with a personal and highly impassioned caring for the welfare of those afflicted by injustice and a respect for those who fought such inequity.

Going even a step further, (Sudick, 2008) presents sustainability as a new literacy for the 21st century and appeals for it to be incorporated as a fundamental and practical capability within the current shifting and intricate social and global situation. Another way of looking at this would be to consider social and environmental ethics as a critical component of life skills (or transferable skills) in the design education environment. The value of transferable skills, in contrast to transient commercial market demands for technical skills, which perhaps only satisfy short-term employability, has been highlighted in education debates (Davies, 1996; Design Council, 2007). Transferable skills can be

described as skills that, in contrast to the latest software programme or technology driven-techniques, transcend time and become part of a student's ability to function in an adaptive way to future life endeavours. With the focus shifting away from technical training, an alternative possibility exists where visual communication students can contribute in a more integrated, positive and humanistic way to society (Inciong, 2004, p. 94):

In this way, they practice and live the discursive nature and respond in kind with a body of work that bears the mark of one who truly knows, which will no doubt alter the market's perception of the designer from an abstruse jobber / hired hand / technician to indispensable resource.

Transferable skills can include a combination of knowledge, values, attitudes and skills with a particular emphasis on those aspects that related to critical thinking and problem solving, self-management and communication and inter-personal abilities. It is not difficult to see that social and environmental ethics has a place within the current transferable skills-set in design education, not only as knowledge, but also, more importantly, as personal value or even as Sudick's (2008) new literacy. The question that remains is, how can we facilitate the development of social and environmental ethics, as a personal value within our visual communication programme at the NMMU?

Contextualising Social, Environmental and Ethical imperatives within Visual Communications at the NMMU

Social and environmental ethics underpins the philosophy and values of the Applied design Department at the Nelson Mandela Metropolitan University (Cadle, 2009). The visual communications programme places emphasis on the design student as part of a complex, interconnected and multi-layered system of social, cultural and physical components. The responsibility that comes with this position requires sensitivity towards social, environmental and ethical imperatives resulting from the intricate interrelationship between visual communication and society (Cadle, 2009):

We acknowledge that designers and photographers are visual communicators with a particularly responsible role to play in society as influencers and formers of public opinion, and individual and group behaviour... we are bound by duty to present to society a view of the world that respects intrinsic human values, morality and ethics.

Core values are further highlighted that focus on developing students who think critically about their ethical role as visual communicators within society, including "creating an awareness of the environment in which we live that encompasses the physical realm and socio-cultural issues... acknowledging an obligation to contribute to the upliftment of society... focussing on the indomitable nature of the human spirit as a means to influence and provoke positive change" (Cadle, 2009).

In order to implement social and environmental principles in a concrete way within in the visual communications programme, students are involved in a variety of different projects throughout their course of study. Visual communication solutions – graphic design, photographic or film-based artefacts – are developed and produced for charitable organisations. Projects such as these include, Sappi Ideas That Matter, a well-known international pro bono initiative, the Design Achievers Awards Programme, which encourages South-African socially-orientated design leadership, and the Vuka Awards, a film or animation-based public service announcement competition that focuses on South African societal issues. In addition, students participate in community-linked documentary photography excursions within the community that expose them to social and environmental issues within real life scenarios. Within each of these approaches students are sensitised and exposed to social and environmental issues through the conventional design process of exploring and researching the subject at hand – be it a client, product, organisation or environment. This process facilitates exposure to and interaction with environments and people within real-life scenarios. Students who engage and actively participate in the process develop an increased social and environmental consciousness. Anecdotal evidence, such as informal discussions with students and other lecturers, student reflection journals and formal student feedback, such as essays, and project evaluation reports, supports this observation. However, interrogation of our practice reveals that there are shortcomings within the approach. Firstly, submission requirements, assessment criteria (and consequent feedback) focus almost exclusively on the 'excellence' of the creative end-product, drawing emphasis away from the social and environmental sensitisation as an important personal outcome. Secondly, the process of developing social and ethical awareness as an enduring personal value is not always explicitly contextualised and facilitated within these projects. As a possible solution to addressing these issues, this paper explores and describes a proposed project framework to facilitate the personal development of social and environmental consciousness within visual communications students and outlines criteria that can be used as indicators in determining evidence of this.

Methodology

The overarching frame of this paper is qualitative, focussing largely on assimilating information from relevant literature sources and reports on research in development. The proposed project framework and evaluation criteria described and outlined here is under development in the Visual Communications programme at the NMMU at second year level. The paper draws from experience and observation within the teaching and learning environment over a period of approximately three years and is guided by student reflections. Content analysis of student journals provides insight into the student perspective – an opportunity to see what is important from within the student experience. The proposed project framework incorporates aspects of Robinson's Seven Doors Model (2007), adapted to suit our purposes, and is influenced by literature highlighting reflective journaling

strategies. Robinson's behavioural change model is well suited within our context as its intent is to support personal growth and promote enduring value-driven change. It emphasises positive reinforcement in contrast to negative images, which is the preferred approach in our teaching methodology. In addition, the model's aspects of self-motivation and self-initiation, what Robinson (2006) refers to as "voluntary change", are important in developing social, environmental and ethical awareness as an enduring personal value within the student. It is important to note, however obvious, that personal engagement, -awareness and -change cannot be coerced and that each student's background and experience is unique and should always be treated with sensitivity.

The Development of a Project Framework for Emphasising Social, Environmental and Ethical Awareness

Teaching and learning experiences and student feedback, specifically discussion and reflective journals, has provided insight that has guided the development of the project framework. What emerged as important, includes:

- providing opportunities for students to actively engage with the experience on a personal level,
- focussing on positive experiences rather than the negative,
- building a sense of self-efficacy,
- facilitating experiences that challenge stereotyped conceptions of social and environmental ethics, and
- providing time and 'space' for students to contemplate, reflect and contextualise their experiences.

Two main streams, one, social and environmental ethics, the other, the design artefact, are evident within the proposed framework (See Appendix A). Although these are indicated within the framework as quite separate, activities within these two streams naturally do interrelate and shape each other. Key components of the framework include:

A. Project Brief,

B. Learning Activities to facilitate the development of Social and Environmental Awareness,

C. Learning Activities to facilitate the development of Design Artefact (not discussed in this paper), and

D. Submission Requirements, Assessment and Feedback.

The first stage in the process, the *A. Project Brief* provides requirements for both streams – social and environmental and ethics and the design artefact, and includes aims and objectives, outcomes and assessment criteria for the project. Relevant theoretical background and resources, including literature

and audio-visual media, pertaining to social and environmental ethics and sustainability is provided and discussed in order to appropriately contextualise the foundations of the project.

Key stages are identified within B. Learning Activities to facilitate development of Social, Environmental and Ethical Awareness, namely, Personal Engagement, Building Confidence, Addressing Obstacles, as well as Reflection Journaling and Group Discussions. The first key stage here is to facilitate the process of Personal Engagement, the importance of which is highlighted in earlier discussions (Benson, 2007, p. 1; Schmidt, 2004, p. 19; Szenasy, 2004). Opportunities for this to emerge are presented within each project experience in different ways, in order to address the complex nature of each context. Students are placed in unfamiliar environments within projects or excursions, either as part of the documentary photography process within an excursion context, or as part of the initial research and information-gathering step within the process of developing design solutions for charity or community-based organisations. These environments are often very different to their own, for example a rural working farm, an animal shelter, or a community centre in an underprivileged township area. Students are encouraged to relate beyond the surface level and to engage in more practical ways, i.e. not simply as 'spectators'. For example on the community centre excursion, some students assist by packing food parcels for HIV affected families and other students accompany and assist care workers in weekly home visits. In light of literature on the failings of anthropology, sociology and psychology in understanding the situation of 'others', together with significant literature on the 'victim' stream of documentary photography, the complexities of dealing with sensitive social contexts should not be underestimated. It is reasonable to expect that students may initially come to the situation as 'spectators', however the teaching approach aims to facilitate interaction beyond this level of mere exposure.

Within the project experience students interact and become acquainted with people and environments in order to challenge preconceptions. Content analysis of student journals identifies the breaking down of stereotypes within the *Personal Engagement* stage as a crucial component in facilitating social and/or environmental sensitisation. When people distance themselves from issues via preconceived ideas, or stereotyping, the personal element is undermined. Hooks (1992, p. 170) explains that a stereotype is an inaccurate, often simplified, form of representation, a 'fake' or 'invented' stand-in for reality and that "stereotypes abound where there is distance... when the steps that would make them real cannot be taken or are not allowed". Stereotypes and preconceptions can impede social, environmental and ethical awareness in that it enables people to justify their action, or in this instance inaction, to themselves and others. The project experience, specifically the personal engagement process, helps to inhibit the stereotyping process and accordingly can encourage awareness and promote behavioural change. This is highlighted within student feedback and reflections, as many students comment with surprise at how the project experience challenges their initial expectations. With regards to an excursion to a rural working farm, one student observes, for example:

I feel somewhat useless in a sense that I don't know much about this lifestyle. Havent been exposed to it often enough. We know about it but have never fully experienced it. We are so ignorant; we feel. Sorry for the people living here, thinking they suffering when we see their small houses, surviving on the absolute basics. Meanwhile they are actually living 'the dream'. They have more freedom and happiness than city people could imagine. I dream to have this lifestyle that entails far less complications although am trapped as if I was programmed to have an everlasting desire or attraction towards urban content, the 'fake'.

Within the context of social and environmental awareness, it is important in our teaching approach to work within environments and within social contexts where the positive can be emphasised. A care centre in the underprivileged township Missionvale is included annually in the visual communications excursion programme, because here, despite dire circumstances and poverty, the positive contribution made by the centre and its care workers leave students and lecturers inspired. Robinson's model emphasises that opportunities should be provided where the focus remains on the positive and on visualising a desirable future. Negative images should be avoided as they are disempowering, undermine motivation and may reduce a sense of self-efficacy.

The importance of building a sense of self-efficacy is vital – to enable the student as an individual to believe that he or she can make a difference and contribute at small scale and also towards global change. This factor is emphasised and is elucidated by Voronoff (2005, p. 12) who, following Aronson et al, highlights the importance of perceived control in relation to self-efficacy. He describes perceived control as "a sense that one's actions will make a difference" and self-efficacy as "one's sense of ability to take a specific action". The sheer magnitude of social, environmental and ethical issues at global level cause many individuals to feel a distinct sense of helplessness, and as a result a weak sense of perceived control undermines the sense of self-efficacy (Voronoff, 2005, p. 26). For instance, most people believe that installing energy-saving light bulbs will make a difference to energy consumption, however not all people feel or believe that this will make any real contribution to global sustainability. This factor can critically hinder the desired follow through from knowledge and awareness into behavioural change and finally to sustained practice. We find that idea often surfaces within the project experience, one student notes, for example:

throughout my days here in the Karoo – I've found that, more and more I'm taking more notice of where I put out my cigarettes, you feel guilty when you see a beautiful landscape, rocks so much older than you will ever be – and then there's a cigarette butt lying there.

Students' preconceptions are challenged when they realise that small contributions do in fact make a difference. A relatively small gesture of giving an underprivileged family a photographic portrait brings unanticipated joy and in turn inspires confidence in a student to do more. Another student established a monthly collection of toilet rolls from fellow hostel students and in the end inspired a much larger collection drive that includes everything from clothing to tinned food for a Community Centre.

Within the project experience *Reflection Journaling and Group Discussions* are facilitated at key moments. The learning strategy of reflective practice is relevant as it encourages active participation and deep learning approaches (Schön, 1987; Cliff & Woodward, 2004). Ellmers (2006, p. 7) following Davies comments that a reflection journaling approach becomes "a more reliable means of establishing student understanding than relying exclusively on the final design artefact". When students actively engage with the process of journal reflections, the journal itself becomes an end product that evidences and documents the learning process and in so doing facilitates making the developmental aspects of learning more explicit to the student. Reflection Journals provides opportunities for students to reflect experiences back to their own personal context and encourages a personal dialogue (personal engagement) with questions, such as "How does the situation effect me?", "How do I affect the situation?", "How can I make a difference?" and "Why is it important?" (Robinson, 2007). Reflection journal activities and facilitated group discussions are important in highlighting key stages in the process and provides an opportunity for students to identify stepping stones to achieving the intended outcome and encourages independent learning (Ellmers, 2006). Concerns regarding the journaling approach include "procrastination, superficial and unreflective entries, waning enthusiasm, and unwillingness or inability to reflect" (Ellmers, 2006, p. 7). These concerns can be addressed by facilitating the journal process closely, for example, by asking students to reflect within narrower contexts or providing questions to initiate internal dialogue, and by facilitating group discussion where opportunities are provided for shared experience and developing richer understanding.

Other important steps in developing social and ethical awareness within the project framework include *Building Confidence* and *Addressing Obstacles*. Confidence building happens in different ways and is unique for each student. Observing positive contributions made by others – be it community centre employees, members of the community, or other students – plays an important role in motivation. The cyclical nature of confidence building occurs when students contribute and receive 'positive feedback' and personal satisfaction, which in turn inspires sustained activity. The step, *Addressing Obstacles*, provides an opportunity to pre-empt problems that students may experience on

a personal level. Within the personal development process, it is only natural that students may for example experience barriers or doubt their abilities. The group support structure provides opportunities for student to raise concerns in a supportive environment, where issues can be shared, discussed and addressed.

D. Submission, Assessment and Feedback is the final stage of the framework. Depending on the specific nature of the project the Social, Environmental and Ethical Awareness submission requirement could take the form of an oral presentation, multimedia piece, podcast, essay, or poster, to name a few possible examples. The focus of this submission is for the student to contextualises their personal experience of social, environmental and ethical awareness within the project and to make it accessible to an audience. This submission is not assessed in a way where marks are assigned, as this has ethical implications. However, certain criteria can be identified and function as indicators for social, environmental and ethical consciousness. The following criteria has been identified for this purpose:

- Does the student's experience reflect a process of becoming engaged with people and/or the environment on a personal level?
- Does the student's experience challenge stereotypes and preconceptions in order to understand the context better?
- Does the student's experience incorporate self reflection, in terms of answering questions such as:
 - How does the situation affect me?
 - How do I affect the situation?
 - How can I make a difference?
 - Why is it important?
- Does the student exhibit an interest, desire and/or optimism to implement voluntary change? (I want to?)
- Does the student exhibit confidence, and a sense of self-belief and self-efficacy? (I can do this?)
- Does the student identify possible obstacles in the process as well as ways in which to address or overcome them?
- Does the student exhibit aspirations for the development of sustained social, environmental and ethical consciousness and behavioural change for the future?

The final stage in concluding the project is a summative feedback session, where the students' work, as well as their experience of social, environmental and ethical sensitisation is discussed in context of the project experience.

Conclusion and Future Directions

At the core of our thinking is the belief that visual communication has significant power to influence and affect change. Scalin (n.d.) accordingly comments:

Graphic design [read visual communication] is the filter through which nearly all communication is now disseminated. Therefore graphic designers are in a unique

position as the gatekeepers of information. What, how, and for whom we choose to communicate are crucial decisions that have a serious impact on our civilization.

Educators have the potential to make an important contribution to shaping the attitudes and actions of the future role-players in the visual communication profession. Reiterating Witepski (2008, p. 24) they have the potential to contribute towards developing "a world where a desire for the greater good underpins all thoughts and actions". In order to ensure that this is done appropriately, exploration, self-reflection and interrogation of methods and approaches aimed at developing social and environmental ethics in visual communications is required.

The process of implementing and testing the proposed framework will provide further research opportunities. Knowledge and experience from other disciplines, such as sociology, anthropology and behavioural psychology, would be increasingly relevant during the implementation and assessment of the framework. This research is very much a work in progress. However, it provides a starting point – to cultivate a personal enduring value system with social and ethical awareness at its core within visual communication students. This step can be viewed as an important foundation on which to build additional knowledge, skills and values at 3rd, 4th and 5th year level within the visual communication programme. It is envisaged that at these levels, social, environmental and ethical issues with regards to professional practice could be addressed. For example students can develop visual communications strategies for developing industry awareness on sustainability issues and gain practical and theoretical knowledge on sustainable professional visual communication practice such as environmentally friendly printing processes and the use of sustainable resources.

We hope as educators to contribute in any small way to enabling students to develop as engaged, critically thinking individuals, who are sensitive to social and environmental issues in the world. Hopefully, the future design profession can make a contribution that will go beyond commercial interests, titles and awards. In closing, an excerpt from a paper delivered by Szenasy (2004) at the AIGA National Design Conference, rings true now more than ever:

These are early days, but incredibly exciting ones. The last time that humanity was challenged to rethink the world, we came up with the Enlightenment, which served our kind very well up to now. So use whatever words you like, but understand that you are at the center of a revolution where an ethical compass is useful and even essential. This may be a time when intellectual pursuits become as important as financial and entertainment pursuits. For without understanding the new world taking shape around us, we will surely go the way of dinosaurs.

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A Project Framework for Emphasising Social, Environmental and Ethical awareness

Appendix A.

Design Students and Companies - what's the Problem?

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How are collaborative projects between university design programs and external partners like companies or institutions integrated in the curriculum and what are the advantages and problems related to such initiatives? Many experiments are done in the area, but until now a more general overview has been missing. The paper describes the theme in a global perspective referring to the results of a survey among different design programs at 12 universities from 9 countries and 4 continents. The universities use different models but matters like intellectual rights, timing and confidentiality agreements create problems in many cases. Collaborative projects are very valuable on several areas and most teachers and study managers expect to do more collaborative projects in the future.

The Business World: "We Love You!"

The growing amount of collaboration projects between companies and design schools around the world is a way for Design Schools to strengthen their programs, and it reveals that the business world now values the creative and intuitive processes of designers as much as their own traditional analytical tools. This is in shortened terms the conclusions stated by Dr. Mark Brietenberg, president of ICSID, The International Council of Societies of Industrial Design and visible on the ICSID official website February 2009. (ICSID 2009).

Dr. Mark Brietenberg, who is provost of California College of the Arts, refers to a Special Report from Business Week, (Business Week 2006) the top business publication in USA. The report offers as its subtitle: "Desperate to innovate, companies are turning to design schools for nimble, creative thinkers", and the featured stories in the report mentions the growing interest of companies and corporations to work with design schools, and the many advantages of these partnerships.

The tendency of design schools collaborating with external partners is not new and it is a worldwide phenomenon that also includes cross-disciplinary and collaborative projects involving several design programs and even international collaborative projects involving design educations in global networks. Such projects variations can be seen in previous research describing specific projects (Aparo, Soares & Pataco. 2008), (De Vere I. 2008), (Gill C., Arnold J. 2007), (Lindley J. 2007), (Wood A., Oxley D. 2007).

According to the reflections of Dr. Brietenberg and Business Week, the industry is eager to set up such collaborative projects. Not only because they get more fresh proposals for new products but also because the partner industries are interested in the creative processes and approaches taught in the Design Programs.

Collaborative Projects go Global

But what are the benefits of such collaborative projects seen from the view point of the institutions that offer such academic programs? And not least: which problems arise when you take part in such projects? How do the Educational Institutions implement such projects in their programs, and do they expect to do more projects of this kind in the future?

It is not easy to get an overview of all the different approaches and experiences from the different design educations, but in December 2008 a survey was made among different institutions around the world to clarify such matters. The survey entitled "Collaborative Projects – Problems and Benefits" or CPPB (Eriksen, 2009) involved teachers and study managers from countries like Scotland, China, Canada, Denmark, Finland, Mexico, Germany, Iran and Australia.

The representatives from 12 different design programs answered questions like: *when will the students work in such projects?*, and questions concerning qualitative matters like: *what are the problems and benefits in such projects?*

The respondents were asked to give their personal opinion and not the official policy or statement of the university. The data is therefore colored by the respondents' personal attitudes and experiences, thus being more like a screening than a deep survey on the topic. Despite the fact that collaborative projects seem to be a widespread phenomena in design programs on universities around the world, the author of this paper have not found a single paper or research report that gives an indication on the present extension of cooperation projects *with companies* in *a global perspective*.

The data from the CPPB survey gives some kind of overview of tendencies on external collaboration in design programs seen in a international perspective. It also indicates that such collaborative projects are often organized in a grey zone where rights and roles stress the balance in teaching, learning and industry relevance.

Designer, Artist or Engineer?

The 12 institutions in the CPPB survey cover a variety of design programs ranging from technically oriented design engineering to more form giving and arts/aesthetically oriented design. The respondents were hence asked to define the content and direction of their design programs as a mixture between areas that would typically be found in such programs.

The survey exposed that knowledge in management, economy and human science is given in design programs these days along with aspects in technical and form giving matters.
The term 'Design Program' and 'Design Students' was used in general in the survey text although some of the respondents might think of their students as *art* students, *engineering* students, *architectural* students or in other categories. The basic conditions and structures of the institutions differ a lot in size, economical conditions, reputation and age, but such information is not specifically collected in the survey.

Table 1 illustrates the average variety of content and direction of the involved institutions to give a rough picture on the general focus of this survey.

Table 1

"Average" Program. An average distribution of content and aim in percentage for the 12 programs surveyed (Eriksen, 2009)



Typically the Design Programs would involve external cooperation projects in the last years of the study program, but some institutions build their program on strong involvement with external partners all the way and apply such projects in the first years of study as well.

In Table 2 you can see the average percentage of collaborative project work on the 12 institutions. The percentages illustrate the weight of the studies that builds directly upon students doing collaborative projects on different study levels.



Percentage of studies building directly on collaborative projects (Eriksen, 2009)



In average around 52% of the studies build directly upon collaborative projects with external partners during the 4^{th} year of studies, and all institutions show gradually more intense project cooperation from the 1^{st} to 4^{th} year. In the 5^{th} year, the average percentage surprisingly falls to 29%. Almost one half of the programs involved do not focus directly on project work with external partners before the 3^{rd} year of studies.

One respondent claims that 90% of the studies build directly upon such projects early from the 1st year and through all the semesters. The *early* approach is recommended by other researchers in the area (Dong H., Tornock P. 2007).

Partners and Playmates

The respondents were asked to specify the external partners in the 6 categories and Table 3 shows the average percentages for all 12 respondents.

Table 3

The different partner categories in average sizes in percentage (Eriksen, 2009)



The Canadian and the German Universities primarily (60%) cooperate with *Larger Producing Companies* with more than 1000 employees only exceeded by the Chinese institution (80%). Most countries primarily cooperate with *Medium or Small Producing Companies* and probably the business structure of each nation influence much in such matters. This also goes for the Danish institutions and mirrors well the fact that small and medium size industries are dominant in Denmark. The detailed data shows clear differences between the institutions and countries, but the general picture is that most design programs make collaborative projects with *producing* companies of different size. One respondent stated that most of their cooperation projects (40%) involved cooperation with a *Studio/Consulting Businesses* and all respondents said that 20% or less of their projects involved cooperation with a *Public Organization or Institution*.

Cut a Piece of Your Heel

Each respondent was asked if the university part had to adjust their studies on different issues like time schedule, project focus, project format etc. (as seen in Table 4) in such colaborative projects.

They were also asked if they, themselves, found that the external part had to adjust to the demands of the university according to the same topics.

The 2 questions were:

A. Do you have to adjust to demands from the external partners concerning these aspects?

B. Do you think the external partner have to adjust to the demands from your university?

To each question the respondent could give answers like:

Not at all (1)/To a minor extent (2)/Medium degree (3)/To a high degree (4)/Totally (5)

The points to the right (in parenthesis) are added in the following evaluation of the survey results to give an indication as to what extent there is a difference in *the respondents own personal estimation* on the difference in demands from the 2 main parts in the collaborative project.

Concluding this way has obvious weaknesses (changing words into numbers is problematic!), but on the other hand it is a simple way of mapping the different attitudes for a short research paper like this. In Table 4 you can see the differences in the approach and demands of the educational institution and the external collaboration partner.

The numbers in Table 4 show either positive numbers or negative numbers or a zero. The *positive* numbers indicate that the universities demands exceed the demands of the external partner (A minus B) and the *negative* numbers indicate that the demands of the external partner exceed the demands of the university (B minus A). A zero indicates that the demands from the university and the external parts are of equal size.

Table 4

Differences in demands from the university and the external part from the teachers' point of view (Eriksen, 2009)

Respondent number	1	2	3	4	5	6	7	8	9	10	11	12	average
Time Frame/Schedule	0	2	2	1	2	1	0	0	1	0	4	0	1,08
Project Focus	0	1	0	0	1	1	-1	-1	-2	1	2	-1	0, 08
Project Result Format	0	2	0	1	1	1	-1	-1	0	1	2	-1	0, 41
Information available/given	0	1	-2	-2	0	-2	0	-1	-2	1	1	0	- 0, 5
Confidentiality/students	0	-2	-4	0	-2	-4	-1	-2	2 0	1	2	1	- 0, 9
Confidentiality/univ. staff	0	-2	-4	0	-2	-4	-2	-1	0	2	2	1	- 0, 8
Intellectual Rights	0	-1	-4	0	-2	0	1	-1	0	2	2	2	- 0, 08
Other	•	÷	•	•	•	•	•	•	•	•	•	•	0

The table indicates huge differences in the perception of the balance between the demands from the different parts as seen from the university representative (mostly a teacher).

The respondent representing the first column in Table 4 (respondent number 1) actually filled out the question but did not mark any difference in the approach of the two parts. On the other hand respondent number 4, 10 and 11 could apparently establish conditions in collaborative projects that balance the approaches of the involved partners well.

Although it is in very risky to draw any general conclusions on cultural differences or specific national characteristics it is noticed that respondent 4, 10 and 11 represent respondents from 3 Scandinavian design programs. It is not further investigated whether it is based on the fact that Scandinavian educational systems are often based on almost full public funding, thus making it possible for the institutions to take a more powerful position, or it is based on other conditions or collaborative approaches.

If you look at the average differences within each theme it looks as though the university programs in general set the time frame/schedule in cooperative projects. Also the project focus and the format of the project in general (all positive numbers in average) mostly is decided in respect of the conditions set up by the university. At least seen from the teacher's point of view. The external part, on the other hand, seems to set up the conditions concerning the confidentiality agreements for students and university staff, and also to a great extent decides the information available or given in the project. Also, the teachers find that the external part to a great extent decides matters concerning the intellectual rights in relation to the collaborative projects.

It seems like especially the confidentiality of the students seems to be a matter of strong importance for the external part, and this probably comes to no surprise for design teachers who have been involved in arranging collaborative projects. Often the industry partners are quite eager to ensure that information concerning sensible matters in the company or even the results gained through such projects is not spread to competitors, thus creating trouble for the company involved.

You might also think that 'Intellectual rights' would be a matter, where the company would have a strong interest in setting up conditions in their own favor, but the survey shows that this is a matter of minor importance or a matter, where the parts involved do not feel, that they have to adjust to the demands of the counterpart. If you ask the teacher!

Considering the amount of respondents and the emphasis on the personal view of the teacher, the screening survey cannot claim to be a picture of the situation in general, although it is based on respondents from several continents and cultures. Still the author of this paper finds that the average conclusions in Table 4 in several ways illustrates the situation that design teachers describe in ordinary professional conversation

Problems and challenges all over

The above mentioned data might indicate some problematic fields, but do the design teachers find it problematic to set up and run collaborative projects?

You might for instance *not* find it problematic that the projects had to be adjusted in a specific way to satisfy the external partner due to the fact that such adjustments could be easy to make and that they will be understood as natural conditions or limitations. After all it is a matter of negotiation whenever you cooperate with anyone, and such a situation always calls for an understanding of the counterpart's conditions and limitations. On the other hand such projects might challenge the often strict conditions related to planning a semester or a project in respect of a given curriculum. To clarify the possible problems seen from the teacher's position, the respondents were asked for an opinion on matters like:

Cooperation in general, Agreements, Exchange of Knowledge, Confidentiality etc.

In each of these categories, the respondent was asked:

A. Do you find these aspects problematic in collaborative projects?

And they could answer on the following scale:

Big Problems / Minor Problems / No Problems / Only Advantages / Not relevant

The answers in this area showed that collaborative projects create a lot of 'problems'.

Most respondents (58.3%) found that *Cooperation in general* caused Minor problems while one correspondent answered Only Advantages in the same category.

75% of the respondents stated, that *Agreements/contracts in general* created Minor Problems, and one respondent (8.3%) stated, that this matter caused Big Problems. On the contrary one respondent in the same category wrote *Only Advantages*.

75% of the respondents also stated that *Time Frame* and *Rights (intellectual f.ex.)* caused Minor Problems, while no respondents regarded them as Big Problems.

Earlier research based on specific cases describe that the timescale (Wood A., Oxley D. 2007) and agreeing on the intellectual rights (Lindley J. 2007) can be either time consuming or lead to stopping such future collaboration with a specific company.

A research paper describing experiences from collaborative projects in Australia (De Vere I. 2008) mentions that the university allows the students' full ownership of their design outcomes but also that the teaching staff is often drawn into the process of helping both the student and the company define their respective contribution to the final outcome.

Another significant result was that 66,7% found Minor problems in *Exchange of Knowledge in Project*, and a half of the respondents found Minor Problems in *Making the Results Known to the Public*. The need for the university to show the results from succesfull projects to the public seems to be a specific problem in relation to design programs that traditionally expose their results in very popular ways like exhibitions. For this reason more universities choose to preclude specific details of the student's design at the graduate exhibition because of the sensitive nature of either technology or application as described in a case from Swinburn University, Australia (De Vere I. 2008).

The least problematic area among the given areas was *Economy* (58,3% = No Problems). Surprisingly no one mentioned *Only Advantages* in this category. In the category *Examination of Students* more respondents (41,75%) found *Minor Problems*, but in the same category even more respondents answered either *No Problems* (33.3%) or *Only Advantages* (25%).

The Grey Zone

To a certain extent there is a pattern in these answers that resembles the ones mentioned earlier in Table 3. Matters like *Rights, Agreements/contracts in general* and *Time Frame* might be problematic to handle and agree upon from the fact that such issues challenges either the strict schedules defined by the semester rhythm of the university or challenges the usual conditions for an external partners cooperation with a third part in developing projects where confidentiality is more natural than in a more open educational environment.

Still, it is also difficult to draw strict conclusion if you ask for 'problems'. Do you find a matter 'problematic' just because you have to handle it or make some kind of negotiation with your counterpart? If you look at the overall tendency in the answers, you might conclude that collaborative projects call for solutions to problems that might be difficult or delicate to handle if you are in charge of planning a collaborative project. But maybe the simple fact is, that collaborative projects with for example companies will always be found in a 'grey zone' that stretches the rationale and habits of each part. And probably the external part would find problems in exactly the same areas as the one ones pointed out by the teachers.

A further research in this area would be valuable, and probably many teachers would prefer, that collaborative projects were defined and protected as well as any other educational activity in design programs.

When design teachers find it so problematic to set up and participate in collaborative projects it might also be because they probably seldom get any specific education or rules for handling such delicate matters, and the fact that it might involve huge economic interests from the external part could disturb many nights sleep for the teacher or the responsible contact person in the company involved. The personal experience of the author of this paper is, that especially the teachers who get involved in such projects are often ambitious people with a strong desire to prepare the students for a challenging and complex profession, even if such initiatives create 'problems' or a lot of extra work in weekends and late at night. Simply because it is a very rewarding concept for all parts.

But it's Worth it – and We Won't Stop!

The last questions in the survey point in the same direction. When asked about advantages and disadvantages in collaborative projects, it was clear that most teachers found such initiatives to be either an advantage or a huge advantage when it came to matters such as:

Developing methods in general Developing tools in general Gaining knowledge in general Developing communication tools Developing cooperation skills Understanding the profession Understanding business and the market Understanding economical aspects ...and worth noticing: Creating a better study environment!

Similar conclusions in more of these categories are mentioned in specific cases described in earlier research (Dong H., Tornock P. 2007), (Gill C., Arnold J. 2007), (Lindley J. 2007), (Wood A., Oxley D. 2007).

Without going deeper into these answers it tells, that collaborative projects are highly relevant for the design profession, and the learning potential is huge. When asked whether *You will do collaborative projects with external partners* the answer is also significant. 5 of the respondents answered *Unchanged*, 5 answered *To a Higher Extent and* one answered *To a much higher extent*. In this relation it might be worth mentioning that none of the respondents were chosen from any specific prior knowledge about their habits or traditions for doing collaborative projects.

It therefore seems like universities offering design programs around the world are fully aware of the potential in collaborative projects. Teachers and study managers are willing to fulfill the needs of their partner industries, that are "*Desperate to innovate*" and eager to learn from such universities.

In this paper the view point from the educational institutions has been dominating, and the huge potential and the different problems have been illustrated. This approach means that only a reduced amount of interests has been researched and described. It takes two to tango and it would be of huge interest to find out if the external partners' opinions differ a lot from the ones mentioned above. What is the students' opinion , and does such project collaborations create possibilities *or* problems for third parts like practicing designers?

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Hospitable City An effective, sharing, experience for GIDE group

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The topic of the paper is to present didactic results referred to an international experience developed during 2007/08 academic year, from five different European schools involved in GIDE (Group for International Design Education). It would go deep into latter experience, whose topic was concerning contemporary cities and their "liveable" qualities, i.e. "hospitality". Students are asked to investigate characteristics of current needs in local context and provide design solution according to their specific approach and specialization. Teaching staff and guest professor (specially invited) work, in parallel to students, to focus on a theoretical framework in which to fit students' projects and to create a scenario for the following academic year topic to be investigated.

Keywords: Hospitality in cities, International exchange, Design schools' cooperation

1. Defining GIDE – Group for International Design Education

GIDE is the acronym for Group for International Design Education. It was established late in the 90's and today it is composed by several european design school such as: Politecnico di Milano – School of Design, Milan, Italy; Leeds College of Art & Design,School of Design, Leeds, United Kingdom; Mechelen University College (KHM), interior & design department, Mechelen, Belgium; The Netherlands, Hochschule Magdeburg-Stendal (FH), Institut für Industrial Design, Germany; SUPSI Scuola Universitaria Professionale della Svizzera Italiana – DACD, Dipartimento Ambiente Costruzioni e Design.

GIDE purpose is to promote the exchange of design education with an ethical dimension, as well as intercultural competences, working practices and multidisciplinary experiences across the European Union and beyond. To raise this aim GIDE organises the following activities: mobility of students and staff, curriculum development, academic recognition, workshops, dissemination of results and activities (exhibitions, participation in conferences etc.), editing media. The proposed activities will involve the following: teaching staff, students and administrative staff (partly aided by the LLP/Erasmus programme), PhD students and visiting professionals.

The consortium of the schools gives academic recognition to the activities within the GIDE programme, and shared evaluation of added value.

The GIDE activities are developed in an academic semester as part of a rolling programme, as follows: staff coordination meetings, shared programme on a global theme developed by teaching staff and students, an annual event that brings teaching staff and students together in one of the partner schools (workshops, lectures, exhibitions, for example), evaluation and dissemination of the GIDE network and outcomes.

2. GIDE activities 2007/'08: "The Hospitable City" theme and specificity of each school

Each year GIDE network reflects and operates, separately, around a specific and shared topic; the one of the academic year 2007/08 was "The Hospitable city". The term "hospitable" is here referred to the capability of a city to be a device able to be open, accessible, sustainable; able to manage people mobility, to regenerate public spaces, to offer an intelligent variety of services. Each school approached it according to their cultural and specific design background. In add, common framework needed to be situated and fitted in local contests, in order to answer properly to expectations.

At the Politecnico di Milano the theme of the hospitable city was approached by the students during the Final Design Studio at 3rd year of BSc in Interior Design. Fifty students were presented with the specific terms of the theme, as identified in the specific subtheme of health tourism, regarding the City of Milan, and a specific "container", that means an existing building having a certain historical and architectural relevance. After the presentation of the context and of the author (both through images and biographical and historical-architectural indications), the students were asked to run an accurate inspection, guided by their teachers, in order to gather all data necessary to study the architectonic object (measurements, photos, data gathering regarding the whole context and the single manufacture). Moreover, before *concept* elaboration and the projects' development, a complete and attentive analysis regarding the users was developed.

BA (Hons) Interior Architecture & Design and BA (Hons) 3D Design (Furniture) courses *at Leeds College of Art & Design*, School of Design worked together, carrying out initial research in ten mixed groups.

"Related titles were provided to use as a starting point. Students then had to identify a site in Leeds and develop their own interpretation. The ten themes were: 'growing space', 'inside-out', 'quiet', 'seeing', 'meeting & greasing', 'space between', 'wandering', 'education', 'entertainment'. After a presentation of the group's interpretation of their theme, individual students were asked to identify typical users and develop an idea of their

own, establishing aims and objectives and producing a sketch-scheme of their concept proposal" [1].

Hochschule Magdeburg-Stendal (FH) assumed that towns and regions are evidently in search of a distinctive regional identity, and increasingly pitted against one another in competition.

"How is Magdeburg rising to the new challenges? Where in Magdeburg are the changes most keenly felt? In one district of Magdeburg, the urban architectural structure is particularly severely affected – the area where the major mechanical engineering plants were based up until the political watershed of German reunification. The closure of these industrial plants had far-reaching consequences: large- scale derelict industrial sites and, as a consequence of migration, numerous empty houses, apartments and commercial premises. In the Buckau district of Magdeburg, strategies were found to manage the transformation processes of shrinking cities, including structural improvements and redevelopment of vacant industrial sites as locations for innovative enterprises, using targeted investment in urban neighborhoods and some co-funding from the European Union (URBAN 21). Some spaces within the new industrial park have been taken on by sustainable businesses. Sites where heavy machinery was once built are now manufacturing masts for wind turbine for green energy generation."[2]

Hence the "Hospitable City" project involving students of the Institute of Industrial Design at Hochschule Magdeburg-Stendal University of Applied Sciences concentrates on the Buckau district. In the course of the semester, students devised strategies and concepts which open up a creative, positive approach to the new situation in a diversity of ways for different users and agegroups. The proposals for "Buckau - Hospitable City" range from innovative urban design and artistic interventions, to the design of street furniture and additional landmarks for public spaces, to interactive audio-guides to Buckau.

At Mechelen University College (KHM), students involved in Hospitable City programme were from Interior design and Furniture design. They could choose between two assignments in the interior design course and two in furniture design. One of the assignments was the interior design of the library and meditation room in Leuven prison. The possible paradox between prison and hospitality was well explained during the first phase of the project:

"No place within the city is as unknown as a prison; at least for most of us this is true. Still, the prison is open to everybody; it is enough to have committed a sufficiently serious criminal offence to be condemned to prison. Therefore, paradoxically, it may be the most hospitable place in the city as the parameters to be admitted are not determined by the "host", but by the "guest". For obvious reasons nobody is likely to stay in prison out of choice, apart maybe from the homeless looking for a warm place to spend the night. The self-evident reason is that deprivation of liberty is a terrible human condition. It is not uncommon that people convicted to lifelong imprisonment choose death sentence above prison, which explains why all possible precautions are taken to prevent suicide in prison"[3].

A more humane prison policy is in the centre of an international debate. Therefore the layout of a prison can try to relieve the temporary but sad stay in this place that we still cannot do without.

A second site was the botanic garden in Mechelen. Students were asked to give a new and contemporary interpretation to the park pavilion, bearing in mind the context (history and landscape), and the needs of contemporary visitors to the park. The City of Mechelen commissioned a study of the historical-cultural value of the park and its immediate surroundings. This task was undertaken by Bureau lantschap, a consultancy for landscape and cultural history, in cooperation with Albers Adviezen.

"Students plead for a new spatial construction that preserve the role of focal point and that can be seen from different angles of the park (in view of the key to Fuch's design, based on visual lines) and which can moreover fulfil a public function." [4]

SUPSI (CH) students interpreted the waiting condition, which is linked to public transport as a reflection and mirror of the social break in the city. Lugano has a disproportionate series of structures and services, if compared to the number of citizens (50,000) and to its surface (50kmq), which would more than fine for a daily passage of workers and of international tourists.

Autosilo Balestra in the centre of Lugano is the place where students did their own project experimentation. It is a large building of 10 floors and 2 basement floors with different functions: city public parking area, commercial space and Central Station of Autopostali, that is the buses connecting Lugano with the rest of the Ticino Region. The Autosilo has a direct relation with the city; at the ground-floor, horizontal lines which provide access to the commercial activities and shops cross and intersect with the vertical lines of the 10 floor parkings and station of Autopostali at the basement floor.

This crossing and people flow within a public space, which is urban but at the same time inserted in a building, where all gets overlapped without hierarchies and recognition, seemed a perfect testing subject for the theme of the hospitable city.

Students worked on the floor level and on the basement level of Balestra, with an area of 4.000 sqm, which have not the main bearing structure or the technical and circulation elements necessary for its right functioning. The first five weeks were used to conduct a preliminary research useful to identify good proposals for the space and functions for a new vision of this public place and for the elaboration of a personal point of view.

By analysing flows and behaviours, the meaning of transit and the waiting moments, students have looked at the theme of the public transport and of its relationship with the city, of the hospitality as a common use of the public space which creates a temporary community. They worked on the sense of belonging to this place by observing the elements of space and its functions of relationship and of behaviour. During the nine weeks after the first phase, they analysed the themes linked to the specific context: the project of an open-space for the public at the base of the 10 floor building, the research of an immediate interpretation of the vertical links, the possible direct relationships between the different levels: cuts, volumes with double height, ground movements, new relationships between what is the open space and what is the closed space, between volumes with commercial activities and their immediate context, the definition of the spaces where people usually are standing and waiting and of their relationships with the surrounding context.

3. Creativity towards innovation: GIDE workshop "The next best thing"

Students' works were exhibited during the annual GIDE event, this time held in Mechelen (B), in February 2009. During the event all the schools of the network are involved in the workshop "The Next Best Thing" which aim is to explore and define a new topic for the following academic year. The teaching staff decided to activate a process of creating ideas with an umbrella-theme, a scenario, based on sustainability. The goal was to generate propositions (from the higher macro scale of strategic design down to the idea of advanced design and concept) to be used as working theme in didactic laboratories for next academic year.

An important scenery work and a first creative phase had already been worked out by the hosting team. The student were organised in mixed groups, according to their geographical origin, and they were asked to make their reflections on the role of design as an active and propositional discipline in relation to a series of "sustainable oriented" themes: the work, the food, sport and leisure time, teaching models, the public system, the welfare concept, the mobility of people and goods around our planet.

In order to use the lateral thinking we need to gradually train our brains: creativity techniques (or formal techniques) can help; there are various types of techniques and they are based on the principles of the lateral use of information. During "The Next Best Thing" workshop we have decided to organised eight brainstorming parallel sessions on the above mentioned themes: the brainstorming techniques, is based on the principle that ideas generate one from the other.

Each group developed a creative session of brainstorming, trying to build up an order between the divergent and the convergent phase: we have observed how data gathered during the analysis phase create a series of a priori concept bonds, which will necessarily drive the following perspective of

development and evolution. The process is a kind of "double funnel" where at first the highest number of ideas is produced and then they are deeply analysed.

Brainstorming allows apparently non-sense solutions, following the certainty that all proposals are interesting and useful to find a final coherent solution. All results depend on a more and more refined re-elaboration process by the team; participants refer continually to ideas proposed by others and they harmonise the different inputs shared. Each participant is asked to suspend the judgement and the general need of classifying, renouncing to any kind of evaluation on in progress ideas. According to this particular creative technique, problem solving develops through the problem setting, that is by ways that allow to re-design the problem, to analyse it from a new point of view, to re-define it within connections and different "frame sets" metched in between the diverse schools of GIDE.

"The Next Best Thing" agenda was based on three working days: the first two, primarily dedicated to the exercise of the lateral thinking, have evolved into a synthesis convergent phase, whose goal is to provide a collective presentation to be done on the third day. During the two creative days, the team activities were accompanied and stimulated by a series of preliminary "exercises", thought on purpose by the hosting team. Each group had one or more tutors; the goal was of managing conflicts and overcoming physiological stall moments emerging from the process.

In Mechelen, students tried to co-build a definition of sustainability, associating it to the specific theme assigned to each team; e.g. the footprint concept was analysed, with the related estimate methodology; starting from the observation of the model "Product lifecycle" we have got to a methodological abstract which allowed us to associate the idea of sustainability with the system vision.

With this knowledge and didactic "equipment", each team has identified a working strategy.

In any case, among the materials gathered, three main proposals will certainly emerge:

_Clusters of immediately useful and applicable ideas

_Clusters of ideas/areas to be later on analysed more in depth (meant for a longer period of time analysis)

_New approach to the theme

In conclusion, we can say that the application of creative methodology, due to produce innovation, is a common didactic model: each team of students was guided in a process whose output was a structured vision or the birth of a concept cluster. "Vertical thinking is started only if there is a direction towards which we can move, lateral thinking generates a direction" [6].

Once common horizons have been defined, a further project elaboration is destined to the didactic exercise and will thus be our "theory object" in a very near future.

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The Aesthetics of Interaction: Implications for Design and Education Frank Feltham, RMIT University, Melbourne Stephan Wensveen, TU Eindhoven Bert Bongers, University of Technology Sydney

1. Abstract

A major challenge for designers of information and communications technologies (ICTs) is to create an interface with the underlying computer technologies to achieve seamless, intuitive and expressive interactions. Accepting the claim, from theories of embodiment and ecological psychology that our ways of knowing and being rely on our full sensory capacities we argue for a physically embodied interaction with ICTs. Specifically this contribution is framed within two positions, the first is that time is an underlying property in the design of human computer interaction and it should be considered as an aesthetic property. Secondly these interactions should encompass our full bandwidth of communications through physical and multi-sensory means, not just the prevailing visual means of the Graphical User Interface (GUI). To attain an aesthetically pleasing interaction we believe emphasis should be placed on two central themes, time and multi-modal interaction. We articulate our positions on these themes through a review of relevant literature and give an account of the teaching programs we have developed to educate undergraduate design students in the Aesthetics of Interaction.

Keywords Interaction design, physical computing, design education.

2. Introduction, interaction design framing the territory

The design of the interaction with computer technologies and their subsequent devices has become a central concern within select industrial design education programs throughout the world. Adding intelligence, for example the ability to sense and control software, to such things as objects and fabrics is considered an appropriate territory to explore given the state of technologies that are both present and emerging (Kyffin, 2003). As an emerging profession interaction design groups are often multi-disciplinary (Fallman, 2008) due to the theoretical territories and practices they encompass. To contrast with human computer interaction (HCI), which is more analytical but a significant contributor to the ways we account for interaction (Matthews, Stienstra, & Djajadiningrat 2008), interaction design takes on concerns such as the Aesthetics of Interaction (Hummels, Djajadiningrat, & Overbeeke, 2001), (Hallnas & Redstrom, 2002) and notions such as Direct Interaction (Djajadiningrat, Wensveen, Frens, & Overbeeke, 2004). A common thread through all of this work is the acceptance of the physical nature of our interaction with computer technologies as a means to widen the perceptual bandwidth to improve the overall quality and experience we have with computer technologies. In this paper we discuss our views on what constitutes an interaction aesthetic as it applies to design research and teaching.

3. Tangible and Embodied Interaction

This shift towards intelligent products owes its legacy to some of the early work in human computer interaction. Weiser (1991) argued that the embedding of digital technologies into our environment should be a natural evolution for computing. He also argued for the computer to disappear so that we might shift our focus away from its fixed workaday orientation as a desktop device to a distributed model whereby the ability to transfer information is embedded into notepads, whiteboards and identity tags. This digitally augments the objects of the office for greater collaborative activity. Weiser termed this new approach *Ubiquitous Computing* and it has paved the way for the re-imagination of the interaction we have with information and communications technologies (ICTs).

Whilst this was a wonderful vision, the underlying digital technologies of the computer are abstract in their representation to us as humans. If we compare screen based software representations to mechanical systems we find an enormous difference. Lets consider the car combustion engine, we can gain information about its workings by seeing it, hearing it and feeling it, these multi-sensory channels give us cues on the quality of this working. Contrastingly, a computer program works with abstract mathematical functions resulting with a software technology shrouded by its screen interface. In fact it is not directly perceivable in any physical sense (Bongers, 2006). It has to be interpreted symbolically through screen icons and metaphors. Due to this symbolic abstraction, and its lack of connection with our physical and spatial abilities, new approaches to the design of interfaces have emerged that seek to make these symbols concrete through physical and tangible means (Ishii & Ullmer, 1997). Building on this work Dourish (2001) argues that tangible and social computing combine to constitute what he defines as *Embodied Interaction*, whereby the actions with computation are mediated physically and socially. Whilst we are sensitive to the notion of social construction and its influence on the actual use of technologies this aspect of Embodied Interaction falls outside of the discussion in this paper.

4. Towards an interaction aesthetic

We have introduced the notion of physical interaction with computers as a means to make concrete the abstraction of computation. But what means do we use to frame a design of interaction with this consideration in mind. We argue that there are two central notions to address. These are time and multi-modal interaction, whereby time is a consideration in an engaging and aesthetic sense and multi-modal interaction takes what we know of physical and motor sensory perception and converts it into design aims. To gain an understanding of motor-sensory perception we briefly discuss its origins in Ecological Psychology and human computer interaction.

4.1 Perception and Affordances

How we know about an objects potential for use is delivered to us through what Gibson calls its Affordances (1979). From the visual recognition of the substances, surfaces and textures of materials and objects we extract enormous meaning about the world in which we act. This theory raises important considerations for the design of Embodied Interaction as Gibson makes explicit the relationships we observe through visual perception.

In considering the temporal nature of interactive experience and physical affordances, Gaver (1991) introduces the concept of Sequential Affordances. He extends Normans (1988) fascination with door handles and argues that in grasping the handle the user gets a deeper understanding of the manipulable qualities and how the affordances reveal themselves step by step in time. If these sequential cues don't occur the device breaks down causing confusion. For example the grasping and pushing of the handle releases the door from its location via its latch being withdrawn from its catch. This is felt through hand and arm as subtle shifts in tension and compression gives information about the doors release. What are important with Gaver's definition is two factors. The first is that time must be considered when you design any device, not in the least an interactive one; the second is that our perceptual motor abilities should also be considered. In the case of the door handle, it is not just its ergonomic fit to the hand but how the subsequent mechanical actions proceed to allow it to be successfully used and enjoyed

4.2 Time as an aesthetic consideration for interaction

When considering interaction, *time is the central form element for computational things* (Hallnas & Redstrom, 2002, p.118), By this the authors are concerned with the expression of a computer program in which the code is line after line of arguments or commands. How this will be realised as an object in the world needs to be considered both temporally and spatially. It follows that the consideration of the relationships between elements, be they lines of computer code, a collection of musical notes or a filmic scene, contribute to the meaning. If you consider the composition and arrangement of musical notes it is their position and relationship that creates a harmonious whole. Blues and jazz musicians often seek to build a groove to develop fluctuations in their music that seek to create a tension and release in their work. Time is the central element here for the groove is developed or built in an emerging temporal sense as an interactive dialogue.

Hummel's et al (2001) give a compelling account of the toaster to illustrate the sensory motor delight encountered through the feel of the slider buttons and the sounds of the toast being presented for eating. The description offered in this work poetically describes the interaction with a seemingly mundane object. Its emphasis is on the temporal and physical nature of this interaction and how these actions form engaging relationships. In the education of students, much can be gained from studying film or music to consider their dynamic relationships and how they

can make a contribution to temporal meaning and significance.

4.3 Multi-modal interaction

In the earlier discussion on Gavers (1991) Sequential Affordances the temporal and sensorymotor unfolding of the door handle was the significant factor of its successful use. You feel, touch and hear the door, similarly with Hummel's et al (2001) toaster you not only see the device but you feel the buttons slide and hear the release of the toast. But what do we systematically know about the many sensory channels in the interaction we have with physical objects and devices and how can this information be categorized to be useful for design. With their Multi-modal Interaction Space (MIS) framework, Bongers and van der Veer (2007) develop a categorization that articulates the many aspects of multi-modal interaction. The MIS framework considers the design of multi-modal interaction from three dimensions, the levels of interaction, modes and senses/modalities of interaction (p.612). Of particular interest to this paper is the discussion on human input and output modalities within this framework as it sheds light on the multi-sensory channels we use when we interact. Human input modalities, or senses, are defined beyond the five senses (seeing, hearing touching, tasting, smelling) to consider for example feeling as pain (nociception), motion, gravity, acceleration, equilibrium, pressure and so on (p.611). The MIS framework creates a substantial awareness of the range and complexity of interaction we have both socially and bodily. It describes in detail the human input and output cycles that exist when acting and perceiving in the world.

Another framework that describes multi-modal or multi-sensory interaction is the Interaction Frogger framework (Wensveen, Djajadiningrat, & Overbeeke, 2004). In this work the authors argue that freedom of interaction is attained through the natural coupling of action and function. This work articulates that there are six aspects of natural coupling to consider when designing interactive systems and products. The coupling of action and function should occur in *time* (no delay between action and function), *location, duration, dynamics* (speed, acceleration etc), *modality and expression*. The modality as described in this work combines the action/output modalities and input/sensing modalities as described by Bongers et al (2007) in a causal link and argues that these relationships need to be harmonious. These authors cite the common scissors and how when cutting paper that the action can be seen, heard and felt. With consideration toward the often-disassociated nature of electronic products, the framework articulates different types of feedback and feed forward that keep the user in touch with the activity. For example, what does a button on a device tell you before you push it and after you have pushed it?

In the Frogger framework a car engine sounding or a television screen illuminating is considered *Functional* feedback or feed forward (*FBK or FFWD*). In digital or electronic products there may be a delay due to software or electronic processing whereby and *Augmented FBK or FFWD* is needed to inform the user on the state of the system, for example the LED light pulsing on a Macintosh laptop when it is resting. Finally *Inherent FBK/FFWD* appeals to the perceptual motor

skills of the user such as the feel and touch of buttons and handles in a mechanical and physical sense.

5. Time and multi-modal interaction in the design curriculum

We have used time and multi-modal interaction as central themes to inspire design and theoretical analysis in the teaching of undergraduate design students. These students are in an industrial design program that has historically valued form and material design exploration of static objects and products. But in recent years with the introduction of staff research topics as teaching material and the rapid rise of wireless sensing technologies the program has introduced designing interactions as a topic stream. This education stream is framed around the notions of time and multi-modal interaction as fundamental material for teaching interaction design. In the upcoming sections we discuss the project-based approach to the teaching of these themes and reflect on this pedagogy.

5.1 Semantics and Form of Sound

To encourage a greater awareness of time as a central aesthetic impetus we devised a collection of projects that used sound as a central theme for the students to respond to with sculptural forms and collage. These sounds were either selected by the students or prescribed by us. In all of the projects the first activity was to consider the modulations within the sounds, name them and mark them out on timelines. Using this method the students gained an appreciation for each of the sounds and attempted to isolate them to enable a translation to a shape or form. In one project the first outcome was to create a temporal collage using images and other graphic motifs to express what they saw in the sound. This was then translated into a collection of sculptural forms that suggested movement through a temporal sequence.



Figure 1 + 2 Images showing examples of forms generated in response to sound and time, Figure 2 (right) is a response to a piece from the electronic music artist Aphex Twin

5.2 Reflections on teaching

The *Semantics and Form of Sound* projects have been run within three different teaching semesters to date. In two of these semesters the outcomes were either collage or card sculptures as shown at figures 1 and 2. These forms demonstrated an interpretation and representation of the sound through the relationships created through these forms. Some of the students enjoyed the new approach to expression by taking temporal musical themes, that are ephemeral and abstract, and creatively translating these into concrete forms that inferred movement. There were some wonderful results that spoke formally and temporally of the music samples. At student encouragement, we resolved to build this activity into a cumulative learning program over an entire semester rather than a small module within the semester. This enabled further exploration of these ideas and give the anxious and frustrated students a chance to engage with the themes through three project activities. This resulted in the *Form and Sound* exercise being used as an activity to be combined with the resulting Movement and Interaction.

5.3 Semantics of Movement and Interaction

This project continued the themes of semantics and time. It was set within an internet communication context using a desktop computer. Gaining inspiration from the approach to the expression of communication through movement as outlined in (Kyffin, Feijs, & Djajadiningrat 2005) the outcome of this project was to design a device, and its movement through time, that articulated a lightweight message from internet data. For example, a Facebook posting. The students developed their own particular contexts and set about developing scenarios, either written or visual. The scenario was critiqued in class to reveal the quality of its sequential logic as communication through the movement of the proposed object. Emphasis was placed on the movement feedback and how this related to a message that could be perceived or interpreted.



Figures 3 + 4 Images on the right showing movement mediators that gave information such as, file download progress and time elapsed since chat partners have been in touch. Figure three to the left shows a basic means of mechanical movement, which was part of the design outcome for the project.

5.4 Reflections on teaching

The aim was to explore the themes of form, time and movement in a number of ways thus encouraging design exploration over a greater period to achieve a deeper connection with these notions. With *Form and Sound* used as a primer activity, time was considered not just as a functional event but also for aesthetic and expressive opportunities. The students developed mechanical sculptural devices that indicated, for example, such ideas as opening and closing of petals on a mechanical flower as an indication of the frequency of internet chat posts. The responses illustrated poetic and aesthetic approaches to information transfer. The students successfully shifted their orientation from offering iconic screen based representations, which tends to be a natural response to the interface challenge in students, to gestural and behavioural movements that have the potential to engage more affective and emotional responses.

This project developed both a cumulative appreciation of time and movement as expressive communication channels in the students as a way to consider novel and innovative interaction in desktop and home computing applications. The students were very positive in their formal evaluation of the course as a design learning activity. Some wanted to continue the learning in to the next semester which unfortunately could not be facilitated due to the structure of the degree program.

5.5 *Objects that think*

Objects that think was a project based on the themes and ideas developed at a masters workshop conducted by two of the authors at the Designing Quality of Interaction group, TU Eindhoven, in February 2009. The workshop was entitled Designing for Embodied Interaction in which teams of masters students designed and developed socially engaging sound making devices using the *Interaction Frogger* as a design framework (Wensveen, et al., 2004). Based on the success of this workshop, an undergraduate project was devised by one of the authors using the *Interaction Frogger* framework to encouraged students to look at the world of mechanical tools and gain insights into their physical affordances and motor sensory properties. The project title is provocative, for it could be argued that it is our engagement with tools and objects that enables thinking or is thinking. In other words the tool does not think but it orients us to the task and thinking in a particular way.

To gain an appreciation of the subtleties of tool use the students acquired four mechanical devices ideally hand operated in size and use. They analysed the particular nature of the interaction with these tools based on the *Inherent* and *Functional* states of feed forward and feedback. In this way the students could describe objectively the relationship we have with mechanical tools and reach beyond the usual aesthetic comments into a deeper analytical position on why the tool was able or not able to be used successfully. The figure below shows a description of the use of a tea strainer as

a sequential stage of events that the student would then develop a closer analysis through a description of the feed forward, feedback and action couplings.



Held by hands with the fingers on Press the handle inwards to open the top of the steel





strength the mash opens wider

Keep the strength of the fingers to Move hand forward to scoop tea Release strength to close it keep the mash open

When closing we can hear a clipping sound of the mash joining together

Figure 5. An analysis of a tea strainer using considering the couplings of action and function as discussed In (Wensveen, et al., 2004)

5.6 **Reflections on teaching**

The Objects that Think project introduced the students to an organised analysis and categorisation of physical interactions. The aim was not to design but to observe, act and interact with the physical tools. This proved to develop a deeper understanding of the physical relationships with these tools to inspire new design approaches. As a learning outcome there was an initial period of confusion around the definitions and means of analysis through using the Frogger framework. But after in-class presentations and critiques the group grasped the concepts. A majority of the students articulated through a project report that this activity had greatly influenced how they would approach and consider design in future tasks, as they could articulate with some sophistication the nature of physical interactions.

Conclusion, aims and implications for education 6.

The project curriculum developed in the examples above had two main aims. The first was to raise an awareness of the temporal and multi-modal nature of physical interaction as these we determined through our research and practice to be central themes upon which to build an Aesthetics of Interaction education program. Sequential affordances, Tangible interaction, Multi-sensory perception were all considered through the use of the Frogger framework in the Objects that Think project activity. To date the student feedback and the quality of work submitted suggests we should continue improving and applying these themes and approaches to design teaching.

The second aim was to consider time as an aesthetic material through the agency of a design project. This offered the students a contrast to the analytical approach of the Objects that Think activity to creative responses where affective and emotional qualities were considered and presented. We were satisfied that this gave the students a sense that design has plenty to offer the notion of human computer interaction and that looking to established temporal art forms such as music proved to be inspirational.

7. Acknowledgements

The authors would like to thank the students of the industrial design programs at both RMIT University and TU Eindhoven who took part in the activities documented within this paper.

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Transnational Experiences India and China in Australian Industrial Design Education

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Educational experiences that equip undergraduate Australian Industrial Design students with a practice of design capable of effective engagement with Asian cultures and industries are of increasing professional importance. To enable this, the Industrial Design Program at RMIT University has had to shift paradigms. Long-held and essentially Eurocentric notions of the discipline have given way to being independent in its view of what the future of Australian Industrial Design would look like and where it's main locales of disciplinary engagement would be. The rapid economic development of India and China, and their respective differences in design capabilities to those of Australia, has provided an opportunity to build transnational design relationships through a program of integrated curricula and funded student mobility with partner institutions in China and India. This paper discusses the key issues of training Australian Industrial Designers for transnational practice.

Keywords: Transnational, Industrial Design, Mass-Manufacture, Australia, India, China

1. Introduction

Mass-manufacture in Australia has been in decline for many years, making its inclusion as a curricula priority difficult to authentically facilitate in the situated project modality of studio based learning. Counter to this is the growth of the industrial production base, domestic consumer markets, and considerable export capacities of India and China, and their new focus on training Industrial Designers to service this growth. The rapid economic development of India and China, and the new phase of economic codependence that Australia has with both nations has done two things: firstly, it has highlighted the disjuncture of locales of professional practice and their discourses, the authenticity of curriculums, and the disciplinary aspirations that exist in Australian Industrial Design education; secondly, it has provided an opportunity to reclaim a notion of design for mass-manufacture back into the curriculum. To this end the authors' have conceived and implemented a project of building on the transnational inclinations of students and the university to construct a coupled curricula framework that promotes learning that is both locally and internationally relevant. For the past four years this has involved collaborating with partner institutions in China and India through a program of integrated curricula and funded student and academic mobility.

Within the context of the undergraduate Industrial Design Program at RMIT University the negotiation of a solution to this disjuncture between design capability and the needs and types of design opportunities that local industry presents, could be approached in two ways. The first process is to change the curriculum to train students for a more relevant and localized practice. This requires a transformation from a curriculum that focuses upon mass-manufacture in favor of a curriculum that considers design to be a practical education in the humanities, thereby achieving a 'meaning' of design as a mechanism for the types of redirection needed in a post-industrial economy. Such a curriculum could equally reposition Industrial Design as a generalist multidisciplinary practice capable of adapting to the disparate areas of creative engagement that constitute the contemporary nature of the profession. The second process is to keep enough of the specialized mass-manufacturing oriented design curriculum and attempt to connect students to an Indo-Chinese client base. Activities to achieve both these goals began in 2004. The paper sets up a discussion about establishing a rationale and methodology for educating Australian Industrial Designers for transnational practice through the rethink of current curricula and a revisiting and re-contextualization of the curricula origins and agendas of Industrial Design at RMIT University. The curricula transitions discussed are done so in relationship to broader shifts in the Australian economy and the important roles that the internationalization of Higher Education plays in macro-economic policy. It then goes on to describe the transnational capacity developed in students that have participated in the project.

2. The 'Local'

Since the formalization of the Industrial Design Program at RMIT University in 1949, massmanufacture as a central discourse within the curriculum has provided relevant learning and a proximity to a future client and employer base for students. Here the idea of design for massmanufacture has been elevated, perhaps optimistically, as an integral element of Australian economic development and independence, and as an important practical and political expression of the roles that Industrial Design plays in motivating cultural aspirations and cultures of production. Industrial Design in Australia found its feet as a codified profession in the years following the Second World War as a necessary mediator between building and maintaining Western consumer aspirations with the cost and logistics of pursuing this Western lifestyle on the other side of the world. The import of goods from abroad was both slow and expensive leading to the creation of market conditions favorable to local design and manufacture. While distance provided the incentive, much of the mass-production infrastructure, and many of the large manufacturing business entities were established with significant government support as part of the war effort during the 1940's. The sectors' heritage in many ways became representative of the political desire for Australia to share the socio-economic values of its closest allies who were also its largest trading and strategic partners at that time – Western Europe and North America (Bogle, 2002). Throughout the second half of the Twentieth Century the shifting of populations between rural and urban sites of production via large-scale immigration programs, which in turn brought multiple cultures and social aspirations, kept the complexion of the profession internationally attuned and diverse. Immigration saw the rapid growth of a multicultural urban Australia with comparatively benign class structures, high standards of living, functional governance, and employment stability that ultimately helped to solidify Australia's manufacturing base.

While Industrial Design education in Australia imported many curricula values from Europe and North America throughout the Twentieth Century, it steered away from any deep inclusion of design as a theoretical, abstract and speculative practice. The discourse of design as a practice in the modernization of indigenous crafts was also not deeply privileged. Instead, a technically and industrially grounded discourse of design for mass-production and mass market was largely favored. This preference has a lot to do with the social and curricula histories of many of the institutions that offer Industrial Design training in Australia. The working class technical training colleges that were established in Australia in the late-Nineteenth and early-Twentieth Centuries formed the early incarnations of many of the universities in which Industrial Design education was formalized. Curricula that grew out of industrial arts and engineering education in these colleges have provided a particular linage of disciplinary ideology and pedagogy. This saw trainee designers' work in close proximity to their future client base with a view to participating in the cultural project that was 'building' Australia's creative and productive capacity in the best traditions of industrialization as humanism.

In the 1940's, one of the first modern Industrial Design programs in Australia was started at RMIT under the direction of German émigré, designer and educator Gerard Herbst. Known as Formgestaltung, this program explicitly positioned the role of the designer as a humanities trained design generalist that had the necessary technical skills to productively engage in the realm of mass-manufacture. This would later become formalized as the Industrial Design program at RMIT University. Due to the comparatively small size, emergent and diverse nature of Australian manufacturing enterprises, a de-emphasis on specialization in Industrial Design training was seen as critical in equipping designers with the necessarily broad capabilities and cultural awareness to fulfill many organizational roles. The curriculum of Formgestaltung recognized that mass-production and consumption was central to economic development in the post war years and that it would occur regardless of the involvement of designers. Teachings that privileged concepts of product ecology, environmental, behavioral and organizational psychology, philosophy, ergonomics and sociology were balanced against production oriented subjects. This pedagogy aimed at preparing designers with a broad world-view and the ability to act as practical advocates for a uniquely Australian "aesthetic of scarcity" through design (Herbst, 2000). This orientation to the discipline was more focused on the

ideological role of design than the technical and was significant to the ways in which design intersected with local mass-production.

The rapid development of the manufacturing sector in post-war Australia began to stabilize in the mid 1970's and began to contract sharply in the early 1990's. Throughout this period the profession (and its education) incrementally re-oriented itself to be more reactive to the specific organizational needs of the main employers of Industrial Designers. This shift saw a reduction in the desire for a broad humanities education and a more focused and vocational approach to teaching a technical skill-set desired by a larger but less diverse local manufacturing industry. The notion of design pursued in the past three decades can be seen as largely producer oriented, where design professionals shifted from a role as mediators between production and society, to specialists in the various sectors of design for manufacture. The specialization of the profession on one hand significantly refined design capability, and on the other it reduced the mobility of designers and the transfer of knowledge from sector to sector. Consequently an education that was more vocationally localized and more technical in its curricula than the broad and multidisciplinary Formgestaltung came to be.

Hidden under the relative economic prosperity of the past decade has been a shrinking of the local manufacturing base, and a steady drift towards offshore production by Australian companies. This has resulted in a marked contraction of the scale and range of local mass-manufacture that has run counter to the increased size, economic capacity and levels of consumption of the domestic Australian market over the same period (Davidson, 1969; Smith, 2001). This contraction has its roots in a set of macro economic factors that need to be seen in context to appreciate the level of change that the Australian Industrial Design community has had to contend with: the economic deregulation and incremental removal of import trade tariffs of the 1990's; the increase in the export of commodities by primary producers to emerging industrial economies in Asia; a political and cultural aspiration to move away from secondary industrial production activities towards service oriented tertiary industry sectors such as finance and higher education (Zhang, 2005); a cultural aspiration to mark prosperity through a level of material and technological goods consumption not seen since the years following the close of the Second World War (Berry, 2005); and, the rapid expansion of Asia's economic capacity to service the aspirations of a booming Australian economy with a level of diversity that local industry struggles to compete with in the absence of robust organizational and brand structures. Lastly, the causal economic effect of the growth of near neighbors, namely the liberalization and industrialization of the Chinese economy (Zhang, 2005), the growth of the massive middle class of India, and a general increase in role of consumerism in Asian societies (Chua, 2009), has enabled the potential of a new and vibrant Indo-Chinese client base for Australian designers (Dilnot, 2003; Koshy, 2008; Varadarajan, Mayson, & Trathen, 2007).

The consequence of this contraction has been a change in the local contexts of design engagement and the opening up of new contexts and approaches. The privileging of North America and Europe as pivotal to the disciplinary discourse within the curriculum of design for mass-production, as those locales de-industrialize, has shifted towards a greater inclusion of Asia as a key sphere of economic inter-dependence. This has enabled Industrial Design curriculum to begin to grow beyond its traditional and dominant practice discourses of design for mass and medium scale manufacture for local markets into more multifarious and contemporary notions of the discipline. There has also been a reduction in opportunities for Australian Industrial Design graduates to engage in locally based careers within the milieu of design for mass-production or mass market. The nature of employment in Industrial Design in Australia has for many changed from that of being in the service of a company (manufacturer or consultancy), to being a career constituted by forays into design projects where the context of engagement and not the activity, be it production, market or message, defines the method and approach in which design is undertaken. Many designers in contemporary Australia need to orient themselves as multidisciplinary practitioners working on projects: they may work in the realms of art and performance; designing bespoke and batch manufactured products; as researchers, or as generalists working across areas of design, marketing, and production in small and medium sized enterprises. Many designers have little option but to practice in a piece-meal fashion as the nature of employment in design has moved from that of being in the service of an organization to being a contractor within the time frames of a specific project. While moving from project to project has enabled Industrial Designers to increase the ambit of their design repertoires, rarely is there the authentic opportunity to orient careers in the traditional parameters of Industrial Design as a secure career, designing mass-produced objects for a mass-production company. These changes in career structure have also resulted in the diverging and amplifying of the notion of Industrial Design as generalist specialism to becoming two professional modalities: the design specialist and the design generalist. Industrial Design as a generalist specialism is important within the context of design for mass-manufacture in large organizational structures given the diversity of roles and responsibilities that such contexts of practice demand.

3. A Transnational Experience

Australian Industrial Design education in the main continues to educate in view of developing capabilities in designing for a mass market and a large company, despite, as previously argued, it being an unlikely professional activity for the many graduate designers who situate their careers within Australia. Design for mass-manufacture sits as a deeply entrenched and implicit disciplinary expectation, and despite the local condition, it is an important and tightly held aspect of the profession. However the proximity of the designer to the sites of production, user and market is crucial in an effective design education. The context of design for mass-manufacture now sits predominantly in

Asia. The experiential engagement with user and market sits in Australia, while disciplinary aspirations remain largely directed at Europe and North America. Such a segregation of locales of practice questions the authenticity of training designers for a full sense of practice in the area of design for mass-production and highlights the disjuncture of Industrial Design curricula. Alongside this is a reluctance in university programs to recast the curriculum to such an extent as to be either 'localized', and therefore entirely representative of the nature contemporary Industrial Design as it is practiced in Australia, or to remove the 'local' and transition to a curriculum that is 'international' in its entirety. It, therefore sets up both a need for a transitioning of the curriculum so as to be more reflective of the types of local practice opportunities that Industrial Design graduates will have, and a need for a mechanism that can link Australian Industrial Designers with the mass-production opportunities that exist within Asia in order to provide access to an authentic locale of practice.

Depending on their size most Australian undergraduate Industrial Design programs now have a coupled local and internationalized curriculum as central to the ways that design in Australia is to be understood. For these programs this curricula 'coupling' raises questions of direct local relevance of content, and of the depth of meaningful penetration into the international spheres of practice that their graduates will embark on. There is no neat fit for a curriculum that is stretched between two poles, however, most programs cannot afford to not be international in orientation given the origins and trajectories of their students, just as they cannot afford to neglect to service the needs and help direct the futures of the Australian design sector. To make any shift away from the local in the formative training of designers carries the danger of further marginalizing the remnants of a local design industry for which the idea of a design service to local production and consumption is significant.

Of most importance to this reticence to 'localize' the curriculum has been the concomitant increase in the internationalized nature of students of design. When viewed as a 'transnational' disposition two main factors inform this internationalized nature: one, the professional trajectories of international students, and two, local students with a transnational appreciation and the means to effectively practice across multiple cultures (McBurnie & Ziguras, 2001; Ong, 1999; Volet & Ang, 1998). This change in the global orientations and expectations of students sits alongside the broader project of internationalizing the Australian Higher Education sector as a significant aspect of the nations macro-economic policy directions (Knight, 2006). Most undergraduate Industrial Design programs in Australia have a high proportion of international students that are in Australia for the purposes of professional education with a view to translating that training back into their countries of origin. Within the RMIT Industrial Design Program international students make up about 30 percent of the total student cohort. Many of these students are from Asia, where the notion of mass-manufacture is, and continues to be, a significant element of economic development. Other international students from Europe or the Americas within these programs often come to study design in Australia because of its

proximity to Asia. For both groups of international students Australia represents a middle ground between the contextual opportunities of emerging Asian industries and markets and the design values of developed and de-industrializing Western economies. Additionally the generation of 'local' students that have entered Industrial Design programs over recent years have a different sense of what Asia means to them than previous generations of students. Many have some Asian heritage or have developed a greater value and awareness through studying Asian languages and cultures as part of their primary and secondary education. For these students the Australia is a legitimate part of Asia and therefore a desirable context for design practice (Evans, 1995). This is evidence of a move away from the idea of Australian design being an adjunct of Euro-American design values. Both groups of students engage in educational contexts that provide a highly reflexive enmeshment of cultural values. This enmeshment is further facilitated through the use of universalized information and communications technologies, and visual communication conventions particular to design, such as the sketch and the model, that transcend linguistic barriers.

In response to these changes the authors' developed a project of coupling the local with the transnational via a set of opportunities that students can choose to engage in. Here the 'transnational' is encountered by the student in three different ways. Students can undertake 'transnational coursework' that includes design studio projects that focus on designing for real world client organizations and manufacturers in India or China, and design history and cultural theory courses that provide a focused study of design in either India or China. Alternatively some students can do an 'exchange' which involves spending a semester abroad in a partner university in India or China, or coming to RMIT University with an aim of immersion and familiarization in a culture and design practice of another country. This provides students with a grounded appreciation for other sites of professional activity and the capacity to build lasting professional and social relationships in their host nation. Finally, students can engage in 'localized' coursework. This involves working in a team on a design studio project that is grounded within the local practice discourses of design. Project teams are made up of international students enrolled in the full four-year degree program, local students with some or no prior experience of India or China, and students on exchange to RMIT from partner Universities in India and China.

The co-construction of project-based learning activities by academics from the various Universities involved has been a major aspect of this project so as to ensure that the key learning objectives of each institution are met. Constructed design projects have included the opportunity for participating students to work within the areas of: design for the mass-production of ceramic goods in Foshan, China; the design of products and services systems with NGO's and fabrication industries in Ahmedabad, India; design projects with Australian automotive companies, and sustainability and social innovation design research projects in Melbourne, Australia. Critical to the learning in these

projects has been the amplification of local design and production discourses so that students on exchange have to contend with differences of culture and discover the values of design, production and practice particular to each context. Alongside these design project learning experiences students sit practical and theoretical coursework as normally taught in each of the Universities. For RMIT students in China or India this has provided authentic learning in design for mass-production and mass market. Additionally students have undertaken design studios in Australia directed at both Indian and Chinese contexts of application. These include transportation design projects, product and service design in the areas of health management and diagnostics, sustainability oriented campaign projects, and product design for grass-roots inventors in the process of commercializing inventions.

These projects have involved a linkage between the research agendas of the project teams at participating institutions and the development of direct project relationships with manufacturing companies and client organizations. Constructing projects around ongoing research activities serves two primary aims; firstly it provides a surety for the students that the activities and contexts of learning undertaken have been adequately negotiated and will be monitored in an ongoing way by academics from their home institutions, and secondly it provides academics with a direct, and embedded link into the areas under research. The disciplinary objectives of these projects vary depending on their duration, degree of immersion and levels of complexity. The experience deliberately sets out to connect the Australian experience of moving through a peak of industrialization and into a phase of de-industrialization as a possible model or outcome for Design in India and China. Here the temporal, political and macro-economic nature of creative industries is highlighted for students so that inter-cultural learning is enabled. This provides Australian students an opportunity to understand the changing conditions of design in Australia through grounded comparison. It provides Indian and Chinese students with a possible future image of the changes that they may encounter through their careers as their nations economic growth peaks and plateaus. Finally, this embedded agenda provides an experiential lesson in the macro-economic and cultural forces that direct the phases, transitions and opportunities of the profession in major economies in the Asian region, giving students agency as designers with a regional appreciation that sits over and above the confines of national constructs of the profession.

Set up by the authors' as an ongoing project, these encounters have involved the development of academic and institutional linkages and the securing of Australian Government and University grant funding and scholarships to facilitate the mobility of students and staff between key institutional partners. Since 2004 the project has enabled the funded exchange of fifteen students from RMIT Industrial Design to India, and sixteen students to China. It has also provided the mechanism for the funded inbound exchange of forty-seven students to RMIT from Indian and Chinese undergraduate Industrial Design programs. To date a total of seventy-eight students have participated in exchange

between Australia, India and China. When added to the many hundreds of students and academics at each of the universities involved that have interacted with students on exchange or on their return, either through projects or socially, the project represents a significant quantum of transnational activity. Such a degree of sensitization to different contexts has enabled a familiarity and fluency of working across locales for participants. It has also provided the program with a mechanism to proactively confront the standing and implicit notion of India and China as 'other' to the established values of Industrial Design in Australia.

The learning that happens in these constructed transnational contexts has a few key aspects, as gleaned from the values expressed by the students who have participated in the programs and projects via course experience evaluations and feedback. Students relay the effect of learning new ways of working as a fundamental re-articulation of the design processes previously learned and considered universal by "adapting key routines, rules and practices with each actor acting from a specific sociocultural background" (Hachmann, 2008), when they study and experiment under different conditions, and when they jointly invent new products, services and systems within a transnational or localized project context. Students encounter new parameters of evaluation, where good design is defined in different ways, leading to an understanding that the knowledge constructs of Industrial Design are fundamentally arbitrary and locally contingent. This realization enables a greater openness to an exchange of cultural and disciplinary knowledge, ideas, strategies, and expectations. Many of the students that have participated talk about the act of confronting the 'other', and their own perceived limitations, as a critical and self-actualizing moment. This moment provides a scaffold for developing new ways of looking at the world, appreciating difference, and adapting to environmental and socioeconomic conditions. For some students these changes manifest as incremental enlargements and improvements in ways of functioning, but often they can also be fundamental in their reordering of the very nature of design as understood by the student. In the latter, the degrees of misalignment felt towards 'localized' curricula suddenly dissolve so that subjective and deep assumptions learned previously are questioned. This often results in the transformation of the very way design projects are constructed, through a "forgetting" or "unlearning" of accustomed routines and outdated knowledge and the replacement of outdated institutions, roles, and procedures with new and more effective ones.

Conclusion

Visualized as an ongoing project of capacity development for future Australian trained Industrial Designers this paper argues the rationale and timeliness of a more effective engagement with Asian cultures and industries as a formative learning experience that is critical to the discipline and its sites of practice. The project group at RMIT University arrived at the need for this project through a sensitization to the career trajectories of students given the changing nature of the profession and its

curriculum in the Australian context. Key to the authors' position is the belief that the role of design for mass-production provides Industrial Design curriculum with the necessary depth of content to impart contextually transferable knowledge and practices that sufficiently account for the social, technical, economic and managerial elements that constitute a robust foundation to the practice. A method of approaching this belief through an integration of the activities of student exchange with curricula design and delivery and its impacts on learning is described. The belief that there is still an important place for a curriculum of design for mass-manufacture for students of the Industrial Design Program at RMIT University, despite the continued shrinking of the sector locally, has provided for the authors' a way of engaging students with the new centers of mass-production. Opening out India and China as legitimate pathways for learning and professional practice has enabled a clearer view of disciplinary and curricula priorities, and a deeper value in the transformative power and authenticity of contextually situated learning.

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Beautiful Strife Between the Concrete and the Ephemeral

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This paper attempts to explore the ways in which notions of cultural authenticity have contributed to the further marginalization of people already living on the economic edges of Vietnamese society. The site I have investigated is Hoi An, on the central coast of Vietnam. It is a UNESCO World Heritage listed site, the preservation of which has fostered a tourist trade from which those not deemed 'authentic' are excluded, leading to further marginalization which is exacerbated by annual flooding.My aim is to intervene in this process through concrete proposals which provide both immediate economic relief and spatial opportunities for the future. Underpinning this project is a belief that the public sphere is inherently contested. This contest carries within it the potential for delivering justice. By encouraging the participation of the marginalized in this process of contest, my aim is to enable distributional justice as a catalyst for social change. I have looked at the lives of two groups of marginalized people who derive a living on the edge of the UNESCO preservation area. Understanding the economic, spatial and temporal effects of flood began to reveal spatial opportunities within the landscape which allowed the use of the line as an operational tool with agency potential. My design outcome involves the occupation of a narrow strip of land on the high flood line which acts as a repository for rubbish from both the flood and the surrounding urban area. Rubbish deposition on the site is facilitated through a network of footings and walls to provide a new surface which serves as the basis for temporary flood shelter. This intervention has the potential to act as a new river front under future climate change scenarios. This potentially places those who are currently marginalized at the centre of society into the future. I understand that such a utopian outcome would be unlikely to eventuate in reality but once the stage has been activated for contest, it may repeatedly play out into the future. Such a scenario provides the opportunity for justice.

Keywords: Marginalization, Authentic, Contested, Justice, Opportunity, Agency, Change

1. Introduction

Vietnam was ruled as a Chinese province for at least 1000 years until the 19th century and Chinese philosophy in the form of Confucianism has left an indelible imprint on Vietnamese society particularly in the central and northern regions. Originally playing out through systems of governance down to the family level, vestiges of Confucian influence remain in a few remaining urban elements, familial structuring and in rare preserved architectural forms. Hoi An, a small trading town on the Central Coast contains the best preserved collection of these architectural forms in the country. Established in the late 16th century, Hoi An's position on the Thu Bon River saw it become a thriving hub for

global trade on the Ocean Silk Route through the 17th and 18th centuries. Through this period, Chinese traders established their own quarter in the town to facilitate trade with the Japanese, a trade which was restricted by the ruling dynasties in both countries. Arab, Asian and European traders also regularly visited Hoi An throughout this period and together with the Chinese they have left a layered architectural legacy. This was added to with French colonization in the middle of the 19th century and Marxist and quasi-capitalist periods from 1954 onwards have left further architectural imprints as the town has developed inland away from the river in response to a decline in the importance of the port. This decline commenced from the early 19th century as a result of river silting and helped shield Hoi An from the worst depredations of the American war as it held no strategic importance.

The town of Hoi An was afforded World Heritage status in December 1999 on the grounds of it possessing outstanding cultural heritage which UNESCO considers to be in the interests of the international community to preserve for future generations of humanity. This preservation, which seeks to capture a snapshot in time from the 16th century through to the early 20th century , applies to a 30ha area of the old town and imposes restrictions on development and use within this area. Many of the historically important buildings and streetscapes have been renovated and restored with the assistance of UNESCO and with local expertise. The majority of these now house tourism oriented businesses including souvenir shops, restaurants, tailor shops (for which Hoi An has traditionally been renowned) and tour operators with some guest houses.

2. Preservation

The preservation area is demarcated by an abstract line which runs in from the river and parallel to it at a distance of several blocks. Signs and unobtrusive mobile barricades at intersections along this boundary line prohibit the movement of vehicular traffic, including the ubiquitous motorcycle, through the streets of the old town. Pedestrians, bicycles, hand-drawn trolleys and small carts are the only form of transport in this area. Other restrictions related to the preservation of the old town cover the display of retail goods on the street and footpath, street vending and facade signage. These restrictions diminish as one moves a block or two away from the old town and the usual vibrant street life and traffic buzz of Vietnam reasserts itself. The old town itself is characterized by a quiet, bucolic charm sitting between the buzz of activity on the river and that of the more contemporary areas. In the sense that 'that culture has become a commodity of some sort is undeniable' (Harvey, 2001), I argue that the UNESCO preservation is producing a commodified, sanitized version of Hoi An culture and landscape. This is gradually being co-opted into a symbolic economy producing a specifically packaged culture for consumption by global markets. This package contains a carefully presented element of "authentic otherness" which can be safely, and relatively comfortably, experienced by the tourist. This connection between the commodification of landscape and tourism mirrors the choice of 'security over uncertainty' (Goula, 2007) which the globalised tourist trade now demands as it shifts from 'elitist to massive due to the economic and cultural emancipation of the middle class in the Western world' (Goula, 2007). This commodified landscape presents a packaged 'fantasy of the 'Other', regardless of whether this 'Other' is natural, exotic, idyllic or, especially, authentic, or indeed a simulation of authenticity' (Goula, 2007). Together with an inherent post-colonial discourse, this commodified culture

excludes those not deemed to be part of the right story. Paradoxically, many of those excluded use the abstract line of preservation as an opportunity. Cyclo drivers, motorbike taxis, handcart pushers, vegetable vendors and small boat men all engage in an opportunistic urbanism around this line which is highly portable, temporal, mobile and engages with materials which are affordable and easily obtained. It is this opportunistic engagement with the line which I will use as an operational tool for this project.

3. Flood

The Thu Bon River, which provided Hoi An with its prosperity also produces 2-3 flood events annually. The topography of Vietnam is dominated by a heavily forested mountainous spine which rises from the coastal plain and runs down the length of the Laotian border. These mountains act as a watershed when monsoons sweep across the South China Sea, bringing major rain events from July to December each year.

Flood is regarded by the United Nations as the major cause of poverty in Central Vietnam and indeed in large areas of Asia. The scale of a flood disaster is often registered in economic terms –as nature acting against the economic interests of a community. This plays out in Hoi An as the flood acting against the economic interests inherent in the old town preservation. My argument is that flood should be considered a joint production of natural, social, political and economic factors and be incorporated into the socio-economic activities of the local community.

Throughout Vietnam, flood is treated generally in one of two ways-structurally, which involves engineered or constructed responses such as floodwalls, levees and dykes and through community based initiatives. Community has been defined as 'a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together' (Shaw, 2006). In this sense, community may be regarded as including 'not only the people living in a certain location, but to also incorporate the local government, local business sectors, local academic bodies and non-government organizations' (Shaw, 2006).

In Central Vietnam, an elaborate system of alarms and warnings alert communities of impending flood. These warnings are based on communications between various government instrumentalities and are often lost in bureaucratic tangles, through infrastructural failures and a lack of access to electronic media amongst the poor. Those with fewer economic resources also have fewer options in responding to these warnings even if they do receive them at all. Evacuation options are often by road and transport is limited to bicycle or motor-cycle with emergency accommodation areas under-resourced. In the old town itself, boats evacuate goods and people whilst the double storey construction of many of the buildings buys extra time.

While the flood event lasts a matter of days, crop and property losses must be borrowed against with payback periods often amounting to several years. Although the figure may be less than \$US100, for those in a pre-existing condition of poverty the flood exacerbates this condition.

4. Poverty

Vietnam embraced market-based reforms to it's Marxist economic system as part of the 'Doi Moi' realignment in 1986. Since then the economy, as measured by GDP, has grown steadily and poverty levels have been reduced. Much is made in government media releases of the role of tourism in aiding this economic turn-around. Although it is a point of contest, the United Nations considers that around 8% of the Vietnamese population is still living in abject poverty-a generalization which has been defined as living on less than \$US1 a day. It is this pre-existing condition of poverty which is most exacerbated by flooding but also that which can be most effectively targeted with small-scale local interventions. Such interventions need only produce a relatively small economic advantage to provide a significant impact in the lives of the marginalized.

5. People

The daily market which sits on the river front adjacent to the old town preservation line is the focal point for the region. Traditionally, villages have specialized in one mode of production or service and these are brought together by bicycle, boat and motorcycle in the daily market. Ihave chosen to work with two groups of people-lettuce growers and pippy collectors. Both sell their wares on the edge of the market adjacent to the line of preservation, both are excluded from the mainstream economy of the old town and both are severely impacted upon by the flood in both spatial and economic terms. Not only do they suffer property losses but their ability to derive an income is also lost for the duration of the flood. Both groups of people engage in an opportunistic urbanism based around the line of preservation.



Figure 1. Regional diagram-Refer Appendix A

Throughout the region, the flood spreads steadily away from the river (Refer Appendix A). The pippy collectors are flood bound almost immediately while the lettuce growers are cut-off after 27 hours. Both suffer inundation for up to 10 days. The high lateral line of the flood is reached about 60 hours after the commencement of the event and remains that way for 2-3 days. As this lateral expansion is taking place, flood water rises vertically reaching a height of around 2.8 metres at its peak in the old town. The usual response to the flood is to move to dry ground, for the wealthier this is the 2nd floor or a designated evacuation zone but for the poor this usually entails an extended stay on an unprotected roof. I am seeking to use both the vertical and horizontal lines of the flood to provide opportunities for the marginalized based on the operations inherent in their use of the line of preservation.

6. Method (Operation)

Traditional Vietnamese society, under the influence of Confucianism, was organized as a rigidly horizontal hierarchy based on filial piety (*hieu*) and moral debt (*on*). Children were taught to honour, respect and obey their parents as the foremost duty in their lives (*hieu*) and were made to feel that the moral debt (*on*) owed to their parents was so large as to be unable to be repaid. Traditionally, this has resulted in the 'parent-child relationship being at the very core of Vietnamese culture, dominating everything else' (Jamieson, 1993). Further to this, 'family relationships were models for broader social organisation' (Jamieson, 1993). This also accords with the 'one major aspect of the central Confucian virtue of *ren* ('humanity', 'virtue' or 'benevolence') being to restrain oneself and return to propriety' (Cheng and Bunnin, 2007). The imposition of an abstract line through generations and through society acted to impose an equilibrium which denied change but attempted to maintain order. The line of preservation in Hoi An acts in a similar way, by maintaining not only an architectural legacy but an embedded societal and economic order.

Later Neo-Confucian thought, in correlation with the Western Pre-Socratic canon, views the abstract notion of the line as an agent of perpetual change and through this perpetual change, equilibrium is established. Such perpetual change or 'strife' is the agency through which opportunity is delivered - opportunity in the way that the line of preservation is used in Hoi An but also the opportunity for justice. Russell (1946) writes of the philosophy of Heraclitus '(He sees) there is a unity in the world, but it is a unity resulting from diversity . . . nothing ever is, everything is becoming'. For Heraclitus, 'strife is justice' (Russell, 1946) and I assert that this agency of 'strife', which has the potential to deliver opportunity, also holds the potential for justice through the ability to take part in the contest or 'strife' of public life. It is this notion of justice-claimed by the recipients rather than delivered from above or outside - which I am attempting to explore through this paper. The agency of the abstract line of preservation will be applied to the similarly abstract line of the flood.

7. Results (Intervention)

The lettuce sellers live in an outlying village on the Thu Bon River estuary as shown in Figure 1. They generally live in simple single storey dwellings in close proximity to the river estuary itself. During





flood events the road out of the village is usually cut around 27 hrs after the commencement of the flood. Their possessions are limited to household items and farming tools while their mode of transport is invariably the bicycle which is usually fitted with a home-made cartage rack. Each household has a tract of land that is around 400m2 which supports 4-6 crops per month. Crops are grown on a 2-3 month rotation with seedlings being raised in the ground for 3-4 weeks before being transferred to the main tract, depending on the crop. Crops are harvested early in the morning and (generally) the ladies transport the crops to their selling point on the edge of the market in the old town - a journey of around



Figure 3. Economic cycles of typical small vegetable growers

40mins fully laden, and spend the day selling from baskets or crates. In the crowded selling atmosphere of the market each seller generally conducts two-three small transactions per hour, generating sales of around \$1.60 per day for the household. This selling situation, whilst quite competitive, is also inherently social. The lead time involved in raising a crop means that a single typhoon or flood event which directly impacts the household for no more than ten days, potentially destroys a three month slice of the crop cycle and loan repayments extend this disruption as previously discussed.



Figure 4. Lettuce grower with retro-fitted bicycle crate

My first intervention is to suggest the adaptation of this crop cycle. If seedlings were raised in trays for the duration of the typhoon season (Refer Fig. 3), in the event of a flood they could be stacked into the existing bicycle racks for transportation to dry ground (Refer Fig. 4). Household goods can be transported by the same system as long as a dry destination for storage can be reached within the time constraints. An adaptive strategy such as this has the potential to save at least \$65US for the household (Refer Fig 3). This also provides the lettuce growers with mobility for the duration of the flood-mobility underpinned by a degree of economic certainty.

In regarding the flood as an agent of change, the high flood line presents an opportunity for occupationan opportunity open to the lettuce growers given the portability of their crop and vital possessions. This line does not flood, is accessible within the required timeframe and is currently unoccupied.

The bamboo thickets which grow along this line act as repositories for rubbish (which is dumped from the urban area) and debris deposited by the flood, making it a generally unappealing zone. This particular bamboo (*Bambusa stenostachya*) grows in distinct clumps and can be managed as a resource usually on a 3yr rotation. The poles can be harvested at long lengths with a high compressive and tensile strength and it has traditionally been used as a vernacular building material. To facilitate occupation in the flood season, this harvest would be managed by cutting 50% of the clumps in one area in one year.



Figure 5. Occupation of bamboo thickets on the high flood line

The resulting ground plane to canopy cover ratio would permit the construction of pyramid shaped pole structures which can then be covered with emergency tarpaulins or sheeting for the duration of the flood event. Each structure could hold the contents of 15-20 households with the bicycle crates being used to create individual personal spaces. Bamboo harvested from each area would be used to build the structures, with excess bamboo potentially sold as a building material for a small return. By proposing a three year rotation for bamboo harvesting and occupation each area has time to recover and return to productivity before the next occupation. Each area is sufficient to more than meet the needs of the target village and could meet the needs of other villages before new areas were required.



Figure 6. Occupation diagram

In making this proposition I have been guided by the work of Desvigne and Dalnoky the French Landscape Architects in three ways - their representational mapping techniques, their belief in the connection between nature and culture and their understanding that they are working with a landscape 'which in and of itself has a purpose, thus lending the outcome a sensible reason for existing in the world' (Marot, 1998).

This proposition is an attempt to use the line of the flood as an operational tool to set up conditions by which the lettuce growers can participate in the contest for space which may be public for the duration of the flood. The proposition relies on the fact that the space would be deemed undesirable to other potential users and also that the lettuce growers need to be actively engaged in taking up the space - that it would be useful to them. If these conditions are met, then over time this line can be thickened, allowing these people to achieve a measure of justice for themselves. Once occupation of the line has been established, a 'thickening' can take place. In facilitating this 'thickening' of the line I have proposed an operation whereby the natural accumulation of rubbish enables a level surface to be built over time from two directions-the urban and the rural. This opportunistic harnessing of rubbish accumulation results is informed by work done at Kintore, a community 520 kilometres north-west of Alice Springs. In this project community rubbish is harnessed as a source of mulch, facilitating the establishment of vegetation in a particularly harsh environment 'in order to reduce dust-borne diseases by providing shelter,



Figure 7. 'Thickening' diagram

and plant uses such as firewood and carving wood for artefacts' (Sinatra and Murphy, 1999) .

The first operation in the occupation of this new ground is the installation of a network of concrete footings. Each footing has a 250mm long 75mm diameter galvanized post stub set in it an angle of 39 degrees. Over these are sleeved 8m lengths of bamboo as harvested from the clumps at the beginning of the season. A three-cornered galvanized connection provides the linking key at the apex. This allows tarpaulins or plastic sheets to be slung over the angled posts as the remaining canopy allows for the duration of the flood. Excess bamboo poles are laid horizontally between



the footings to facilitate the build-up of rubbish over ensuing years from the adjacent urban development, facilitating a level surface over an intermediate time-frame of some 10 years.

Concurrently a staged concrete wall would be built along the rural edge of the line. Built in 200mm vertical increments over a period of 25- 50 years this would in turn trap rubbish deposited from the flood as its lip allows water to lap over the top. Abutments or ramps which correspond to the rice paddy edges would permit access to the paddies in the short term and mooring points for the small boats in flood times. As the thickening of the line progresses, the original footing layout would facilitate this



Figure 9. Incremental wall building



Line facilitating occupation of road edge

Emergency shelter restricted to edge spaces

Climate change scenarios and rubbish deposition force new land use modes to edge-lotus farming displaces rice farming-small boat men still facilitated

Figure 10. 'Thickening' the line

economic activity to move from the old town to the road edge as the urban development increases along this line over time and the ground surface thickens and solidifies. This development would necessarily shift the emergency occupation area to the middle of the line, coinciding with the finished construction of the concrete wall. The occupation and short-term thickening of the line allows the lettuce ladies time to continue to sell their wares, and hence retain their social connections, for the duration of the flood.



Figure 11. Street view-old town



Figure 11a. Old town roofscape as new ground





Figure 11b. Cantilevers facilitate new ground

My second site of intervention is in the old town itself and involves the installation of pre-cast concrete cantilevers into the existing walls along the street on the edge of the old town preservation area. This is the street in which the lettuce ladies sell their crops. The cantilevers act as attachments for cultural objects or for the many blinds in use during the dry season. For the duration of the flood, these permit the temporal laying of a horizontal surface to enable the old town roofscape to be accessed as a potential new market ground. Most importantly, this gives the pippy gatherers in t heir small boats an economic opportunity to act as couriers or delivery men for the duration of the flood. Able to access the narrow lanes and internal courtyards, the pippy men provide the conduit for goods to those flood bound in their upper level houses.

At this point in time 3 speculations can be made:

Under a climate change scenario whereby carbon emissions are capped at 550ppm, global sealevel rises of between 1.5 - 4m may be expected in the next 100 - 300 years (Garnaut, 2008).



Figure 12. Riverfront projection diagram 2100-2300 (Refer Appendix A)

This in turn would project a new river frontage for the town of Hoi An along the thickening line. In this scenario the wall configuration provides the opportunity for the lettuce sellers and the small boat men to occupy the pre-eminent urban site in the town. The build-up of rubbish as a surface with its potential leachate would necessitate a changed land-use in the rice farming area adjacent to the line of occupation which may be envisaged as lotus farming. The pre-eminence of the site and it's occupation demands an on-going contest and a demand for inclusion from the marginalized - one which can be abetted through design intervention.



Figure 13. Ongoing contest

Conclusion

Acknowledging that such a site would be highly contested and likely to be once again open to the symbolic economy, further intervention would be required in the future. Such an intervention will necessarily involve the social, political and economic as well as the spatial, physical and temporal to form a landscape which skews the contest outcome to the side of the marginalized.

In pursuing this project I was initially guided by the Spanish architect Eduard Bru's repudiation of the Western fetishisation of the ephemeral and his call for 'concrete interventions in the developing world' (Bru, 2001), along with my own recognition that public space is inherently contested. A reservation I had was that of my role as an outsider intervening in a society of others. Through this paper I hope to have demonstrated that landscape architecture, in harnessing the ephemeral as an operational agency, can produce concrete interventions which set up conditions of contest favouring the marginalized and thus facilitate justice. In this way, social change is enabled from the bottom up. This provides a platform for practice whereby intervention grows out of the socio-economic and political landscape as well as the physical and temporal.

Landscape is not imposed.

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Appendix A-Flood diagram

Conference theme: Transitions in art and design education, balancing teaching, learning and research

Cognition and Process vs. Design Artifact in Fashion Design Pedagogy

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Abstract

Design education is changing as a result of an expanding body of research into, by, and through design. Fashion design process is only just starting to be recorded, documented and validated as a legitimate design discipline with its own knowledge structures. Fashion design studio no longer focuses on the creation of a design artifact, but uses a design pedagogy that emphasizes the design process and cognition through open-ended learning tasks.

What are the epistemological issues at the core of fashion design – where a major part of design process is an understanding of the relationship between flat pattern and form, and the intimacy of the human body?

How do we educate a student in "designerly thinking", and how does the cognitive content of design thinking become a reality in contemporary fashion design education?

Key words: design education; design process; fashion design; design cognition

"The underlying axiom of design as a discipline is that there are forms of knowledge peculiar to the awareness and ability of a designer, independent of the different professional domains of design practice. Just as the other intellectual cultures in the sciences and the arts concentrate on the underlying forms of knowledge peculiar to the scientist or the artist, so we must concentrate on the 'designerly' ways of knowing, thinking and acting." (Cross 1997, p. 46)

Introduction

What are the epistemological issues at the core of fashion design – where a major part of design process is an understanding of the relationship between flat pattern and form, and the intimacy of the human body? Wearing is a creative and transformative engagement with the self. Placing oneself within a constructed form (the garment), with the possibility of modifying that form, or being modified by it, is the ultimate three-dimensional experience. When an object of material culture is placed on the body it symbolically extends the self (Belk 1988). We feel the fabric on our body, see the form, and respond to the texture and colour – where it touches our skin, moves around and across us, and conforms to or constrains the body. The garment can be seen as an active subject in a web of relationships between persons and things. This can be either an individual or collective experience where the garment acts upon both wearer and viewer. Fashion design epistemology can be explored through knowing and knowledge about design, making, clothing, and wearing.

Design and fashion design

We can define design as "the collected experience of the material culture, and the collected body of experience, skill and understanding embodied in the arts of planning, inventing, making and doing." (Report by The Royal College of Art, 1979 by Bruce Archer and colleagues cited by Cross 2006) This covers history – and very importantly, making. The material culture of fashion design is the culture of the technologist – of the designer, doer and maker. In fashion design we need to consider the designer as maker and the maker as designer. This is crucial in terms of how it is taught. There is a practical knowledge base that students must acquire – pattern making and construction; in parallel with the acquisition of the design skills they need to use the technical skills creatively. There is a need to create intimacy with materials – an acquired familiarity that becomes second nature and this knowledge becomes so much a way of working that it seems intuitive. The garment idea proposed by the designer has to be reconciled with what is and isn't make-able, and wearable – which is where the knowledge of construction and fabrication is essential. The immediacy of fashion design is important – we need to respond quickly to materials and construction as we go – so the notion of design as a process of reflection-in-action is particularly important.

Fashion design practice

Design is referred to as problem solving – so what is the fashion design problem? It is not as simple as the human race needing something that can be worn to protect the body from external elements. In fashion, the designer simultaneously constructs their own problem during which time they attempt to solve it. The problem is extremely complex in that the designed garment must have a resolved aesthetic; must have some kind of relationship with the body; should explore the fashion elements of silhouette, design lines, proportion, colour, pattern and fabrication; moreover, be "real" – can it be constructed, if so how?

Design culture relies on nonverbal modes of thinking and communication – in fashion design we use drawing¹, formal technical illustration, toiles² and patterns – which serve two functions. They record ideas and are consequently aids to internal thinking, as well as aids to communicating ideas and instructions to others. Ideas for garments are generated, primarily through drawing, in response to gathered information that inspires and informs. A concept will emerge from the inspirational material, and technical information will assist in the assessment of feasibility. Colour palette and fabric choices are considered and garment ideas are further developed towards creating a single garment or a series of related garments (a collection). The speculative garment is then created through drape (working directly on the stand) or drafted using flat pattern making techniques, then toiled (sampled) in calico to test the shape, detail and methods of construction. The toile is then modified and the information transferred back to the pattern. This process is repeated through toiling until the desired outcome is achieved. During this process the initial design idea may change and evolve, and the designer moves continually between two-dimensional (2D) and three-dimensional (3D) development. Samples may be constructed to test technical construction detail, especially as it relates to final fabrication and construction. The fully resolved garment may then be constructed in its final fabrication. This is the sample or prototype garment.

Design knowledge resides as much in the processes as it does in the product. The strategies of designing reveal the intimacies of thought, while the design knowledge that resides in the product itself – the garment – is an embodiment of the process. The knowledge embodied in the processes of design is as valuable in design learning as the knowledge embodied in the products of design. It is essential that the assessment value of the design process is as heavily weighted as the assessment of the design artifact in order that the students develop these abilities parallel to one another.

¹ The term "drawing" will be used throughout this paper to describe design drawing- a hand drawn, informal sketch

² A toile is a sample garment, or section of a garment

Fashion design pedagogy

Fashion design studio no longer focuses on the creation of a design artifact, but uses a design pedagogy that emphasizes the design process and cognition through open-ended learning tasks. Open-ended, meaning that more than one appropriate response exists, and there may be many ways of constructing that response.

My personal design pedagogy is based on industry experience; teaching experience; and contemporary industry practice, as well as detailed observation and reflection about my own practice and research; and framed by an intention to focus on cognitive content. I explore ways of working and knowing within the studio environment with a view to some or all of the following as successful fashion design outcomes. Successful in that the 2D outcome:

- Uses active research methods
- Creates inventive responses to research, ideas, images and other gathered information
- Tells an evolving story through drawing, text, and the documentation of 3D development
- Is readable to someone else (this includes the pattern as well as drawings)
- Is a record of a process

And, effective in that the 3D outcome:

- Has a relationship with the body
- Has a resolved aesthetic sensibility
- Has been constructed using appropriate techniques/methods
- Demonstrates an understanding of the fabrication and it's appropriateness for the end use

In between the 2D and 3D sits

• A demonstrated understanding of the relationship between flat pattern and the form that it creates.

Cross (2006, Chapter 1, p.9) states that "teachers of design have a responsibility to be as articulate as they possibly can about what it is they are trying to teach, or else they can have no basis for choosing the content and methods of their teaching". My intention is teach students the fundamental knowledge needed in fashion, and an ability to act - to design - with that knowledge. Studio should offer an environment where students acquire and apply knowledge simultaneously, as design knowledge is best understood if imparted in the context of application.

In fashion design, the knowledge that resides in the designed object (the garment) tells a multitude of stories about a tradition that encompasses methodologies (such as tailoring and drape); fabrication (for example - wool suiting, silk jersey, hemp); and construction (flat felled seams, rever collar, dolman sleeve). In the past fashion design teaching would teach pattern making and construction using a craft based model – where the student would copy an example, and learn through replication. There is still

value in this way of learning, and when making is combined with an understanding of design process, a new world of understanding opens up for the design novice. There is no way to understand making, other than going through the process of making. Drawing develops spatial reasoning ability, and visualization skills are necessary for envisioning, specifying and creating complex designs in 3D. Hands on making does this. It is crucial that academically based fashion design education retains making as part of its pedagogy.

The complex design process elevates design beyond the reach of the craftsman – in this case a dressmaker, where garments are made by copying or adapting what has been done before. Studio learning is important "because of the nature of design knowledge and the fact that it is so richly intertwined within designing itself" (Downton 2003, p.51). Design education is about creating processes for the student to go through – so that they will understand through experience the design knowledge embedded in the act of designing itself. Downton (2003, p.101) describes the design process as an interaction between the ongoing making of a representation and the evolving knowing of the designer making the representation. There are learning increments embedded in the process – which are more useful than a single, technically successful outcome that has been arrived at through no design process at all. This is the purpose of weighting process heavily in design education – to acknowledge the value in the development of ideas and ways of working. Downton states, "It is a mistake to concentrate on finalized representations; they represent what was decided through the inquiry undertaken and attempt to communicate it" (2003, p.101). The inquiry and its communication in fashion manifests in the exchange between the designer, the drawing, and the toile.

There is a difference between clothing production and fashion design in the same way as there is a difference between a building and architecture. There are knowledge requirements to be met; the designed garment must "display knowledge that can be characterized as either additional to that required for the production of a (garment), or not additional but at least exemplary or refined" (Downtown 2004, p. 120). The fashion design outcome – whether two or three dimensional, will demonstrate the maker's knowing as well as their knowledge. The knowing is for the individual – a never-ending process that relates to doing; the knowledge will manifest itself physically in design outcomes. Knowing will come from self-reflection, and is the ability to understand the design processes and outcomes experienced – it may be seen as an awareness of the knowledge. My goal is to make students aware of both knowing and knowledge.

The ability to think in a "designerly" way creates a sustainable design practice. My pedagogical intention is to immerse the student in processes and situations that stimulate designerly thinking through a series of design encounters within the studio environment. These encounters focus on cognitive content through drawing, pattern making and toiling, as well as criticism and reflection. The use of these as studio tools builds ability in students to generate ideas that become problems; to

generate solutions to these problems (that becomes design development); and the utilization of design process strategies that integrate making and thinking, that in turn become a loop of conjecture/solution/reflection that the designer continually plays – and sometimes backwards.

Drawing as part of fashion design process: the use of analogy and observational drawing as tools

Drawing for fashion design development is NOT fashion illustration³. Drawing is a thinking and reasoning aid, and assists cognitive processes. First year students are introduced to life drawing, drawing the clothed figure, rendering textiles, texture and drape, exploration of different media, observational drawing; and fashion specific requirements of silhouette, proportion, line and detail. These are essential 2D "tools". 2D drawing is taught within the context of 3D representations, which contextualises the relationship between 2D and 3D. These representations serve as a base for more advanced learning.

The thinking process of the designer hinges around the relationship between internal mental processes and their external expression and representation (Cross 2006, chapter 3, p.33). Once ideas become externalised the drawing itself becomes a reasoning tool. Drawing helps the designer find unintended consequences. The information that emerges during the design process cannot be predicted prior to undertaking the design activity or task. Ideas emerge as to pathways that may be taken, and this exploration gives glimpses of what might lie ahead. The fashion designer will latch onto and try different configurations and multiple versions of this emerging something in order to take it to a higher level of resolution. The first idea should never be the last, nor will it be the best. I refer to the drawings as "your mind on paper" – show us what you are thinking – what Schon refers to as "a reflective conversation with the situation" (1983, cited by Cross 2006).

We need to teach the student how to recognize an emerging idea as successful and worth pursuing. Drawing in fashion design identifies what needs to be known about the developing concept and promotes the recognition of emergent features and properties of the garment ideas that make sense. They help the designer to shift to new alternatives selectively and pursue them creatively. Goldschmidt (cited by Cross 2006, chapter 3 p.37) refers this to as the "dialectics of sketching", the dialogue between "seeing that" and "seeing as"; where "seeing that" is reflective criticism and "seeing as" is the analogical reasoning and reinterpretation of the sketch that provokes activity. Drawing enables and promotes the kinds of thinking that are relevant to the particular cognitive tasks of design thinking.

In second year tailoring studio, a guided observational drawing exercise uses a sourced jacket, which is placed on the stand – re-configured, inside out and gradually dissected. Drawing has a loosening effect, which facilitates re-interpretation and prevents mental fixations. The student draws what they

³ Fashion illustration is a realistic or expressionistic rendering of a fully resolved garment or outfit

see from various angles – experimenting with different media and methods (such as continuous line drawing) to create representations of the jacket on the page. These drawings are then used as a starting point for further exploration. How can we see the jacket in new and different ways? Observational drawing can inform the student about what is, as well as what could be.

Productive thinking is based on devices for changing the direction of thought. Creating student tasks that build in such devices will take the student on an expositional journey. Analogy is one such device. Goldschmidt (2001 p.199) proposes that the use of visual analogy in problem solving is an example of similarity-based reasoning, cognitively facilitated by imagistic operations. Goldschmidt's theory is that evidence suggests that this valuable type of reasoning – using analogy – helps the designer "better understand abstract concepts and to fully exploit their capacity to retrieve and implement previously acquired knowledge". It is a strategy for learning to design, in that it facilitates the acquisition of new concepts.

Visual analogy can be used to access indirectly related design information and make new associations. In a creative search analogies can be identified and used in fashion design to inform shape, colour, construction and even function. What does it remind you of? What does it look like? Encouraging students to establish relationships through analogy shows them how to abstract a design and generate possibilities. It allows the exploration of form from new perspectives, and creates new trajectories and tangents to explore. This in turn develops an ability to recall relevant design information. Breaking down a reference into smaller components will also show students how to abstract a design to generate more possibilities of analogical transfer.

As the student becomes more familiar with the 2D representation it gradually becomes routine then automatic. At this point we are able to focus on the drawing's semantic content. The development of the lower level representational skills is a prerequisite for the high-level reasoning and actions of the expert designer (Eastman, p.174).

There is a danger in the current trend towards fashion design students simply recording 3D development with a camera, and not responding by drawing, as it bypasses cognitive involvement. This means an inability to draw on experiential knowledge – as it has not been internalised – that impedes the building of fashion design knowledge.

Pattern making and toiling as part of fashion design process

A major part of fashion design is the relationship between flat pattern and 3D, and how pattern making relates to the body. We don't work with space – we work with form - the form of the garment and the form of the body. "Form literacy" in fashion design is the ability to generate and interpret form – the knowledge in forming, recognizing and interpreting complex shapes that sit around and against the

body. These complex shapes are developed from multiple components such as sleeves, collars, and pockets. Form literacy is developed through observation, drawing, pattern making and construction. Eventually the student will be able to read and draft patterns; to be able to look at a flat pattern and mentally assemble it. And, conversely, have the ability to mentally image the 3D form, and what the pattern could look like in order to achieve that form. Pattern making fluency is indispensable in relation to form literacy, and becomes a basic, assumed skill.

Pattern making is a means of achieving a shape around the body. The body, and the basic body block remains constant; and the goal of the pattern making process is to develop pattern pieces that will fit together and function. The body is a form, and the garment is sculptural; but this form actually moves, and this must be taken into account in the cut of the garment. Pattern making is a mix of analytical and creative thinking. Once the student has learnt to manipulate formal configurations, they can move on to experiment with their own design ideas in creating form. The basic rules of pattern making are based on sound principles, and when understood thoroughly, the rules can be broken, as it will be "a creative decision allied to sound reasoning" (Aldrich 1989 p.5). The basic body block determines critical shapes, sizes and other variables; and pattern making uses standard annotation, so that how the garment is to be constructed is inherent in the pattern (straight grain, notches, cutting instructions and so on).

Pattern making can inform, or respond to, a design idea. Designers modify their expectations about the final result in response to new information gained through the process of design. That is, the speculative design artifact itself will change in response to things that happen during the design process. It is highly likely that the garment design will change in response to the form that is continually evolving through pattern making and toiling. The first pattern draft challenges the designer to create the form and shapes they have drawn. This is where form literacy comes into play – and the design process continues from a 2D design proposition through pattern drafting and toiling. Fashion design must move between 2D and 3D, in order to establish what the speculative garment actually is. Design doesn't suddenly stop, and making begin.

Downton (2004 p.17) states that a designer potentially engages in three conversations with the material of the design. One conversation is within the designer's head – where an imagined object can be changed or developed; another is with a 2D representation (usually a drawing) of the design; and the third conversation may be with a 3D representation of the design. In fashion these conversations are continuous, interchangeable, definitely not sequential, and very noisy. The visual representing of an idea may be two or three dimensional – and the notion of a 3D "sketch" as an investigative tool, is pivotal in fashion design studio, as well as in professional practice.

The importance of pattern making and construction skills cannot be overstated. There is a direct relationship between technical ability and the generation of design concepts - the stronger the pattern making and construction ability, the more advanced the design possibilities. This takes on added importance in the current backlash against disposability, and poor construction and fabrication.

Writing and talking about design – critical evaluation and reflection as part of fashion design process

Goldschmidt refers to the teaching modes of instruction and reaction (cited in Salama 1995) both of which are needed to drive fashion design studio. Individualized instruction guides students in how to draw from research, utilize appropriate methodology and develop design ideas through drawing, pattern making and toiling. Reaction is also necessary, throughout this design process, in the form of informal feedback or formal crits, to help the student understand what has, and what has not, been a successful design outcome and why. Students need to understand the difference between external sources of knowledge and their own perceptions, and the necessity for external knowledge as a means of evaluating their own ideas (Salama 1995).

Studio is not simply a passive space to work in, but an interactive tool for learning. It is a space for discussion, conjecture, reflection, and articulation. Studio, by its very nature, must be empirical, but the research and knowledge that informs what takes place in the active studio space may be theoretical and abstract. The purpose of fashion design education is to teach students to design garments; this knowledge manifests itself primarily in drawings and toiles. But we also ask our students to talk about their work, informally to peer groups, and more formally to lecturers in crits. When it comes to explaining the work it becomes more than just images and toiles. Design becomes textual as well as visual. Writing and talking can explain, explore, justify and identify. Students are encouraged to annotate their work alongside design development drawings. This annotation may be statement of fact, speculation about construction, an exploration of abstract concepts, an explanation of connections between research and design responses, or simply a description of what they have drawn. Verbal articulation is crucial in the development of a fashion designer and thinker, and is an essential tool for knowing.

There needs to be an awareness within the student to ensure engagement with the processes - in order to be "initiated into the content of the activity or forms of knowledge in a meaningful way" (Peters, referenced by Cross 2006, Chapter 1 p.4). We have to try and build awareness into learning tasks and environments in order to develop the students' intrinsic cognitive processes and abilities. Critical thinking, reflection and feedback by both lecturers and students are necessary in order for this to work, and there has to be an interactive engagement throughout the whole process, not just at the end when an "outcome" has been produced.

Fashion schemata are numerous and sophisticated. An experienced designer looks at a garment and sees an assemblage built of garment components, fabrication and technique. This designer "knows" the garment intimately. Fashion design schemata becomes embedded in our language and drawing, and verbal articulation encourages the student to build knowledge and use these codified terms in context. The building of this knowledge requires that students be exposed to and seek out precedent through images, texts and artifacts. Our drawings are encoded texts, which, when combined with conversation that shares ideas based on concepts or schemata, becomes the complex language of fashion design.

Conclusion

The encoding of fashion knowledge is "a complex, multi-modal structure" that uses technical knowledge; design development; historical and cultural information; form literacy; and critical assessment (Eastman 2001, p.175) – that all come together by 4th year to enable the student to draw analogies, and reference precedents and parallels with their work in order to explain, justify and contextualise it. The student can build on their formally learned knowledge through information continuously learned experientially – which will continue in their professional life after graduation.

To take fashion design education from trade school to design discipline we need to ensure analysis and understanding of the design process itself. In doing this, we firmly establish the value of cognition and process as more educationally meaningful than the design object itself (Oxman 2001, p.273) and teach a sustainable design practice based on designerly ways of knowing, thinking and acting.

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Identifying with an Avatar:

A Multidisciplinary Perspective

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Abstract:

Avatars perform a complex range of inter-related functions. They not only allow us to express a digital identity, they facilitate the expression of physical motility and, through non-verbal expression, help to mediate social interaction in networked environments. When well designed, they can contribute to a sense of "presence" (a sense of being there) and a sense of "co-presence" (a sense of being there with others) in digital space.

Because of this complexity, the study of avatars can be enriched by theoretical insights from a range of disciplines. This paper considers avatars from the perspectives of critical theory, visual communication, and art theory (on portraiture) to help elucidate the role of avatars as an expression of identity. It goes on to argue that identification with an avatar is also produced through their expression of motility and discusses the benefits of film theory for explaining this process. Conceding the limits of this approach, the paper draws on philosophies of body image, Human Computer Interaction (HCI) theory on embodied interaction, and fields as diverse as dance to explain the sense of identification, immersion, presence and co-presence that avatars can produce.

Keywords:

Avatars, design, presence, interaction, visual communication

Introduction:

In computer games and virtual environments we often experience an odd phenomenon. We come to identify with an avatar as I. As Lister, Dovey, Giddings, Grant & Kelly (2009) have observed in their book *New Media*, "Users describe their activities in an online environment in the first person: 'I went to the bar', 'I levelled up', 'I went on the guild raid'; they never say 'My avatar went to the bar' and so on" (p. 212). They argue that this happens "despite being masked by the avatar" and attribute it to "identification with the non-space of cyberspace". I would argue otherwise, and suggest that it is through identification with an avatar that the process of perceptual transferral and immersion in the screen-space occurs.

In this paper I will investigate how we identify with an avatar. I will consider this phenomenon through a complex range of functions that avatars perform. At a base level, an avatar describes the manifestation of the self in a screen-world. In this, an avatar provides an expression of identity. In networked space, it affords a means of non-verbal communication, which shapes the way we present ourselves to others and how they respond to us. Avatars also perform a locative function in the interface and, by extension, facilitate the expression of our motility through the screen-space. However, an avatar is more than a place-marker or cursor that relays the fine motor movements of our wrist and mouse, joystick or Wiimote. We not only direct an avatar through our motion, we also find ourselves involuntarily dodging and weaving the obstacles it encounters. We become coupled with the avatar through the process of embodied interaction.

Because of this complex interplay of roles and effects, our understanding of avatars must be grounded on theoretical perspectives from multiple disciplines. Studies from the perspective of social psychology have so far provided the largest body of readings on the subject. However, critical theory, visual communication, interface design and art theory can also help us to understand how their visual form functions in the expression of identity. Film theory and Human Computer Interaction (HCI) can provide insights into their expression of motility, and fields as diverse as dance and philosophy can contribute to ways of thinking about the embodied interaction they can afford. In this paper I will therefore combine a range of interdisciplinary perspectives from the arts and humanities, as well as HCI and social psychology, to help explain how we use avatars to express our identity and to facilitate our interaction, and how this identification can contribute to a sense of "presence" (a sense of being there) in a virtual space.

1. The Avatar as I

To understand our identification with avatars, we might first consider them as an expression of identity. As illustrated by the above quote, analysis of avatars in media studies has often focused on their capacity to "mask" our identity, that is, to facilitate the production of alternate, anonymous personas. This preoccupation reflects an enthusiasm of early thinking about the potential of computer-mediated communication, which can be summed up as follows. When we join geographically dispersed communities in a virtual environment, we are no longer bound by our physical location and social situation. We are therefore free to cast off existing social ties, institutional and social structures and formalities, as well as the conventional markers of our "real world" identity (gender, age, ethnicity, social status and so on). Unfettered by the social cues and constraints of our located communities, we

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can adopt (multiple) new identities in alternate worlds. As Sherry Turkle (1995) famously wrote in *Life on the Screen*, "[in computer-mediated communication] there is unparalleled opportunity to play with one's identity and 'try out' new ones" (p. 356). While Turkle was referring to early textual avatars, this capacity is now supplemented by image-based avatars, which provide an additional layer of identity production – what we might describe as a "pixel skin". Tales of second lives, secret identities, tricksters, trolls and sock puppets facilitated by such avatars continue to capture the imagination of the media, but the pleasures of carnivalesque masquerade also continue to underpin much of the discourse on avatars in academic literature.

On the face of it, the potential that avatars provide for anonymous identity play appears to suggest a remove from, or rupture with, the (authentic) self, which is hardly a condition for strong identification. However, we must consider this aspect of avatars more closely. We can do this through Turkle's text, which is founded upon her understanding of Lacanian psychoanalysis. Lacan proposes that the ego (as it is formed during the mirror stage) develops as a "fabricated" identity, which provides a link between the subject's psyche and the world outside by performing the role of "character" or protagonist. Turkle's interpretation of online identity play is therefore predicated on an understanding that identity is already constructed, performative and "decentered". Virtual environments simply afford the opportunity to extend this production and performance of the self because, as Turkle puts it, "people are able to build a self by cycling through many selves" (Turkle, p.178). That is, avatars, as Turkle understands them, provide an opportunity for (extended) identity formation. In this case, even when they are part of role-play, they are not separate from, but part of, an expanded production and expression of self.

We might also align the potential that avatars provide for fluid identity play with other postmodern understandings of identity. Critical theory of the 1990s not only critiqued the "regulative structures" (the social frames, institutional powers and bodily constraints) that bind identity (Foucault, Butler, Grosz and so on), it also positioned the formation of the self as a "nomadic" and discursive process of "becoming" (Deleuze and so on). If we consider avatars from this perspectives, rather than simply as providing a "mask" that obscures our identity, we might think of them as providing a mechanism and context for exploring and playing out aspects of the self through an unbounded discursive process. Indeed, Lister et al's (2009) discussion on avatars can be interpreted in this way when they write, "[through avatar based interactions] we can experiment with other parts of ourselves,

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take risks, or express aspects of the self that we find impossible to live out in day to day 'meatspace'" (pp. 201-211). That is, they are adopted as part of an emergent and discursive process of becoming.

It is also important to establish that the roles of avatars are increasingly broadening along with the expansion of computer-mediated communication. Like divisions between the authentic and inauthentic self, distinctions between physical and disembodied presence; material and discursive space; and located and online communities were never as clear-cut as some analysts have claimed. Nonetheless, any such distinctions are increasingly breaking down. We no longer "enter" digital worlds; we are now always, already connected through ubiquitous networked technologies (3G phones, wireless Internet and so on). As our social interactions and communications flow between online and offline contexts, the emphasis is shifting from a detachment from geographically and contextually located community ties to strengthening them. So while avatars continue to provide a vehicle through which we can perform a role through a pre-designed and dramaturgically fixed character in scenario-based computer games (for example *Mario, Duke Nukeham, Everquest, Spore*), or dramaturgically fluid online role-playing (for example *Habbo Hotel, Second Life*), their contexts and functions have expanded. Avatars are increasingly being deployed to form a contiguity between our "online" and "offline" selves.

In an increasing number of games and forms of networked communication, the role of the avatar is not anonymity and masquerade, but its opposite: self-representation. Through templating, we are now afforded personalisation of game avatars such as Miis in Wii and personal avatars in the Xbox 360 and PlayStation Home. We can easily produce an avatar that looks like us (albeit in cartoon-like form). And, in Internet forums, instant messaging services and online chat, while avatars currently tend to be produced as small, flat images that are often abstract representations, abstraction is not driven by an intention to produce an alternative identity. Overwhelmingly, such avatars represent a merged online/offline identity. Far from obscuring the user's gender, ethnicity and so on, they often make explicit reference to such traits (Kennedy, 2006; Messinger, Ge, Stroulia, Lyons, Lyons & Bone, 2008).

While such profile avatars are not the same as the "new identities" Turkle refers to, it is important to note that neither are they singular or static and fixed. The image the user wants to project may be different in different social contexts, just as we might change clothes and shoes in the physical domain depending on the activity we are undertaking, who we are interacting with, the context we are in, and the aspect of our identity we want to express. We might adopt a range of avatars or multiple versions of an avatar because, as a form of visual communication, we are mindful of their audience, and the context and the purpose of the interaction or communication. Moreover, we might project ourselves differently next week or next year. After all, the formation of identity is a lived and emergent process. It is responsive to shifting relationships and understandings of the world. The projection of identity, as well as identification with an avatar, must therefore be framed at the outset as contextual, fluid, and socially continuous. We will identify with an avatar only to the extent that it provides a good fit – in the here and now and for the purpose at hand.



Figure 1: Evolver, templated 3D avatar, 2009Figure 2: Avatar showing abstracted, minimal form. design by Stewart Lawson, *Intimate Transactions*, Transmute collective, 2006Figure 3: Mii, Wii Fit, 2008

2. The visual form of avatars: abstraction and identification

Avatars are produced in a wide spectrum of visual forms–from 48 x 48 pixel instant-messaging avatars and slightly larger 2D images in Internet forums and profiles, to cartoon-like, minimal and highly rendered 3D figures in games and networked environments. They may represent the participant in varying degrees of likeness–from abstract shapes, creatures or even objects, to highly stylised selfportraits. They may be illustrative, image-related, concept-related, arbitrary or symbolic in their visual realisation. However, they are rarely photographic and are usually abstracted. Abstraction is important because, as a function of the visual interface, an avatar is, by minimum definition, an icon. In this section I will consider how avatars function as icons and, through reference to theories on portraiture, consider whether abstraction limits our capacity to identify with them.

From the perspective of visual communication and interface design, abstraction is necessary because an avatar must assume the role of figure in the figure-ground relationship with the scene they inhabit (whether this is a Web page or forum, mobile phone screen or rendered game world). The term figure-ground relationship, which is taken from gestalt theory, refers to the relationships we perceive between visual elements within a scene. We identify visual forms as either the object of focus (figures) or as the broader perceptual field (ground) (Lidwell, Butler, & Holden, 2003, p. 80). Factors that contribute to the effective production of a figure include symmetry, definition and a simple shape. This simplification of form can be brought about through visual concision—the reduction of detail through an economy of line and form—while retaining and emphasizing the essential qualities, or "essence" of the thing represented. This principle, which is exploited by designers of icons for graphical user interfaces more broadly, causes a figure to stand out from, and appear to sit in front of, the ground. It thus becomes more visible, and will receive more attention and be better remembered than the scene it inhabits. In the case of avatars, differentiation, visibility and memorability are highly desirable attributes. They mean that an avatar will be more easily located and followed by the user. And they help to provide a measure of visual stability for the figure when it, the ground, and the camera are in motion.

As with other forms of icons, abstraction therefore strengthens the capacity of an avatar as a function of the interface. It might be assumed that the cost is a weakened capacity for identification. However this is not necessarily the case. We might draw upon theories of portraiture to help explain this counter-intuitive conclusion because, like avatars, it is often thought that, as an exemplary form of mimetic representation, it is exactitude that defines the "quality" of the portrait and identification with its subject. However, what constitutes a convincing portrait in the traditional sense, according to Ernst Van Alphen (1997), is not its literal representation of the subject, but whether it captures the subject's essence. He writes,

... the portrait brings with it two referents. The first is the portrayed as body, as material form. The second is the essence of the sitter ... Within the traditional notion of the portrait ... the strength of the portrait is being judged in relation to this supposed essence not in relation to the looks of the person. (Van Alphen, p. 240)

Photography then, with all its capacity for exactitude, is not the portrait's ideal. Indeed Van Alphen describes it as its failure, because while the camera has a supreme capacity to capture the physical appearance of the sitter, it is rarely able to capture their "essence". Roland Barthes (1981) provides a graphic example of this failure in his desperate search for his mother–"looking for the true HER"–in a pile of photographs, which he recounts in *Camera Lucida*. Photography's "accuracy" and "objectivity" can create a reduction–a complete flattening out of the subject into an equivalence with the surface of visual resemblance.

While capturing the essence of the subject is possible through photography (Barthes eventually finds a photograph that satisfies him), as well as portrait painting, it is not guaranteed, and it is possible (albeit in another form) through abstraction. Picasso's sequential abstraction of a bull (1945) is a classic example of abstraction that reduces visual complexity while retaining the subject's essence. By emphasising key characteristics (the horns, the shoulders, the genitals), the final image retains–indeed emphasises–the bull's essential qualities (physical strength, masculinity and so on) even while its use of line is minimal. We live in a world saturated by signs, which depart from representational accuracy in the interests of their signifieds. Besides animated characters; pictograms, way-finding and screen icons all harness this strategy. The user-designers of avatars are therefore already heavily acculturated to the process of reduction of visual complexity with the attendant retention and emphasis of key characteristics or qualities.

Research in social psychology supports the argument that abstracted avatars can function effectively. Indeed Kristine Nowak and Frank Biocca (2003) argue that abstraction appears to increase rather than decrease identification with the avatars of others. Their study concluded that,

When the virtual human's image was more unusual and iconic (less anthropomorphic), people felt more co-presence, social presence and telepresence ... than those interacting with partners represented by either no image at all or by a highly anthropomorphic image of the other. (Nowak and Biocca, p.489)

This, they argue, is because people are more comfortable communicating with those who look like them, which promotes a feeling of familiarity. When the avatar of someone we are communicating with is generalised, we can more easily project traits of similarity, as opposed to difference, onto him or her. We might extend this argument to include avatars that represent ourselves, if we consider what I have said about the need we have for both contextual and temporal fluidity of identity.

We might also consider this from the opposite direction through the 'uncanny valley effect'. The uncanny valley effect, identified by roboticist Masahiro Mori suggests that our emotional response and empathy will be enhanced up to a point of human realism, after which we are quickly repulsed. While Mori associated this effect with robots, it has been extended to criticism of highly realistic 3D computer animation (MacDorman, Green, Ho, & Koch, 2009). If we apply this principle to the design of avatars, it would suggest that a high degree of realism does not necessarily increase identification with an avatar as representation, and may even have the opposite effect, once it reaches a tipping point. However, this

effect tends to be reduced by the averaging effect produced in templated avatars, even when they have a sophisticated 3D rendering (see figure 1).

This argument about realism and abstraction should not be confused with likeness to the self. Social scientists who have analysed quantitative and qualitative data collected from Second Life residents have argued that people tend to design avatars that look like themselves, with moderate enhancements (slightly younger/older, thinner, taller, and so on).¹ Messinger et al. (2008) ague that this arises out of "balancing motives for self-verification and self-enhancement" (p.15). (Self-verification is the desire to maintain a consistent self-concept and sense of truth to self, while self-ehancement is the tendency to promote a positive self-concept and to "propel the ego upward".) There are two strong, intertwined motivators for self-enhancement. Messenger et al. conclude that,

people with more attractive avatars than their real selves are more confident and extraverted in virtual worlds than they are in the real world, particularly those who have low confidence and are introverted in the real world. (p. 15)

This impact of the avatar's enhanced appearance on confidence and social behaviour is what Yee and Bailenson (2007) refer to as the Proteus effect. Secondly, more attractive avatars solicit more positive social responses (Messinger et al., 2008). And of course, both of these outcomes are mutually reinforcing. However, according to Messinger et al., the desire for self-enhancement is counter-balanced by the need for self-verification, so enhancements are moderate. This suggests that retaining an essence of identity in avatar representation is clearly important to our capacity to identify with an avatar.

On the other hand, avatars may take a symbolic or even arbitrary form. I have discussed the use of such avatars for role-play above. Here I will focus of the arbitrary and symbolic avatar/icons in social networking (such as small 2D avatar icons used in instant messaging and discussion forums). As I have already established, such avatars are not necessarily, or even usually, driven by an intention to produce anonymity or alternative identities. Instead, they are produced in continuity with offline identities and can be understood as a form of branding (of the self), in the context of self-publication. We might compare such avatars with logos that establish a brand identity. Through recurrent use and recognition of a logo, we come to identify it, as well as its connoted meaning, with a product and its attributes. For

¹ It would also be interesting to investigate whether this includes a tendency towards the 'most average facial effect', a principle that suggests that we find faces that are an average (in terms of the form, size, and arrangement of facial features) of the overall population more attractive and 'familiar' than those that deviate from this 'norm' (Lidwell et al., 2003).

example, the Nike swoosh denotes a shoe but it also connotes the shoe's "qualities": mythical power, high performance, luxury (which are reinforced by other, multimodal signs in advertisements and PR). Similarly, a symbolic or arbitrary avatar can represent a user (lets call her Jane). Through recurrent use, I will begin to read the avatar as Jane in our online interactions and conversations, while I might also assign the denotations of the avatar to her identity (especially if these attributes are reinforced through other multimodal communication). In this way, the avatar operates as a sign.

Abstraction then, is not necessarily an impediment to our identification with an avatar. Indeed, abstraction and reduction of visual specificity can increase identification, as it provides a more familiar, and malleable representation of identity, to both ourselves and others. Moreover, we might identify just as strongly with an arbitrary or symbolic pixel art image in some contexts as a highly rendered, highly individuated 3D self-portrait in others. This is because it is not visual exactitude that produces identification, but capturing a likeness, essence or even a signified.

3. Beyond visual representation: From motility to embodied interaction

Beyond visual representation, there is another, significant contributor to our identification with an avatar. Our identification with it has a great deal to do with the avatar's representation of our motion and our intentions. I will therefore now turn to consider the role that avatars play in representing our motility, interaction and spatial engagement.

A number of writers have proposed that film theory provides a reference point for understanding motion in computer games and virtual environments (as well as character design, cinematic narrative, and art direction). Texts such as Deleuze's *The Movement-Image* (1986) can help to make sense of the camera views that coincide with the motility of the avatar. (Deleuze considers perception images (which convey what is seen), affection images (which express what is felt) and action images (which focus on duration and action). Deleuze also suggests that, instead of describing figures in motion; it is continuity of movement that describes the figure in films. (p. 5) This, he suggests, allows for the "production of the new", where the character may be open to chance and accident (he cites the examples of Charlie Chaplin and Fred Astair) (p. 7). All of these aspects of film can be aligned with the motion of avatars.

However, watching a film as part of an audience is very different to interacting with a responsive screen interface. Our relationship with a movie character is ultimately one of passive observation. In contrast, the avatar facilitates a performative, choice driven relationship with events, the

scene, characters and other participants. In social computing this agency is extended further since the participant operates in a context that involves a network of relationships, activities and practices, which are both contingent and emergent. This produces a generative quality to the interaction and decision-making around the paths taken, relationships established and actions pursued.

Secondly, while our body remains disassociated and inactive when we are watching a film, as I have established elsewhere (2007) through reference to the writing of a pioneer of interactive cinema Toni Dove (2002), interacting with a screen interface by way of an avatar requires an active physical engagement. This increases our identification with an avatar because the avatar reflects our intentions through motion. But it is more than this. When we exert our agency to interact with other objects, events and participants, the avatar responds immediately to our actions. Dove argues that this immediacy leads to a perceptual integration with the avatar. She suggests that, "[the subject becomes] simultaneously aware of their presence 'in' their body and 'in' the screen" (Dove p. 210) and describes this as the "tug" of the avatar. She goes on to argue that, to overcome the split in location, we perceptually traverse the intermediate space. We experience partial transference of the self into the screen-space as we become connected with, or "stuck to", the avatar. This causes the physical properties of the screen, and its two-dimensional surface, to perceptually recede. It is being stuck to the avatar in this way that causes us to duck and weave around the "virtual" objects that our avatar encounters.

HCI theorist Paul Dourish (2001) also discusses "embodied interaction". He explains the effect of perceptual integration with the interface through reference to Heidegger's concepts of "intentionality" and "ready-to-hand" (where you act *through* a tool or device causing it to perceptually recede into the background). Using a mouse and cursor as examples, he observes that, as the hand moves with the mouse, and the cursor moves with the mouse, the entire system (hand, mouse, cursor) is perceptually "coupled", the subject/object distinction is overcome, and we can get on with higher-level activities such as selection, navigation, or composing text, image or code. While it was not written in relation to interaction, the work of philosopher Liz Grosz (1994) on body image and body boundaries provides a similar insight. Through reference to psychoanalyst Paul Schilder's work, Grosz argues that the boundaries of our body image are not perceived as fixed but are fluid and "osmotic". We absorb objects, implements or instruments (from a pen or scalpel to a car or jet aircraft) into our body image when we use them as a tool or medium of expression. We relay our intentions through them, becoming less aware of their physicality and our operation of them, than our effect beyond them.
Extending Grosz's conception of osmotic body boundaries and Dourish's process of coupling, we might transpose the mouse for any input device and the cursor for an avatar in so much as they provide an intermediate tool and representation of our action and form a bridge to a higher intellectual program or pursuit. For this cognitive leap to occur, we must absorb both the physical tools (the mouse and screen) and the conceptual tool (the avatar) into our body image and concept of self and "enter" the screen space, through what Dove describes as perceptual transferral. But of course, glitches in the system (latency or lag for example) can cause us to become acutely aware of the system again, disrupting this coupling and perceptual transferral. Or, to borrow a term from film theory, such glitches break "suture", a term that refers to the process through which we become perceptually "stitched in" to the narrative or fabric of a film and its encompassing story-world. Suture is broken when watching a film if we become aware of the actors as actors, or the mechanics of the film-making process. We might transfer this principle to becoming aware of the avatar as interface and the sense of separation this causes, as well as the computational process that causes the disruption.

Here we are moving into the realm of phenomenology and proprioception. From this perspective, I would like to briefly consider the contribution of a dancer to the potential for identification with avatars. Collaborating on a new media artwork entitled *Intimate Transactions* by the Transmute Collective (directed by Keith Armstrong, 2006), Lisa O'Neill has worked to increase the sense of embodied interaction and immersion that avatars can provide. She questioned the confinement of our physical interaction with an input device to gestures of the wrists, hands and mouse. As a dancer, she believed that the whole body should be brought into play (O'Neill, 2007). She choreographed whole body movements, which the participant performs on a large, posterior input device with embedded motion sensors (see figure 4). Drawing on the Suzuki Actor Training Method, O'Neill focussed on the participant's middle body, which she describes as the body's "energy centre". The choreographed gestures of the participant, which revolve through this energy center, were also transposed into the design of the screen avatar, which moves through the same central axis. The movement of the participant is therefore mirrored not only in the avatar's direction, but also the energetic qualities of its movement. This shared gestural expression was designed to enrich the user's connection to and identification with the avatar.



Figure 4: Conjoined avatars showing an energy centre that pivots on the same axis as the participant, *Intimate Transactions*, The Transmute Collective, 2006

The participant in *Intimate Transactions* is linked to a second user through the distributed network. Their (abstracted) avatar is similar in visual form as well as motility. It therefore has familiar visual as well as expressive qualities. This serves to extend the perceptual "tug" of the avatar to that of the avatar of the other participant. As one user commented in awareness research conducted by Madden and Viller (2007), "Once I saw the other participant, I wanted to dance" (p. 102). This comment reflects not only a high level of identification with the participant's own avatar but a co-identification with the avatar of someone else as well.

As Dourish (2001) argues, embodied interaction is not simply about physical embodiment but also situated, contextual and social experience. He argues that,

"embodiment need not rest on a purely physical foundation. Embodiment extends to other phenomena that unfold directly in the world; conversations, mutually exchanged actions, and so on... Embodiment denotes a participative status" (p 101).

If we extend this thinking to our understanding of avatars, we might say that we identify with the avatar not simply because it represents us visually or because it relays our locomotion, but because it reflects our intentionality, our agency and our social participation. By recognising the need for interplay of our physical and social expression in the avatar, and by emphasising this relationship, O'Neill's approach not only increases embodied interaction and immersion; it increases social participation through identification with the avatar and the other, distant participant. It not only produces a sense of presence– a sense of being there in the screen-space; but a sense of co-presence– the sense of being there with someone else.

Conclusion

We have come to inhabit two, increasingly conjoined worlds. Social networking sites, collaborative tangible media, and networked multiplayer games have extended our social interaction into the digital realm. Increasingly, avatars have been adopted to express our identity; establish a social presence; communicate; interact and collaborate within this emergent space. By drawing on a range of disciplinary perspectives, and considering the range of roles that they perform, I have provided a multi-disciplinary interpretation of avatars. Understanding how we might design avatars to increase our identification with them will become increasingly important as we look forward to the increased adoption of avatars as icons of self, as mediators of social connection, dialogue and collaboration, and as the facilitators of embodied interaction.

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Cross Cultural Education in the Visual Arts

Shared Experiences

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Abstract

With the increased mobilisation of people the issues of multicultural classrooms will continue to grow and become increasingly pertinent. This paper looks at educating people from differing cultural backgrounds in a visual arts environment, the issues involved and the effect on the teaching methods and approaches. The result is a collection of experiences, ideas and approaches that have the potential to contribute to the body of knowledge in the teaching field. It is a 'snapshot' of the experiences of visual arts teachers in 2007 in Western Australia. The experiences of the teachers who participated in this research offer some guidance and a point of reflection for teachers of all backgrounds and experience It also gives a launching point for those who design and implement policy, on how to approach classes that are increasingly composed of students from all over the world and the teachers that take these classes.

Education, Multicultural, Stereotypes, Culture, Assumptions

1.0 Introduction

This paper focuses on one of the questions and its responses from the surveying of secondary Visual Arts teachers across Western Australia. The issues addressed and uncovered are of relevance to teachers from all levels of education. The question looked at the attitudes and ideas of teachers in regards to students from different cultures and whether they had been changed through their experiences. The question was drafted carefully in an attempt to avoid dragging up racist or prejudiced views.

2.0 Method

A list of all visual art teachers in Western Australia at both private and public schools was compiled. Teachers were approached by email and then followed up by phone to undertake the survey.

The question "In your experience what are the most common assumptions you have made that have been challenged, concerning students from the same and differing cultural backgrounds?" (Hampson, 2007) stems from the idea that in order for us to make sense of the world our minds use schema and that we have the ability to break down and reconstruct them, or to have it done

for us (Fine, 2006) and aims to explore what teachers found had challenged their "schema" and how they might have been changed. This was a qualitative survey and responses were categorised into different themes, of which this paper addresses time, body language, gender, stereotypes, cultural values, prior knowledge and language.

3.0 Time

Time is categorised as a non verbal form of communication that has to do with space. In education it is the idea of formal time and how it is conceptualised in different cultures that is important. Respondents found that the "assumption concerning the use of time and the cultural importance of different events. When to be somewhere, how to use ones time, due dates etc" (Hampson, 2007), was what was of importance in the classroom situation.

3.1 Body Language

Body language is a form of non verbal communication bought up as an issue by respondents. The meaning of particular gestures or postures varies greatly from culture to culture and in the responses it was raised in particular relation to Aboriginal and African students not being able "....to be confronted, looked in the eye or 'singled out'" (Hampson, 2007) and that students of European descent were "...more accustomed to this form of communication" (Hampson, 2007). The respondents had assumed "that we have the same body language" (Hampson, 2007) but came to realise that we don't. Cultural education units in Graduate Diplomas attempt to address these issues in terms of "being an effective teacher requires having an understanding of Aboriginal culture" (Herslett, Harrison, Godfrey, Partington and Richer, 2000).

3.2 Gender

Gender was a more frequent issue raised. Gender relationships in different cultures can vary greatly and the majority of the respondents have a westernised attitude towards the relationship between the sexes. Even in our multicultural policies it specifically refers to gender "…and equality including equality of the sexes" (Healey, 2005) in terms of it being a basic structure and value of Australian society.

The respondents had this value challenged by students whose cultural backgrounds have a different attitude towards the relationship between the sexes. There was issues that had to do with teacher/student relationships. The respondents noted that "...how different cultures approach gender, specifically the gender of the teacher..." (Hampson, 2007) had an impact on the classroom, particularly "...male/female in charge issues..." (Hampson, 2007). The respondents found that the "attitude of boys from patriarchal cultures to women and gender issues" challenged their own beliefs on gender (Hampson, 2007). This impacted on activities in regards to the teachers expectations of what would be appropriate and what the students demonstrated. For example "a boy might be inspired in traditionally 'female' artistic practices" and vice versa" (Hampson, 2007).

This leads on to the point that it wasn't always cultural background that led to gender issues but rather family background and attitudes. "I have assumed that children from my own background will know the things I know. I am sometimes surprised by religious belief Muslim/Christian it doesn't matter. I have assumed that you have faith but would still believe in evolution, a negative history for the church, equality for the sexes, democratic law. ANGLO/SAXONS are the most surprising" (Hampson, 2007).

Gender is debated by politicians, the media and society in general. The Education Department and the Curriculum Council both have specific policies relating to gender, as do the individual universities and their curriculum offices. The teachers' role in this is important as they can set an example, explain about the various powers at play or help students to explore their own ideas and thoughts about the issue.

3.3 Stereotypes

Stereotypes have been explored by a variety of people, particularly psychologists, in an effort to understand how the human mind works. They are referred to by different people using different terminology. One explanation being that they are 'patterns', in that our mind creates patterns out of its surroundings and uses these to make sense of the world, and in the process entrenches them (De Bono, 1970). Others refer to them as a subgroup of 'schemes' which are the "filing system of your mind" (Fine, 2006). I like the Nachbar and Lause (1992, pp. 236-244) definition which refers to them as the 'mental cookie cutters'. The main thing to take away from looking at the theories surrounding stereotypes is that they are part of the natural function of our mind and in themselves neither positive nor negative until we might attempt to impose them on the world around us without regard for the complexity or individuality that may be present. "Stereotypes affect everyone's perceptions not just the bigot" (Fine, 2006) and through the examination of our own assumptions and that of others we may come to a deeper understanding of what is common and shared by members of a common culture and what is individual (Nachbar & Lause, 1992, pp.236-244).

Many respondents had made assumptions on the 'artisticness' of people from particular cultural or racial backgrounds and had consequently had these stereotypes negated and reconstructed. This was particularly true in the case of African students, in that they had presumed "that all students from an African background enjoy music and can be united and made feel comfortable by playing "African" music-they don't!" (Hampson, 2007). It also held for a variety of respondents in regards to Aboriginal students through making assumptions as to their literacy, "through teaching Aboriginal students at risk I have made the assumption that all Aboriginal students have low literacy skill. I have also assumed that the same group of students will enjoy hand on tasks" (Hampson, 2007). Assumptions were also made regarding their predilection for activities or learning styles as in "all Aboriginal students are good artists! Art students are not good at maths. Students from traditional cultures make art with symbolic meaning" (Hampson, 2007). Some respondents had these assumptions negated as can be seen in the

following response. "Not all Aboriginal students are good at Visual Arts or can hold a beat to music" (Hampson, 2007).

There was also pre determined ideas about how students from particular cultural backgrounds behave and of their attitudes towards education and the educational environment. Some had felt "that Aboriginal children cannot learn. Also, that non-Aboriginal children would be more knowledgeable and easier to teach" (Hampson, 2007). Others observed that "... in my experience many Aboriginal students have a reluctance to achieve success that makes them stand out from their peers and can sabotage themselves..." (Hampson, 2007) and also that students of Asian backgrounds tend "... to be studious and focused on high achievement" (Hampson, 2007). Both of these respondents also stated that this did not always hold true in their experience. These respondents had their schema broken down and replaced by a new one.

Some respondents however did not appear to have adjusted their schema and had rather held onto them, whether this was because they had been unchallenged or for another reason I am not able to say from the responses. The first was in regard to Aboriginal students "that both aboriginal and other cultures have the same work ethic. That aboriginals students have regular class attendance. That both aboriginal and students from other cultures share similar abilities, worldview. ie abor. students enjoy pattern constructions, making bowls, baskets etc not drawing naturalistically" (Hampson, 2007) and the second in regard to Asian and Indian students in that "... they are usually very quiet and attentive and keen to do well" (Hampson, 2007). They did not say that they held these beliefs true for all Aboriginal, Asian or Indian students but they also did not state, as others had, that these weren't true across the board. Further research is recommended to resolve this question.

3.4 Cultural Values

This stereotyping of people based on their cultural background closely relates to the idea of cultural values which was raised by respondents. These are values such as "... respect and learning" (Hampson, 2007). That "some value [is] placed on education" (Hampson, 2007). The idea "that new migrants and students of certain ethnic backgrounds have a greater personal desire and push from home to succeed academically" (Hampson, 2007) is deeply related to "parental level of education. Parental 'world issue' concerns. Parental involvement in child education" (Hampson, 2007). The issue of cultural values as seen in the previous response is often couched with the idea of family. Respondents found that assumptions based on cultural background such as student's being "... white Australians, country kids whose literacy skills are generally low" (Hampson, 2007), could be undermined by the fact that "... some students have family that help expose them to many different cultural experiences and often they can be more informed than I give them credit for" (Hampson, 2007). This also leads to the varying ideas of "what 'art' is – that everyone has the same understanding of the Western concepts of art and craft" (Hampson, 2007), which can vary hugely depending on exposure.

The values that are held in high regard by different cultures can vary, as illustrated by the responses above. The culture of a person is not only influenced by the country they come from but also by the subculture with which they affiliate themselves and their socioeconomics. In relation to subculture some respondents felt that the peers of students played an integral role in the attitudes of the students. The idea "that students from similar cultural backgrounds will have shared experiences and understandings and this does not always follow" (Hampson, 2007). In dealing with students they had too easily overlooked the individual, seeing instead students from the same cultural groups as being all the same.

The importance of the teacher getting to know the students as individuals is already well documented in educational literature. In particular regards to Aboriginal students it talks of individual difference and says "with respect to individual difference, teachers advocate curriculum planning around "student point of need" and "working from what they know" (Herslett et al., 2000).

3.5 Prior Knowledge

In order to be able to do this a teacher has to get to know what their student's individual needs are and what they know already, that is assess their prior knowledge. Books such as the Handbook for Beginning Teachers (Marsh, 2000, p. 192) state that "catering for individual differences is a major concern for all teachers" and that there are approaches which can be successful in individualising instruction including major structural changes (mastery learning, outcomes based education) and teacher organised initiatives such as individual student contracts (Marsh, 2000, p. 192).

Assessing prior knowledge was definitely an issue for respondents with a variety of responses addressing this issue. There are issues of assuming "...that children from my own background will know things that I know" (Hampson, 2007) or "that everyone arrives at your classroom door with the same set of experiences and a similar understanding from which you plan to build" (Hampson, 2007). This extends to knowledge of their "...own culture" (Hampson, 2007), "...Western Art History" and of different Australian landmarks and Australian history (Hampson, 2007).

Socioeconomics can be crucial in whether a student has had exposure to activities or knowledge, for example "...that they might have previously visited our Art Gallery. Most have never been to our Art Gallery" (Hampson, 2007), or that " their exposure to art activities has been common in schools. Not all children have had the privilege" (Hampson, 2007). This can lead to simple assumptions such that ".... all of the students would have used some form of art book in their lives so would know how to use them for Art. These students have no idea at times and require guidance in use of media" (Hampson, 2007). It is particularly pertinent however when it comes to resources that have to do with technology.

"...knowledge if IT-eg assuming they are all computer literate/have access to the internet etc. When they haven't-but this is more of an economic aspect...." (Hampson, 2007).

The assumptions of teachers in regards to prior knowledge can be as above that it is lacking or that they won't know what is being talked about however they can "...in fact ...exhibit high levels of knowledge

in various areas" (Hampson, 2007). The mobilisation of people often means that "...most younger people are well travelled and have an idea of varying cultures" (Hampson, 2007). An example of this is the following, "Common assumptions would be that students do not have much cultural knowledge of Arts in other societies. Ie. I have used a program where students make ceramic 'Indian' elephants where we discuss examples of Indian Art and visual ideas associated with Indian culture. I surprisingly found a couple of my students had travelled in India and had quite a lot of cultural knowledge and experience from their time there" (Hampson, 2007).

Another issue of prior knowledge is that of literacy and ESL students. Respondents thought "that students from different linguistic backgrounds will require too much teaching time in comparison to the rest of the class." (Hampson, 2007) or that "that there will be major communication/understanding problems leading to isolation etc..." (Hampson, 2007).

My teaching began in the E.S.L. area, and it was the clash of E.S.L. and Visual Arts teaching that I witnessed that initially interested me. Stereotypes of ESL learners have been deconstructed for some teachers, for some however practicing these stereotypes led them to modify lessons for E.S.L. students in ways that are not necessarily positive for the students. The idea that hands on work is what is suitable for E.S.L. students can lead to some remarkable failures and create self esteem issues for students that are already struggling with a host of literacy and cultural issues which can lead to a negative attitude towards the Visual Arts which is such a shame as the Visual Arts has a lot of potential to expand the learning, literacy, self esteem and confidence opportunities for E.S.L. students.

3.6 Literacy

This issue with the stereotyping of E.S.L. students relates closely with another point that was raised by many of the respondents, that of literacy. There were various respondents who raised points such as "that they understand instructions in standard Aust. English" (Hampson, 2007), "thinking that they understand when they don't" (Hampson, 2007) or simply put "certainly language can be an issue at times" (Hampson, 2007). The teacher on my prac definitely held similar views to the following respondent, that "there is an assumption that students with limited English can join an art class and pick it up-Language competency is required to learn art skills and processes" (Hampson, 2007). This view however doesn't encompass the possibility that the visual art lesson itself can be a tool for language learning as the following respondent discovered "one South African student with language difficulties became a high achieving student" (Hampson, 2007).

Whilst from reading the responses I could assume that these issues were directly related to E.S.L. students it wasn't always explicitly stated by the respondents. It was the following respondent that particularly bought up literacy being an issue across the board, for native speaking students as well as non native speaking students. "I have been reminded a couple of times not to make assumptions about the 'whole class' based on the fact that they are White Australians, country kids whose literacy skills are

generally low. Some students have family that help expose them to many different cultural experiences and often they can be more informed than I give them credit for" (Hampson, 2007).

3.7 Reflective Practice

One of the issues that was repeated in the survey responses was that of reflective practice. In the section on stereotypes I discussed whether my survey respondents were truly so egalitarian as to having no preconceived notions about their students based on cultural background. Whilst acknowledging that it is entirely possible that they have retrained their brains through experience it should be noted that many respondents admitted to having preconceived notions that they have consequently adjusted. This reconstruction of our "mental cookie cutters" is part of what one terms reflective practice/teaching. Reflective teaching is defined by Snowman and Biehler (2003, p. 13) as being "constantly engaged in thoughtful observation and analysis of their actions in the classroom before, during and after interactions with their students." Roy Killen in 'Effective Teaching Strategies' refers to a variety of reflective practises but the one most relevant here is 'Reflection on action' which is "the typical self evaluative thinking that teachers engage in after most lessons. It is a deliberate attempt to understanding *past* events in order to shape future action" (Killen, 2003, p. 51).

There were respondents who stated that they tried not to assume or make assumptions. They didn't say it didn't happen but rather that they started out themselves by attempting to consciously address this, for example "I don't have many assumptions – and find <u>all</u> students can challenge the few assumptions I have" (Hampson, 2007). These teachers felt that although they weren't assuming ".... anything of a student based on cultural background" (Hampson, 2007) there was still issues at times such as language and ".... occasionally male/female "in charge" issues. Some African students will not meet your eyes, as is considered impolite, but generally, kids are kids" (Hampson, 2007). They saw themselves as aware and "....always looking at new ways to approach teaching and learning especially with students with problems because this has a major impact on the whole class" (Hampson, 2007).

There were others that were adamant that they ".....don't have assumptions about any students" (Hampson, 2007). The question was structured so they could share past experiences and their responses have to be taken as stated. The conclusion you might make is when viewing statements such as "I make no major assumptions on kids, rather try to understand an individuals background" (Hampson, 2007) is that they have "retrained" their brains in order not to do this. That they are able to not make assumptions and "....respect individual difference and I work with each individual as much as possible to acknowledge this. Some students do not want to personally acknowledge their difference" (Hampson, 2007). There is also the possibility that they had not had the experience of having their schema changed.

4.0 Conclusions

The majority of respondents were obliging in sharing their experiences facing situations and of reevaluating beliefs or a point of view. Further investigation of responses would be invaluable in further unravelling the thinking and reasoning behind respondents answers. Their experiences are invaluable for educators and policy makers as we can broaden our own experiences and abilities and continue to improve the quality of education for students through the sharing of experiences with colleagues.

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Design Ecology

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Keywords: Design, Transdisciplinarity, Integrated Assessment, Heuristic, Wicked Problems

Abstract

This paper describes a heuristic for the integrated assessment of design ecologies and an explanation for the maintenance of these complex networks. The assessment model builds upon interpretations from cultural anthropology and ecology to create a heuristic for characterizing the distribution, abundance, and interaction of design concerns at different scales and for multiple actors. I employ information theory and the evolution of cooperation to provide a mechanism for the stickiness of integrated ecological, social, and material-based networks and the degree to which these factors influence design decisions. The examples allude to alternative social roles for artists and designers than have been emphasized in the past for their part in catalyzing cooperative networks and solving difficult problems.

1. Introduction

The title of this paper refers to its purpose, which is to attempt to organize an integrated assessment for the ecology of design. The term *ecology* comes from the Greek word *oikos* meaning 'house' or 'home'. Correspondingly, this paper aims to locate the place of design at multiple scales and across heterogeneous actors using a framework of integrated assessment (e.g. Ravetz, 2000). My intent is not to specify a framework for ecologically sustainable design work, but I do suspect that recognizing other relevant actors and participants will allow sustainable propositions to follow. In another vein, my aim is to encourage an expansion of the problem space where artists and designers can contribute. This begins with the ways problems are defined.

We tend to encounter a certain type of problems in the news every day as controversies over resource availability and demand, peace and conflict, adaptation and complex coordination, and how best to achieve equity among individuals and groups. Solutions to these problems have been especially elusive in history. Urban planners Rittel and Webber (1973) call these "wicked problems" because their social dimensions mean they cannot be adequately described, falsified, or optimized. This description places wicked problems in stark contrast to the relatively tame problems for which science and engineering are equipped. This is because the practices in science and engineering are organized to claim certainty and exclude many of the social dimensions that would otherwise complicate things.

Funtowicz and Ravetz (1993) categorize different kinds of problems using the degree of uncertainty– how much information one has about the nature of the problem–and the stakes involved. The stakes usually refer to the consequences for failure, which was also a distinguishing characteristic of Rittel and Webber's wicked problems. Funtowicz and Ravetz use the degree of uncertainty and stakes to invoke an expanded set of methodologies resulting in what they call *post-normal science*. Their expanded methodology calls for the inclusion of extended peer communities from outside of "expert" disciplines to help lend legitimacy and quality control to these high uncertainty and high stakes problems. This is a move towards greater democratic participation, information transparency, and increased assurance that the output of scientific work is valuable for policy and action in a dynamic world. It also suggests that changing our perspectives about how these problems are approached and by whom may facilitate the development of more robust social, ecological and technological systems.

My goal here is to offer an alternative view of the disciplinary space that artists and designers can call home. I have a second goal to insinuate designers as agents of the extended peer communities referred to by Funtowicz and Ravetz where the job of the artist and designer is to mediate collections of people, places, and things that can contribute solutions to wicked problems. However, in order to do this, I need to put forth a few points about diversity.

1.1 Diversity

When it comes to both tame and wicked problems, diversity is important to our ability to make small improvements to existing situations. Groups composed of individuals with different sets of cognitive perspectives yield better solutions than more homogenous groups for the sorts of tame problems encountered in science and engineering (Page, 2007). Their perspectives are mappings from objects, events, or situations to mental representations that come from our experiences with information, locations, and relationships. However, diversity only really works for these tame problems when the participants have similar mental models, or fundamental preferences, of how the world operates (Page, 2007). The difference between fundamental preferences and perspectives is important because it helps us see why wicked problems are so much more difficult to solve than tame ones. Tame problems are characterized by elements and perspectives that, when properly identified and ordered in the correct configuration, may allow us to solve the problem. With heterogeneous actors and scales involved, wicked problems tend to be much more complex. Consequently, we often suffer from the inability to agree on the source or nature of the problem in the first place, not to mention the identity and order of possible responses. This is because our differences in experience, learning, expertise, and perception do not necessarily overlap.

We also have rational and irrational preferences that contribute substantially to our development of the diversity needed to solve problems because they admit different ways of ordering things and of interacting with the environment. Rational preferences limit the number of alternatives one has to take into account in order to reach a decision—i.e. only "sensible" options are relevant. Because "nonsensical" alternatives make so many more combinations possible under irrationality, a large

amount of processing power is needed even beyond the capability of today's computers in order to analyze the dynamics of diversity using a model or simulation. This creates a limitation for our understanding of diversity and why it matters for problem solving. This is especially true for modeling difficult problems that require multiple alternatives, simultaneously.

Consequently, it is sometimes argued that irrational preferences result from unclear thinking (e.g. Page, 2007). However, an alternative perspective is that cognitive biases, risky or riskless contexts, the choices themselves, and the information we receive affect our assessment of preferences, judgment, similarity, and beliefs (Tversky and Shafir, 2003). Previously, behavior was thought to be predictable because people make choices in their own interest. We now know that we neither have access to all of the available information about a choice nor the ability to process that information meaningfully all of the time. Economists Richard Thaler and Cass Sunstein explain how *choice architecture,* the infrastructure of decision making, is shaped by the form and arrangement of information and can help people make better choices in line with their own preferences (2008). The principles they describe are aimed at helping people simplify alternatives and make decisions under more meaningful and less information-dense circumstances. That is, they show how diverse perspectives can be adapted to each other using the elements of visual and interactive form: typography, ordering, scale, repetition, and other elements. This is where I believe artists and designers can play a renewed and proactive role in civil society.

When artists and designers are trained to recognize and value their roles as brokers of information and meaning, they can be the agents who bring diverse people, social groups, and choices together to solve wicked problems. My proposition is that artists and designers open the landscape to new solutions to these problems 1) by augmenting peoples' understanding of their own fundamental preferences, effectively allowing them to find common ground, and 2) by adding design processes that will allow people to make meaningful choices and reduce the cognitive dissonance and uncertainty associated with wicked problems. However, in order to do this we may need some additional levers and institutional arrangements to perform this work.

1.2 From Interdisciplinarity to Transdiscipinarity

Interdisciplinary practices can integrate diverse ways of working and interacting. Julie Thompson Klein describes interdisciplinary learning as "neither a subject matter nor a body of content. It is a process for achieving an interpretive synthesis, a process that usually begins with a problem, question, topic, or issue" (1990). Boix Mansilla elaborates, describing interdisciplinarity as "the capacity to integrate knowledge and modes of thinking in two or more disciplines to produce a cognitive advancement – e.g., explaining a phenomenon, solving a problem, creating a product, raising a new

question – in ways that would have been unlikely through single disciplinary means. ... the integration of disciplinary perspectives is a means to a purpose, not an end in itself' (2005).

While interdisciplinarity might be viewed as a form of cognitive integration, transdisciplinarity is the application of interdisciplinary solution finding when applied to wicked problems. It can be thought of in terms of its cognitive *and* its practical integration. When concepts, theories and methods are applied across disciplines and groups working to solve wicked problems, they are effectively being tested for their robustness and value for multiple communities. Extended peer communities such as those outside a discipline are therefore important for the propagation of transdisciplinary work and for negotiating its value in multiple instances, places, and forms. However, in moving information, tools, ideas, practices, and meaning from one community to another, a great deal of translation must occur if these transplanted practices are going to make any sense in their new context.

I compare interdisciplinarity and transdisciplinarity because students and teachers face critical decisions about how to apply forms of knowledge and the basic patterns they describe, as well as the arrays of artifacts they put up as candidates for everyday use. Social networks are shifting rapidly, if only due to the rapid urbanization of many of the world's inhabitants. I also believe students and teachers face a mounting challenge and responsibility to increase the number of participants in the design process. If you consider the multiple scales of design, from the nano scale to the planetary scale, negotiation is paramount for the successful deployment of sustainable technology in these social and ecological systems.

This paper then is an attempt to complicate the matter of design when it interacts with social and ecological systems. By conflating two sets of interpretations from the fields of cultural anthropology and ecology, I hope to stimulate discovery of predictive models and courses of action based on the specifics of actors or individuals involved. The goal here is to manage uncertainty by enhancing students' capacity to integrate diverse perspectives and to synthesize different implementations across communities. The benefit is posed as the invocation of a larger suite of interactions and solution space for students to consider, along with the emergent and unexpected processes that can result from those interactions. I caution that this is not by itself a predictive model for action. It is a bit like rearranging the shelves in the library so that you can turn around and discover a new book or topic, something you were not expecting given your location in the stacks, your office, or your discipline. It does not tell you what to do, but it might add something useful.

2. A Heuristic for Framing Interactions

A heuristic is a rule applied to an existing solution (in this case, design) that generates new solutions or possibilities (e.g. It answers the question, "who do we consult and who has a stake?"). Heuristics

tend to be more valuable when there is uncertainty rather than when preexisting interpretations of the world are already agreed upon. This heuristic developed Russell Bernard's matrix for finding research topics in cultural anthropology, which represents a common interpretation of factors (hereafter, "sources of uncertainty") important to cultural anthropology (1996; Table 1).

Bernard's interpretation works pretty well for humans, but if we rely solely on cultural anthropology we might fail to include the concerns of others like plants, animal, majority perspectives, or even ourselves. If we take as our goal the design and emergence of preferred situations, we need to keep ecological concerns in view if we are going to include a measure of justice for everyone and reduce the amount of risk we face. Drawing from the field of ecology, I have added an additional interpretation to Bernard's matrix that asks how biological, cultural, and material sources of uncertainly matter at different levels of ecological scale (Table 1; column 2). This is relevant because knowledge in these domains is increasing rapidly, and as that knowledge increases, there is often a corresponding series of designed interventions by people. These additional categories allow us to consider the designed interaction, even if they are not standard practice in anthropology or any other discipline. It asks, "What happens when we merge the work of cultural anthropologists, ecologists, and cognitive psychologists, designers, economists, and evolutionary biologists?"

Their interactions between categories may suggest sources of emergent traits or mechanisms of failure. At a minimum, they facilitate thinking and working with these other sources of uncertainty in mind. I have dispersed them across the grid as a simple way of making sure that each interaction is accounted for and considered (Table 2), because accounting is a major way to bring participation and sustainability to the design process (Boyce, 2000; Bebbington et al., 2007; Frame and Brown, 2008; see also Latour, 2006). The grid arrangement also points to areas where the interactions can be particularly relevant for organizational goals. For example, traits that are uniquely human touch on motivations, while the interactions of human-generated 'stuff' seem uniquely qualified to inform us about the robustness of our ecological and technological systems. The grid also helps us recognize that the interactions can be bidirectional, with "arrows" of material or sign/semeiotic causality (i.e. "What is driving what?") arriving from any level or actor (Lemke, 2000).

3. Design Ecology

With this set of interactions in mind, we can see a sort of design ecology begin to emerge. Design ecologists study the distribution and abundance of the design concerns, their interactions, and how their architectures are maintained. Much like ecologists concerned with the distribution, abundance, and interactions among species, design ecologists study biotic, social, abiotic, and technological sources of uncertainty that structure the origin and maintenance of products, infrastructure, and services that support human and non-human flourishing. Ecological models have been used in the

past as analogies for design-based systems including theories of competition among firms (Hannan and Freeman, 1977), mimicry or convergent relationships between design systems and natural ones (Beyus, 2002), industrial flows (O'Rourke, et al., 1996; Verhoef, 2004), and artifacts (Krippendorff, 2006). Here, my goal is to start to connect the concerns of each of these together in an integrated fashion so that we can start to enlarge the perspectives needed to design robust systems before we prematurely exclude the ones we need most. To describe and arrange these ecologies, designers and artists may need some "material" to work with. Here I think mutual information, cooperation, and preferences can help.

3.1 Mutual Information

Mutual information is a term from information theory that describes the amount of information one thing tells about another thing. It is the reduction in uncertainty of one thing due to knowledge of another (Cover and Thomas, 1991). If we ask how information is shared between each of the different sources of uncertainty, we may be able to get a sense of how they are connected and how they might respond to each other. Mutual information provides a mechanism for observation and engagement.

3.2 Cooperative Networks

Social networks endure because they are able to maintain mechanisms for stabilizing their interactions. Network reciprocity describes a process that allows entities to form enduring cooperative networks (Ohtsuki et al., 2006). It serves as an example of a strategic game that simulates cooperation in groups where an individual's success in making choices depends on the choices of others. Relationships endure over time from the benefits of interaction. Defectors or cheaters do not pay to a cost to their neighbors, but they nonetheless benefit from the donations of their neighbors. Because it is a network, neighbors form clusters, help each other, and despite those defectors, are expected to persist when the ratio of benefits to costs is greater than its average number of neighbors (Ohtsuki et al., 2006). Networked reciprocity creates heterarchies, or interlinking, between actors and individuals. This allows conditional or power-sharing roles to develop when one's ability to be successful is influenced by the choices of others and vice-versa. Consequently, defining the size of the network of interactions in an important step in being able to determine the likelihood that cooperative design ecologies will form.

3.3 Preferences Redux

If our goal is stronger cooperation and more cohesive networks, it might make sense to reduce the number of participants or actors in that network to those that are going to "work well" with each other. This might mean behavioral coordination, but it may also mean that clear and informed understanding between participants, whether they are people or things. Designers can limit or arrange choices and help focus preferences, effectively limiting the number of actors and uncertainty in a network. By

designing information and interactions to increase mutual information and refocus preferences, artists and designers can facilitate cooperation, perhaps even on the most difficult problems.

Consider time as a special example. One of the ways we design and coordinate systems is by arriving and departing at the same time. In whatever shared space we inhabit and work, we are able to communicate and perhaps even reach "common ground." Clocks are visual information sources that help us limit our choices, making it possible for us to connect facets of behavior, artifacts, populations, and cognition together and into the places they need to be to do work or whatever we decide we need them for. When we coordinate our clocks, we increase our mutual information and limit our network size, making cooperation possible by increasing our common ground—sometime figuratively and sometimes literally as well. Clocks are a social technology, invented for the purposes of communication and coordination. My question is, "Are there other social technologies that can be created by artists and designers to provide similar services and that will help us solve some of the more difficult problems of cognitive and social coordination?"

4. Role and Characteristics of the Design Ecologist

In taking together the things I have presented here, there are a few final heuristics for teaching, learning, and designing that I think will become even more valuable in the coming decades.

The first comes from the concept of *interessement*. Sociologist Michel Callon (1986) describes interessement as, "the group of actions by which an entity attempts to impose and stabilize the identity of the other actors it defines through its problematization." This means that a role for artists and designers is in the communication of identities, goals, and avenues of coordination when they get involved and frame problems through their own ways of working. The value they create is arrived at in the way problems are reshaped, assumptions examined, and new channels for communication found when they are made visible for potential stakeholders. Designers can then be thought of as mutual information builders for diverse groups. A further question is, "How do we then design for communication between humans and non-humans?"

Role and identity is important, but what artists and designers make and do is also critical. I like the concept *boundary objects* as a target for the types, forms, and functions of things that exist and interact in social spaces. According to Bowker and Star (1999) boundary objects:

"... are those objects that both inhabit several communities of practice and satisfy the informational requirements of each of them. Boundary objects are thus both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly

structured in common use and become strongly structured in individual-site use. These objects may be abstract or concrete... Such objects have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting communities...Boundary objects arise over time from durable cooperation among communities of practice."

Here again I think artists and designers have a distinct role to play in aiding the development of these objects. Maps offer an excellent example. Within the map's boundaries, real and imagined places or objects can be represented with more or less convention and with changes over time. Different people can use maps for different purposes.

A third heuristic not altogether different from *interessement* is the concept of *network entrepreneurship*. A network entrepreneur is someone who brokers ideas across structural holes in organization and networks (Burt 2004). Structural holes are areas of emptiness or gaps between social groups. The epistemological and methodological gap between the arts and sciences is a good example. According to Burt, individuals (and possibly groups) that provide vision across these gaps create advantages and opportunities that are a form of social capital. The work that these types of individuals do is based on the assumption that within group variation and the diversity of ideas is less than the variation and range of possible solutions achievable between groups. Network entrepreneurs position themselves to draw from these different sources of cognitive or other contextual variation while seeking solutions, ideas, and ways to connect. If an individual is involved in designing a boundary object, the degree to which they engage in network entrepreneurship may increase the suitability of that object across different communities *because* they are communicating with and engaging with those communities.

Interessement, boundary objects, and network entrepreneurship, taken together, suggest a final set of teaching and learning goals. Burt's (2004) characteristics of network entrepreneurs and Rhoten and Pfirman's (2007) interdisciplinary behaviors were the starting points for these guides, but I have reframed them somewhat here. These goals provide questions that can be asked of assignments and projects and may serve as a set of characteristics to encourage in behavior as well.

4.1 Adaptation

Are tools, artifacts, concepts, data, methods, metaphors, or results adapted from different fields and/or disciplines? Are individuals in one or more groups aware of the concerns of the other(s), and does that awareness create common ground? Do these result in the creation of new value chains for social,

economic, and epistemological development that can be applied in new contexts and in response to shifting norms, values, and environmental conditions?

4.2 Coordination

Does it promote seeking, exchange, and/or creation of tools, concepts, data, methods, or results across different fields and/or disciplines? Are collaboration, infrastructure, and participation enhanced? Are practices transferred that have the potential to create value from one group in another group?

4.3 Knowledge-Networking

Does the work or play involve engagement in domains that sit at the intersection of or the edges of multiple fields and/or disciplines? Are seemingly unrelated things "drawn together" either out of analogy or other cognitive tool?

4.4 Framing

Is there engagement in topics that not only draw on multiple fields and/or disciplines but also serve multiple stakeholders and broader missions outside of academia? Is there synthesis of new behaviors and beliefs that combine the concerns of diverse groups?

5. Conclusion

The Australian Public Service concluded that the prime skills needed to address the problems of governance include working across organizational boundaries, engaging stakeholders, and influencing citizens' behavior. The Public Service Commissioner's report says that, "People with connecting skills will be increasingly valued—people who can build up relationships across the public, private and non-profit sectors and leverage these relationships to build networks of mutual benefit. There is also a need for policy makers to be aware of and apply behavioural change theory." (Tackling Wicked Problems, 2009). Artists and designers are some of these people, and they should become more directly engaged with these tasks. Training the next generation in these kinds of skills is itself a difficult passage point, but it is also a kind of stimulus to help push us past the current threshold and into a new space of possibility and coordination, perhaps finding new design ecologies along the way. As teachers and mentors, we can help emerging professionals develop these skills, but in order to do so we may need to shed our own biases and assumption. We have taken the first step by showing up here to communicate together. What's next?

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Table 1.

Social Research Methods and Design Ecology Framework Compared.

Social Research Methods Interpretation	Design Ecology Interpretation
(Bernard, 2000)	
	Genetics
Internal States	Cognition
External States	Phenotype
Behavior	Behavior
	Material Aggregations
Artifacts	Artifacts
Environment	Population
	Community
	Landscape
	Ecosystem

Table 2.

Sources of Uncertainty in a Grid Arrangement Help to Integrate and Assess Design Ecologies.

Sources of Uncertainty	Genetic	Comition	Alenotho	Behavior	⁴ 991694110116	Antifacts	Population	Community	Landscape	FCOSISION
Genetic										
Cognition		N	otivatio	n	Medi	ation				
Phenotype								Coord	ination	
Behavior										
Aggregations					Effic	iency		Robus	tness	
Artifacts										
Population	x2	for Dire	cted Ne	tworks				С	peratio	1/
Community								С	ontinge	псу
Landscape										
Ecosystem										

The Problem with Problems: Investigating the Framing of the Practice of Communication Design as Problem-Solving.

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ABSTRACT

How does the framing of design as 'problem-solving' relate to today's social, economic and environmental conditions? Is problem-solving enough? Could we look to Lakoff and Johnson's work (2003), and their examination of the metaphors we live by, and say that in describing design as 'problem-solving' communication design might be limited by its own terminology?

The communication design activity includes many aspects other than problems and solutions. What other framings might we apply to the activity of communication design, and how might those alternative framings act to change communication design practice? By examining a research project into online annotation of time based media this paper questions the framing of communication design solely as a problem-solving activity.

KEYWORDS Communication design, problem-solving, wicked problems, ontological design

1 INTRODUCTION

Terri Irwin suggested in her recent keynote paper at the *New Views 2* graphic design conversation in London last July (2008) that keeping our vision focused on the minutiae of kerning might no longer be enough for contemporary communication design practice. She proposed that designers needed to 'lift their heads up' and look further into the world around them than one hundredths of an em in order to maintain a sustainable, relevant and useful practice in today's world.

From their undergraduate education onward communication designers are encouraged to think of their work as 'problem-solving'. As Stephen Heller states in his introduction to his book *Teaching Graphic Design*;

Each assignment covers a different aspect of the creative communication process and generally presents visual problems that can be solved in any media–from painting to photography to computer graphics. (Heller 2003)

Given this framing of the design activity it is not surprising that designers, clients and commentators to come to understand the work of the communication designer as 'problem-solving'. When designers complete their first student assignments (and later presumably complete commercial projects) they will often attempt to investigate the problem, get to the bottom of that problem and

apply themselves to designing a 'solution' using their expertise and knowledge. They can then deliver their 'solution'.

How does the framing of design as 'problem-solving' relate to today's social, economic and environmental conditions? Is problem-solving enough? Could we look to Lakoff and Johnson's work (2003), and their examination of the metaphors we live by, and say that in describing design as 'problem-solving' we might be limited by our own terminology?

Design work does of course include problems to be solved, however it also includes other aspects that, if we continue to frame the design task as solely the fixing of problems, can be over-looked. Communication design work includes discussion, negotiation and experimentation. Outcomes can often more usefully be seen as propositions rather than as solutions. While elements of the work may involve the fixing of particular issues, the solutions to those issues often reveal new opportunities available for investigation and negotiation. All parties involved in a project will often find the project itself changes and develops their practice. This educative nature of communication design can be over-looked, or even seen as a waste of time, if we strictly follow the problem-solving framing.

As Herbst Rittel stated (1972), design problems are often 'wicked problems', indeterminate in their nature. They do not necessarily have an absolute or optimal technical solution.

Is visual exploration and expression a 'problem'? Would we characterise a conversation as a 'problem'? If we accept that the framing of design as 'problem-solving' can be reductive, what might an alternative framing be, and how might we apply that to design practice?

This paper will look at specific design project; the design of an online system for creative collaboration. Through this project, the paper will critically examine the framing of design as 'problem-solving'. It will argue that in looking at design projects solely as 'problems to be solved', a range of expectations are accepted which, taken together, encourage designers to ignore Terry Irwin's call and instead 'keep their heads down', keep their focus on the kerning and side-step the most important complexities of their work.

What might happen if we altered the framing with which we define communication design practice? The pressing ecological, social and economic crises are forcing communication designers to reconsider many elements of their practice; to re-think what design does, and how it does what it does.

2 COMMUNICATION DESIGN: A NEW DISCIPLINE

Graphic design, as a design discipline, has undergone many recent changes; it has changed with the society it inhabits, with technology and with its own internal growth as a practice. Its name change from graphic design to communication design is both the result of these changes to everyday practice and the provocation that enables some of these changes. The sense that 'graphic' might no longer have a broad enough scope to describe what practitioners do has become obvious in the last ten years due to social and technological changes as well as changes in the self image of the practice.

With a change of name, from Graphic to Communication Design, the discipline is now able to accept the many new aspects which have become part of practice over the last half-century. These changes to practice include the movement into new media and the changes brought about by technology in the areas of print, motion, interactive, and environmental graphics. The change also includes the growing professionalism of a practice claiming recognition for the significance of its work and, at the same time, obliged to take some responsibility for its affect within society.

3 METHOD OF INVESTIGATION

In order to discuss 'problem-solving' and design, this paper will examine a project currently being undertaken within RMIT University, Melbourne, Australia. This project is funded by the Australasian Centre for Interaction Design (ACID). It aims to design an online system allowing for the annotation of time-based media by multiple users. This system is designed to enable geographically dispersed teams to discuss and work collaboratively on the development and refinement of time-based media. This project, and the system developed by the project, is known as *Protospace*.



Figure 1: Current version of Protospace online software

The *Protospace* project has involved many people, including visualisers, interface designers, programmers, design managers and project facilitators. Working together over an extended period of time they have developed the online system into a fully functioning prototype. The project has enabled developments within the project team and numerous design research outcomes beyond its stated objectives.

4 AN ESTABLISHED PARADIGM: DESIGN AS PROBLEM-SOLVING

Design disciplines have embraced a framing of design practice as a 'problem-solving' activity. Using a methodology similar to that used by Lakoff and Johnson to analyse the use of metaphor and metaphoric concepts in language, we can start to examine the use of the 'design as problem-solving' framing for design practice. In their book *Metaphors We Live By*, Lakoff and Johnson made the point that the metaphors used in language affect thinking, preconceptions and perception. It is possible to use a similar method to examine the prevalence of 'problem-solving' as a framing of the design activity. The following examples of common terms and phrases used in communication design practice reveal patterns in our common communication design language:

The designer worked out the solution Design involves thinking through the problem Designers arrive at solutions Some designers leap to solutions Clients want the best solution The brief defines the design problem Designers need to determine what the design problem is

The phrases above start to indicate the extent to which the 'problem-solving' framing of design practice is embedded in the way design is discussed and thought about as an activity. As Kees Dorst notes:

...the conceptual framework of rational problem solving has become the normal "language" of thinking and talking about design. (Doorst 2006)

This paper aims to problematise that framing, suggest alternative framings and starts to consider what effect those alternative framings might have on communication design practice.

5 THEORETICAL SHIFT: THE WICKED PROBLEM

A seminal moment in the development of thinking about design and design practice occurred when Professor Horst Rittel wrote his much-cited paper on the crisis in planning brought about by the use of first generations systems analysis to deliver solutions to design problems (1972). His paper outlined the basic steps of the systems analysis:

- 1. understand the problem
- 2. gather information
- 3. analyse the information
- 4. generate solutions
- 5. assess the solutions
- 6. implement
- 7. test
- 8. modify

Rittel went on to reveal the paradoxes created in applying this rational system to real-world situations; that one would have to be aware of all the consequences of ones actions, and the consequences of becoming aware of those consequences, before taking action, and that all relevant consequences, factors and phenomena would need to be somehow contained. Only when all these factors were somehow contained could systems analysis start its process of design. Rittel then shows the limitations of this first generation systems approach, described it as best being able to tackle 'tame problems' (problems which could be laboriously written down and solved by another person) and described most planning problems as essentially 'wicked problems'.

Rittel describes that in dealing with activities, like planning, that involve 'wicked problems', the defining of the problem defines the solution and the designing of a solution re-defines the problem. With the achieving of a solution the problem changes and in the alternative understandings of the problem the solution changes (and that it is impossible to rationally understand or define the complete problem, since it is a real-world problem, not a lab-based tame problem). In this way Rittel's 'wicked problems' cannot actually have solutions that are true or false, they can only be good or bad, and even this is open to differing opinions and argument.

This paper puts forward the proposal that Rittel's 'wicked problems' might not be seen as problems at all, and are often far more akin to situations that are negotiated. This is key to a possible reframing of communication design practice, if we release ourselves from framing our design activity as 'problem-solving' (since we cannot 'solve' these wicked problems anyway) what might a reframing of practice be? And where might it lead?

6 PROTOSPACE: WICKED PROBLEM OR NEGOTIATED ACTIVITY

The *Protospace* project could be described as one of Rittel's 'wicked problems'. At first glance it may have appeared a tame problem and it did have some tame aspects. The problem of how to compress video to make it viewable via a web browser has a solution. However, when we examine even this minor aspect of the *Protospace* project we see that in order to solve this problem we have to make a number of decisions about the audience that might view this video; what are they going to want to do with the video? Is it going to be used in other ways? What resolution do they need? As Rittel states, 'you cannot separate the generation of solutions from understanding the problem'(1972, p. 392). In developing the solution we redefine the problem.



Figure 2: trialing various practitioner interview tools

Protospace worked within a media production industry that does not as yet use an online time-based media annotation system. In order to design such a system the researchers had to develop, at the same time, an idea of how it might be used. The research team was designing for a functionality that was defined by the solution that was proposed. As the system was developed it led to more opportunities and problems, which further redefined the aims of the project.



Figure 3: gathering information on design process during interviews

The clients of the project; ACID and RMIT University, were the driving vision behind the *Protospace* project, however, these participants in the project did not fully know what the potentialities of the project could be. As the potentials for this project came to be revealed through the activity of design, the aims of the project were redirected to take advantage of this new knowledge. Both the 'clients' and the 'designers' were learning and shifting their expectations and ambitions constantly as the 'solution' revealed new elements and opportunities in the problem.

The group of people involved in *Protospace* had different skills and areas of knowledge. They had different individual agendas, priorities and ambitions for the project. Throughout the project these differences provided ground for constant negotiation and re-thinking of those ambitions and priorities. The individuals came together to make the project what it was, their differences of vision forced the negotiation which enabled the project to become what it was to be.

On one hand *Protospace* can be seen as a problem solved, in the sense that the initial research questions were investigated and a solution was developed. On the other hand *Protospace* was a focused collaborative design activity, involving constant negotiation. This activity generated many insights and allowed understandings to develop between project participants. All participants learnt from the project and the project developed simultaneously with what was learned. Protospace was, in some way, a different project to each individual involved, yet it came to be what it was due to the collaboration and negotiation of those individuals and their differing agendas.

Figure 3: example of results gathered on participants design process during interviews

The problem of *Protospace* was unique, the combination and capacities of people working on the project in collaboration were, taken together, a unique combination. The capacities of the media and the technology available to both the target industry and the development team were particular to the historical timeframe of the development. The situation could not be duplicated at a later time and there were no correct answers. The solution is a negotiated one and, once an outcome is delivered, leads through to an altered circumstance. If the team had to do it again they would do it differently, and the next situation would have its own particular qualities.

7 ALTERNATIVE FRAMING FOR DESIGN PRACTICE: A NEGOTIATED ACTIVITY

Based on the experience of *Protospace* and using Rittel's proposal of the 'wicked problem' as a guide, we can reframe the practice of communication design. The 'problem' of *Protospace* is not so much a problem as a negotiated action; the framing of that action is contested ground, redefined and reframed, through design, based on the individuals involved in the design activity, as the project progresses. The design of the solution, or should we say the outcome, reframes the initial problem as it reveals new knowledge and opportunities in its creation.

In this way we see design as an ontological design activity; as we design, the design we design, designs us. As Anne-Marie Willis describes it:

ontological designing - based upon a circularity, in which knowledge comes to be inscribed by being with the 'designing-being' of a tool, this in turn modifying (designing) the being of the tool user (1999)

With *Protospace* the system being designed did not yet exist. It was a new tool for its target industry. Its functional specification was redefined constantly as it 'came into being'. It was designed for an

industry, yet in its testing within that industry, it revealed aspects of that industry's practice which were not previously understood. *Protospace* had the capability to change the way that the industry it was designed for worked, and so in some way, change the industry itself.

The negotiation that was involved in the design of *Protospace* was conducted within the design team itself, the instigators of that design activity, the people researching that design team and the target industry that the system was designed for. All these groups, and the individuals within these groups, had different senses of the aspects and issues of the project. Different ideas of what was. Different ideas of what could be. Different levels and areas of knowledge. Different ways of working in the world. Design, as an activity, negotiates these areas of difference. Design feeds off this alterity and uses it generatively to problematise accepted paradigms and create the new.

The first generation systems analysis process of problem definition leading to solution, is, as described by Rittel, a closed system in which the problem and the information lead through to a single predictable solution. Communication design as practiced on a day-to-day basis, and as seen during the *Protospace* design activity, is a constant negotiation with all involved parties, leading through to a negotiated outcome, which changes those around it and leads to further investigations and outcomes.

Just as Lakoff and Johnson state in their work on metaphor concepts, if we remain unaware of the metaphors we use in language then we are in danger of ignoring the effect those metaphors can have on our thinking, accepting their unstated assumptions and being led by their suggestion. In a similar way, if we remain unquestioning about the framing of design solely as a problem-solving activity we are in danger of assuming the universality of this framework and supposing that it describes the full truth of a design situation.

8 CONCLUSION

In conclusion I would like to reiterate some of the key points of this paper. The first one being that the commonly understood framing for design activity is one of problem-solving. Secondly, the paper proposes that this framing of design might limit communication design practice from responding to the conditions and challenges of contemporary practice. Thirdly, I examined Rittel's concept of the 'wicked problem' and applied that to a recent multi-disciplinary complex design project undertaken at RMIT. Rittel's concept of the 'wicked problem' far more adequately describes this project than that of problem-solving. However, wicked problems are not problems (in that they cannot be solved), the name 'wicked problem' is somewhat a misnomer in that it continues to use a language which implies a problem-solving activity. So how might we reframe the communication design activity? Lastly I have outlined a framing for communication design which speaks of the ontological

nature of design and of the design outcome as a negotiated text, an outcome that represents the

aspirations of the stakeholders at the point in time it is developed, an outcome that changes those

aspirations as it is materialised, and leads on to new visions and aspirations.

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ACKNOWLEDGEMENTS

This work was conducted within the Australasian CRC for Interaction Design, which is established and supported under the Australian Government's Cooperative Research Centres Programme. We would like to thank members of AACORN for their participation in this study. We would also like to acknowledge the contributions of fellow researchers in undertaking the project, these include: Dr Laurene Vaughan, Jeremy Yuille, Michael Dunbar, Dr Yoko Akama, Daniel Pettet, Shan Yang Ying, Linda Wall, Roberto Bruzesse and Nifeli Stewart.

Developing an Interdisciplinary, Discursive Methodology to 'See' Government Emblems

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Design historians frequently struggle to place design artefacts that are 'outside of the realm of consumption' and do not readily fit into the accepted historical design canon. This is in part due to the limitations of commonly used methodologies. This paper discusses the formulation of an alternative, discursive methodology and its application to a historical study of government emblems. Discursive methodology facilitates consideration of government emblems simultaneously as design artefacts and political symbols. It does this by contextualising the emblems within the massive changes faced by the local design industry and local government in mid-1990s Victoria. The research thus avoids a common criticism of design histories, the object/canon bias. Close study of Foucault's work along with the work of Foucauldian scholars reveals the importance of his views on and approach to historical investigation for design historias. This paper discusses these theories, formulates them into a workable methodology for historical inquiry, and then discusses the application of the methodology to the development of an interdisciplinary history of government emblems.

Keywords: Foucault, discursive methodology, design history, emblems

1. The Illness

Almost from its inception, design history has suffered from regular crises of relevance. Although it was initially created to inform design education, the relevance of the fields to one another has been questioned (Baljon, 2002, p. 342; Drucker, 2009, p. 67). Practising designers and design researchers regularly question the perceived pedagogical necessity of histories that repeat an accepted, celebratory rendition of the origins and development of design. Other design histories are criticised for their emphasis on the visual, preferencing aesthetics and style over cultural and economic context and modes of production. Such work has been observed as detrimental to design practise, becoming in effect idea source books that facilitate a thin historicism (Hannah & Putnam, 1996, p. 140; Heller, 2004, p. 137; Kalman, J. Abbott Miller, & Jacobs, 2009, p. 27). These criticisms of design history are often summarised through reference to the object/canon bias, that is the preferencing of the designed 'object' and the 'canon,' or the generally accepted
view of how these objects, their designers and their stylistic traditions relate to one another (Fry, 1988, p. 53). Design history has few links to other historical disciplines and therefore it is low on methodological resources to combat these issues (Margolin, 2009, p. 97).

2. Diagnosis

Design historians have long been aware of these challenges, many having spent considerable effort diagnosing design history and proposing effective remedies. They have variously attributed these maladies to the object/canon bias, failures of definition and design history's origins in art and connoisseurship histories. A common observation is that design history has a narrow focus on 'the object' that excludes consideration of its cultural production and of its use.¹ British design historian John A. Walker identifies design history's origins in art history as a weakness because 'art history long ago ceased characterizing art; its real function now is that of constructing a particular tradition or way of looking at art.' Design history, he suggests, needs to be a history of design in all its forms, rather than 'retrospective constructions of a tradition' (Walker paraphrased in Dilnot, 1984, p. 5). In a recent commentary on approaches to design in history, eminent design historian Victor Margolin attributed what he sees as design history's impending irrelevance to a failure of definition. He argues that too many design histories lack significance due to design historians generally having a limited view of what constitutes design. They therefore only identify a narrow range of artefacts for study. In this he echoes Clive Dilnot's observation in his expansive survey of design history some twenty years earlier (Dilnot, 1984, p. 5; Margolin, 2009, p. 105). In an earlier essay, Margolin (2002, p. 235) also rejected the idea, left over from design history's connoisseurship origins, that judgements of quality are central to design history. Another product of these connoisseurship origins is the dependence many design histories have on 'star designers,' or the 'designer as hero' model (Hannah & Putnam, 1996, p. 135).

Although these observations are constructive in and of themselves, they also point to an underlying methodological weakness in much design history (Teymur, 1996, p. 149). The 'retrospective constructions of a tradition' that Walker laments stem from an explanatory approach to history that seeks to order historical events and artefacts in a linear, chronological procession of cause and effect. The progressive narrative is constrictive, forcing events and objects into artificially sequential roles. This empirical approach contains several implicit assumptions: first, that all of history is describable and can be explained; second, that there is a

¹ See, for a typical example, Baker's observation that 'design historians are not at the moment providing their readers with any understanding, historical or otherwise, of how the complexities of identity are given visual form by the designer, let alone going on to consider whose ends the resulting [logos] serve and how they do so.' (Baker, 1989, pp. 277-278). Also see Fry (Fry, 1988, p. 43).

'correct' version of history to be discovered among historical archives; and third, that it is possible for the historian to provide an objective account of this correct history (Drucker, 2009, 2008, p. 63).

3. Prognosis

Design history, and the sub-discipline of graphic design history are not alone in facing these methodological challenges. As Walker (1989, p. 197) states:

the issues confronting design historians are comparable to those which have been faced by scholars in other disciplines... It follows that design historians can avoid crass errors, gain insight into their own practices, and save themselves time by attending to debates within the social sciences and by studying the writings of major anthropologists, sociologists [and] general historians.

Many design historians in the last decade have done just that. Approaches incorporating semiotics, Marxist and feminist critique have incorporated consideration of signs, socioeconomic forces and gender issues into design history.²

Despite these inroads, there are still artefacts that design historians struggle to place, largely because there is no established approach that accounts for their existence. Non-commercial designed objects or, as Margolin describes them, those that are 'outside of the realm of consumption' and have no claim to the historical design canon are typically absent from the historical record, irrespective of their broader cultural significance.³ These artefacts are often produced anonymously, making them difficult to place through typical approaches, relying as they do on organisation by star designer and judgements of value. Such culturally significant yet rarely studied design objects include civic infrastructure (street signs, street furniture and public amenities), religious paraphernalia and political symbols. Non-commercial graphic design artefacts are particularly absent from the historical record.⁴

² For incorporation of semiotics into design history, see Hollis (2001). For a Marxist approach see Lavin (2001). For a gendered account of design history see Sparke (1995, p. 103). Goodall's 'Design and Gender' provides a good example of a combined Marxist feminist approach (1996).

³ 'We now write about stoves and automobiles, corporate identity and digital fonts, but we have little to say about design outside of the realm of consumption.' (Margolin, 2009, p. 103).

⁴ This is due to a combination of the often ephemeral, anonymous nature of graphic design artefacts, the relative newness of the tradition, as compared with other design disciplines such as architecture and industrial design. For example, government emblems are highly public designed objects that inspire strong emotions, have a long, rich cultural history and are both politically and socially significant but they are rarely included in design histories.

Having observed similar symptoms in other historical writing, French philosopher Michel Foucault offered a broad explanation for such omissions. Critical theorist John Rajchman (1988, p. 92) writes:

Foucault's hypothesis was that there exists a sort of "positive unconscious" of vision which determines not what is seen, but what *can* be seen. His idea is that not all ways of visualising or rendering visible are possible at once. A period only lets some things be seen and not others. It "illuminates" some things and so casts others in the shade. There is much more regularity, much more *constraint*, in what we can see than we suppose.

The Marxist, feminist and semiotic methodologies previously discussed have been used to shed light on hitherto unconsidered design artefacts. It stands to reason then, that there are methodologies that can be used to illuminate non-commercial graphic design artefacts.

4. The Structuralist Prescription

Margolin and Dilnot have both advocated methodologies developed by the Annales school for 'seeing' such otherwise invisible design artefacts. Tunstall and Walker have suggested Foucault's work in particular 'holds relevance for design history' (Tunstall, 2007, p. 4; Walker, 1989, p. 16). The Annales school is a geographically disparate group of historians working from the 1930s to the present. They are known for taking a fundamentally interdisciplinary methodological approach as epitomised in the French journal *Annales: Économies, Sociétiés, Civilisations*. Many Annales historians, such as Bloch, Fevre and Braudel, used their interdisciplinary methodology to identify the structural underpinnings of society, thus their approach has come to be identified with that of other 'structuralists' (Green & Troup, 1999, p. 88). Margolin details two significant advantages of the Annales approach: the ability to tackle artefacts not previously included in the canon, and the facility to then contextualise those artefacts in their contemporary economic and social contexts.⁵

Foucault's *Madness and Civilisation* and *The Order of Things* were written in this structuralist mode, his work being greatly influenced by the first generation of Annales historians (Foucault, 2008, p. 16). Foucault's approach to history shares with the Annales scholars the notion of historical accident, a consequent questioning of causality and a commitment to interdisciplinarity. Marc Bloch, one of the founders of the Annales school, describes the importance of

⁵ It is an irony of design history that although its focus has been on squarely on commercially produced objects, it has seldom taken into account the economic circumstances surrounding them, either in terms of the macroeconomic conditions that facilitated their production, or their economic effect (Margolin, 2009, p. 100).

acknowledging how all historical events and artefacts are the result of multiple factors; they are accidents in the sense that they are one outcome in a range of infinite possibilities. For Bloch, the seeming importance of any one contributing factor over another, the 'fetish of single cause,' is always due to the perspective of the observer.⁶

For Foucault and the Annales scholars, historical investigation was intrinsically interdisciplinary because they considered the division of knowledge into various academic traditions arbitrary, and their differences from one another, illusory. It is 'our age and it alone,' Foucault says (1967, p. 286), 'makes possible the appearance of that ensemble of texts which treat grammar, natural history, or political economy as so many objects.' His work *The Archaeology of Knowledge* can be seen as an attempt to illustrate the arbitrariness of these divisions.

5. The Poststructuralist Prescription⁷

However, in his later work, Foucault went on to reject several notions central to the structuralist way of thinking. The concept of a 'total history' that Bloch and Fevre developed, the idea that 'all aspects of a society were part of a historical totality' he rejected in favour of an opposing concept he called a 'general history,' that is, a fragmentary history, without obvious linear or chronological links between subjects (Foucault, 2008, p. 10; Green & Troup, 1999, p. 88; Dean, 1994, p. 93). He suggested that history's fragmentary nature is in fact its main strength. 'What is found at the historical beginning of things,' he says (Foucault, 1971, pp. 371-372), 'is not the inviolable identity of their origin; it is the dissention of other things. It is disparity.' With this statement Foucault rejects overarching narratives.

Foucault also went on to completely reject causality, claiming that cause and effect are illusory (Foucault, 1971, p. 369). Thus in terms of historical inquiry all that can be done with history is an observation of past appearances. Foucauldian scholars such as political sociologists Gavin Kendall and Gary Wickham go further, pointing out that the notion of progress itself is an illusion

⁶ He provides this example, quoting Simian: 'For a doctor, the cause of an epidemic would be the multiplication of a microbe and its conditions the dirt and ill health occasioned by poverty; for the sociologist and the philanthropist, poverty would be the cause, and the biological factors, the condition.' (Bloch, 1953, p. 193). Lupton and Miller situate this idea within a design context (Lupton & J Abbott Miller, 2008, p. 9).

⁷ Foucault's rejection of the notion of structure or systemic explanation in historical analysis saw others attach his work to poststructuralism. Foucault himself sought to distance his work from this trend, citing that discourses, his area of expertise, can be studied systematically, that is, their study has a structural element, because they have common characteristics and behaviours. Wickham and Sage do a thorough job of logically explaining this (Kendall & Wickham, 1999, p. VIII) He has also been referred to as a postmodern scholar, a label he also rejected, commenting that he regarded the study of discourses and how they change over time to be the opposite of discontinuity (a central theme of postmodernism), as his work explains the transformation of discourses from one state to another (Foucault, 1967, p. 283). Despite these protestations, Foucault's work, particularly in *The Archaeology of Knowledge* and *The History of Sexuality* is regularly referred to, particularly in history circles, as poststructuralist. However, in the wider academic community his work is perhaps more commonly referred to as discursive, owing to the greater influence of his later, discursive works.

(1999, p. 4). Although this rejection of causality has become popular in the fields of cultural, media and gender studies, it remains a minority view among academic historians and almost non-existent in design history.⁸

Furthermore, Foucault also famously rejected the notion that the historian could be an impartial observer, to the point of rejecting objectivity itself. The assertion of the historian's objectivity became more problematic for Annales historians when they attempted histories of the industrial age and beyond (Green & Troup, 1999, p. 93). Foucault's rejection of objectivity suggested a solution to this methodological challenge by bringing the historian and his subject into closer contact. With the distance between the historian-observer and his subject decreased, the study of recent times becomes more tenable. Despite this methodological innovation, Foucault acknowledged that there are problems inherent in historical study of the recent past, since the study of recently created archives is inevitably the study of current modes of thought (Foucault, 1967, p. 293).

6. The Discursive Prescription

Discussing the importance of history, Foucault describes how historical archives contain evidence of communication patterns that influence the behaviours and thought of both institutions and people. He calls these patterns discourses, and through his own historical inquiries demonstrates them to be a form of discipline, embodying both knowledge and power (Rose, 2007, p. 143). For its capacity to reveal discourses, Foucault considered history to be the highest form of new knowledge. However, he argues (1967, p. 284), 'there is nothing to be gained from describing... discourses unless one can relate [them] to... practices, institutions, social relations, political relations, and so on.' Much of Foucault's work was therefore devoted to describing how various discourses contributed to the formation of public attitudes and institutional biases that were previously hidden or considered 'natural.' For example, in one essay he discusses how the concept of liberty begun as an upper class social construct that later developed into a value supposedly fundamental to human existence (Foucault, 1971, p. 371).

⁸ The one exception is Anne Bush, with her work 'Through the Looking Glass: Territories of historiographic gaze' (Bush, 1994).

7. A Discursive Historical Methodology for Design History?⁹

From the sum of Foucault's historical work and writing about history, a working discursive history methodology for design historians can be formulated. Although his writing is at times opaque, Foucault's actual historical work appears to be based on several guiding principles that were developed into perhaps surprisingly systematic methods.

The main purpose of any historical investigation following a discursive mode should be identifying and describing the discourses inherent in the studied events and artefacts (Foucault, 2008, p. 49). For design history, this means identifying and describing the discourses inherent in the designed object, as well as those surrounding its development and production. This process must be interdisciplinary, observing discourses without giving preference to designerly or aesthetic considerations, since the division of knowledge into various disciplines was considered by Foucault to be completely arbitrary. Time restrictions should also be avoided, as Foucault rejected them in his own work in favour of studying a given phenomenon or 'problem' from beginning to end. The period studied is delimited by the rise and fall of a particular phenomenon rather than by time bounds arbitrarily set by the historian (Kendall & Wickham, 1999, p. 22).

All observations of discourses, events and objects should be documented without conscious value judgements. Although all descriptions are subjective, Kendall and Wickham (1999, p. 15) explain that, for this kind of inquiry, judgements can be divided into two kinds, first order and second order judgements. Second order judgements are those an observer consciously makes; first order judgements are those the observer makes when he is intending to be objective. These first order judgements are influenced by the sum of the observer's beliefs and past experiences and so, although they are in no way objective, these first impressions are of most interest to Foucauldian scholars.

Discursive methodology avoids attempts at identifying causal relations between any elements of the study. This includes rejection of notions of causality between the designer and designed object, and between the object and its users. In discursive methodology then, the 'object' is secondary to the discourses of which it is a part. The main subject of such a history should

⁹ At different stages of his career, Foucault suggested two methodologies for investigation of theoretical problems: archaeology, and later, genealogy. While consideration of these approaches is helpful for the historian, it should be noted that they represent Foucault's thinking at given stages of his career and therefore only address methodological challenges he was concerned with at a particular point in time. For example, neither of these approaches suggests a way to incorporate his later, influential work on 'governmentality.' It is also helpful to bear in mind that Foucault did not, in a lot of his work, follow his own advice.

therefore be the identified discourses, with designed objects only featuring in so far as they add insight into various discourses (Foucault, 2008, p. 52).

Ironically, this aspect of Foucault's work has spawned an influential method used across social science disciplines called 'discourse analysis.' This is a way of identifying and describing in great detail the discourses inherent in written records. Through very detailed description of discourses it sheds light on past events but avoids the pitfalls of explanation. For design history, the relatively new field of visual discourse analysis is particularly helpful (Rose, 2007, p. 146). Rajchman identifies how in his own work Foucault frequently uses the device of before-and-after pictures, to describe events and situations at the beginning of a discursive trend and then toward the end of it (Rajchman, 1988, p. 90). This device suggests the possibility of analysis without attempts at explanation, as the description of discourses, through this illustrative device, often illuminates the relationships between various objects of historical study.

8. The Project

The discursive methodology described above was formulated as a way of approaching a historical study of government emblems. These are highly public designed objects that inspire strong emotions and have a long, rich cultural history. They communicate messages about the government and the territory it represents, but also about the broader public mood, Foucault commenting that 'the same organisation a period assigns to inner or psychological processes recurs in external "public" ones,' such as graphic design artefacts, government emblems included (Rajchman, 1988, p. 92). Further, emblems are one of the many devices governments use to shape their citizens' collective and personal identities, and ultimately, to alter their behaviour (Large, 1989, p. 7; Tunstall, 2007, p. 4). Despite these historically, socially and politically significant characteristics of government emblems the design history canon struggles to 'see' them.¹⁰

As discussed, design history methodologies that employ a linear, chronological, explanatory narrative cannot adequately take into account the multiple roles government emblems perform, let alone multiple perspectives on those roles. By preferencing the ordering of authorship, aesthetics and value judgements into illusory causal relationships, the canon leaves questions of function and of broader cultural impact in relative darkness. In contrast, a discursive methodological approach views government emblems in terms of function (in its widest sense), describing how

¹⁰ Government emblems are not completely absent from the historical record. There have been at least three historical studies of government emblems to date, one conducted by Michael Large and two by Javier Gimeno Martínez. However, each of these has been conducted either as an interdisciplinary study or through a discipline other than design history. (Large, 1989; Martínez, 2006, 2008)

they are produced by and contribute to historical, social and political trends. The avoidance of causality and explanation allows for observation of discourses across disciplinary boundaries, both those that contribute to the development of the emblems and those the emblems ultimately contribute to. In this approach, aesthetic treatment and authorship are incidental, being considered only in their capacity to illustrate discourses. It is a primarily descriptive approach, wherein observations are set down as impartially as possible, in an attempt to reveal the discourses inherent in the production and use of government emblems.

The emblems studied in this project consisted of 276 crests, stamps and logos used to represent municipalities in Victoria before and after a State-wide council amalgamation occurring in the mid-1990s. In 1994, before the council amalgamations, there were 210 councils using emblems in a wide variety of forms, mostly heraldic or heraldry-inspired. The wide variety in the council emblems was matched by the variety in the size and nature of Victorian councils. They ranged in age and heraldic authenticity from the City of Melbourne coat of arms, originally designed by engraver Thomas Ham in 1842 and later granted by the Letters Patent of the Kings of Arms in 1940 to the comparatively new, in both age and style, stamp of the City of Sherbrooke (Hauser, 2006, p. 76). The symbolic representation in these emblems was broad. They depicted local flora and fauna, landmarks, the ethnicities of residents, references to local history, and representations of local industries at the time of the emblem design. Some, such as the City of Preston contained mottos bearing the council's aspirations, such as 'Industria et justicia' (Harvey, 1982, p. 164). These emblems were often originally created as three-dimensional metal engravings, for hanging on the walls of council chambers.

By the end of 1996, the amalgamations were complete, 77 new councils having been formed, bringing the total number of councils to 78. All of the 77 new councils commissioned new emblems. These new emblems were in the form of logos, and the majority of these employed a modernist, or modernist-inspired aesthetic. All of the logos were commissioned via public tender, in accordance with the tight new regulatory measures that were introduced by the State government during local government restructuring. The various notices of tender resulted in the councils receiving submissions from, and awarding tenders to, graphic designers with wide-ranging credentials and reputations. The contracts were much sought after by Victorian graphic designers. (Taffe, 2008) They were high value jobs at a time when graphic design firms were under significant financial pressure. Design literacy at the councils was low, although some Councils hired external consultants to assist with the selection of designers. Some of the logos

were designed at well-known and well-regarded graphic design studios in Melbourne (e.g. FHA), while others were created at relatively unknown graphic art houses.

Despite the significant differences in the conceptual training and experience of the logo designers, the council logos contained similar symbolic representation to one another. The majority of them contained references to the flora, fauna and geography of the local council area. Hills and water motifs featured heavily in the logos, even for councils that did not contain large amounts of either.¹¹ Where some of the old emblems featured mottos, some of the logos were adorned with advertising tag lines. These contained messages aimed more at service quality and attracting tourism than at political ideology, for example Colac-Otway Shire's tagline 'Naturally Progressive.'

The majority of the new emblems were created electronically, using a combination of traditional design tools, for example Pantone swatches, and some that were new to the industry, such as vector editing software. The introduction of new technologies into the graphic design production process around the time these logos were developed presented challenges for the graphic designers and the councils in the logo development process. The new technologies, such as scanners, disk drives, new versions of computers, operating systems and software were expensive and took many man hours to master. In addition, there was an expectation from clients that graphic design files were becoming the accepted standard delivery format for logos, but this was hard to communicate to the client councils, and they received the logos in a variety of formats, some of which became redundant in a short space of time (Cozzolino, 2008).

Comparison of these two groups of logos, those created before and after local government restructuring, indicates that they were created for very different purposes and through vastly different production processes. Observing the contemporary political context supports this assertion. The local government restructuring was part of a broader public service restructuring in Victoria that effectively changed the nature of the Victorian public service, from a public service provider to that of a contract administrator. While the unofficial 'third tier of government' status of local government in Australia had been honoured by past State governments, as part of its public restructuring the Kennett government assigned local government to a principally service

¹¹ Mornington Peninsula Shire Council and Cardinia Shire Council represent two extremes of this water representation. Mornington Peninsula has the most coastline of any Victorian council and is represented by a shell, while Cardinia Shire Council, which contains relatively little coastline, is represented by a seagull, another sea motif.

provision role. Councils' legislative duties were temporarily suspended, as administration of State government initiatives and collection of revenue became the main priorities of Council operation. Political scientist John Alford (O'Toole & Burdess, 2007, p. 242) has summarised these changes saying that the local government restructuring 'focused on a corporate approach to governance involving new public management, corporate accountability through democratic representation and the redefinition of citizens as shareholders and customers.'

9. Conclusion

Critiques of design history methodologies by respected design historians inspired investigation into the possibilities of a discursive methodology for design history. This fundamentally interdisciplinary approach has allowed for the study of government emblems in terms of their broader social, professional and political influences and impact. The two groups of government emblems, those created before and after local government restructuring, illustrate changing administrative trends in government. Their production was influenced by the dramatic changes occurring within the graphic design industry at the time of their creation. The study has also illustrated how graphic designs artefacts communicate discourses by highlighting two of the discourses inherent in the later group of government emblems, those of government corporatisation and design technologies. This methodology serves as a potentially useful tool for other design historians and also as an example of the innovation possible by looking outside of the discipline for remedies to seemingly discipline-specific symptoms.

Illustrations



City of Melbourne coat of arms



City of Preston stamp



Shire of Sherbrooke stamp



Naturally Progressive Colac-Otway Shire Council logo





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Pushing Your Button

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Abstract

The computer's move from the office into our personal lives has brought with it reciprocal changes in our expectations of software. In our personal lives, the officiousness of workplace software is not appropriate, and has come to be replaced by software that is more friendly and enjoyable to use. With the advent of the iPhone, Apple aims to take software even further from its workplace origins and cast it as an exciting new entertainment media. This cultural shift brings with it significant changes for producers of software. In the entertainment media paradigm an app is no longer a utilitarian tool but a source of aesthetic experience. To meet audience expectations of utility and aesthetic novelty, software designers must engage with both the prosaic and poetic dimensions of the app medium. While software as entertainment holds great creative promise, developers are required to negotiate the economy and culture of the crowded app marketplace where the dominance of cheap *ringtone applications* threatens the prospects of more ambitious and experimental software.

Keywords:

Software, Interface Design, Aesthetics

1. Introduction

Cultured Code, VectorPark, Steph Thirion, ngmoco, Atebits - you'll find them all in iTunes, Apple's ubiquitous media management software. If you haven't heard of these artists it may be because they are not musicians but software developers. In iTunes, software is presented along with other forms of electronic entertainment media and this association is no accident. It illustrates Apple's ambition of casting iPhone software (apps) as an exciting new entertainment form. This paper provides some context for the software as entertainment paradigm, and considers its effects on consumption and its implications for developers.

2. Aesthetic experience

The iPhone and its associated software (apps) are part of a general trend of software aesthetisation that has been occurring over the past ten years. The catalyst of this trend is the computer's migration from the workplace into our homes and personal lives. The shift in context has brought with it changes in the function and behaviour of software. Office productivity tools have come to be replaced by software for social communication, media management, recreation,

entertainment and personal expression (Löwgren, 2006). All of these activities are elective, and if unenjoyable will most likely be avoided. Accordingly, the officious software of the workplace has also been replaced by software that is aesthetically engaging, friendly and enjoyable to use. In the workplace paradigm, the software interface aimed to be a transparent conduit, facilitating efficient use of an application. In the personal paradigm, the interface becomes a scene of aesthetic experience. Rather than transparent, the interface is a conspicuous element that calls attention to itself and requires the user "to devote significant emotional, perceptual and cognitive resources to the very act of operating the device" (Manovich, 2006, p.2). Rather than a means to an end, the interface becomes an end in itself, a vital aesthetic component of a software application.

The notion of creating more aesthetic and personable computer media is supported by the research of Reeves and Nass (Reeves & Nass, 1996), who demonstrated that our relationship with such media is governed by the same social etiquette that we use in our dealings with other people. Put simply, people respond accordingly if media is polite or rude. These findings do not invalidate aims of transparency and efficiency but support the notion that cultural context will dictate what is appropriate behaviour for software, just as it does with our personal interactions. The rise of software aesthetisation can also be understood as a product of the experience economy, which is proposed as the fourth economic offering, following from commodities (agrarian economy), goods (industrial economy), and services (service economy) (Pine & Gilmore, 1999). In short, businesses that build more memorable experiences are able to charge higher prices than those offering comparable goods or services without the experiential qualities. The initial success of the iPhone was largely built on its aesthetic, experiential offering. On debut the device had no App Store, no third-party software, limited functionality compared to cheaper competitors but triumphed due to its seductive touchscreen user interface which made even the most mundane phone activities playful and enjoyable. With the advent of the iPhone App Store, Apple built on the iPhone's foundations and created a marketplace for software as a source of aesthetic experience and entertainment.

3. Software as entertainment

Within iTunes, iPhone software is presented along with other forms of electronic entertainment media such as music, movies, TV shows, audiobooks, and podcasts. The *App Store* is a clone of the other iTunes media stores in its function and presentation. Genres such as Rock, Country, and Pop are substituted with categories such as Utilities, Social Networking, Lifestyle, and

Entertainment. Apps are represented with bright, iconic artwork in much the same way that albums or videos are displayed. Each app has a dedicated page with a brief text summary, screen shots, developer notes, reviews, and recommendations based on other customer's purchases. An app can be downloaded with the click of a button, sometimes for free and in many cases for the same price as a song in the Music Store: US \$0.99. The entertainment strategy has been incredibly successful, with one billion downloads in less than one year, and over two billion downloads to date (http://mashable.com/2009/09/28/2-billion-apps/). The immediate effects of the associations with entertainment media are evident in these consumption patterns. On average, iPhone users download over 10 apps per month, and iPod Touch users over 18 new apps1 (AdMob, 2009). It is not suggested that users keep all of these apps, but rather that they are willing to try new apps, in much the same way that audiences sample new music, movies and other media. In response to this demand for the new, the majority of successful apps use design as a way to distinguish themselves and win audience attention.

Even the most utilitarian of apps, such as unit converters, trade in interface aesthetics as a means of differentiation. Mobclix (http://www.mobclix.com/appstore/1) app rankings lists 245 apps under the term "unit converter" with the highest ranked being those with the most appealing interfaces and lowest price. Convert has the highest ranking and user-rating combination2 (http://www.mobclix.com/appstore/1), and sports a highly refined interface. Where other unit converters typically use menus to organise and list the different values, convert displays its unit types on the surface of a large cylinder. As with many iPhone apps, the cylinder implies a sense of weight as it responds to the force of the user's push. A polished lens sits above the cylinder, focusing the current selection. Once a unit type is selected a surface listing the different options slides into place. A calculator pad allows the user to enter any quantity for conversion, or do simple mathematical calculations. Convert offers a beautifully crafted realisation of a potentially boring utility. As a result is has been praised by reviewers (Chen, 2009) and customers alike, with the quality of its design convincing users to pay (US \$0.99) despite the host of freely available alternatives offering the same function. The example of unit conversion apps shows that the role of the app designer is not to merely expose functionality but to interpret that functionality and creatively represent it within the bounds of the iPhone format. This role is akin to that of the theatre director who must interpret a script and represent it within the confines of the theatre in which it is to be staged. Even if the script is familiar, the director can engage an audience with the qualities of her/his rendition. In the case of unit converters or social media apps, the script is well known and so the value of these works relies heavily on the designer's interpretation and representation of the familiar source. Whether they acknowledge it or not, app designers are engaging in poetic forms of interface design in order to provide the novelty that users seek. Poetic here refers to "using language for its aesthetic and evocative qualities in addition to, or in lieu of, its apparent meaning" (http://en.wikipedia.org/wiki/Poetry). Software design has traditionally been focused on the prosaic aspects of the interface, its ability to transparently convey meaning, and these concerns are not redundant. As was shown with the Convert app, a successful app will strike a balance between the prose of utility and the poetry of experience. It is fascinating to consider the characteristics of the app, however the creative potential, like that of other entertainment media, must be realised within a volatile commercial marketplace. The cultural and economic conditions of the market have dramatic effect on the creative ambition that is possible and the financial return. And in the case of the App Store, the market conditions have seen constant increase in competition and reduction in average price, leading some developers to question the commercial viability of app production.

4. Ringtone culture

The App Store features over 85000 apps including mainstream titles, eccentric niche apps, and everything in between. The store offers developers an inexpensive3 direct-to-market platform and offers customers a low risk environment where they can download apps, 19148 of which are free (MobClix, 2009). The availability of free and low cost apps has been a successful way of inducting customers into the App Store and familiarising them with the process of downloading apps. Ideally, customers should also be willing to try more expensive apps, however some argue that the glut of cheap *ringtone apps* or *shovelware*, priced under US\$0.99, are crowding out quality offerings and creating a ringtone market in which prices of \$2.99 and above are considered prohibitively expensive (Hockenberry, 2008). The obvious issue of such frugality is the difficultly for developers to recoup their investment. App producers are faced with the prospect of reduced sales due to their *expensively* priced app, or reduced margins if they lower their price. Either way, it is an equation that some are claiming will rarely pay off. In his open letter to Apple CEO Steve Jobs, app developer Craig Hockenberry of Iconfactory claims that development costs for a modest app are in the order of \$80000, requiring sales of 115000 units at \$0.99 to break even. With over 85000 apps now in the store, the task of selling those 115000 units becomes increasingly difficult. The obvious strategy has been to downsize, as Hockenberry (2008) states:

"We have a lot of great ideas for iPhone applications. Unfortunately, we're not working on the cooler (and more complex) ideas. Instead, we're working on 99¢ titles that have a limited lifespan and broad appeal. Market conditions make ringtone apps most appealing."

Faced with the same frustrations that Hockenberry expresses, the developers at ustwo came up with the 48hApps concept (http://ustwo.tumblr.com/):

"Each of the apps is created in a 48 hour time period, and each is about simple, stunning design and simple, addictive game play. Collect all 6 games to complete the set."

While the 48 hour concept reduces development costs and financial risk, it does not necessarily improve the prospect of reaching an audience. Two weeks after its release the first app in the 48hApp series was struggling to get any market penetration, selling 272 units in total (http://ustwo.tumblr.com/). The concern regarding the frugal ringtone culture is that it will stifle development of weightier projects that hold great promise, and without which the platform will stagnate. To provide greater exposure for higher priced apps, the App Store now includes a *Top Grossing* ranking in addition to *Top Paid* and *Top Free*. The App Store home page also features more curated content under titles such as *New And Noteworthy*, and *Staff Picks*. It is too early to say how, or if, these strategies will impact the purchasing habits of customers but given the enthusiasm with which audiences have adopted apps as a budget form of entertainment, it seems unlikely that the demand for cheap apps will be easily undone. There is even the prospect that it will expand beyond the App Store, as TapTapTap developers John Casasanta and Phill Ryu report (http://www.taptaptap.com/blog/how-to-prevent-the-app-store-from-becoming-the-crap-store/):

"This dollar store mentality even goes beyond the iPhone as most of the Mac developers we know have been experiencing significant downward trends in their software sales since the App Store opened. It appears that the "instant-gratification-on-the-cheap" factor has implications on the desktop, too. It's going to be tough to compete with impulse purchases when you can get around 20 iPhone apps for what a typical desktop app costs."

5. Conclusion

Framing software as entertainment media can be seen as an extension of existing trends of software aesthetisation. The strategy has proved to be an incredibly successful marketing ploy, but one that also effects how software is designed and consumed. In the entertainment paradigm, designers are charged with the responsibility to provide novel experience in addition to utility. This obligation can be viewed as a creative opportunity and requires understanding of both the prosaic and poetic language of the interface. However, the small scale and focus of iPhone apps has seen them equated with similarly diminutive prices and customers have quickly become

reluctant to pay more than a dollar or two for apps. In this frugal culture the store becomes a brutal commodity market governed by price rather than the qualities of experience that have been principal in the iPhone's success.

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Running head: RENAISSANCE 2.0

Renaissance 2.0

Expanding the morphologic repertoire in design

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Abstract

In the Renaissance, the arts and the sciences were considered an inseparable whole – and open-minded cooperation between distinguished artists was common. The majority of the contemporary scientific community is similarly attuned by collectively splicing together countless individual threads of knowledge, paving the way for new methods and applications. This paper argues that a likeminded *modus operandi* would befit the design professions; the prevalent protectionist and romanticist approach is insufficient for designers to act both as competent intermediaries of change and domesticators of science and technology. Although designers are increasingly gravitating to political issues and systemic contributions to society, they will be engaged in the shaping of the physical world for some time yet. To that end, the morphologic repertoire should be expanded, as has long since been the case in the domains of architecture and the arts.

Keywords: Design, Morphology, Nature, Science, Mathematics

1. The Status Quo

More than ever, we are confronted with a synchronicity of challenges ranging from an endangered ecologic to an erroneous economic system; equally subjected to global political disaccord and torpidity. All the while, the ramifications of scientific research – whether of methodological or technical nature – continue to infiltrate and affect all aspects of life. In particular, the accelerated propagation of IP-enabled technologies is reshaping our interaction with the physical world.

The present scenario yields a wealth of opportunities for change and engagement alike – assuming that economy, environment and ethics are not antagonised *en route* to a more sustainable world. This is the context within which the design professions and design educations have to continue readjusting their focus, assuming wider responsibilities and become scientifically minded in the process. To that end, new levels of articulation are necessary – akin to a writer's command of an extended vocabulary and grammar allowing for experimentation with language and meaning to find new depths of expression.

1.1. Modus Operandi

On the whole, the design professions are involved in very diverse activities; and design practitioners perform manifold tasks in varying roles over the course of their individual activity. While more designers turn towards the sciences in their desire to absorb and translate research into pioneering concepts, the outcomes of such collaborations, albeit initiated with good intentions, often result in factitious appropriations for "the gloss of scientific validity" (Aldersey-Williams, 2008). The proliferation of superficial knowledge in on- and offline media – and designers' transient ardour for the nexus of nature, science and technology – confront us rather often with *parascientific* and *paraphilosophic* justifications.

In particular, a recurrent issue is that, in reaction to the status quo, designers tend to envisage themselves being empowered with a decisive authority on par with that of politicians, financial and industry leaders, assuming an almost epic role as solitary agents of societal change (Maldonado, 2007). Undoubtedly an alluring and well-meaning proposition; but in reality, the majority of design professionals are firmly aligned with the capitalist modes of production and value generation, susceptive to reflective engagement mainly within the framework of their clients' corporate strategies (Morelli, 2007).

The prevalent *modus operandi* within the design community is by and large characterised by compartmentalisation and protectionism insofar as the methodologies of analysis, creation and realisation are rarely shared, publicised or subjected to critical public debate. Why the level of interindividual and inter-agency co-operation is still substandard compared to that of the international scientific community is unclear. But arguably, such risk-aversive professional conduct is inconsistent with the highly respectable goals with which many design practitioners publicly associate themselves.

1.2. Dematerialisation and Rematerialisation

It has been suggested that the advance of technological convergence and human longing for shared experiences signal the onset of a world characterised by *piecemeal dematerialisation*. Supposedly, the design professions will shift their focus to immaterial aspects such as the conception of services and mediation of societal processes and, in doing so, rising to the present global challenges (Thackara, 2005).

Although there is no doubt that the disappearance of certain products and entire categories – and their subsequent *rematerialisation* in form of sustainable solutions – is a momentous research topic both economically and ethically, we should not jump to conclusions and apply *Occam's Razor* to the paradigm of private ownership without further research. Surely, peoples' propensity to *experientialise* their environment currently leads to the emergence of open-source design initiatives and the like; but we cannot be sure that the majority of humankind is yet prepared to be released from its sedentary role as consumers of products in *commodified societies* (Debord, 1967).

To give an example of how designers can enmesh themselves in a complex web of social, economic and ecologic interdependencies, let us consider a seemingly trivial conundrum; evaluating the designing of a bread-baking machine versus a bread-delivery service versus a community bakery. We could argue that on one hand, in terms of activating the consumer whilst raising nutritional awareness, the designing of the machine is preferential. On the other hand, a traditional bakery has locationspecific advantages as facilitator of communal communication and a superior cumulative energy balance. Then again, a delivery service might generate employment for unskilled members of the local community; but in return this could put a premium on the average bread price, enticing consumers back in the fold of discount supermarkets. Without an analytical mindset and tools, it is all but impossible to make a qualified decision on which route a designer should take in such cases. Ultimately, whereas in certain product categories the consolidation of functions or changes in people's behaviour is stimulating the amalgamation and incremental disappearance of products, we cannot preclude with certainty that those very same behavioural changes may stimulate the appearance of new ones. And, after all, the physical reality of human interaction with the world – the indisputable *createdness* of our environment - entails *per se* that designers will not be able to dispose of their role as gatekeepers to the world of objects so soon (Maldonado, 2007).

Nascent digital processes in designing and fabrication on the one hand, the advent of social media and co-creative strategies on the other are changing the product nexus. Objects become dynamic – and part of dynamic solutions. Embracing the sciences will empower the design professions to promote and mediate these changes in a more substantial and qualified manner. Through consultation of nature's *inventory* and its analysis in the mathematic *observatory*, language and grammar in design should be expanded to develop new characteristics (aesthetics, flexibility, efficiency, etc.) and methods (participatory, self-regulatory, autopoietic, etc.) in the *laboratory* of the design sciences.

2. Morphologic Repertoire

To begin with, it is important to establish that neither form nor structure or composition thereof has *a priori significance*; their adequacy can only be evaluated according to well-formulated criteria relating to their intended application (Williams, 1972).

When we define the *morphologic repertoire* (MR) as the infinite repository of all possible forms, structures and their potential correlation, we are faced with an important issue – its origin. Here, an epistemological question arises: if we would possess *a priori* or *innate knowledge* of the MR, accessing and expanding it would be simply an act of *mental evocation*, akin to the romanticist understanding of genius (Safranski, 2007). But, because the MR is infinite and exhibits *emergent* qualities, reliance on *serendipity* or *tacit knowledge* would amount to a restricted vocabulary – often found at the root of historic-dogmatic and temporal-commercial aesthetics or *styles*. But, before entering the aesthetic debate too soon, designers should adopt an unbiased and inquisitive mindset to acquire *a posteriori knowledge* with such methods as are fit to the cause – from whatever source.

2.1. Education

On the whole, design educations convey access to the MR through canonical, experimental – or no substantial methodologies whatsoever. The first, having culturally and historically emerged, is at risk of becoming outmoded, because the circumstances leading to its inception may have changed or the issues it was intended to address may have disappeared altogether. However, they are sound methods to *initiate* designers to the MR as such. The second, predominantly motivated by an aesthetical cross-disciplinary discourse (Akner-Kohler, 2007) is problematic because it sidesteps kinetic, performative or computational aspects; yet it provides a foundation from which to explore further. The third approach consigns designers to the limits of commercial software and shifting visual trends, often giving rise to me-too concepts or stylistic mimicry. All three fall short of an in-depth investigation of the natural and mathematic MR, ignoring its potential to address the aforementioned challenges the design professions should see to.

Some proponents engaged in the contemporary discourse about an expansion of the MR are concerning themselves primarily with matters of computation (Terzidis, 2006) – in some way bypassing the wealth of procedural dynamic processes present in nature itself and reducing the discourse to programming issues. While it is true that programming is essential for the simulation, analysis and realisation of algorithmically generated morphologies – whether relating to nature or mathematics – an approach that takes into account the entire human sensory apparatus should not be neglected.

By coupling the discourse about the MR to the introductory basics of established practices – neither precluding intuition nor antiquating existing knowledge – a strategy becomes apparent: Exploiting designers' intuitive curiosity for latent aesthetic potential in nature and the sciences – and subsequently transforming curiosity into consolidated knowledge.





3. Inventory: Nature

For some time, biological terminology *contaminates* language and thought. Why this happens remains unknown, but we can speculate that it expresses the perceived subliminal scientification of our existence or a means of reconciliation with an incomprehensibly complex world; possibly a typical reaction to societies in crisis (Sachs, 2007). Businesses strive for *organic growth* and aim to *crystallise* their *brand-DNA*, investors provide *seed* capital to start-up companies, advertisers seek to *infect* potential customers through *viral* marketing, aiming to initiate *contagious behaviour*, architects adopt *genetic algorithms* to *evolve* concepts according to *environmental fitness criteria* – and some designers appropriate nature's symbolic and iconographic reservoir of floral and crystalline motifs.

Taken designers' open-mindedness and inquisitiveness, a surprisingly limited set of *deficitary symbols* (leaf, tree, double-helix, hexagon, the colour green, etc.) continues to permeate the creative disciplines to a degree that we could be tempted to purport that nature's vocabulary is nearing exhaustion. In most cases, design inspired by nature serves as the *greenwashing* ingredient in commercial marketing strategies, bestowing a sustainable aura on otherwise mundane products and services.

In On the Parts of Animals Aristotle conjectured that nature does nothing for nothing, which alludes to nature does everything economically, foreshadowing a fundamental paradigm for the contemporary discourse on sustainability. Victor Ruprich-Robert justified the iterative invention of natural ornaments in Architecture on the premises that the repertoire of nature is infinite and the end of evolution remains forever unknown (Ruprich-Robert, 1876). Artists such as August Strindberg and Paul Gauguin saw themselves as devices of nature, not as her storyteller, a notion to Spinoza's differentiation of *natura naturans* from *natura naturata*. The current paradigm shift – from designing after nature (homological design) to designing like nature (procedural design) – has historic roots in philosophy and the arts. In his fable On Rigour in Science, Jorge Luis Borges depicts an empire in which the discipline of cartography became so exact that the empires' map arrived at the size of empire (Borges, 1946) – illustrating the pointlessness to aspire to absolute homology: It is impossible to rebuild nature, because such task would imply nature's duplication. Therefore, designing from nature with materials and processes quite different from nature – a constraint we will have to accept for some time yet - will inevitably result in objects and systems with their own nature (Negrotti, 2008). The outcomes from nanotechnology, genetic or tissue engineering research show how difficult it is to transpose these results due to the issues associated with scale-invariance.





4. Observatory: Mathematics

Mathematics and science are not required to appreciate nature – to transform appreciation into consolidated knowledge they are. Mathematics is not a science; its proofs are *mental constructs*. These are final universal truths – existing autonomously from physical reality – unlike scientific findings that are provisional, because they can be empirically falsified. The debate whether mathematic proofs are either *found* or *invented* is still open.

Unfortunately, mathematics rank low on the agenda in the design professions, possibly because of prejudices developed from inadequate schooling. Mathematics and creativity are often seen as incompatible – Renaissance or contemporary artists would find such notion rather absurd (Kemp, 2006). The prevailing mathematic understanding of what geometry comprises, is fairly rudimentary. Although most designers have long since ventured beyond basic rational *Euclidean* geometry – proficiently manipulating Bézier curves and NURBS surfaces to create *freeform* shapes – there seems to be little understanding of what is actually happening in doing so. The inflationary use of terms such as algorithm, emergence or topology lacks sufficient selectivity, often rather clouding these topics with *parascientific* significance or outright nonsense.

The relevance of mathematics for the design professions is twofold: First, the dynamic properties of animate and inanimate nature (growth, decay, adaptation, kinematics, etc.) can be described and applied to the designing of objects and systems; what can be observed *prima facie* does not reveal everything about the intrinsic formative processes. After all, what we see in the physical world at any scale is nothing but the result of "the forces that are acting or have acted upon it." (Thompson, 1942). Second, many fields of geometry spawn morphologies *sui generis* – beyond observable reality – revealing highly relevant properties (stress-resistance, surface-minimisation, space-partitioning, etc.).



Fig. 3 – Mathematics

4.1. Algorithmic Design

The first mathematical algorithm is ascribed to Eudoxos of Cnidus (≈ 375 B.C). In principle, an algorithm is a finite sequence of well-defined instructions that, from an initial state, leads to one or many end-states with determinable or indeterminable results. Cooking recipes, art performances and music scores are algorithms; Johann S. Bach used very complex algorithms – as did composers such as John Cage or Steve Reich. Obviously, most of contemporary music is *programmed* and hence is *algorithmic* in one way or another. The typical way to implement algorithms to explore the MR is via *scripting languages* that control and extend existing software. Algorithmically created morphology quite often displays random behaviour, but that is no sufficient condition to qualify it to be *emergent*.

4.2. Parametric Design

When we speak about *parametric design*, what is actually meant is that elements have a defined relationship in such manner, that they are *constrained* to each other. Therefore, we should rather speak of *relational design*. A relationally designed object is a topological construct of one or many surface elements that are linked through a *hierarchy of constraining relationships*. The difficulty in relational design is, how a theoretically limitless number of elements and relationships can be managed so that the integrity of the topological construct remains modifiable. The key issue is, then, how complexity is being handled on an element *and* object level – if and how the tree of constraints can be controlled. It is above all an issue of software functionality. Relational design does *not* extend the MR *per se*; rather, it allows to manipulate and *dynamise* its synthesis.

4.3. Emergent Design

The paradigm of *emergence* can be traced back to ≈ 400 BC, when Aristotle conjectured in his *Metaphysics* that ,,the whole is greater than the sum of its parts". In terms of the discourse about the MR and the design professions, emergence can be defined as the *unintentional manifestation* of phenomena on the macroscopic level of a system due to *unforeseeable interaction* of its elements, where the emergent properties of the system cannot be attributed to the properties of its constituent elements on the microscopic level. The weather, a shoal of fish or cellular automata are examples of systems that display *emergent behaviour*.

4.4. Evolutionary Design

Scripted algorithms can also be understood as rules or better as the grammar of a system in which a design can be evolved. Designers encode certain *fitness criteria*, incorporated in the system in order to steer the evolution of an object or system into a *preferable direction*. The implementation of evolutionary principles is often done via *genetic algorithms* that perform a *stochastic search* in order to approach an optimum solution (maximum diversity, minimum weight, highest strength, etc.).

The expression *generative design*, often used in these contexts, is somewhat misleading, because a design is the *outcome* of a generative process at some point in time. These aforementioned examples make it clear that, in order to implement and master them, programming or scripting skills will become essential for designers who wish to explore the MR and its properties without the semantic limitations imposed by commercial software (Aish, 2005).

4.5. New Ornament

Inevitably, contemplating the expansion of the MR rekindles the controversial debate on the recurrence of decoration, patterns and ornamentation. It has been argued that this trend can be attributed to a number of factors; ranging from a diffuse longing for a discernible codification of cultural roots – to *can-do* enthusiasm for the technological mastery of generative software. However, much of what is claimed to be a manifestation of the *new ornament* is actually *patterns* that have no relation to the *formative necessity* – the *createdness* – of a solution.

In his polemic *Ornament und Verbrechen*, Adolf Loos argued that ornamentation is a manifestation of instinct driven primordiality and thus an intolerable squandering of valuable resources. According to Loos, objects that are not manufactured but fabricated by machines must remain unadorned and pure in restrained and civilised societies so that "soon the streets of the town will glisten like white walls. Like Zion, the holy city, the metropolis of heaven. Then we will have fulfilment." (Loos, 1910). Loos demanded nothing less than cleansing the human environment of humanity by sidelining irrationality to the arts. But ironically, it is precisely the irrationality of evolution that accounts for the fact that no resources are squandered in nature. Adolf Loos – indifferent to the deeper implications of Aristotle's conjecture on nature as well as the theories of Charles Darwin, Ernst Haeckel et al. – reveals his lacking of scientific historical perspective. It is worth to reconsider these issues in the contemporary context, because the etymology (*ornamentum* \approx apparatus, equipment, furniture and *ornare* \approx to array,

to beautify, to make ready) is indicating the *new ornament*, namely its character as *performative* formal or structural element. The debate, whether or not the ornament can be justified, has now lost its significance a century after it was begun; the question is now, how well it is implemented.

5. Laboratory: Simulation, Analysis and Realisation

The procedural combinatorial methods employed for the extension of the MR, whether in form of algorithms derived from animate or inanimate nature or mathematic descriptions of novel geometry, will lead to momentous paradigm changes in the design professions.

Encoding essential aesthetic (form language, colours, etc.) as well as environment variables (materials, weight, strength, etc.) to which a morphologic development process should adhere, effectively shifts the focus from *form-giving* to *form-finding* – in the sense that designers *formulate and manipulate a parameterised design-space* within which over time a *solution-space of plausible outcomes is generated*; a wealth of results from which to select and refine further. Through programming such a system with free, limited and constant parameters – thus predetermining the solution-space to a desired degree – designers can endow the system with a certain *degree of freedom* (DOF). A low DOF, then, corresponds to imposing a personal or corporate signature style; a high DOF would suit the requirements of an open-source design system to be released into the public domain with a creative commons license. It is by all means conceivable that – in connection with the emerging *rapid fabrication* technologies (*digital crafts*) – the latter scenario will be instrumental in questioning the prevalent designer-producer-consumer relationship, opening up new horizons for *co-creation, micropreneurship* or *inshoring* of production. In this context, the evaluation criteria in design may shift to the assessment of the ethical motivation at the root of the generative process (Picon, 2008).

We can assume that software is on the verge of becoming autopoietic. This fundamental paradigm shift will test our romanticist notions of creativity, control and autonomy. The question is, then: Will designers become moderators, then curators and, at some point in the future, redundant altogether?

6. Renaissance 2.0

The Renaissance was an era of rediscovery and shifting paradigms where the arts and sciences were seen as an *inseparable whole*, in that sense relating to the Hellenistic notion of *techné*, meaning *all that which emerges from human endeavour* by giving form (*morphé*) to matter (*hylé*) from nature (*physis*) by way of transformation (*poiesis*). Intellectual mobility, scientific interest and outstanding creativity went hand in hand, evident in the works and lives of polymaths such as Piero della Francesca, Nicolaus Kopernicus, et al. Albrecht Dürer rejected the mystic notion of creativity in favour of a "selective inward synthesis" (Panofsky, 1943), meaning that only a sufficiently developed repertoire of experiences and consolidated knowledge allows for the creation of works of relevance and meaning. In that sense, Renaissance artists unintentionally provided the blueprint for the ongoing discourse on how designers should address their profession – in order to reunite theory and practice (Friedman, 1997).

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Textile Light Design

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Abstract

What happens if light is transformed into an integrated active part of a textile surface? The field of smart textiles is characterised by the use of a new generation of materials that are no longer static in expression. They change their performance and expression in a given context through outer stimuli, introducing new dimensions in design and generating a change in design practice. This paper discusses examples of lightemitting textile design research that explore aesthetic, functional and conceptual opportunities of PMMA (polymethyl methacrylate) optical fibres in textile applications. The outcome is a range of samples that explore how materials and different textile structures affect light intensity and quality, and how to achieve patterns incorporating lighting and not lighting and three-dimensional lighting surfaces. Light-emitting models also stand for the visualisation of different concepts incorporating the use of sunlight as a renewable energy source or for dynamic lighting.

How can light be integrated as an active part into a textile surface? What would it mean to work as a textile designer with light as an integrated active part of a textile surface?

The combination of textiles and light is not new - often textiles are used for lamp shades - spreading, filtering and colouring the light of the inherent light source. However the possibility to integrate light into textile structures generates new ways of lighting designs. In the last years, a range of lighting materials have been investigated in textile applications from artists, designers, researchers and companies. The integration of LEDs, electroluminescent wires, fluorescent and phosphorescent materials, as well as optical fibres have been tested and first products have reached the market, both craft and industrially produced, (cf. Philips Lumalive (2004-2009); Worbin (2006, p.23); Lene N. Iversen (personal communication, October 2006); Glofab (n.d.); Luminex (2003-2006); LBM (n.d.), SubTela (n.d.)).

Current research into the impact of light on health shows that daylight, through its dynamic changeability, has a crucial impact on the well-being of the human body. The whole wavelength spectrum, as well as increasing and decreasing light intensity triggers positively the circadian body system. Therefore future artificial lighting systems should incorporate these aspects as much as possible, (cf. Boyce (2003, p.95-97, 458; 478-479, 487); Cimo (2006); Dess (2000); Licht und Gesundheit (2008)). A design example which is investigating the interaction of light, textiles and health is *Light Sleeper: a silent alarm clock* a work by Rachel Wingfield (2001). The integration of electroluminescent wires in beddings simulates with their lighting a natural dawn to wake you up.

The collection of projects in this paper discusses examples of light emitting textile design research, which explore aesthetic, functional, and conceptual opportunities of PMMA optical fibres in textile applications, through a practiced based research approach. (The projects have been developed in the School of Art and Design Berlin Weißensee and The Swedish School of Textiles, between 2005-2008. Many thanks for all the support from technicians, cooperation partners and sponsors.)

OPTICAL FIBRES

PMMA (PolymethylMetaAcrylate) optical fibres have been used throughout all projects. (Below the term optical fibres will always refer to PMMA optical fibres).

Optical fibres are very interesting to work with in a textile context, being similar in their outer appearance to a transparent monofilament makes it possible to integrate them into a textile structure as any other traditional yarn material. They are able to become a real part of a textile structure and at the same time they allow the textile structure to become a real light source.

Optical fibres are a new material in textile applications. To be able to integrate them successfully, i.e. to create a smooth light-surface, new investigations need to be carried out. (Originally, optical fibres have been developed to transmit light as fast at possible from one end to the other without shining of light at their sides.) The basic issue is to create the right bending angles in optical fibres through textile techniques to provide lighting at their whole length. The challenges and ways how to integrate them into textile structures will be described in the following Phases 1-5.

PHASE 1: woven light - powered by sun energy

How could a textile surface incorporate lighting in one woven structure? Hand weaving techniques have been chosen to explore how to integrate optical fibres for lighting into weaving structures.

The aesthetic aim of these experiments has been to investigate how to create an even all over lighting surface through optical fibres, which can be applied in interior spaces. Three sets of experiments have been carried out on a computer controlled shaft hand loom; optical fibres with ø 0,25mm have been used for all experiments.

The first group investigated optical fibres in different weaving structures. Light tests showed that the integration of optical fibres in double layered structures — both compound weaves and double weaves — generated a stronger light effect, than within one layered structures (only exception were some panama bindings). Therefore double layered structures were further investigated. Optical fibres were combined with a wide range of white materials: from transparent to opaque, from soft-fleecy till smooth and shiny.

The second material has been used as a reflection layer for the light emitted from the optical fibres, optical fibres and the second material dominating each one side of the double layered structure. Using only white materials offered the possibility to see the pure material impact on the light intensity and quality. See figure 1.

The second group continued investigating double layered structures by combining optical fibres with synthetic metallic yarns. Samples, where double layered parts and parts with only optical fibres stand beside each other, showed clearly noticeable differences in light intensity. The double layered sections, using metal yarn as reflection layer, show a stronger light intensity. These samples visualized, again, the importance of a reflection layer. Beside that, the colours of the metal yarns had an impact on the light colour – testing all samples with a white LED lamp – showed slight yellowish and reddish tones by the use of brass and copper yarns. See figure 2.



Figure: 1

Figure: 2



The third group explored the integration of relief elements – crocheting knots into the surface during weaving, or weaving in silk petals, and additional colours. The 3D elements create shadow effects in the light surface. The piece with the integrated silk petals created, on one side, a pure light surface, and on the other side, a multiple toned yellowish light surface. See figure 3.

A further important element for all set ups were; to use a transparent monofilament warp, to cover the optical fibres as little as possible. Choosing a transparent warp material allows the two sides of a double layered structure to appear as pure as possible. Thereby both – lighting and reflecting layer – can function as optimally as possible. All samples were finally lightened up through a white LED lamp, as well as a light projector including a colour wheel. Presenting the samples with white light, showed the pure material impact on the light. Demonstrating the samples through different coloured lights opened up for future investigations towards the interplay of structure, material and coloured light. In Summary can be said that the experiments resulted in a range of samples, which showed different possibilities of how to integrate optical fibres into weaving structures.

PHASE 2: industrial weaving

Working on concepts of lighting for an everyday environment – creating big window screens for public buildings et cetera – raised questions about industrial production possibilities. Is it possible to weave PMMA optical fibres on industrial machines? The aesthetic goal stayed the same, i.e. to create an even all over lighting surfaces through optical fibres in a woven structure?

A broad range of experiments on an industrial shaft loom (Dornier) have been set up, to see if optical fibres can withstand the industrial production process. Previous optical fibres were only integrated into the weft system of weave structure, now they were investigated in the weft- and the warp system. The thesis work *The screen – a textile installation* by Lene N. Iversen (personal communication, October 2006), inspired to introduce optical fibres in the warp system as well. In her thesis she had successfully integrated PMMA optical fibres into the warp system of a hand loom. Integrating optical fibres into the warp system, opens up for larger scale opportunities for lighting textiles.

Based on previous experiments double layered structures were chosen, as well as real metal yarns as reflecting material for the light emitted through the optical fibres. The experiments using optical fibres (Ø 0,25mm) in the weft system resulted in a range of samples which were able to create a lighting surface. Some bindings provided lighting over the whole width of the fabric, and some samples were only able to lighten up parts. First light tests showed, surprisingly, a sparkling effect in the lighting surfaces. What has happened? Hand woven samples never showed any sparkling lighting. After examination of the production process, it was realized that the cylinders for taking down the fabric, were covered with sand paper. The sand paper had caused scratch damages in the fibres and therefore a sparkling effect arose. By further tests the cylinders were taped and the sparkling effect minimized. The tests using optical fibres (Ø 0,5mm and Ø 0,75mm) in the warp system resulted in a range of samples which were able to light up until a length of approximately seven meters, by an eight meter warp length.

In summary can be said the experiments resulted in different samples of how optical fibres could be integrated in industrial weaving process, both in weft and warp system. Extending the range of optical fibre thicknesses showed new variations in the aesthetic expression of the lighting surface. Sparkling effects could be generated, and a much more structured, linear light effect appeared by the use of thicker qualities.

Beside the already mentioned challenges of using optical fibres on an industrial machine other basic issues are to avoid: strong bending angles of fibres (thick qualities will break and thin qualities will have problems with loss of light), scratching the surface, cutting of fibres through grippers, and too insensitive feeding systems.

PHASE 3: light patterns

The aim for this series of experiments has been to further explore the aesthetical possibilities of optical fibres in woven structures; how to go from monochrome textile light-surface to more complex surfaces, how to compose more complex patterns of light textiles and light tones in woven surfaces.

Nature inspired patterns have been used to investigate the composing of light and not light in one surface. Using double layered structures allows creating *two coloured patterns* – light and not lighting, and vice versa on the back side of the fabric. By using this traditional technique a light pattern can be generated. Experiments have been executed on a jacquard machine (Vamatex SD 1701). See figure 4.





Figure: 4

Figure: 5

Relief structures, based on the same *two coloured pattern* system, have been investigated to further explore the shaping of light in woven structures. The result is a range of samples which show how different relief structures can be generated by combining cotton, Pemotex and optical fibres. Pemotex is a

heat sensitive yarn which shrinks after heating up. Thereby by partial use in a pattern, areas of the pattern will shrink. Optical fibres however will *bubble* up and therefore create relief shaped lighting areas. Samples including optical fibres need to be heated very carefully. Experiments have been executed on a jacquard machine. See figure 5.

By shifting the experiments to industrial machines a crucial element of the hand weaving experiments got lost, the transparency of the warp material (as only unbleached cotton warps on the machines were available). Transparency had been a functional choice towards minimizing the blocking of the light emitted through the optical fibres. Additional to that it had created a very specific airiness and lightness of the daylight aesthetic of these pieces. Besides that a transparent warp allows to increase the aesthetic expression possibilities in one warp immensely. Being unable to use industrial machines, a shift towards hand weaving was initiated, to test the possibilities of creating light patterns in the desired material aesthetic.

Testing the double layered bindings on a transparent warp, to create *two coloured patterns*, was not successful. The transparency melted lighting on front and backside visually to one layer and a monochrome impression arose. Therefore three layered bindings were introduced to gain the wished effect of light and no light and vice versa on back side. Three layered binding allowed modulating even more light shades in one surface. See figure 6.



Figure: 6

To summarize, it can be said that the series of experiments presents different possibilities of creating light patterns in a woven structure. By the use of an opaque warp, two layered bindings are sufficient to create patterns, however by the use of a transparent warp, three layered bindings are needed to create similar effects.

PHASE 4: industrial knitting

Having explored light in 2D surfaces widely, investigations towards lighting in a 3D surface started, and therefore a shift towards the integration of optical fibres into knitted structures had been initiated.

The starting point was the question: Can optical fibres be knitted on industrial machines? To begin with the optical fibres have been knitted as any ordinary yarn on a circle knit machine (Meyer Relanit 0,8). Light tests were not successful; the light didn't travel further than two to three loops and then stopped completely. The bending angle in the optical fibres, which is created by knitting loops, is too sharp to transmit the light further. Therefore the light burst out strongly at the first loops and afterwards a total loss of light becomes consequence.

Next step was to test optical fibres through inlay technique, which allows a horizontal integration of a yarn in a knitted structure, through knitting on a flat knitting machine (Stoll CMS 330 TC). Thereby sharp bending angles could be avoided, allowing the light to continue travelling. Promising inlay technique has been found in a plain knitted surface, but as the aim was to integrate optical fibres in a 3D structure, or rather a 3D shape, a new challenge appeared: in a 3D knitted object the yarn is been knitted in a constant transition from front bed to back bed, back bed to front etc, and thereby the optical fibres as an inlay have to follow from front to back, back to front etc. This transition forces the optical fibre back into a sharp bending angle and transmission of light can not be successfully ensured. See figure 7, page 8, (cf. Jansen, 2008, pages 58-59).

Independently from investigations into the integration of optical fibres into knitted structures 3D knitting has been explored. 3D shapes have been knitted on hand flat-knitting machines and afterwards programmed and knitted on an industrial flat-knitting machine. Surprisingly, not the same shapes arose, even by the same exact use of materials, bindings and amount of loops etc. These experiments on industrial flat-knitting- machine showed that 3D shaping requires a quite complex programming and production process (and that the transfer from hand production to industrial production is not as easy as changing weaving technology). Therefore the decision was made to focus on developing ways of knitting three-dimensional as simple as possible and to exclude asymmetric shapes for the moment. Hence a

continuous exchange between hand knitting, hand flat-knitting machines and industrial flat-knitting machines has been explored, to investigate 3D seamless shaping.

In summary can be said that optical fibres are able to knit industrially, but a successful transmission of light has not been achieved yet. Furthermore to create a 3D seamless shape is possible, but requires quite complex development processes.

PHASE 5: Light Shell

The *Light Shell* project is concerned with the question of how to create a space-shape which supports a feeling of well being for the human body through the media light and textile. Research has shown that daylight has a crucial impact on the feeling of well being for the human body. Therefore optical fibres have been chosen as a light source, as they can be directly connected to sunlight – for example through a Parans Solar System (Parans Solar Lighting AB (n.d.); Parans Solar Lighting AB (2008); Parans Solar Lighting AB [visit, July 2, 2008]) – or/and to an LED system, which could simulate the dynamic changes of daylight. Several experiments have been done to create 3D knitted space-shape integrating a dense lighting surface based on the integration of optical fibres.

As industrial knitting with optical fibres has not been successful in terms of light transmission, alternatives for integrating optical fibres into knitted structures have been looked for. See figures 8-9. Finally the integration of fine optical fibres into plain knitted metal structures, produced on circle knit machine, by 'simulating' a similar binding as in previous weaving experiments has been tried out. The optical fibres go on top of a certain amount of loops and underneath, on top, underneath etc. Thereby two things could be generated: bending angles over the length of optical fibre, which forces the light to exit on the entire fibre length, and creating a reflecting layer for the light through the metal knit structure. Example see figure 10.



Figure: 7

Figure: 8

Figure: 9

Figure: 10

Surprisingly the light tests in short plain pieces didn't show a difference in lighting between bended and not bended parts of optical fibres (\emptyset 1mm). However the light tests in weaving structures, by using \emptyset 0,25 – 0,5mm optical fibres, showed a clearly noticeable difference in lighting: from no light, little or strong light, depending on different bending angles. Nevertheless, applying this technique of *weaving in* optical fibres by hand into 3D shapes showed differences in lighting, as the fibres are not only bended up and down, but also around different wide curves.

Results of this project are two models presenting two space-shape concepts incorporating dynamic lighting:

• Design concept 1: is a horizontal lying oval shaped space, which is based on a lying body position. The space offers its visitor space of privacy for a moment of personal time-out, being surrounded by an embracing dynamically changing light. The model is presented in scale 1:10. See figure 11.

• Design concept 2: is a round cupola shape, which can house two bodies comfortable in a lying and sitting body position. This concept aims as well to surround its guests with an embracing gesture of dynamically changing light for a personal moment of time-out. The model is presented in scale 1:20. See figure 12. Both design concepts could be placed in private or public spaces, (cf. Jansen 2008, pages 7-31).



Figure: 11

Figure: 12

In summary it can be said that by combining industrial and craft production techniques visualisations of *Light Shells* – how to create spaces for well being through light and textiles – have been developed in form of models. The models are able to be connected to a variety of light sources and therefore can demonstrate a dynamic changing of light in a three-dimensional space.

DISCUSSION

The field of Smart Textiles introduces new generations of materials into the field of textile design. These materials challenge traditional working methods, techniques and production possibilities and force the involved designers to develop new ways of working. Therefore one can say the field of Smart Textiles opens up for a shift in design practice. Not only do new materials generate new working methods and aesthetic and conceptual possibilities for textiles, they also oblige the designer to gain knowledge outside of their traditional field. Knowledge about electronics, programming, light and light technology needs to be implemented, and therefore does not only influence the field of tasks for the designer. Besides that, it will also need to involve design education, to make future designers being able to approach these new dimensions of designing. The field of Smart Textiles, for example working with lighting design, opens up more and more towards a dynamic and interactive design approach in textile design, which marks a big shift in the fields design practice.

Craft and industrial processes have been used to explore the lighting possibilities for optical fibres in textile structures. Does craft stand against industrial? No, they in fact complement each other very well in a practice based design research approach. Both feature individual strengths: craft based processes allow a very free and direct working access and high flexibility in material choices and technical decisions. On the other hand industrial processes allow testing future visions in a bigger scale. Besides that, both ways create very specific aesthetic expressions. The work in the field of Smart Textiles develops a new type of working within craft, it allows to go beyond current industrial possibilities, and thereby pushes the industry towards new potential. Being able to merge them, like in *Light Shell*, enables to create future visions for textiles.

The series of projects and experiments presented in this paper have initially started in weaving technology; exploring possibilities of how light can be integrated into a woven structure. A range of lighting expressions and conceptual applications areas have been investigated and are presented through samples and prototypes produced both through craft and industrial possibilities.

Out of these two-dimensional explorations into textile light design, three-dimensional investigations have been initiated. Resulting in models which integrate 3D knitting technology as well as working methods from weaving with optical fibres, by *weaving in* by hand optical fibres into 3D artefacts.

Transferring knowledge from one technology to the other has enhanced the possibility to create future visions of lighting design through the media textile.

This paper has discussed a varying range of examples which explore aesthetical possibilities of how optical fibres can be integrated as an active part into textile structures. The final models of *Light Shell* visualize experiments in creating concepts of spaces for well being through the media light and textiles.

Besides that, all examples of light investigations lay a base for new design technologies in weaving and knitting technology towards the integration of optical fibres into textile structures.

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FIGURES

- Figure: 1-3 Photos: by author (2006)
- Figure: 4-6 Photos: by The Swedish School of Textiles (2007)
- Figure: 7-12 Photos: by Henrik Bengtsson, Imaginara (2008)

Re-distributed Thinking: Paradigmatic Shifts in Textile Design Technologies and Methodologies

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Abstract

New technologies such as digital textile printing have led to significant shifts, not only in design processes and print aesthetics, but in the development of new modes of production, distribution and consumption. This paper draws on examples from current literature and from projects developed at the Textile and Design Laboratory (TDL) at the Auckland University of Technology. The differences between traditional screen printing and new digital textile printing technologies and some of the effects of these changes on design, education and business practices are considered: Firstly in relation to design processes and associated aesthetic shifts; Secondly in terms of sustainability; And thirdly, through a number of new business models that exemplify some of the social and economic implications of these new approaches. Within these new frameworks longstanding binary distinctions - such as between industrialised mass production and unique craftsmanship; designer and producer; producer and consumer - are blurring. Taking advantage of these new and rapidly evolving systems requires approaches that recognise the value of personalisation and "on demand' supply rather than traditional mass production strategies.

Keywords

Textile design, digital printing, customisation, distributed systems

Recent developments in digital textile printing technologies have led to significant shifts, not only in design processes and print aesthetics, but in the development of new modes of production, application, distribution and consumption. These innovations are supporting the development of new business models that include customisation and personalisation strategies, distributed systems and forms of participatory design practice. They also support more environmentally sustainable approaches. Within a design education context, the challenge presented by these developments lies not only in the practicalities of up-skilling staff and developing new print design curricula, but in understanding the implications of these changes and finding new ways of engaging students and researchers in these emerging and profoundly different ways of working. Such inquiry requires new methodological frameworks to support design innovation.

Within the New Zealand context, where local textile manufacturing and garment production has been decimated by the growth and dominance of offshore manufacturing, on-demand digital textile printing offers a number of significant advantages for local producers. It also presents radically new opportunities for design researchers and graduates. For example, a shift from repeat patterns, which have been the dominant and defining form of traditional textile printing, to strategies of placement and garment specific ,engineered' printing, demands a re-conceptualisation of the approach to designing for textiles. It also opens up new business possibilities, for example through product customisation and ,on demand' supply. This paper addresses some of the design implications of this technological shift, in the context of recent developments at the Textile and Design Laboratory (TDL) at the Auckland University of Technology. Established in 2006, the TDL is concerned with design innovation through new fashion and textile technologies including digital textile printing. Its aim is to build capability and create economic value across the educational, research and industry sectors.

This paper considers the differences between traditional screen printing and new digital textile printing technologies and some of the effects of this change: Firstly in relation to design processes and associated aesthetic shifts: Secondly in terms of sustainability; And thirdly, through a number of new business models that exemplify some of the social and economic implications of these new approaches. These examples are drawn from projects and programmes conducted at the TDL and from national and international examples, some of which have TDL associations. The implications of these shifts in relation to industry, education and research opportunities are addressed.

1. The Shifts in Textile Printing Technologies

Although the worldwide production of printed textile fabric is still dominated by rotary screen printing, the growth of digital textile printing over the past ten years has been considerable. Raymond (2006) recognises the potential growth of this technology, suggesting that the worldwide opportunity in digital textile printing solutions could range from \$4 billion to \$6 billion within the next five years. The process of screen printing involves printing each colour separately using an individual "screen'. The size of these screens determines the maximum size of the "repeat', as the design is reproduced along the length of fabric. The repeat structure should disappear into a "seamless' continuous flow of pattern.

In digital textile printing, what is essentially a large ink-jet printer receives an image file of a digital design. The design in its entirety is sprayed onto the fabric, either in rolls or on garments as placement prints. Without screens, there are no set-up costs and no minimum runs. There is essentially no limit to the number of colours that can be used at one time. Motifs can be easily rescaled and there need not be any repeat. The following table identifies the different stages of textile printing and summarises the different approaches taken using screen based and digital textile printing methods:

	CURRENT, SCREEN-BASED METHODS	DIGITAL METHOD, INK-JET STYLE PRINTER
IMAGE PREPARATION	Colour separation, preparing and exposing screens.	Digital design file prepared (scan, Photoshop, Illustrator etc).
FABRIC RANGE	Wide and varied.	May be limited according to dyes/ machine used.
FABRIC PREPARATION	Standard preparation for printing (scouring, de-sizing, etc).	Additional chemical pre- treatment required to assist dye uptake.
IMAGE FIELD	Limited image field, results in repeat structure.	Image field limited by size of fabric. Repeat not necessary.
COLOUR RANGE	Maximum 16 in one design Solid colour only. Gradients problematic.	Thousands of concurrent colours within gamut of particular printer. Solid colour only in small areas, large areas can 'band'. Gradients possible.
INK RANGE	Wide and varied, including glitters, opaques, flocks, puffs, devoré, discharge, metallics and most fluorescents. Types of ink not limited by print head capability.	Limited by print head size. Excluding glitters, flocks, puffs, devoré, discharge, metallics and most fluorescents. Cannot print on dark fabrics.
PRINTING	Prints by contact. Ink pressed onto fabric.	Ink sprayed onto fabric. No physical contact.
PRINT SPEED	Fast.	Slow.
POST PRINT TREATMENT - FABRIC	Drying, sometimes steaming.	Drying, sometimes steaming. Washing to remove pre- treatment chemicals.
POST PRINT TREATMENT - MACHINERY	Cleaning, drying time, storage of exposed screens.	No cleaning. Image files stored digitally.
OPERATING STAFF	Several (colour separator, print engraver/ printer, cleaner).	Usually one (print technician).
COSTS PER PRINT	High initially due to set-up costs. Increasingly reduced with volume production.	Static. No set up costs, so no economy of scale. But significantly slower to print out.
	Higher usage of inks and fabric producing greater waste. Strong solvents used for cleaning equipment. Excess production hard to monitor. Factory occupies significant physical space.	Pre-treatment chemicals, but on demand printing of more precisely required volumes or engineered print uses less ink and produces less fabric waste and excess production. Smaller physical footprint. Customisation encourages greater consumer satisfaction and product longevity.
LARGE SCALE PRODUCTION	Excellent.	Not yet feasible but likely to become viable as machines improve speed with material handling.
PRINT ALTERATION	Exposed screens used to print same design in different colours.	Any alteration possible, at any stage.

Figure One: Summary of shifts in textile printing technologies

While still the most economical method of printing large quantities of fabric, there are a number of disadvantages with the screen based process. These include the time and set up costs involved in screen development, the need for a highly skilled labour force, factory space requirements, downtime needed for cleaning between print runs and screen storage for repeat runs. These factors mean that print runs have minimum length thresholds of hundreds of metres, which limits availability to smaller or emerging designers and companies, and encourages sameness in larger scale production. Digital printing is not dependent on such economies of scale. This ,,print on demand' technology brings ,,just-in-time' or ,,Quick Response' manufacturing methods closer to the small business operator. As the uptake of digital textile printing increases, it needs to be considered in relation to the currently established production system, rather than as a replacement for traditional methods. For example, design development and print sampling is now often done digitally, while large scale production uses established methods. In this situation, the print must be designed so as to be compatible with both systems. Nicoll (2006,) points out "Bad computer-aided design for inkjet-printed samples can cause massive problems at the factory production state. Often the computer-produced designs are impossible to prepare for production machinery" (p. 23). Therefore it is necessary for textile design educators to both address processes and understand the differences implicit in each medium. Two aspects that exemplify these differences - colour approaches and motif placement strategies - are considered in more detail.

1.1. Approaches to Colour:

Colour in screen printing appears in solid blocks of single colour. Each colour fills only the space allotted to it. Thus, gradation between shades or colours is problematic, and the number of colours remains low, even when using techniques such as overprinting (e.g. printing yellow over blue to achieve green). One way of creating variety is to use the same set of screens with a different set of colours. The alternatively coloured variation of the same print is called a "colourway'. In the clothing industry, manufacturers use this to construct fashion "stories' and the same garment can appear in different colourways. Colour in screen printing is a carefully controlled process. Trend forecasts for colour are considered, as are the way colours interact in a print. Any subsequent colourway must display similar "balance' between colours as in the original design.

In digital textile printing, colour tends to be less precisely controlled, particularly if the design is sourced from a photographic image. With hundreds of possible colours, it is too time consuming to refine each one or to alter the whole colour range to create a true "colourway' variation of that print. For some textile artists, this has led to the adoption of heuristic approaches to their work – on encountering a problem with colour, Alison Bell, will "work with it and use the lack of fidelity in the printed outcome to stimulate further her creative process" (Treadway, 2004, p.265). Serendipity can be as significant as skill in this model. Differences in calibration of computer monitors, and variations in fabric type, pre-treatment, etc, mean that careful colour management is critical for accuracy in more technically or commercially oriented approaches.

1.2. Beyond the Repeat System

The production methods of textile print have determined print design. A key issue to be faced in the shift from screen to digital print is the long tradition of repeat pattern used in most commercial roll to roll textile printing, and the industries that have used this material. Carlisle (2001,) suggests that the repeating structure, "...can be seen as a symbol of order that was previously required by both aesthetics and the printing technology" (p.90). The limitations of industrially produced repeat pattern have prescribed both the range of design applications and methods of apparel manufacture. Dech (cited in Lui, 2008) believes that "traditional textile designers can't get past the limitations of rotary screen printing" (p.59). It is a challenge for designers and teachers to look afresh at textile design practice, and accommodate such paradigm shifts in the form itself. It will also be a challenge to accommodate such changes within the established practices of clothing and furnishing industries.

Dispensing with the repeat structure enables fabrics to be printed with far more specific end uses. "Engineered' prints are designed within the constraints of a particular pattern piece. Elements of the print match across seam lines to replicate a seamless flow, "to overcome the difficulties associated with the alignment of odd-shaped pattern pieces, darts seams, and their disruption of the surface pattern of the print" (Treadway, 2004, p. 268). This minimises not only wastage of ink on unused cloth, but the amount of cloth used when attempting to "pattern match" prints within the constraints of a design. These can be printed out only in the area of the pattern piece and in line with the grain, regardless of the direction usually needed for pattern matching.

Production output can also be limited to an on-demand business model, using the best of Just-In-Time manufacturing techniques to produce and supply stock as required. Anderson (2004) introduced the "long tail', describing how digital production and online retailing can service niche markets no longer priced out by economies of scale. With no inventory to store, track, or go "stale', and with digital files easily adapted for individual customers, this model offers significant cost benefits to companies and the environment, as well as opportunities for design innovation.

2. Sustainability

Tyler (2005, cited in Orzada & Moore, 2008) identifies that digital printing methods are cleaner than conventional printing methods used in applying colour to textiles: "For digital printing, the amount of dye applied to the fabric is precisely controlled. Additionally there are no thickeners or carriers that must be washed off" (p. 311). Washed off pre-treatments are rated as non-toxic. Increasingly integrated processes also occupy a smaller footprint accommodating a range of locations and the modest production runs that digital printing supports (Maguire, King, Garland et al, 2009). The triple bottom line of sustainability addresses social, environmental and economic impacts, or ,people, planet, profit'. This requires a consideration beyond digital textile production processes to consider the wider impacts of the use of this technology in the industry. Forman and Jørgensen (2004) recognize that the textile sector is now characterised by frequent product shifts

and long - and often international - supply chains. More modest production units occupying relatively small spaces can begin to bring commercially viable textile production back onshore to a small country like New Zealand, enabling culturally specific design, reducing air-miles and boosting jobs in local design and manufacture enterprises. Through such versatility in print production, modest production runs may result in treasured garments, carefully chosen or even co-designed by the consumer, passed on rather than discarded.

Designers like Yeohlee Teng use the principle of zero waste to drive design. Yeohlee's Fall 2009 collection was "created with zero waste. Every inch of the fabric is used; not one scrap of material is wasted" (Teng, 2009). [TC]2, an American textile and apparel technology research centre, recognises that linking digital printing to the cut-and-sew process is the next step toward full integration into the sewn-product supply chain. Such convergences of technologies encourage a minimisation of processes, reducing demand on resources. They have also supported the rise of new integrated business models that have environmental, social and economic implications.

3. Projects and business models

Lev Manovich (2001) has written about the characteristics of digital media in relation to earlier analogue systems. He recognises the interoperability between digital systems as one of a number of significant features. The work flow between a digital image developed in Photoshop on a personal computer, into a design placed onto a virtual garment pattern piece on a CAD system, which is sent via the internet to a digital printer and then cut out by laser cutter, is now feasible. Technologies like seamless or whole garment knit (where entire garments are produced with minimal need for cutting, sewing and finishing processes leading to substantial savings in cost and time, quick response and just-in-time production) indicate that garment construction processes are starting to become integrated into this digital workflow. A finished garment can also be marketed on the internet with the sale and distribution organised online. Nicoll (2006) has noted that "All developments, whether mechanical, technical or chemical, have always brought about important changes in the characteristics of the textiles produced" (p.16). The impact and integration of digital print technology is also affecting the ways textiles are designed, used and marketed.

Fashion theorist and ,activist', Otto von Busch (2008) has described the fashion system as shifting from a highly mechanical and linear system to a distributed and networked one. This corresponds to the way theorists like Manuel Castells (1998) and Manuel DeLanda (1996) have described the transition of society from industrial mode to digital network. Von Busch suggests such networked systems are eroding the traditional hierarchical fashion system and that strategies like co-authorship are challenging the notion of the "passive consumer." Thus the role of the ,professional' is eroded by the rise of the ,prosumer', as Tapscott (1996) termed this blurring between the producer and the consumer. With the means of textile print production - a computer and digital printer – moving outside the confines of large factories, new design approaches and teaching strategies are evolving. A distributed economy encourages students to take advantage of an

opportunity, to develop new product designs and print applications and market them online (as designs or products) rather than just look for a job in an established design or manufacturing business. There is a need for staff in design schools, trained in older industrial production systems, to understand this paradigm shift, and develop curricula and resources accordingly. For example, AUT textile design lecturer Angela Fraser has developed a substantial online resource (<u>www.textiles.org.nz</u>) to support students in the new Textile Design for Fashion degree programme. The effects of the move towards more distributed production models are evident, to varying extents, in the following examples:

3.1. Remote development through digital sampling for bulk screen production:

In 2008, the TDL worked with Icebreaker, an iconic New Zealand brand specialising in outdoor apparel, using digital printing as a product development tool. In mid 2007, the majority of Icebreaker's design and product development teams relocated from Wellington, New Zealand, to Portland, Oregon in the USA. While the company uses New Zealand merino wool for its products, its fabrics and garments are manufactured and made up overseas. The TDL digitally sampled a range of new designs for printing onto merino knit. As well as prompt turn around, the client was also looking for accurate Pantone-based colour matching. These samples were then to be used as references for bulk fabric printing. The finished samples were submitted, to their US and Wellington offices. Designs were selected from the samples for production in China, where their knitted fabric supplier is located. Peter Heslop (2009) notes that this method of printing, with associated benefits of quick response and low set up costs, is being adopted by an increasing number of designers and product developers during the development stage of new ranges. Once design decisions are finalized the design is then printed conventionally on flat bed or rotary screen machines. This project also illustrates how geographical distance is no limitation within a digital supply chain. Digital print technology coupled with the ease of global communications enables such remote development processes and supports additional design capability within New Zealand.

3.2. Customisation and Personalisation Strategies

A number of different approaches to product customisation using digital systems have been identified. *Mass customization* or agile manufacturing is broadly defined as the process of modifying products or services to meet the requirements of particular groups of customers. However the term customisation can be used more specifically, to mean a process of engaging individuals in combining components to make a product more personal and meaningful. One such approach to textile print customisation is evident in a project underway between J.R. Campbell, formerly of the Centre for Advanced Textiles at the Glasgow School of Art, with the design company, Timorous Beasties. A computer-based customized fabric design system will allow the consumer to create their own customized "Timorous Beastie' textile design, using motifs drawn from the company's stable of iconography within a set of design parameters. These are pre-determined by the designers

as a set of rules within the software to ensure any personalised design still meets the standards and characteristics of the Timorous Beasties brand and style (Campbell, 2009).

Vast Customization describes the customisation of products to form a total environment producing a variety of applications through digital printing technology; printed products in the home furnishing market can be customized using different print scales, arrangements of motifs and colourways, and digitally printed to create a visually cohesive interior. Using this approach, digital files need not be limited to a particular output and can evolve to cover the far broader scope of surface design. Scaling the motif can also be used to fit different sizes of garments rather than using the same scale of print pattern on small and large sizes.

Personalization is the creation or tailoring of a consumer product to a specific user, based on personal details or characteristics they provide. This approach can also be linked to the notion of the ,prosumer' when "producers and consumers both actively participate in the creation of goods and services in an ongoing way" (Tapscott, 2008, p.208). Tapscott distinguishes many varieties of the prosumer. These include: the amateur using professional level tools; the activist removing the corporate middle man; prosumers can also be skilled individuals using a specific corporate platform to develop product for independent sale, for example selling fabric designs through Spoonflower's Etsy store.

3.3. Distributed Systems

Companies are developing new models that build on these new technologies and emergent practices. The US internet based company Spoonflower provides on demand print for fabric designs. Developed to support the ,handmade ,or crafter community, a customer's digital design file can be uploaded and printed onto cotton fabric with no minimum order and pricing between \$18 to \$32 US per yard. Spoonflower also provides a swatch service, supports an online crafters community discussion group and an online voting system where site visitors can nominate a textile design of the week. AUT textile design students have used the Spoonflower service to print textiles for projects as a way of engaging with new online manufacturing systems.

A New Zealand company that has developed considerable profile in relation to a new distributed model and digital product management system is Ponoko, which describes itself as the first online shop for individualised goods. The Ponoko model is more than just a shopfront; it provides an integrated system through which people can shop, design, make, share, sell and communicate. Ponoko supports designers in designing products; sourcing materials; identifying manufacturers; negotiating production; communicating and selling ideas and/or selling products. It enables businesses to source and purchase original designs and products, or to offer production services. It allows consumers to buy products or to contact designers to order or customise original products and also supports an online community of designers, consumers and makers who share information and ideas. To date, Ponoko has focussed on CAD technologies including laser cutting and CNC routing. Staff at AUT are currently discussing the development of workshops and teaching projects with Ponoko, to engage

students in areas of product design with this new globally distributed and socially networked approach to designing, making and selling ideas and products. The TDL is working with Ponoko to integrate its textile printing capability into the Ponoko system, enabling online access to digital textile printing within set parameters, by students and designers across New Zealand. This system will also support a bureau for students and designers to sell designs and products, allowing them to develop experience with an integrated online marketing and distribution system.

4. Summary

Such approaches require a move beyond traditional business models, design methodologies and curriculum approaches. Within these new frameworks longstanding binary distinctions - such as between industrialised mass production and unique craftsmanship; designer and producer; producer and consumer - are blurring. Understanding and taking advantage of these new and rapidly evolving systems require approaches that recognise and value engagement and personalisation through ubiquity rather than prioritising specialisation and mass production.

Within the field of textile design, digital print technologies are changing the way textiles are designed, produced and consumed. The role of the textile designer is changing moving beyond surface design to include areas of print engineering onto garment shapes and working with software designers to help define design parameters for online production and customisation systems. The look of printed textiles is changing - pattern is adaptable and can be customised to make products more meaningful or appropriate to the individuals who buy and use them – an approach that stands in stark contrast to mass market strategies. The curriculum is changing in response to these new opportunities. The focus of the TDL has expanded to include a stronger engagement with new design approaches and print applications and an awareness of the ways these technologies are converging and enabling radically different distributed design and business approaches.

Acknowledgements

The contribution made by TDL colleagues Peter Heslop, Angela Fraser, Gordon Fraser and Robert Wriesnik is recognised in a number of the examples cited in this paper.

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Exploring Intuition in Dance and Design Education: A Comparative Perspective

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Abstract

Intuition is very important both in dance and design. However, intuition often remains implicitly embedded in education of dancers or designers. Our practice-based interdisciplinary research attempts to highlight the experience and education of intuition in dance and design. In this paper we document some preliminary results from our study. We give one example of a simple movement exercise from the realm of dance improvisation that we applied for the design students and that yielded promising effect. We suggest that a closer look at the practices already present in dance and design education as well as cross-domain exchange of information and exercises can be helpful in further deciphering the illusive nature of intuition.

1. Introduction

Intuitive judgment is a critical and irreplaceable part of any human activity without which normal daily activity would be seriously impaired (Voltz & Von Cramon, 2008). Many artists, scientists, inventors and business people also indentify intuition as one of the cornerstones of human inventiveness. Indeed, mathematician Henri Poincaré has stressed that with logic we prove, but with intuition we discover (Bastick, 2003). The power of intuition is so convincing that plenty of self-help books have been dedicated on the matter (Goldberg, 1983; Nadel, 2006; Rosanoff, 1991; Thibodeau, 2004; Vaughan, 1978; Winter, 2002). More recently, many scholars and science writers have highlighted the role of intuition in complex decision-making process (Gigerenzer, 2007; Hogarth, 2001; Kahneman, 2003; Myers, 2002; Plessner, Betsch, and Betsch, 2008), in management (Parikh, Lank, and Neubauer, 1994; Rowan, 1986) as well as in popular psychology (Dossey, 2009; Gladwell, 2005). In short, intuition is genuine, and people are hungry to learn more about it.

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Exploring Intuition in Dance and Design Education 2

However, although today much discussed and widely recognized as a very important tool in decision-making, the experience of intuition remains poorly understood (Bastick, 2003; Petitmengin-Peugeot, 1999; Sinclair & Ashkanasy, 2005). For example, it is often very difficult to separate intuition from other instantaneous modes of knowing, like instincts, over-learned automations, imagination or emotion-ridden wishful thinking. For the purposes of this paper, we define intuition broadly as a nonconscious, fast, effortless, associative and sometimes emotional operation. This is distinct from rational reasoning characterized by slow, serial, deliberate, rule-governed and effortful processes (Kahneman, 2003). We separate intuition from insight, in that insight is the 'eureka' (literally 'I found it') moment where many disparate strains of information unite in a new and illuminating manner to give a solution to a problem. Before insight however, there has been an incubation period during which the problem has been thought over multiple times and small steps toward the solution have been made, consciously and non-consciously (Perkins, 2000). Intuition has a place in this process, it is the 'force' that tells which direction to go. Indeed, Policastro (1999) and Boden (1994) have stated that intuition helps the individual to shift through the endless possibilities of idea development by setting preliminary boundaries for exploration. In other words, intuition is not a knowledge artifact (i.e. it is not equal to tacit knowledge). It is a process that mostly relies on tacit knowledge, but may also rely on other information or processes that we do not understand yet (Harbort, 1997).

Intuition is especially useful and needed in situations where problems are ill defined and where there is a lot of information available (Sadler-Smith, 2007). These kinds of situations are the norm especially in dance and design. Indeed, many dance and design professionals attest that intuition is extremely important in their working process (Mielonen, Keinänen, Raami, and Rouhiainen, 2009). However, especially the beginner level dance and design students express uncertainty about the usage of intuition and how to enhance their intuitive skill (Mielonen et al., 2009). Further, despite the central role of intuition in dance and design, educating intuition as part of the dance or design process has been given very little direct attention (Cross, 2001; Lawson, 2005; Lawson, 2004; Parviainen, 2002).

Consisting of two professional dancers/researchers and two professional designers/researchers, our interdisciplinary research team applies practice-based research (Eisner, 1998; Schön, 1987; Schön, 1983) in order to study what are the possibilities and difficulties in trying to facilitate intuition in dancers and designers. This study is a part of larger ongoing qualitative study on intuition in creative processes that is being conducted in Finland and Russia. The study is its pilot phase so the work reported here is tentative and preliminary. However, the initial experiences are promising and serve as a departure point for further discussion.

We believe it is important to try to understand intuition in dance and design context. By looking at the actual practices used for training dancers and designers we can learn how intuition already is trained in these disciplines and how it could be developed further. In this paper we take one step toward this direction by discussing the place of intuition in dance and design education. We further explore dance and design education through the lens of multiple intelligences. We give one example of dance exercise that we applied in the design context. Lastly we argue for the benefits of interdisciplinary exchange in order to learn new ways of educating intuition.

2. Body and Intuition

George Lakoff and Mark Johnson (1999) point out that "Thought is mostly unconscious...reason is not dispassionate, but emotionally engaged and shaped by the body" (p. 13). Indeed, it is a generally accepted fact among neuroscientists that 95% of all thought is unconscious (Lakoff & Johnson, 1999; Sadler-Smith; 2007). Damasio (1994) suggests that a way we become aware of this non-conscious knowledge is through bodily signals, which operate as a kind of biological alarm bell of the feelings (or affects) below the level of conscious awareness. Hence the popular term 'gut-feeling' that is often used to describe intuitive experiences. Indeed, researchers have identified a specific region of the brain's frontal lobe where the somatic component of decision-making is located. When the functioning of this part of the brain is impaired the individual concerned may experience significant difficulty in making effective (Bechara, Tranel, and Damasio, 2000). Further, putative objective neurological correlates for intuition have been mapped, and they suggest the (partial) role of medial orbitofrontal cortex for intuition (Volz & von Cramon, 2008). This implies that the ability to accurately sense and interpret sensations from the visceral and motor system could play an important part in developing and using intuition.

However, blindly following gut feeling is ill-advised. Intuitions are not always correct (Klein, 2004). The best we can do is to be on-guard against subtle sources of error that can bias our intuitive judgment. Because of the strong somatic component of intuitive decisions, better sensitivity toward bodily responses may help us recognize the 'true' intuitions from the false ones. Frances Vaughan (1998) points out that bodily response is a source of information about yourself and your environment. According to her, learning to trust our bodily responses is part of learning to trust your intuition. Therefore, sensitivity toward different bodily states may be instrumental in utilizing our intuitive ability.

3. Intuition in Dance Education

Dancers train their bodies systematically and use a high degree of proprioceptive information to regulate their movements. They should therefore be more sensitive to different bodily states. However, it could also be argued that the traditional dance training (ballet, codified modern and jazz techniques) may alienate dancers from their bodies by inducing an outlook of the body as an object to be sculpted whose needs and signs (e.g. pain, exhaustion) should be ignored¹ (Foster, 1997; Fraleigh, 1987;

¹ The format and the goal of the dance class are always highly dependent on the teacher, his or her particular dance background, goals for teaching as well as his or her teaching style. Therefore, it is possible to have for example a ballet class that is taught from a very somatic viewpoint integrating the students' subjective feelings and imaginary in learning.

Parviainen, 1998). The somatic dance forms offer a counterbalance to this tradition. Somatics refers to ways of working where the body is experienced from within as a subject rather than from outside as an object. Somatically oriented dance educators are interested in the tacit knowledge the body contains and consider enhancing bodily awareness as a means of change that supports better bodily functioning, self-understanding, and ethical relationships with others (Eddy, 2002; Fortin, 2002; Green, 2007; Green, 2002a; Green, 2002b; Hanna, 1995). Somatic practices often seen within the dance context include for example Alexander technique, Feldenkrais method, Body-Mind Centering and Authentic Movement. In fact, many new dance techniques such as Release Technique are based on somatic principles. Also, improvisation is gaining ground both as an independent discipline with somewhat codified 'techniques' such as Contact improvisation, Action theater, Listening strategies etc., as well as a supplement or even a format for the whole technique class (Albright & Gere, 2003; Bales & Nettl-Fiol, 2008).

These improvisational and somatic techniques (or styles influenced by this outlook) train the dancers to be more aware of their internal bodily experience as well as hone their bodily expression by fueling the imaginary powers and clarifying the pathways through which bodily imagination finds an outlet. Thus, intuition, bodily and otherwise, is clearly present in this process, if not a central part of it (Parviainen, 2002). However, even though intuition is certainly touched on implicitly during dance explorations, the authors find it is rarely discussed or honed as a separate skill that could be developed through focused exercises².

4. Design Education and Intuition

Perhaps the most common reference of the role of intuition in design education is made in context of acquiring expertise; as practitioners gain knowledge through experience they pass through stages of expertise development and acquire increasing capacity to apply non-conscious thinking (i.e. intuition) in their design work (Cross, 2001; Lawson, 2004). The emphasis of design education itself has swung from the 50s and 60s more implicit learning based 'Big Idea' approach to a more structured linear approach (Cross, 2001; Jones, 1992; Lawson, 1991; McCoy, 2005). Today design is seen as iterative process where the designer continually switches the frame of reference or goes back and forth between the problem-space and the solution-space (Goel & Pirolli, 1992; Seitamaa-Hakkarainen, 2000).

Regardless of the approach, design education research has dedicated a lot of effort to understanding the act of creative ideation in design (Cross, 2006; Cross, 2001; Lawson, 2005). Intuitive capabilities have been associated with designer's creative 'leaps' or 'change of set' (Cross, 2001; Lawson, 1991). Indeed, while the more structured and rationally applied design methods have

² The institutions the authors have attended/worked at include London Contemporary Dance School, the Laban Center, The Theater Academy of Finland, Alvin Ailey School, Merce Cunningham Dance Studios, Movement Research Institute in NYC, Earth Dance, School for Modern Dance in Copenhagen, as well as countless of classes with established independent teachers around the world.

helped designers in their rational appraisal of design solutions, and in building their cultural capital (Hogarth, 2008), they have not removed the need for intuitive judgments when making design decisions. Nevertheless, the specifics of how intuition actually works within the design process or how designers could utilize intuition as a tool are not addressed (Cross, 2006; Cross, 2001; Goldschmidt, 2001; Lawson, 2005; Lawson, 2004). Further, the actual exercises, methods and practices related to intuition in design process are often random or based entirely on teacher's experience and understanding of the role of intuition in design, rather than having a systematic application. Also, the potential pitfalls of hampering the intuition through particular actions (e.g. over-analysis, doubt) are often not dealt with.

5. Dance and Design Education and the Multiple Intelligences

In general, dance and design education call upon many of the intelligences identified by Howard Gardner (1983) in his theory of multiple intelligences. Here we only concern ourselves with the process of educating dancers and designers, not the endproduct (a choreography or a design).

In dance education, most emphasized are the non-verbal kinesthetic intelligence, spatial intelligence and musical intelligence. Dance may also call upon linguistic intelligence, when students learn the verbal vocabulary of dance, or when they discuss and evaluate a dance sequence. Because dancers typically work as a group, a dance program may teach skills in interpersonal intelligence. And because dancers are taught to express their feelings through movement, dance may help people become more aware of themselves, and hence may help to develop intrapersonal intelligence (Keinänen, Hetland, and Winner, 2000).

Design education clearly draws mainly from visual-spatial intelligences. Kinesthetic intelligence is engaged in for example the acts of drawing and sculpting. In order to understand the function of the design, logical mathematical intelligence is required. As with dance, designers need to communicate their designs for others and often work in teams; hence verbal intelligence and interpersonal intelligence is required. However, since the object of creation is outside of the designer, the designer is not required to use introspective skills in the working process, but can function perfectly well by 'forgetting' him or herself and immersing all attention to the design object (or that the self emerges with the object and does not disappear as such). Musical intelligence does not hold a position in design education.

In short, dance and design are similar but different in interesting ways. Both have established rich methods of how to train young practitioners. Both rely heavily on intuition in the working process, yet the formal education for both lack explicit attention to teaching intuitive skill. The emphasis on intelligences in dance and design education is different. Dance training draws heavily from bodily-kinesthetic intelligence that holds lesser importance in design education especially today when much of the work is done with computers. Design education emphasizes visual-spatial intelligence that is

present in dance training but not as refined³. However, while most design professions are considered to be highly visual activities, designers commonly refer to bodily-kinesthetic sensations in their experiences of intuition (Mielonen, Raami, Keinänen, and Rouhiainen, forthcoming). Further, as mentioned before, several researchers have suggested a link between intuition and bodily sensitivity. Therefore, for the purposes of this paper, we give an example of an exercise that has been used successfully in dance context in terms of soliciting somatic attentiveness and sensitivity and discuss briefly how the design students in our "Coaching for Creativity" class⁴ experienced it.

6. A Case in Point: Training of the Gaze

Although dance and design use different modalities and intelligences, there is one physical act that remains equally important both in dance and design: that of the gaze and the use of the eyes. When dancing within space with other dancers, the dancers actively survey their surroundings in order to modify their movements to fit with the other dancers and spatial limitations. They may also observe intently in order to be influenced by the other dancers or the space in terms of mood, intention, quality etc. This is especially highlighted in improvisation where the movement decisions in the moment are informed by what is going on inside and outside of the dancer's body and mind.

Designers design mainly while sitting down, although they may move a lot intermittently surveying their design. They intensely use their eyes to evaluate the design and to come up with new visual solutions. The challenge is to see the product anew, so that the process does not get stuck (Fletcher, 2001). Some deal with this problem by stepping away from the design for a moment, others have other 'tricks' how to 'fool' themselves to see the design with 'fresh eyes'.

In dance improvisation especially, it is commonly acknowledged that there is a critical difference in how the gaze is used in order to achieve maximum creative or intuitive 'state', a state where the dancer is primed for maximum sensitivity and awareness. The descriptions of this gaze include that the dancer 'receives' the information through his or her eyes, rather than 'grabs' it by active gaze, that the dancers use their gaze as if looking through the third eye that is located at the center of the forehead, or that the eyes look out from the back of the head, as if they are further back than the actual physical eyes are. As dance teachers we have noted that asking the dance students pay attention to the use of their eyes has induced observable shifts in the students' attention, concentration and ability to be in the moment⁵.

Even though designers use their eyes actively when designing, there are no similar exercises that focus on the gaze. Thus an exercise focusing on the use and movement of the eyes was identified

³ Due to space limitations, describing these exercises is beyond the scope of this paper, but this is another promising direction for cross-domain exchange that we are exploring.

⁴ "Coaching for Creativity" is a term long Master level class offered at the Media Lab of University of Art and Design in Helsinki, Finland. The eye exercise was offered Fall 2008.

⁵ This observation is based on the authors' experience of teaching dance technique and improvisation over two decades in various settings we as well as students' self reports we have collected over the years.

as possibly fruitful cross-domain exercise exchange experiment; anyone is capable of doing it and it engages a central element in both domains. Further, it is has been suggested that gaze plays an important role in intuition both for practical reason that we need our eyes and peripheral vision (sometimes called peripheral intuition) to take in the world as well as from the evolutionary perspective as in gaze heuristics (Gigerenzer, 2007). The use of different foci is also central in many mediation techniques that in turn are often suggested as helpful in terms of developing intuition (Bastick, 2003).

The exercise was very simple. The students were paired up and standing facing each other. They were asked to practice shifting their focus from looking to each other's eyes like a laser beam to looking at their partner from 'afar' back from the back of their heads and the spinal cord. In the end they were asked to settle in between the laser gaze and 'spinal' gaze to get used to a gaze that can take in information from inside and outside of the body equally. In other words, the students were asked to practice narrow and wide focus. At the end of the exercise the students were asked to perform a very simple movement improvisation exercise based on pedestrian movement and listening to others, using this newly practiced gaze.

The reception among design students was enthusiastic. The students reported improved sensitivity to the surroundings with the shifts in their gaze. The feeling was also novel since before they had taken the use of their gaze as automatic operation. As teachers we observed, as with the dance students, visible difference in the design students' concentration, presence and certain relaxation of their body when the gaze was 'working' in a more precise manner⁶.

Our experiment was preliminary and does not say anything about intuition. However, the premise was to trade an exercise that enhances physical 'sensitivity' that may in turn enable intuition since somatic awareness is often mentioned in relation to enhancing intuitive skill. We were encouraged by the effectiveness of our try out, and are in the process of exploring more exchanges of practical exercises between dance and design, informed by theory and our professional experience.

7. Conclusion

Dancers and designers rely on intuition in their work. Therefore it is surprising that even a rough draft for the development of intuition in dance or design education is yet to emerge. We suggest that the non-conscious nature of intuitive thought should not hinder conscious teaching of intuition. On the contrary, dance and design could benefit from modeling and intentionally bringing forth intuitive experiences. We further suggest that bodily training, informed with sensitivity towards the internal experience, will be useful for the design education, which traditionally focuses on the visual-spatial skills and not much on bodily sensitivity. Design education in turn, has refined teaching of visualspatial intelligence that can be informative for young dancers and open up new 'avenues' to their

⁶ The experiments are documented on video and will be shown as a part of the conference presentation.

intuition.

This is the focus of our future research. We continue to develop courses for dancers and designers with an emphasis on intuition, experimenting with cross-domain approach. We are also interviewing design and dance professionals about their experiences of intuitive moments in order to further understand intuition in these domains.

We believe that knowledge gained looking at intuition in two domains where intuition is central but that have different intellectual profiles can be informative of intuition in other domains as well. Firstly, it may give us clues where to look at when searching for intuition, be it body, mind, emotion and so forth. Secondly, it helps to give legitimacy and rigor for the concept of intuition that remains loosely defined and poorly understood. Thirdly, it acts as important informant for the efforts of developing intuitive skill, both domain-specific intuition as well as more general intuitive ability.

Acknowledgements

This project has been funded by the Academy of Finland.

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Place Branding and Cross-Cultural Visual Communication: How do the theories and practices of Place Branding inform our understanding of Cross-Cultural Visual Communication Design?

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Abstract

In a globalised environment, visual communication designers are now required to understand their audience's needs, values and unique methods of communication, creating a new focus on the recipient. In a cross–cultural design context, the visual communication also needs to appeal to a broad range of stakeholders and multiple recipients who hold a strong emotional investment in the message being sent. Our understanding of the complexities of designing in this environment can be informed by recent developments in the research of place branding where the focus is on the increased possibility for failure, the strong potential for criticism and the issues associated with a broad range of stakeholders.

The outcomes of this connection are explored further in a case study involving eight countries as diverse as Australia, Brazil, Mexico, South Africa, Turkey, Qatar, United States of America and Zimbabwe. More than 140 student and lecturer participants reviewed a student driven cross-cultural visual communication project that produced over 560 designs. The increased potential for failure and strong, emotional criticism raised questions about the role of images and symbols in cross-cultural visual communication. The impact these have on the reception of the design, challenge our views on the use of stereotypical imagery. This paper will discuss the movement towards designing visual images that are generic and lacking in cultural representation presenting the view that stereotypical imagery is important to the recipient who relies on these cultural references to effectively read the message.

Keywords

Cross-cultural, visual communication, place branding, images, stereotypes.

1. Cross-cultural Visual Communication Design

"Working on assignments aimed at cultures other than their own" Henry Steiner
"To some people, it means working directly for clients across international cultural borders, possibly in collaboration with foreign designers, or it may simply be an opportunity for a sociable and stimulating professional exchange among peers."

Linda Cooper Bowen

"A movement within the design community characterized by a general recognition and respect for 'otherness'."

Steven Rigley, coordinator of the Glasglow School of Art

1.1 Introduction

Although the aim of visual communication is to communicate successfully and efficiently, "graphic designers have the unenviable task of balancing their visions with what others are likely to make of them" (Richardson, 2003). Visual communication designers are now required to understand their audiences, their needs, their values and their unique methods of communication. No longer can designers rely on the mass communication methods for all of the visual communication problems they face. Instead they must consider the receiver and use their differences and diversities to enrich the message being delivered. "As professional designers, we have developed an effective body of theory, method, and form to deal with both the sender and message. Now we must do the same for the receiver component of the communications equation."(McCoy, 2006).

Cross-cultural visual communication design is one area in visual communication that has emphasized the need to focus on the recipient. In this discipline there becomes a greater possibility for the perception and interpretation of the communication to appear as different from what is intended. The visual communication has a need to appeal to a broad range of stakeholders and multiple recipients who hold a strong emotional investment in the message being sent. As a result there exists an increased potential for debate, dissent, conflict and miscommunication.

The central focus of this paper is to question the role of images and symbols in cross-cultural visual communication design and the impact these have on the reception of the design. To assist in this process, the researcher will reflect on the emerging theories and practices of place branding and the attention place branding places on the views of the recipient. This paper will discuss the 2000 Sydney Olympic Games logo, demonstrating that this logo uses culturally stereotypical images that were initially quite controversial but have now been commended. A new

identity for Auckland, however, does not use culturally iconic imagery and yet has created similar controversy. The paper will then reflect on the findings of a case study involving a large cross-cultural visual communication design project demonstrating that recipients favour a cultural connection to their message or the communication becomes ineffective and disregarded. Design theories suggest we need to create and maintain a cultural construct to achieve effective communication in a globalized market, yet the result of this study demonstrates that, although recipients of the communication prefer a cultural connection, place branding designs in particular do not provide this in their identity designs.

1.2 Place Branding

Place branding aims to create the cultural identity for a place. It is a form of branding that must extend across cultural divides. There often becomes an emotional engagement and investment in place and cultural identity creation, with multiple stakeholders at a local, national and international level involved in the process. Preconceived views of how a nation or a place should be visually represented may exist and if the image presented is not closely aligned to the recipients understanding, the image will be challenged or even rejected.

It is very difficult to create a single image to define a place and challenges will arise in creating an appropriate representation. For instance, Arquitecto Pedro Ramirez Våzquez, President of the Organizing Committee for the Games of the XIX Olympiad claims that when it comes to designing an identity for the host country of an Olympic Games, "of least importance was the Olympic competition; the records fade away, but the image of a country does not"(Rivas & Sarhandi, 2001). The project becomes an enormous responsibility of providing an image that satisfies the world, as well as solves the internal issues of communication. "Culturally, logistically, politically and aesthetically it is more complex than 'selling' anything" (Rivas & Sarhandi, 2001).

The Sydney 2000 Olympic Games identity program embodied many of the issues associated with cross-cultural visual communication and place branding. It was required to be effective across many cultures, be seen to successfully represent a national identity, be supported by multiple stakeholders and create unity for a large-scale event.



Sydney Olympic Logo Design (Wheeler, 2006)

With a large number of stakeholders believing they have a right to respond to the design solution of the Sydney 2000 Olympic Games identity program, controversy was always going to ensue. The image created was of the Sydney Opera House represented in the Olympic flame carried by an athlete. The athlete was depicted using the iconic image of a boomerang, with an image of the sun representing the head. Responses to the Sydney 2000 Olympic Games identity program varied with comments ranging from wonderful to corny. Some enjoyed the dynamic quality of the logo, the use of colour and the mixture of Australia's white culture and Indigenous culture; the sails of the Opera House, the boomerangs and the sun.

Views that expressed an unfavorable response ranged from considering the new design to be 'corny', difficult to read, confused with too many disparate elements, and 'fussy'. The federal president of the Australian Labour Party (ALP) at that time, Mr Barry Jones, thought the logo looked pretty dreadful. "I am at a loss to know why it appealed so much to the judges. It is a collection of clichés" (Weekes, 1996). One representative of the Indigenous community, aboriginal activist Michael Mansell, expressed the view that "Australian sports officials have no right to use indigenous symbols. Aborigines should boycott the logo and associated products" (Dasey, 1996). In the same article, Ric Birch, Sydney Organizing Committee for the Olympic Games (SOCOG) artistic director took a more pragmatic view when he stated, "the thing about Australia is that we've go 17 million people with 17 million different opinions".

A number of years down the track, the Sydney Olympic logo is now considered a large factor in a successful marketing campaign. For all of the controversy and public outcry, considerations of the use of clichés and stereotypes, the logo is now thought to be representational of our unique culture. Graham Hankinson (Hankinson, 2007) felt that the logo helped build a positive reputation that has been sustained well beyond the event. Where initially there is controversy, this eventually fades and the identity has become a commonly accepted cultural moment in the history of Sydney and Australia.

Faced with a similar issue of creating an identity for their city, Auckland launched the new visual identity program, 'Brand Auckland'. Strongly supported by the website www.brandauckland.com, it is explained that "this brand plays a pivotal role in telling Auckland's story, creating recognition, relevance and understanding that this is a place where ideas and new technologies really come to life" and "visually, it speaks volumes about our many cultures, our vibrancy and our spirited progress - don't you think?" The website argues the reasons to unite and support the concept and calls on all stakeholders to announce loudly and proudly the benefits of Auckland. It explains that the process of creating an identity for Auckland is a journey, the development of a reputation that can be left in the hands of others or created together. It states clearly on the home page "brands are not about the technology. They're about inspiration. It's about leading and it's about dreaming big."



KIAORAVIBRANTDYNAMICCELEBRATEHARBOURAMBITIOUSPLAYGROUNDAMBITIOUS

City of Auckland logo and design applications, (AucklandPlus, 2008)

As opposed to design solution for the 2000 Sydney Olympic Games identity, the new logo created for Auckland does not contain any stereotypical Auckland landmarks or features. The website clearly directs recipients to endorse the visual solution as a representation of the many cultures of Auckland, yet from a design perspective, there is not a direct reference to these cultures in the graphic identity. With a lack of visual connection specifically associated with Auckland, the symbol could be easily used in a campaign for America or Argentina. The design has become a generic design solution and an identity that will require stakeholders to support and build the emotional connection with the brand as it is being used.

It may have been considered that the design for Auckland does not contain components that could cause controversy or isolate any stakeholders, or there is nothing in the identity that could be deemed offensive. Yet, similarly to the 2000 Sydney Olympic Games identity program, controversy has surrounded the launch of Brand Auckland. Described as "A.palling", "laughable rubbish" and like a "pair of disgustingly ragged jean shorts", former Auckland City Mayor Dick Hubbard thought the logo "symbolised a city that is "frayed at the edges" and predicted it would become the butt of jokes" (Orsman, 2008). Since its introduction over a year ago, however, Brand Auckland is starting to gather positive feedback. AucklandPlus chairman Michael Barnett says there is no question the logo is gaining acceptance. He feels the logo has given the city the opportunity to represent Auckland and all of its opportunities under the umbrella of a single coherent, consistent identity.

Generic design solutions are commonly appearing in the international arena. The logo created for Belfast is another example of a design solution that could be applied to locations other than Belfast such as Brussels, Broome or even a town in Central Victoria, Australia, Bendigo. In considering the diversity of the receiver, the message is diluted to a safe, common design. The adjectives used to describe places have also become common and generic and often include words such as 'dynamic', 'vibrant' and 'inspiring'.



City of Belfast logo and design applications, (Belfast City Council, 2009)

1.3 Stereotypes

The review of place branding demonstrates two distinct approaches to the use of images in the development of design solutions. The first contains images that are stereotypical to the culture of a region and the second avoids using stereotypes. Controversy existed with both design approaches.

"Traditionally, researchers in cross-cultural communication and management hold that to facilitate cross-cultural communication, people from different cultures should avoid stereotyping" (Lee, et. al, 1995). This is not possible as humans, when they come across a culture that is different from their own, use stereotyping as a basic means of managing the complexities of that culture. Human's selective attention leads them to casting stereotypes on people we meet or places we visit, allowing us to make assumptions quickly and efficiently so we can move on to other matters of importance. Stereotypes are never true of every group member and using stereotypes is always open to the potential for unfair and inaccurate interpretation.

In an online creative forum defining the role of stereotypes in design, Steven Heller (Heller, 2005), discusses that it depends on the stereotype being used as to the success or failure of the communication. He believes stereotypes are a useful marketing tool that can be appealing and beneficial in the right context. If designers feel their work is beginning to create stereotypes, promote stereotypes or being used by others to create stereotypes, they should not be used.

Designers should look at the use of stereotypes as simplistic and wrong, "unless, of course, the stereotypes don't hurt. Many of those that will play themselves out." Steven Heller, in a similar discussion in Design Forum (Heller, 2005), explains that "context is everything". Stereotypes are created and enjoyed in many environments but the right venue is essential or the creation will cause controversy, or at worst, be considered a very bad idea.

The image of a country or place, however, may not be able to reflect reality. Historical and stereotypical imagery may obscure present day notions. Negative images may be accurate and a true reflection of the current climate yet may damage the general perceptions of the nation. While positive and negative images are endlessly represented in popular culture, there is often little control of the external portrayals of a nation.

If the domestic population or other domestic stakeholders disagree with the representation used in a communication strategy, they cannot be expected to 'live the brand' and endorse the image. It is important that the local community and stakeholders have participation in the process of creating a place identity. The design solution must endeavour to reflect a representation that can be endorsed by all of the stakeholders.

2. Cross-cultural Visual Communication Case Study

2.1 Methodology

To explore this further, the complexities of cross-cultural visual communication and creating the visual representations of a community were the focus of a cross-cultural design exchange project. Eight countries as diverse as Australia, Brazil, Mexico, South Africa, Turkey, Qatar, United States of America and Zimbabwe participated in the project with over 560 designs submitted and reviewed by over 140 student and lecturer participants.

University level Visual Communication students were chosen to be the subjects for this study. University students are in the process of learning to identify, describe and discuss design characteristics and have the ability to articulate their responses to those characteristics. They also demonstrate an element of interest in the area of cross-cultural visual communication as it relates directly to their chosen profession. The University environment indicated an ability to offer the available resources for viewing the work and time to participate in the two stages of the project. The sample selection of design students was obtained through the International Council of Graphic Design Associations (Icograda) Education Network (IEN). This database has been established for the purpose of encouraging interaction between international Universities and their students. An email requesting expressions of interest was sent to a number of the lecturers who had indicated their willingness to participate in cross-cultural design exchange projects. Eight countries responded and suggested they would have from six to forty students able to undertake the brief.

There were two stages to the design project:

1. Design stage: This involved the creation of a series of four postcards designing a visual image to reflect the recipient's 'sense of community'. Students were required to design one postcard for each of the participating countries in their group.

2. Review stages: Postcards were collated and returned to the target country for review.

The review process involved the collection of questionnaire responses, email correspondence, discussion group transcripts as well as personal notes reflecting on the postcards designed for the target country.

Students were asked to comment on four different questions:

a) Can you determine the origin of the designer?

b) Does this design contain stereotypes?

c) Do you think this design is successful in communicating the given topic, 'Sense of Community'?

d) Can you indicate which top ten design solutions you like?

Each country presented its own unique sample of design solutions and correspondence and a case study methodology was followed due to the diversity of the information that was supplied by the broad range of sources. Notes and memos were documented and a data bank of observations led to patterns in results. Most commonly cited design solutions and multiple measures of the same phenomenon were recorded determining the similarities in opinions. Patterns were based on repeated observations or consistencies in both quantitative and qualitative data and generalizations were established in the findings.

2.2 Results and Discussion

Collating of images and the findings of the review process demonstrated a number of key patterns, four of which will be presented below.

2.2.1 Theme 1

Design solutions that contained images representing heritage, natural features, streetscape, events, architecture and facilities all faired poorly in the evaluation process. These images were strongly considered as stereotypical images.



Brazilian submission for Australia



Zimbabwe submission for Turkey

2.2.2 Theme 2

The majority of submissions cited as successful in communicating the topic 'sense of community' were also considered to contained stereotypes. In the case of the Australian submissions, participants cited the design solution that created a humorous exchange as the most appealing design solutions. In the South African submissions, the South African recipients cited images that were seen to represent the South African 'sense of community' as peaceful and with unity as those that were most appealing.



Australian submission for Australia



Brazilian submission for Australia



Mexican submission for South Africa



Brazilian submission for South Africa

2.2.3 Theme 3

The images cited as 'liked' were often contradictory in whether the recipients thought they contained stereotypical images or they did not. The following design submissions were cited as 'liked' by participants of each country yet there was an element of uncertainty as to whether the pantone swatches used in the concept were a stereotype. Approximately half of the participants in each country considered that pantone swatches as a stereotype and half of the participants considered they were not.



Australian submission for Australia



Australian submission for Brazil



Australian submission for South Africa

2.2.4 Theme 4

Postcard submissions that did not contain stereotypes were often rejected because they did not resonate any connection with the recipient. The following design submissions were considered too abstract by all of the participants irrespective of country.



Brazilian submission for Australia



Brazilian submission for Mexico



Brazilian submission for South Africa

3. Conclusion

The design solutions present in the cross-cultural design project demonstrated a number of key themes. It was indicated in the findings that without stereotypes the visual communication strategy was considered abstract and not able to communicate the given topic of 'sense of community', and stereotypes were valid in promoting a visual connection with the recipient. If a design submission was considered successful, the presence of stereotypes was not discussed. If a submission was considered unsuccessful, the presence of stereotypes was articulated as to the reason why that submission was not liked. The same stereotypical images appeared in the design submissions that were cited by the majority of participants as 'liked' or 'not liked' submissions. Place branding literature informs visual communicators that not everyone is going to be happy. It shows us that generic design solutions are developing as a result of the complexity and diversity of the stakeholders and audiences. The strategies to create a successful visual communication come from the support and application of the identity, not the visual identity itself. The outcomes of the cross-cultural design project look further into the responses of the recipient when it demonstrates that using stereotypes assists in creating that connection between the recipient and the message as long as the images are presented in a new and interesting way, are non offensive

and, quite often, represent an image of how the recipient wishes to be seen. The patterns in the responses demonstrated that without stereotypes the visual design solution might not connect with audience.

The familiarity, recognition, interpretability and connection that can be developed with visual stereotypes assist in creating that emotional connection with the recipient. It becomes the role of the designer to negotiate the existing attachment people have to their cultural icons and develop a new and interesting relationship to successfully communicate to their chosen audience. Rather than avoiding stereotypes and assuming all stereotypes are 'bad', designers need to consider the receiver and use their differences and diversities to enrich the message we send.

It is the researchers view that culture and cultural assets should not be eliminated from the design process in an attempt to keep all of the stakeholders happy. Controversy will exist when the topic of communication must appeal to a broad range of vocal recipients. With patience and time, clear communication and participation from all stakeholders, cultural aspects of a community can and should be enjoyed in cross-cultural visual communication strategies.

4. Acknowledgments

Great thanks must be extended to members of the International Council of Graphic Design Association's Education Network and the students and teaching staff from the following Universities:

Australia: Monash University Melbourne and Swinburne University Melbourne

Brazil: Senac Institute

Mexico: University Iberoamericana

South Africa: Vega School of Communication, Joburg

Turkey: Bilgi University

Qatar: Virginia Commonwealth University

United States Of America: Arizona State University

Zimbabwe: Zimbabwe Institute of Vigital Arts (ZIVA)

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Art After Auschwitz: Towards an art of indirect witnessing

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Abstract

My paper explores whether and how artists and writers can make a meaningful contribution to the discourse around the Holocaust and other forms of state sponsored mass violence without aestheticising atrocity. My approach is to contextualise the work of Doris Salcedo's within a larger framework of the representation of indirect witnessing of traumatic events in images and situating the approach taken by Salcedo in relation to examples of Holocaust representation in creative works in other mediums produced in the half century since Theodore Adorno's radical pronouncement that after Auschwitz poetry is barbaric : Cinema (Claude Lanzmann's film Shoah) and photography/text (Serge Klarsfeld's book The French Children of the Holocaust).

Keywords

Holocaust, Contemporary Art, Film, Photography

Introduction



Fig.1 Delaroche, P. (1855). La Jeune Martyr. 170 x 148 cm. Louvre, Paris

For US \$545 (plus postage and packing) the good people at wholesaleoilpainting.com will sell you a hand-painted portrait of a dead young woman, hands bound in front of her, floating on her back in water, with her face lit by the moon - or perhaps it is the light of her halo. At 76 by 66 centimeters this particular *La Jeune Martyre* (The young martyr) is considerably smaller than the original by Paul

Delaroche (1855) that has hung in the Louvre since 1895, but quite a bit larger than the postcard sold in the museum shop. There are however numerous other merchants, on and offline, who will sell you posters of various sizes, or reproductions printed on canvas, framed or unframed, of this and other images of aftermaths of violence.

No Holocaust images have yet managed to find such an extensive market as *Le Jeune Martyr* but my interest in the problem of the aestheticisation of images of violence, has lead me to explore whether and how creative practitioners can make a meaningful contribution to Holocaust discourse, and the discourse around the innumerable subsequent genocides and politically motivated mass violence, state organized or otherwise - whilst avoiding the problem of aestheticisation. It is a problem which has concerned artists, film makers and writers for the more than half a century which has passed since Adorno's radical pronouncement that after Auschwitz poetry is barbaric, which has often been misinterpreted, and applied to creative practices generally. [1] Indeed in 1962 Adorno wrote "it is now virtually in art alone that suffering can still find a voice, consolation, without being immediately betrayed by it. (...) it is to works of art that has fallen the burden of wordlessly asserting what is barred to politics." [2] However it is imperative for art to 'de-aestheticize' itself [3] in relation to violence lest it results in making " an unthinkable fate appear to have had some meaning." [4]

In a contemporary context Doris Salcedo, a Columbian artist living and working in Bogota whose work deals both with specific acts of political violence in her native country and historical acts of mass violence such as the slavery trade and Holocaust, says she wants to "disassociate her work from the way art has represented torture. Mostly it has been represented as a spectacle, as something we can watch. The implication is that it cannot be stopped and the inactivity of the onlookers underscores this impotence." [5] In Salcedo's work "Aesthetics and politics join together to develop an ethical conscience that not only operates in the restricted space of the original investigation but also affects survivors of collective suffering." [6] Thus Salcedo transcends a number of the binaries which face creative practitioners in this process, which I have called the art of indirect witnessing [7], addressing both the past and the present, memory and experience, and survivors as well as perpetrators.

Salcedo also quotes the German writer W.G.Sebald, who lived and worked in England in self-imposed exile for almost his entire professional life. Sebald "poses a question about how to form a language in which terrible experiences, experiences capable of paralysing the power of articulation, could be expressed in art." [8] Sebald's own approach to memorializing the Holocaust in his novel *Austerlitz* is analogous to the way many of us learnt about it : through layers of narratives, through witnessing either directly or indirectly, the testimonies of survivors. Sebald's view was that the only way to approach the Holocaust is : "obliquely, tangentially, by reference rather than by direct confrontation." [9] and *Austerlitz* is one of the most interesting literary works about the Holocaust that I have come

across, and it is not a historical novel : It doesn't actually use the word Holocaust or mention the 'horror' of the concentration camps. In making *Neither* in 2004 Doris Salcedo too tried to find a way to address historical ones as well as contemporary concentration camps and she mentions Australian government policy for asylum seekers in this context. She explains this work as follows : "*Neither* is an indeterminate space, located beyond my powers to articulate, to understand and measure the political structure in which we live. *Neither* is a piece about uncertainty and ambiguity." [10]

In contextualising Doris Salcedo's work within a larger framework of the representation of indirect witnessing of traumatic events in images, by situating her approach in relation to two examples of Holocaust representation in other mediums, I will demonstrate that each of these creative works have significant similarities in their approaches to addressing the trauma suffered by others, characterized by

- 1. avoiding the use of images of atrocities;
- 2. "assuming responsibility towards the bereaved" to use Salcedo's own words [11];
- 3. going beyond simply describing specific instances of catastrophe;
- 4. perhaps most importantly, by being able to be read and to function as a memorial.

Shoah

A memorial can also function, and Salcedo calls some of her works, an intervention, a facilitation of relationships, of conversations [12]. Claude Lanzmann's epic nine and a half hour Holocaust documentary *Shoah* (1985) too, functions both on the level of a memorial and an intervention. Far from pretending to be an objective documentary maker recording history for posterity Lanzmann directly intervenes in the testimonies of both victims and perpretrators: When a Nazi perpetrator refuses permission to have the interviews filmed, Lanzmann uses a hidden camera which transmits a suitably unstable grainy black and white picture to a Volkswagen Kombi parked outside. He films Abraham Bomba, a member of the team of Jewish barbers forced to work in the extermination chambers cutting the victims' hair immediately before they were gassed, giving his lengthy testimony in a monotone whilst cutting the hair of a customer in a barber shop in Israel. When he finally breaks down, Lanzmann's unflinching lens never leaves Bomba's face :

"We have to do it. You know it.

- I won't be able to do it.

You have to do it. I know it's very hard. I know and I apologize.

- Don't make me go on. Please.

Please. we must go on." [13]

These are some of the most moving minutes of cinema ever made, but some have criticized Lanzmann for his unabashedly artful approach. [14] But is it a case of aesthetic stylization? Throughout the film Lanzmann's camera wanders across the desolate landscapes: Treblinka, where stones stand silent to mark what happened there; Auschwitz, where railway tracks, towers and fences provide visual clues; and lingers in fields and forests where nothing out of the ordinary is visible. However I would argue that Lanzmann concern is not an aesthetic one. He is not looking to reveal beauty, far from it : we are struck by the ordinariness of these landscapes, for we had imagined they must look extraordinary, the places where it happened.

In one of the film's final sequences Lanzmann interviews Dr.Franz Grassler deputy to the Commissioner of the Warsaw Ghetto, who claims not to remember much about those "sad, bad times." But Lanzmann says : "I'll help you remember!" and quotes from the diary of Adam Czerniakow who died in the Warsaw Ghetto on July 23, 1942, leading Grassler to say : "Oh on the first of July... I was already there?" In this supremely ironic moment one of his dead victims is telling the Nazi where he was and when, during the Holocaust.

There is no attempt at even a veneer of objectivity and why should there be? Rather than being historiographic the film intervenes in history. Further, like all meaningful creative works Shoah documents an intensely personal process, charting Lanzmann's own indirect witnessing and this subjectivity is made clear throughout by the visual and aural presence of the filmmaker himself. For Lanzmann's aim is to engage the viewers' empathy and rage, a kind of "controlled incitement." [15] It is the act of making itself, the creation of a text, in which both the viewer and the maker are engaged, and this is what makes the film such a powerful act of memorialisation. The work is as it were created anew over and over again during each nine and a half hour viewing, thus avoiding what Friedlander calls the *redeeming* function of narrative closure. [16] In *Shoah* "each individual testimony remains a story unresolved. The overall narration is neither linear nor circular; it is a spiral recoiling upon itself, then moving into new territory through a succession of forays." [17]

Where films like Polanski's The Pianist (2003) and Spielberg's *Schindler's List* (1993) are arguably guilty of fetishizing and romanticizing the Holocaust, Lanzmann does not need to recreate images of atrocity using special effects and avoids using any of the archival images with which we are so familiar. Relying principally on the words of witnesses, perpetrators and bystanders Lanzmann creates a work of astonishing emotional depth without any narrative arc by allowing the testimonies to speak for themselves.

French Children of the Holocaust

Where Shoah is a collection of fragments without "any possible totality or any possible totalization..." [18], Serge Klarsfeld's The French Children of the Holocaust : A Memorial (FCOTH) is a collection of fragments of a fragment. The book collects images of 2,500 of the more than 11,400 children deported from France by the Nazis, together with all of the names, addresses, places and dates of birth and death, and lists of the convoys of their deportation (where known.)

As an object FCOTH occupies a unique space between archive and artwork, and, as a text, between historiography and memorial. It contains both cinematic and poetic elements. It functions as an instrument for remembering: The reader is invited to reflect on the lives, and deaths, of these children by looking at the images, and referring to the lists and dates. Accordingly the word "Memorial" is an important part of its title, but no less importantly Peter Hellman in the introduction refers to Klarsfeld's books as "tools of explication, evidence and memory" [19], in recognition of the fact that simply to remember and reflect is not enough.



Fig. 2 Photographer Unknown Régine Ajdelson 1942 [24]

Régine Ajdelson was born on 2 April 1935. This image of her was taken on nine days before her arrest

on July 16, 1942 at her home at 25 Passage du Prevot (4th arr.) It is a classic black and white portrait taken in a photographer's studio of a blonde girl in a simple white dress. She looks calmly at the photographer without smiling. The star is visible on the left side of her dress. After her arrest she would have spent some time at the Vélodrome d'Hiver of which we have a photograph taken on the same day, when tens of thousands of Jewish families were brought there after being arrested in their homes and on the streets of Paris and before their transport to the internment camps in the Loiret. Regine's mother Sarah was sent to Auschwitz on 3 August. We know from eyewitness accounts that parents had to be separated from children by French police using their rifle butts at the Loiret camps. So Régine would have spent two weeks alone at Loiret before being deported to Auschwitz on Convoy 20 of 17 August 1942. She was six weeks older than my mother.

Apart from one inexplicable (and devastating) exception, Klarsfeld's book consists solely of images of the children before their deportation, taken as they were living their more-or-less ordinary lives, although some of the images existed only on gravestones. Each of these images function more effectively as memento mori - or secular icons as Susan Sontag calls them [20] - than the images of atrocity taken by the British Army in Bergen Belsen which so deeply affected a teenage Sontag when she chanced upon them in a bookshop.

Like in the viewing of *Shoah* here we are actively engaged in the process of remembering, which as Sontag points out is an *ethical* act - since remembering is the only relationship we can have with the dead. [21] What we see in these images is people living their lives, even if the lives of many of them as we realize when we locate their names in the accompanying lists of transports - were about to undergo a rupture of an unimaginable kind.

Shibboleth



Fig. 3 Doris Salcedo Shibboleth 2007 Photo: Tate

Shibboleth is the title of a book by Jacques Derrida about Paul Celan, Auschwitz survivor and poet. According to the O.E.D. Shibboleth refers to a word or sound which a person is unable to pronounce correctly; a word used as a test for detecting foreigners, or persons from another district, by their pronunciation. In the Old Testament the Ephramites' inability to pronounce the word Shibboleth led to 42,000 deaths. Shibboleth is also the title of a temporary installation by Doris Salcedo in the Tate Modern's cavernous Turbine Hall in London (9 October 2007 – 6 April 2008), but to say that it was installed there would be a misnomer. Doris Salcedo intervened in this space, choosing to subtract from it rather than bringing something into it, by bringing about a fissure in the very floor of the museum itself and exposing its fundaments; where, in a wonderous sleight of hand, she inserted a link fence which she first appropriated as a motif in 2004 with *Neither*, a work dealing with the issue of historical and contemporary concentration camps.

This radical act of intervention in the architecture of an art institution was a work about difference, a work about an unbridgable gap. This was a work about an abyss into which you were in danger of falling, by which you could be swallowed up. For Doris Salcedo : *"Shibboleth* is a negative space: it addresses the w(hole) in history that marks the bottomless difference that separates whites from non-whites. The w(hole) in history that I am referring to is the history of racism, which runs parallel to the history of modernity, and its untold dark side." [22]



Fig 4. Klabbers, J. In the Turbine Hall Tate Modern December 2008 (Unpublished photograph)

It would be a grave error to suggest that what remained in the Turbine Hill in when the exhibition had ended and the concrete had been poured in, **was** Doris Salcedo's *Shibboleth*, because one of its essential elements, the links of the fence, had been rendered invisible. However what remained, what remains, is a trace - a definite unmistakable and undeniable shadow - which shows where *Shibboleth* was, and reminds us of its referent. As Ivonne Pini had predicted in her review of Shibboleth in ArtNexus: "The transgression of cracking the floor open will leave a trace: however the floor is filled, there will be a scar, which will function as a memorial. " [23]

No doubt at some future time the institution will cause this broken ground to appear like a single smooth field again, but for now we can trace Doris Salcedo's intent with our hands and our eyes and wander along its path, all the while wondering whether in fact the museum also left intact the reminder

of the concentration camps which Salcedo placed inside the fissure and just filled the gap with concrete, or whether the links of the fence had been painstakingly picked out one by one.

In any case there are not many contemporary art works which have managed to impress themselves so deeply into the very structure of the building which houses the museum that a visitor from far away who arrives long after its exhibition ended and another has been installed, is still able to perceive the effect of the work on it, and is thus provoked to contemplate the issues it raises.

In this way Salcedo's work manages to be unique in the history of art, and as such it exists in a different kind of space, which public art works do not usually occupy. In view of the issue/s she is addressing in her work, in which she seeks to intervene, it is a space that is entirely appropriate. It is a critical space - but one which demands reverence and trust, because it allows us to listen to voices which had been silenced and words which had not uttered. [24]

Conclusion

It is not difficult to find examples of art or writing about the suffering of others which reads and feels inadequate, hollow or contradictory. As Michael Rothberg warns: "No 'text' - and no museum, feature film or epic documentary - can embody the contradictory content of history in a coherent form." [25] and in reference to Holocaust art Inge Clendinnen identified 'the inversion effect' : "We expect the magic of art to intensify, transfigure and elevate actuality. Touch the Holocaust and the flow is reversed. The matter is so potent of itself that when art seeks to command it, it is art which is rendered vacuous and drained of authority." [26]

Perhaps one of the reasons why the works I have discussed succeed where others fail is that while all of these works are monumental either in size: FCOTH weighs in at three kilos and over two thousand pages), or duration : *Shoah* runs for nine and a half hours; or in the case of *Shibboleth*, in the extent of its intervention in the very architecture of the building which houses it; they do not seek to 'command' or to understand. Klarsfeld approaches the witnessing of the Holocaust obliquely, or rather indirectly. This is achieved in part by avoiding the use of images of atrocities, whilst Doris Salcedo's recent work does not refer to specific instances of catastrophe at all, and connects with the issues through references. These works are necessarily 'difficult' : they are intellectually and emotionally complex, and demand a great deal from their audiences. Further each work is open-ended and without closure - like an archive, even if one way of reading *Shoah* is as a kind of anti-archive, since Lanzmann collects the words of survivors, perpetrators and bystanders utilizing every conceivable means of extracting them, and then shapes the way in which we receive them; whilst Klarsfeld invites us to construct our own narratives, and Salcedo's methodolgy is markedly different again. Yet each of these works have

significant similarities also in their approaches to trauma suffered by others, characterized by "assuming responsibility towards the bereaved" in Salcedo's words. [27] These creative practitioners are the "caretakers of postmemory in a decidedly unredeemed landscape, (where) no resource, be it fictional, rhetorical, or visual, can be spared." [28]

Is it possible that art can act, not as a substitute for historiography but as its antithesis or counterweight? To intervene in the present, to "watch over the Forgotten so that it remains unforgettable." [29] and to imagine what was, and perhaps still is, possible. [30] Thus I would like to propose that the works I have discussed, difficult as they are, are examples of an art of indirect witnessing, in that they not only keep watch over absent meaning as Blanchot urged, but they are engaged what Jean Luc Nancy calls "Attentive, careful, affectionate vigilance." [31]

'Difficult' art is perhaps more difficult now than ever, especially if it is to address the problem of violence in the wake of subsequent genocides and almost daily news of acts of individual and mass political violence. But, as I hope I have demonstrated, these are examples of creative works that sustain what Adorno called "the project of establishing humankind's autonomy in the world, even after that project has proven inherently contradictory." [32] Indeed Buckner sees Adorno as arguing that whilst "natural scientific objectivity disavows the irrationality of modern life, art reveals an eccentric capacity to articulate this irrationality by preserving rather than effacing the contradictions that plague the subject." [33] ; and Adorno in 1962 wrote "it is now virtually in art alone that suffering can still find a voice, consolation, without being immediately betrayed by it. (...) it is to works of art that has fallen the burden of wordlessly asserting what is barred to politics." [34] Such was Adorno's disillusion with politics as long ago as 1962 and I can't help but wonder what he would have made of it almost half a century later. Does Adorno's call for artists to do that which politicians can not (and/or will not) hold true today? If it does, and I think it does, it should, it *must* - this represents a huge responsibility for contemporary artists and writers, and an enormous challenge for our culture.

Notes

[1] Adorno later returned to his statement about the barbaric nature of poetry after Auschwitz, to "redefine its emphasis, to underscore the aporetic, and not simply negative, intention of his radical pronouncement." (Felman & Laub, 1991, p.34)

[2] Adorno Commitment, 1962, in Arato, 1982, p. 313

[3] Felman & Laub, 1991, p. 33

[4] Adorno, 1962

[5] Borchardt-Hume, 2007, p. 109

[6] Pini, 2008

[7] Here I acknowledge the work of Andreas Huyssen, who in writing about an earlier work by Salcedo, speaks in terms of "the art of the witness; the art of the secondary witness to be precise, the witness to lives and life stories forever scarred by the experience of violence..." Basualdo, Princenthal, & Huyssen, 2000, p. 96 [8] Salcedo, D, (2007). Proposal for a project for the Turbine Hall in Borchardt-Hume, 2007

[9] Schwartz, 2007, p. 80

[10] Borchardt-Hume, 2007, p. 109

[11] ibid

[12] ibid

[13] Lanzmann, 1995, p. 117

[14] Geoffrey Hartman, one of the founding members of the Yale archive of testimonies of Holocaust witnesses : "However effective this device may be, we sense its artifice." Geoffrey Hartman. The Book of the Destruction in Friedlander, 1992, p. 118

[15] Clendinnen, 1998, p. 202

[16] Friedlander, 1993, p. 88

[17] Friedlander, 1993, pp. 121-122

[18] Felman & Laub, 1991, p. 223

[19] Peter Hellman Introduction in Klarsfeld. 1996, p. viii

[20] "Objects of contemplation to deepen one's sense of reality." Sontag, 2004, p. 107

[21] Sontag, 2004, p. 103

[22] Salcedo, 2007, p. 65

[23] Pini, 2008

[24] In the words of the Tate Modern Curator of Modern and Contemporary Art Achim Borchardt-Hume: "(But) this critical space is one that allows voices and thoughts to be heard that hitherto were silenced or remained unspoken. It is a space that demands trust and commitment, and that allows for going beyond the intention of the original speaker." Borchardt-Hume, 2007, p. 17

[25] Rothberg, 2000, p. 263

[26] Clendinnen, 1998, p. 185

[27] Borchardt-Hume, 2007, p. 1

[28] Rothberg, 2000, p. 313

[29] Langer, 1996, p. 21

[30] Adorno, 1970/1998

[31] Nancy, n.d.

[32] Statler & Buckner, 2005, p. 8

[33] ibid

[34] Arato, 1982, p. 313

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Cumulus 38° Conference theme: Shifts in art + design practice and technology

Designing with the experiential in digitally augmented exhibitions

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Abstract

The ways in which audiences interact and make meaning of digitally augmented exhibitions is an important design determinant. In such an interdisciplinary project, the design, the museum and new media encounter the problem of the experiential. A creative experimental analysis of audience experience employing aesthetic visualisation semiotics drawn from the principles of information design, computational aesthetics and human centred design is argued as a relevant adjunct to an exhibition providing fresh persepectives and new knowledge to interdisciplinary stakeholders. Interactive, experimental artifacts, known as *field* and *body*, provides a conceptual map of the exhibition experience relying on the creativity of audience participants in making visible, legible and tangible their personal reception of a work. The data yielded reflects abstract notions of audience experience engendering a discussion about the phenomenological, curatorial and cognitive effects of the digitally augmented exhibition.

Keywords

Co creation, user experience, information design, digital container

1.Introduction

Human centred design and the museum have undergone parallel changes regarding the position of the audience. Human centred design refers to the philosophical and theoretical discussion focused on prioritising the human being in the overall design program (Preece, Rogers & Sharp 2002, Hanington, 2006, Buchanan, 2006, Sanders, 2006). Human centred design is a broad term that acknowledges the concept of the user surpasses 'use' to incorporate a sentient person situated in their world. In reframing their nature and practices, museums have also come to understand their audience as plural in its composition (Macdonald, 2006, p.31). Barbara Sudick (2006) argues that each person shapes their dialogue with an artifact and constructs their own unique understanding of a message "influenced simultaneously by intercultural, cultural, social and personal contexts" (p.186). Understanding the museum visit as a participatory social activity privileges the experience of the audience as a requirement to be addressed in the museum's audience research activities (Kelly, 2004, p.49). Paralleling the challenge to designer-driven from human centred and participatory design, the museum-as-expert and the audience-as-novice communication model is now commonly seen as an anachronism stemming from an overtly didactic past. Indeed, Douglas Schuler and Aki Namioka (1993) could be writing of human centred design or contemporary museum practice when they argue,

participation stands in contrast to the cult of the specialist. In the specialiast model ... [t]he question is presented to the Expert who will eventually produce the Answer. With this approach, those most affected by the conclusion must sit idly by, waiting patiently for enlightenment (p.xiii).

For Helena Friman, (2006) museums' future hinges on "their relationship with the public" (p.55). Following André Malraux, she takes the idea of the 'museum without walls' to challenge museums to merge with potential communities. This she argues requires the museum to shift its focus from what the museum is to what it does. Friman (2006) argues that for most museums it's not enough to have sophisticated well designed exhibitions; talented curators and marketing staff "must adapt a new strategy and use their resources with the public in a more creative way" (p.56).

Such philosophical developments have seen the call for museums and other cultural heritage institutions to adopt technology to expand the dimensions of peoples' interaction with their programs and collections, while still promoting learning. L. Smith, (2001) argues that technology is transforming all aspects of museum activity, bringing about fundamental shifts in the operation of cultural and knowledge institutions. Angelina Russo (2009) reports on the role social networking has played in connecting organizations and audiences (p.2). The development of digital exhibitions has enabled diversification and disseminating exhibition content facilitating more democratic outcomes for museum visitors. For instance, as curators recognize the potential for multiplicity of meaning, they are compelled to become less didactic and more open in their choices of exhibition form and content, taking on the role of facilitators of experience and learning, embracing a multiplicity of representational techniques and processes based on intercommunication with visitors (Kelly, 2004, p.50). Yet discussions of digital presentation systems in the museum are often mired in the fetishization of technological advancements, which fail to grapple with museums' major challenge in mediating exhibition content, technology and audiences.

Where museum activity encompasses not only the presentation of cultural objects and information but also experiences, correlating audience experience with the digital immersive augmented exhibition (digital container) is argued as equally important as the technology. Therefore the museum and its contributors cannot afford to deploy digital technology without understanding processes of mediation or adopting human centred approaches.

The 'appearance' of the audience in the philosophical domains of museology *and* design is an important concurrence. Over the last ten years, a move towards an inclusive and interpretive paradigm of practice concerned with better understanding people has affected a number of disciplines within the museum, including audience research, museum pedagogy and exhibition evaluation (Hooper-Greenhill, 2004). Audience research in the museum is an umbrella term that

comprises visitor studies, visitor research, evaluation and market research (Kelly, 2004, p.49). Measures of success based on the museum's ability to transmit knowledge on a functional level, albeit important, particularly in reference to science and natural history exhibitions, have lost currency along with behaviourist models of audience research where the museum visitor is examined in terms of the effectiveness of their response to the museum's stimulus (Macdonald, 2006, p.320). Within such a model, design served the role of 'packaging messages' to help pass over the expert-visitor divide (Macdonald, 2007, p.150).

The role of designers, like that of the museum visitor, has shifted from a passive position of waiting to receive a mission to an active one of exercising influence over the content and form of exhibitions. For example, summative museum exhibition evaluation sees the exhibition not as a fixed destination, but rather something under continual evaluation and change. Michelle Henning (2006) argues that this shift can be traced to the 1970s, when "museums began to employ professional communicators and designers to mediate their messages to the public" (p.314). Designers, once tasked with delivering an attractive medium for the presentation of content, began to act as translators and facilitators of information, a role which today has become integral to the conception of many museum programs (Macdonald, 2007, p.150). Design is increasingly acknowledged as central to the visitor's experience, with potentially profound connotations for determining the inherent character of that experience (Macdonald, 2007, p.150).

The effort to create a progressive museum model more responsive to the needs of visitors requires communication between audience research, design and museum practice. Understanding people and their role as interlocutors of an exhibition or an entire museum program demands innovative research methods. This is evidenced both in audience research and design practice. Co creative, participatory human centred design methods assist in exhibition concept development as well as the evaluation of exhibits where visitors are no longer considered 'an undifferentiated mass public' (Hooper-Greenhill, 2006, p.363, Sanders, 2002, p.5). The intention is that audience and designer gain new knowledge as they are "as active interpreters and performers of meaning-making practices within complex cultural sites" (Hooper-Greenhill, 2006, p.363). The resurgence of Benjamin Gilman's (Gilman in Kelly 2004) observations of people in the 1880s identifying visitor fatigue underline an interest in the phenomenon of the audiences experience. Gilman concluded that prioritising the aesthetic and curatorial in exhibitions without considering visitor-focus was in danger of being poorly designed. He specifically argued that the physical wellbeing of the visitor affected and impeded on the reception of the exhibition (p.51). This paper

extends on Gilman's notion of well-being to include the emotional, the social and thus felt responses of audiences in a digital immersive exhibition.

1.1 Communication spaces

Falk, Dierking, and Adams (2006) argue that, "in a world that allows for multiple perspectives, the conditions for meaning have become as important as the meanings themselves "(p.325). For design, these conditions of meaning are relative, the act of communication framed by several key conditions, which Frascara (2006) argues, "provide a context, a code, and a possibility ... [and] also allow and constrain the communicational outcome" (p.xiii). Frascara (2006) uses the terminology of frames to explore the nature of a communicational event, which he sees as always situated. For Frascara, communication is a constructive as well as a transmitting act. Not only is it "something that always happens in a setting", communication designers forge "'a space', where the public meets the message"(p.xiii). This 'communication space' proposed by Frascara is not based on designers' intuitions or authority. Sudik (2006) argues that the communication space is a dialogic medium for processing information transactions, operating "like a conversation-always adjusting, changing direction and focus with stops, starts, and surprises-between individuals or groups with different cultural backgrounds, life experiences, thinking, or cognitive styles"(p.186).

Communication spaces require negotiation between designers and audiences. Communication spaces may be physical or virtual, or take the form of containers as in the case of digital immersive museum exhibits. Frascara locates the communicational power of spaces in the objects that populate them as well as in the characteristics of the spaces themselves.

What are the characteristics of the communicational potential of the spaces provided by an interactive digital augmented 3D stereoscopic immersive exhibition (digital container) such as the PLACE system (Shaw, 2009)? Investigating 'an experience' in the digital container is fundamental if we are to follow human centred design and museum research paradigms. What are the transactions between the audience and these digital immersive spaces? How are the messages provided by the content providers, constructed by and received by the audiences? What is the influence on the combinatorial factors such as the dynamics of the interior, the audio, 3D stereoscopic animation and presence of others? How does the audience actively contribute and build their experience of these digital containers? How is it possible to convey or discuss these abstract phenomena? Furthermore how can all stakeholders engage in the discussion? Here the questions outweigh the answers found in the literature. Design of 'multiuser systems' that expand into new areas of audience experience are in urgent need of attention (Krippendorff, 2006, p.208). Investigation of 'an experience', through the interactive artifact of the digital container is proposed as a collaborative activity. An analyses of 'an experience' in the digital container aims to generate co creation activity between the designer, audience, content providers and technology.
1.2 An analyses of audience experience in the digital container

A study of PLACE-Hampi consisted of a questionnaire that was conducted in conjunction with the exhibition, *Spark to Pixel* at the Martin-Gropius-Bau, Berlin, 2007 (Kenderdine, Shaw & Kocsis, 2009). The questionnaire was designed to generate a mix of quantitative and qualitative information about audience experience in the PLACE-Hampi exhibit. PLACE- Hampi based on an interactive projection system, invented by Jeffrey Shaw, has today integrated stereoscopic 3D projection amongst other features documented at http://place-hampi.museum. Its main attraction is the motorised platform that lets the viewer rotate in their projected point of view in 360 degree within its large cylindrical screen enabling a multi-media multi-sensory presentation of the archaeological, historical, and sacred locations at the site of the World Heritage of Vijayanagar in Hampi, southern India (Kenderdine, 2004, 2007, 2008).

An analysis of the findings bought new information pertaining to the audience's world within the exhibition space (Kenderdine, Shaw & Kocsis, 2009). This informs the creative and experimental framework of the interactive artifact known as *field* and *body*. Furthermore findings about the social and the co-experiential aspects of the exhibition audience inspired aesthetic visualisation of the audience experience via the interactive artifact. This artifact is proposed as an adjunct to a digital container exhibition. The interactive artifact aims to provide a post exhibition debrief whilst facilitating for stakeholders of a digital exhibition project a creative participatory avenue in the exploratory, generative and evaluative phases of research and design (Hanington, 2007, p.3). The interactive artifact provides an abstract and experimental visualisation of an equally abstract and difficult to qualify expression, namely ones experience of the exhibition.

1.3 A phenomenological approach to audience experience

The difficulty with experience, however, is that we can only experience our own life, what is received by our own consciousness. We can never know completely another's experiences, even though we have many clues and make inferences all the time (Turner & Bruner, 1986, p.5).

While a discussion of experience would not appear to require specialist knowledge, since it is a universal concept that we can all relate to on some level, a concise understanding, framing and conceptualisation of the term is not easily accomplished. Experience design, audience experience,

user experience and HCI reveal that definitions across the 'experience studies' community are inconsistent.

In the context of the author's investigation, the concept of experience is described as qualitative aspects of human thought, activity and behaviour. Here experience is defined as a synthesis between abstract reasoning and the senses. It enables the designer to identify and make useful the difference between the learnt and the felt, between intuition and formal knowledge, and between the objective and analytic and subjective perspectives. Dewey's (1979) account of 'an experience' serves as a workable context informing the meaning attributed to the design of the interactive artifact. An experience is defined by a clear start, completion and a cohesive trajectory. Dewey thus clearly distinguishes an experience as marked by a sense of fulfillment, unity and completion. It is this working definition of experience in conjunction with a pragmatic phenomenological framework that forms the context for drawing specific insights about the audience experience in the digital container. A phenomenological account proposes that the task for researchers is " to make manifest the incessant tangle or reflexivity of action, situation, and reality in the various modes of being in the world" (Orleans, 2000, p.2101). Phenomenological studies undertake analyses of small groups, social situations and organizations using a number of qualitative techniques, methods are employed to uncover the subjects "life world" (Orleans, 2000, p.2101).

The complex and abstract nature of an audience's inner life challenges the process of extrapolating the meaning of experiences. Its fleeting and effusive character and its unclear temporal nature – the fact that experience seems suspended in time between presence and its memory- makes difficult any attempt at defining experience. As Wilhelm Dilthey (1976) argues,

the relationship between experience and its expressions is always problematic [...] and the relationship is clearly dialogic and dialectical, for experience structures expressions, in that we understand other people and their expressions on the basis of our own experience and self-understanding (p.161).

Therefore it is proposed that representing such an abstract and subjective concept requires collaborative experimentation that engages in co creative activities in order to generate further discussion. A visual sensorial and interactive activity ideally can facilitate the interpretation of an experience given that the structure of experience is a hermeneutical and reciprocal process in which revealed is the intimate connection between experience and representing experience: "experience structures expressions and expressions structure experience" (Turner & Bruner, 1986, p.5).

Sharon Macdonald (2007) argues that although audience research encompasses issues of media, sociality and space and recognises an active pluralist audience, "that there has not yet developed a

significant language in which to describe and analyse the phenomena on which they focus" (p.158). Evidently, the work of sketching out this horizon and of finding a language for a technological phenomenology presents challenges. Macdonald (2007) also suggests that devising an 'affective syntax' of exhibitions or a common set of rules seems a rather complex project (p.159). Nonetheless, the interactive artefacts *field* and *body* aim to further the discussion pertaining to audience experience in the digital container where the functional criteria become complemented by phenomenological criteria. As design values have moved from "objects to experiences, from procedure to situation, and from behaviour to intent" (McCullough, 2005, p.50). Designers have changed the question from "How is it used?" to "How does it feel to use?" This phenomenology of engagement as suggested by Malcolm McCullough (2005) is evident in the work of designers that build technologies and digital artifacts around the everyday. However the phenomena of experience of the digital container in design research has attracted seemingly little descriptive and analytic focus whereas schematic frameworks and experimental toolkits dominate research methods. The experimental artefacts in this paper aim to generate participation and discussion.

The conceptual understanding of the phenomenology of an experience in the digital container was based on an analytic framework from a questionnaire in 2007 of the audience experience in a digital container (PLACE- Hampi). The analyses and the findings (not discussed in detail in this paper) play a vital role in informing the design of the interactive artifact. The components of the analytic framework belong to a set of psychological and physical, sensual and supra-sensual, individual and social, and intellectual and affective parameters. The set is structured by the concepts of emotion, embodiment, scalability, composition, spatio-temporal, 'flow', and co-experience. These components are crucial to better understanding 'an experience' in the digital container. Key concepts pertaining to an experience as part of the questionnaire focused around "specific propositions, questions, or activities" (Yin, 1981) of the digital container developed by the author were clustered thematically and listed as follows:

- Orientation / navigation / negotiation / time in the space / spatio-temporal
- Bodily experience of the space / embodiment
- Relationship between user and screen content
- Relationship between user and interface usability / participation / orientation
- Level of immersion ('being there', presence, sense of travel)
- Flow (time spent, level of involvement)
- Social experience levels: individual and co-experience

2.0 The post exhibition interactive artifact

2.1 Background

Post analysis of the questionnaire uncovered the social and largely co experiential life of the audience in the digital container. Secondly anecdotal discussion with the participants disclosed that they had hoped for follow-ups or further discussion given the extensive and somewhat grueling length of the questionnaire. The lack of opportunity to share, discuss and learn what others had to say about the exhibition, directly after the exhibition became a predominant criticism post the questionnaire. The designer saw the opportunity for a co creational activity for all stakeholders employing the language of interaction design and computational aesthetics to provide an abstract, visual platform to portray elements of the exhibition experience.

2.2 About the interactive artifact

In the context of digitally augmented spaces, audience experience research can become integrated into the installation experience as a post installation activity. As in human centred design, in codesign and in participatory design practice, the designer is required to bring together non-design stakeholders as the advocate for the audience. The audience experience can facilitate brokering in order to communicate across disciplinary boundaries and across the stakeholders' embedded knowledge's and practices (Kocsis & Barnes, 2008).

The findings pertaining to audience experience provide a series of designerly observations that relate the technological capability of the PLACE platform to its effective experiential dimension. The work of visualising experience brings together a number of disparate elements. Visualisation can overcome the limitations of text-based questionnaires that can be laborious to interpret and counter-intuitive to the post-installation interpretation of the audience experience. Using a visual language and an easily understood metaphoric concept, a postinstallation artifact can utilise the representational potential of digital media native to the installation in order to enable participatory audience feedback. Here it draws not only on the audience's experience of the installation, but also on the creativity of audience participants in making visible, legible and tangible their personal reception of a work.

The psychology of participation means that, following the installation, the audience can debrief cognitively while interacting with an easy-to-use and easy-to-understand visual interface.

Similarly, seeing their own experience visualised in relation to other audience member's experiential expressions stimulates and furthers the co-experiential aspect and creates a sense of communal meaning making. The visitor/participant/audience member is no longer atomised, but can understand his or her own reception in the context of others. At the same time the continual evolution of the interactive artifact makes conceivable a non-local, possibly transnational, possibly online virtual, extension of the installation where the duration of the work is not limited by the museum location.

Current work on the artifact uses Processing (Fry & Reas, 2007, Greenberg 2007). The development and design of the artifact was in collaboration with designer, programmer (Hwang, 2009) and online participants. The physical interface consists of mouse and touch screen connected to customized data projection. Designs of both physical and virtual interface are aimed at intuitive participation and the existence of a terminal is compelling in itself; no instructions are needed. The cognitive difficulty of the post exhibition artifact is designed to be significantly less than that of the installation.

The two interface design iterations titled *field* (figure 1) and *body* (figure 2) demonstrate examples of interactive co-experience. Both designs are developed in regard to the semiotics of software studies drawn from the principles of information design, computational aesthetics and user centred design. The two themes have been chosen to illustrate the capacity of computational aesthetics and making meaning of data. The interface motifs and iconographic display can be designed to correspond to the exhibition or installation for the purpose of thematic consistency.



Figure 1: Screen grab of interface titled 'field'

In the current interactive artifact the interface *field* is a virtual field comprising virtual flowers that grow over time. A flower represents a single participant's responses, while the field represents all such responses in a collective form. The attributes of the flower (height, colour, petal shape) depend on the responses prompted by the dialogue boxes. The virtual field exists in real time. The progress of time is represented by the background sky changing from night to day illustrated by colour hues. Here nature iconography is used to express and illustrate visitor experiences and to elicit a phenomenological spectrum of responses.



Figure.2 Screen grab of interface titled body

While the *field* interface of the interactive artifact researches emotional and cognitive states, the *body* interface focuses on embodiment and physical reception of the installation. The interface *body* specifically questions bodily responses of the work over time. The virtual on-screen body maps colour-coded 'visual', 'aural' and 'spatial' visitor responses. These responses are further divided into age and gender statistics. The embodiment responses over time form colour clusters. These clusters reveal physical sensorial reception patterns.

The interfaces are designed to provide a real-time enjoyable activity in the presence of other visitors and co-participants. Interface responses become visible in real time and are represented in correspondence to all other responses. The interface thus "encourages us to leave our isolated self and interact with a greater social group" (Bullivant, 2005, p.5). The following conceptual diagram (figure 3) represents the interface in situ.



Figure.3 In situ example of installation field

The interfaces collect and contain valuable audience experience data. Stakeholders and designer can discern patterns of data over time, can monitor the fluctuations and experiential progress of an installation, and the real-time data can be deployed in rapid re-design processes. The data in its visual form, as images, provides a conceptual map of the exhibition experience. The continual evolution of the data (as more and more responses are fed into the interface) also provides an installation experience history that "makes the human response a constantly active and evolving interface" (Bullivant, 2005, p.5).

4. Conclusions

Field and *body* are examples of a dynamic and evolving post installation artifact. It draws audience participation and provides a space for experiential and cognitive debriefing. It constitutes audience research that is contiguous with the installation in medial and experiential terms. The data yielded can inform stakeholders about the epistemological, curatorial and cognitive effects of a new media installation, and the ways in which audiences interact and make meaning of the new digital worlds. One of the key finding of the 2007 case study is the co-experiential aspect of PLACE (Kenderdine, Shaw & Kocsis, 2009). In the data a distinct sense of 'togetherness' among the audience, and some tacit and overt forms of collaboration and conflict become visible. Indeed the co-experience potential is significant and stands in marked contrast to conventional museum visitor behaviour. Interface use here constitutes the intersection of intimate personal reception of the work, and the social dynamics of PLACE. Thus, PLACE technology and co-experience are not only not opposing factors, but are deeply interconnected. While the technology allows the displacement of self-awareness, the interface use generates levels of performativity.

Subsequently interface negotiation and dwelling dispersion combine to produce hitherto unknown modes of operation, modes that were not explicitly designed for, namely, performative co-experiential ways of being in the space.

Given this information this paper further seeks to investigate these important issues over time, over a number of exhibitions and across varying cultures. *Field* and *body* aims to facilitate this enquiry albeit on an abstract and contentious form of experiential and qualitative data collection.

The experiential data can serve a number of functions. Firstly, it can enrich the stakeholders' future co-design work, because data is present at the outset of a project. In the case of PLACE, the data should be eminently useful in conversations between content providers, artists and curators. Furthermore this conversation can be ongoing as technology allows. In addition, this can overcome the traditional separation between content providers and the audience, as the data can illustrate to non-artist stakeholders how audiences, and under what conditions, interact in digital containers.

Acknowledgements

The author acknowledges the assistance of Jeffrey Shaw and Sarah Kenderdine.

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Lost in Translation: Teaching Product Design Across Cultural and Language Boundaries in China and the United Kingdom

Ian Lambert and Richard Firth

Abstract

This paper will explore strategies for transcending cultural and language barriers by two British design tutors when teaching in design studios at a Chinese university. Ian Lambert and Richard Firth, both based at Edinburgh Napier University in Scotland, have been visiting tutors at the Zhengzhou University of Light Industry (ZZULI) in China for three years and have recently been exploring the use of entirely visual design briefs.

The pedagogical differences between Chinese and British design education are widely known and the nuances of British design pedagogy, and even the most blatant differences, are often lost through the translation of verbal direction.

Pedagogic design communities in China and the UK are keen to share ideas on design education and innovation in industry. While such cross cultural design exchanges seem to focus on the export of western design and innovation philosophies, approaches to Chinese design education have also been imported back to the UK with positive results.

The paper will draw upon hands on experience and primary field research, including the experience of British design students on exchange in the China.

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1. Introduction

Since 2004, the Chinese government has supported the expansion of design education as part of the Closer Economic Partnership Arrangement (Lau et al., 2005 p. 72). There are now over 30,000 undergraduate design students in China; in 1985 there were only two hundred (Cheung-Nainby et al., 2006, p. 115). Recent estimates suggest there are over 500 design schools in China, with that figure predicted to rise to 1,700 in the next two decades (Rigby, 2007, p.24)

While design schools in China are increasingly adopting western teaching methods to foster the development of ideas and innovation and focus on process and design strategy (Gao & Ren, 2008), the Confucian pedagogic approach of learning by "rote" or copying/following the teacher is still prevalent. This *top-down* approach is continued in Chinese design companies were management structures are often patriarchal. By contrast, Western design companies are more likely to foster innovation through teamwork and creative thinking. Confucian pedagogy has its strengths in design education, as will be discussed and we are not attempting to assert that western design pedagogy is *better* than Chinese. However, following the teacher is not conducive to the development of innovation. Although China has a long history of technical innovation, the notion of Intellectual Property Right (IPR) has little influence there. Chinese manufacturers will happily make copies of other peoples' inventions – why pay for research and development when you can use someone else's? Rigby (2007) says, "China's products are popular but rarely original … While China is the workshop of the world, the design capability – that all important creative force – is still very much where it has been for a century, the US and Europe." (p.22)

It is no co-incidence, that in many Chinese university design departments, studio projects have had an emphasis on the re-styling of an existing design (outcome), rather than problem solving and usercentred design development (process), as may be found across the UK and is certainly the case on design programmes at Edinburgh Napier University.

2. The Brief

In April 2008, we travelled to China to teach Product Design for two weeks at the Zhengzhou University of Light Industry. The students were in their third year of a four year undergraduate programme based in the University's International Education College, and supported by tutors from the School of Art & Design. We do not speak Chinese, and while the students were concurrently learning English, the level was not good enough for teaching to take place without a translator.

We had become familiar with Chinese design pedagogy on previous teaching visits to ZZULI and through discussion with design professors there. Also, Edinburgh Napier product design students had

spent three months in the third year industrial design studio at ZZULI in 2007 as part of an exchange programme which continues today.

The challenge of teaching Chinese design students has nothing to do with their ability as designers or their capacity for learning, per se, but in communicating thought strategies across contrasting cultures. In bringing something from the UK, our aim was to teach design innovation by emphasising the *process*, through teamwork, brainstorming, idea generation, and quick prototyping (testing of ideas) with reflective practice.

Students were asked to design a suitcase that met international aviation requirements for hand luggage. This required them to undertake user-centred research that would inform the design process, and to make full size models to test and evaluate ideas. By embedding these processes in the project we aimed to ensure that the students could not succeed without their own information gathering and reflective practice, and enable them to take ownership of their own learning.

Design professors at ZZULI are progressive and forward thinking in their ambitions for design pedagogy and the purpose of our visit was to expose ZZULI students to western design thinking. Professor Gao Liang and Professor Ren Jian Jun of the ZZULI School of Art and Design, who have taught Edinburgh Napier students on the exchange programme had observed that British students were more "critical and reasoning" in their thinking and able "to go into more depth with their ideas" – or, as Gao puts it, "more scientific". By contrast, Gao and Ren believe Chinese students working alongside them were weak in critical thinking and reasoning, but more "*intuitive*" and also tended to have stronger skills in visualising the finished product. Both professors described the Chinese curriculum as having "very specific requirements" with an "emphasis on the outcome instead of the process… and this has to change" (Gao & Ren 2008).

This can be further supported by contrasting the experience of the students on the exchange programme between ZZULI and Edinburgh Napier University. The Edinburgh Napier design students, with no grasp of Chinese language at all, were placed in a studio where only a few students had basic English language skills. The Chinese professors, while very supportive, made little allowance for this – the Edinburgh Napier students had to determine what was going on using their initiative and respond accordingly. They would simply ease into the project and use sketching and modelling to help get their ideas across to tutors and peers. By contrast, the Chinese students who visited Edinburgh Napier would wait for instruction, and struggled with the lack of direct tutor intervention.

Gao, who had spent six months on secondment at Edinburgh Napier University in 2007, and Ren are both leading the changes in pedagogic strategy for design at ZZULI. Their own pedagogic research has resulted in four recommendations to change curriculum design (Gao & Ren, 2008):

- 1) To be more interactive in the teaching (to run both ways between teacher and student)
- 2) To change the role between the learner and the teacher whereby teachers learn *with* the students
- 3) Train the students to think creatively
- 4) Assess the students from different perspectives other then a final test (or outcome)

It would be fair to say that these recommendations would be refreshing in any design school across the globe, but while Gao and Ren are progressive, they still have some work to do in making their ideas common practice throughout their own university.

In addition to differences in the cultural perception of design, we also encountered translation difficulties. Translation from English to Mandarin is not straightforward. Giving advice on a simple matter like making the edge of a form "rounded" only became clear to the translator when we said "curved" instead.

Further problems arose from the deep rooted culture of the student-teacher relationship. In the west, students are often encouraged to question and challenge pre-conceived ideas. But to question a teacher in China is considered disrespectful, and the students were uncomfortable in doing this with us. At the end of a design task, a group of students asked what to do next. We answered, "we want you to think for yourself." The students remained silent for a while, before asking "how shall we do it".¹

2.1 Group Working

In British higher education, group work used in design as a means of fostering innovative teams or "hot groups" (Kelley, 2002, p.69). We quickly observed how the layout of the design studios differed to our own. In western design schools students face each other while in China students face the front of the room. We duly re-arranged the tables to enable group based learning (see fig 1).

With the students unaccustomed to this form of learning, we used Tom Kelley's guide to the *Perfect Brainstorm* (Kelley, 2002, pp. 53 - 66), to carefully explain the "rules" of brainstorming.



Figure 1: ZZULI design students brainstorm ideas as a group (R. Firth 2008)

Using this process, the students were asked to come up with 50 quick design concepts and make a short-list of 5 to take forward to the next stage of the design process (fig 1). We had to work hard to keep them going: at first, the students tried to use detailed fully rendered drawings to visualise each of their concepts, so we stopped them to re-iterate the need for quick sketching to speed things up. They immediately copied exactly what had been drawn on the white board – not what we wanted. With further perseverance they eventually produced some potentially good ideas. However, at the end of the process they still asked: "Which ones shall we choose?"

This inability to self-reflect cropped up throughout the project. Questions like "is this good", or "do you like this?" came up repeatedly, and it took time for the students to proceed without direct tutor feedback and make progress based on their own decisions. Sketching and sketch-modelling at full scale allowed for analysis and evaluation without the investment of time required for neat and detailed drawings and models (see fig. 2). However, it was difficult to get them to value a strong concept over what "looked good" which is what they had been trained to do.



Figure 2: ZZULI design students working at full scale (I. Lambert 2008)

In producing the presentation model, some groups were distracted by the superficial imitation of real life materials - surface decoration – which concealed the structure and detail, which in turn expose the *process*. In the final stages, the students had fallen back into their comfort zone of *outcome*.

3. Lost in Translation

Whether or not this arose from a breakdown in communication is unclear, but the translation – or what was lost in the translation - was one of our biggest challenges. Most of our translators were English language teachers who knew nothing of design education and were unfamiliar with the terminology: Trying to convey the subtleties and nuances of design detailing that can make or break a design, or explaining how an observation could lead to innovation proved challenging. Indeed, only very recently was it brought to our attention that the use of the word "work" to describe a student's design output did not make sense. "I think your *work* is very good," would be more accurately translated if spoken as "I think your *design* is very good."

Occasionally, subtlety and detail were lost in translation: after we had attempted to explain to a group of students how they could improve their design by going back to their original observational research for ideas, the translation merely came as "you must change your design." A few translators would also miss the point: after trying to assist a group of students in *independently* weighing up the comparative strengths and weakness of two of their designs, the translator asked, "…so which design shall I tell them to do?"

In spite of these challenges, many students produced a successful body of project work (designs) that compared favourably to the work of our own students. The students had developed designs from observational research which had taken place outside Zhengzhou Central Railway Station. Watching people sitting on their cases had led to integrated seating; people sleepily listening to mp3 players with thieves about led to enclosed access for the jack plug of earphones; watching two people carry a heavy bag led to two robust handles on either side of the case.

In just 9 days, each team had produced three full-sized models/mock-ups, which had been used (with guidance) as part of reflective process at each stage of the design development. To varying degrees they achieved the tasks required, and many recognised the benefit of user centred research in developing new ideas.

China will need innovation to underpin its' economy. Hester Abrams (2006) quotes Sir George Cox, Chairman of the UK Design Council as describing innovation thus "...the process of shaping ideas (design) links the generation of ideas, (creativity) to their successful exploitation (innovation) ... Creativity + Design = Innovation" (p.4). If this is the case for British Design, then for China it is the re-shaping of ideas and their *designers*. Chinese manufacturers need this to move their industry forward. The students had at least tasted a British approach to design education.

The students used rapid modelling to quickly assess and determine the suitability of design solutions and communicate their ideas and they generally agreed that in working as a team they had learnt how to generate and develop more ideas – this is innovation.

But the key question was, would they take these skills into their next design project after we had left? Answer: Probably not, unless *told* to do so.

3.1 No Translation

We returned to ZZULI in April 2009, and decided to revise our approach and exploit our visual skills, by entirely using visual briefs and only using translators to clarify basic requirements, such as when to return from a break or what materials to bring for the next day.

In November 2008 second year ZZULI design students in the International Education College had been given a two week project to design highlighter pens. The brief had been issued several weeks in advance of our arrival and at the start of the project we took the students through the brief in depth with the aid of a translator. Through the translator, the students assured us that they had already read the brief and understood what was being asked of them. At the end of the first week, the students began asking questions about the submission requirements and format for presentation. "But it is all clearly stated in the brief" we replied. The same translator told us the students never read briefs. We were learning that sometimes "yes" means "no".

During our next visit in April 2009, the students were briefed in silence with a visual slide show. We ran two one week projects each for four different groups of second year students, requiring each to design:

- A highlighter pen
- A kitchen knife
- A tape measure
- A folding hair brush

These objects had been chosen as they allowed for user centred research and were of a manageable size to allow for iterative modelling. The slide show brief consisted of a sequence of tasks that make up a design process: research - design precedents and images of these in use; team work - images of students working together in brainstorming groups; idea development - rapid sketch development; prototyping and testing - model making; and visual presentation. At the end of the briefing, they knew exactly what to do without going through the onerous task of piecing together very specific terminology from a written brief. The students were able to follow the task and achieved in one week, what had taken two weeks on our previous trip.

We showed them how to *do* things by using visual demonstration to teach (see fig. 3) with a smattering of Chinese words, such as "kwai", meaning "fast", when sketching to help students achieve a confident and sensitive line quality.



Figure 3: Demonstration sketch of a highlighter pen for students (I. Lambert 2009)

Removing the need for a translator in the studio resulted in a stronger teacher-learner relationship in both an individual and group context. When a task needed to be carried out, we tried to explain it with images. At times, a kind of design *Pictionary ®* was used. Figure 4 shows how we tried to explain that we wanted five pages of developmental sketching. The group showed a certain degree of delight as we addressed the room with drawing.



Figure 4: Pictionary® - *Diagram asking students to produce five sketch sheets for highlighter pens, (I. Lambert 2009)*

At other times, drawings were used to convey the possibilities for developing ideas through rapid sketching. Figure 5 shows four possibilities for folding away a hairbrush, which the students understood much more quickly then with the aid of a translator.



Figure 5: Possibilities for developing the design of a hairbrush (R.Firth 2009)

We could demonstrate sketching and drawing to large groups by relaying this by camera to the data projector and onto the wall (see fig 5). The group were asked to look at the screen and watch us draw

or make models. This helped them to develop the skills and to understand the process – by doing this they were, in fact, learning by rote.



Figure 6: Lambert uses an overhead camera to demonstrate drawing skills

In an earlier paper *Pencils Don't Crash* (Lambert & Firth 2006), architect Will Whimshurst, of Richard Rogers Partnership was quoted as saying, "... a quick sketch can transcend language in terms of the ability to convey relatively complex ideas quickly. Not to mention the fact that sketching is an international language..." (p. 407)

We were doing exactly that – using drawing as an international language.

It did not take long for the students to produce a range of outcomes with a higher degree of clarity and awareness of the process. We deliberately asked for models to stay un-rendered in order to avoid distraction from the process. Sketching was left as fast and informal and the students were encouraged to flick between sketching and 3D models in the development process. While the students worked on the their own designs after the research and brainstorming stage, they were encouraged to support and intervene on each others process to enhance the development of ideas. Figure 7, shows range of outcomes for the tape measure brief that have been driven by process.

Removal of the translator – the middleman – had increased efficiency and output, but above all, the quality of the student experience.

4. Conclusion

What we have shown is that teaching design without words can enhance the student experience. If visual learning has benefitted students in China, then we can assume it will benefit students in the UK.

We are, after all, teaching our students to think and communicate visually, and as the world grows ever smaller this process can be used to teach design to students from any cultural background. Our next step will be to take a wholly visual approach with students for whom English is their first language, and publish that experience as a purely pictorial essay.

4.1 What We Have Brought Back to Edinburgh Napier

Drawing by Rote. Chinese design students learn how to draw by copying their teachers, or from the drawings of other design professionals found on the internet. Many western design academics would question whether this approach would facilitate the necessary analysis and application of the basic principles of drawing: line weight, perspective, ellipses in their own work. We have already talked about the Confucian approach of learning by rote. Watkins and Biggs (2001) describe, in *The Paradox of the Chinese Learner*, the relationship between memorising (i.e. copying) and understanding, yet "[Chinese] students show high levels of understanding." (p. 5). In fact, our own students have repeatedly shown upon returning from three months study at ZZULI an improvement in skills for design sketching and have put it down to the Chinese approach.

Previously, we would not have entertained the notion of teaching drawing by copying the work of others. However, with this approach, students can quickly gain skills in the application of media and quickly build their confidence. We now introduce drawing skills in this way (see fig. 6) – but ensure that it is quickly transposed onto their own ideas.

Clear Instruction. Are our students really all that different? Actually, no. It takes quite a bit of patience and hard work to get our own students to embrace the notion of group work, even if they are very good at it by the time that they graduate – the problem in ZZULI was amplified by translation, but has forced us to use as simple an explanation as possible and in the end their students produced better work then we would expect of our own. For them to take their skills in to the next project is a matter for their own tutors and the work of Gao and Ren is extremely positive and promising in seeing this happen.

It is fitting for us to conclude this paper with an image (fig 7).



Figure 7: Conclusion: Tape Measure Project - evidence that words are not needed to teach design (R. Firth 2009)

¹ In introducing her paper Are Chinese Teachers Authoritarian, Irene Ho starts, "In Chinese societies under the influence of the Confucian culture, teacher authority and the suppression of individuality have deep seated cultural roots. As a result, teacher centred pedagogy and student compliance are still prevalent in many modern Chinese societies..." (p. 99)

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Acknowledgements

Thanks to: Prof. Gao Liang, Prof. Ren Jian Jun, Mr. Angus Cui, Ms Meng Li (Zhengzhou University of Light Industry); Mr Adam Purves (Product Design Graduate, Edinburgh Napier University).

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Trekking Between Cultures, Disciplines, and Organizations Design Practice in the Montebelluna Sportsystem Cluster

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Abstract: The complexity of a design situation can be connected to a variety of dimensions, such as product types, users, cultures, and organizations. In industry clusters, the product type variety is limited. The unique locally, culturally and socially permeated know-how present within clusters thus regards a few related products, and is distributed among several organizations. Interdisciplinary product development and innovation therefore span organizational, disciplinary, social and cultural boundaries with accordingly negotiated outcomes. Designers who act on a global product level, stage for innovation in a process of knowledge mediation and integration among the cluster product development team members. This paper exemplifies how the everyday practice of designers in cluster environments can be characterized drawing from a case study of the Italian Montebelluna Sportsystem cluster. It illustrates how designers deal with a homogeneous product type environment in a complex interdisciplinary and intra-organizational practice heavily influenced by local history and culture.

Keywords: design complexity, design practice, cluster context

1 Introduction

Regional and local agglomerations of similar or related industries and their support infra structures are referred to as clusters (Bathelt, 2005). These often have a long history that results in unique socially and culturally intertwined regional know-how (Maskell & Malmberg, 2007). The official and non-official relationships, transactions and interactions that are typical of clusters, are part of their strength and contribute to knowledge creation, learning and innovation (Bathelt, Malmberg, & Maskell, 2004). The local density of companies with specialized knowledge makes various degrees of inter-organizational product development across the value chain common in cluster contexts. In combination with historical know-how, and culturally pollinated practices, this affects the everyday practices of professionals.

Industrial designers combine knowledge from different disciplines to create objects that make sense to humans. This involves giving the interface between humans and objects a holistic form that satisfies the physical and psychological needs of the user and makes the practice of industrial design an

important part of the product development process. However, the holistic approach generally used by industrial designers can be a challenge in organizationally and culturally complex contexts such as clusters, where the design practice is undertaken between firms, disciplines and cultures. Further, the homogeneous product type environment of clusters entails issues connected to inspiration, learning and knowledge creation among its design practitioners.

This paper exemplifies how the everyday practice of industrial designers in a cluster context can be characterized using a case study undertaken in the Montebelluna Sportsystem cluster.

1.1 Design and Complexity

The complexity experienced by a designer in a design situation depends on the infinite sources of information connected to technological possibilities, constantly changing contextual factors and societal preconditions, clients, customers, and user demands and desires (Stolterman, 2008). The complexity of a design situation can thus be connected to the product as well as to the social process by which it is realized (Bucciarelli, 1994). Bucciarelli described the product development process as a negotiation between members of the product development team. According to Krippendorff (2006), the outcome of this social process depends extensively on stakeholders with different and potentially conflicting interests. Stakeholders are actors who have an interest in a design or its consequences. They are experts in their own object worlds (cf. Bucciarelli, 1994) and knowledgeable about the stake they claim in the product development. Design stakeholders can be found inside as well as outside the organisation that produces the product. They may be professional, as in the case of product development team members, or personal, as in the case of users.

1.2 Design Practice, Learning and Knowledge Creation

Putting the user at the center, industrial design permeates the innovation process, with implications for product development, customer service and management (The Commission of European Communities, 2009). When design practitioners move within and between organizations and knowledge and skill bases, they act as gatekeepers, brokers and integrators of knowledge (Bertola & Teixeira, 2003; Utterback, et al., 2006; Walsh, Roy, Bruce, & Potter, 1992). As innovation occurs at the boundaries between mind sets, knowledge and skill bases (Leonard-Barton, 1995), it can be facilitated through the brokering and integration of knowledge undertaken by designers (Bertola & Teixeira, 2003; Utterback, et al., 2006). It can however be questioned whether designers who work exclusively in industry clusters, and consequently design a limited range of products, are able to perform such a knowledge brokering function.

1.3 The Choice of the Montebelluna Sportsystem as a Study Case

The criteria used by Waxell and Malmberg (2007) for the identification of a cluster guided our choice of the Montebelluna Sportsystem cluster for the study:

- There should be a spatial agglomeration of similar and/or related economic activity
- These activities should be functionally interlinked through various kinds of relations, transactions and interactions.
- There should be an element of self-awareness. The actors in the cluster should identify themselves as 'cluster members' and there should be some form of cluster coordinating mechanism.
- The firms and the cluster as a whole should demonstrate some form of superior innovative performance.

The Sportsystem cluster, which is responsible for a significant percentage of the global snow sports footwear market, fulfils all the criteria listed above, as well as featuring a widespread use of design. For these reasons, it was interesting as a case study of industrial design practice in a cluster context.

2 Methods

Semi-structured interviews were undertaken with the industry cluster actors who had a stake in the design process and its outcome. The main purpose of the interviews was to understand the nature of the industrial designers' life worlds, every-day practices and roles in the specific cluster context. In order to generate a rich understanding of the case, the interviews with industrial designers were combined with interviews with other cluster actors, such as engineers, company owners, R&D managers, and marketing and HR personnel. The interviewees represented small, medium, and large size organizations that produced different products such as ski boots, trekking boots, casual shoes, and roller skates, as well as offering design services. The interviews followed a flexible interview guide and included topics such as the overall structure of the industry cluster, the design process from different stakeholder perspectives, the interactions between designers and industry cluster actors, attitudes towards industrial design and innovation, and the influence of regional culture and history on the everyday product development practices in the cluster.

The interviews were taped, transcribed and coded. In addition to the interviews, a literature review and a personal conversation with the official cluster director and author of several publications on the history and culture of the region, contributed with a historical and social perspective to the interview outcomes.

3 Results

3.1 The Montebelluna Sportsystem Now and Before

An introduction to the history and evolution of Montebelluna and the Sportsystem cluster is presented here to help provide a fuller understanding of the research outcomes. The Sportsystem cluster is situated in and around Montebelluna, a city of 30 000 inhabitants in the Veneto region of northeastern Italy. Montebelluna lies in a hilly, traditional agricultural landscape south of the Dolomites.

The global and local impact of the Sportsystem cluster is widespread. The cluster produces more than 50% of technical mountain shoes, 65% of after-ski boots, 75% of ski boots, 80% of motorbike footwear and almost 25% of the roller skates of the world (Montebelluna Sportsystem - Museo dello Scarpone e della Calzatura Sportiva, n.d.-a). With its emphasis on mountain sports equipment, it has become known worldwide as "The capital of snow industry" (The Cluster Competitiveness Group, 2008). Eight thousand people are employed in the almost 400 companies in the Sportsystem (Sammarra & Belussi, 2006). Of these companies, almost 11% are design consultancies that employ 5% of the total cluster workforce (Durante, Durante, & Polegato, 2006). Outside of Montebelluna, 70 000 people are occupied in the production of products designed in the Sportsystem (Durante, 2006b).

Durante (2006a, 2006b) wrote about how the shoe-making tradition of Montebelluna started almost a thousand years ago. As a response to the local demand for forester work boots that were made from leather and wood, a few people broke the tradition of being full-time farmers and started to produce boots. Later, shoe production adapted to changing market demands with boots for late 19th century pioneer mountain adventurers visiting the area, and for soldiers during the world wars (Durante, 2006b). At the beginning of the 20th century, there were 350 family-run shoemaking operations.

The first ski boots were produced after the First World War but production was revolutionized at the end of the 1960s by the introduction of plastics. The plastic ski boot not only changed alpine skiing, but also had a huge impact on the ski boot production process itself. The entire process, from ideation to the production of boots, which previously could be undertaken by one single designer and patternmaker, was sequenced. Prototyping and production now required technicians, and therefore were separated from design. The mechanization of ski boot production meant that the region's shoemakers, with their deep roots in manual skills, were limited to working on the soft ski boot interior (Durante, 2006a).

Many ski boot producers decentralized production, which resulted in the birth of a large number of suppliers of outsoles, soles, and accessories. The visibility of local best practices and the relatively small investment required to start a small low-tech accessory supplier company made Montebellunians eager to start their own businesses. The number of small family-owned companies consequently grew (Durante, 2006a). The individualist farmer mentality was suited to entrepreneurship, and these new entrepreneurs chose to create proper companies and brands rather than to just supply to someone else. Subsequently, third party supportive companies, such as mould makers, machinery producers, die sinkers, injection specialists, and shoestring manufacturers started to emerge.

With the introduction of plastics, architects and designers started to be employed by some of the larger ski boot companies (A. Sartor, personal interview, April 24, 2009). The new plastic material called for and allowed innovative solutions and gave designers the freedom to explore form, colour and surface finish (Montebelluna Sportsystem - Museo dello Scarpone e della Calzatura Sportiva, n.d.-c). The combination of a soft interior and a rigid plastic exterior that characterized the new ski boot required careful studies and consideration of foot and lower leg anatomy.

Even though ski boot production experienced great growth and success, with production climbing from 250 000 pairs in 1960 to more than 4 million pairs in 1979 (Montebelluna Sportsystem - Museo dello Scarpone e della Calzatura Sportiva, n.d.-b), not all companies were able or willing to make the large investments required for the use of plastics. Instead, they turned to new markets with ice skates, after-ski boots, football shoes, motorcycle boots, cycling shoes, and cross-country ski boots. According to Durante, the ability to diversify according to changing markets, technologies and societies has been the historical strength and evolutionary survival strategy of the Montebelluna Sportsystem. Examples of product and market innovations that have come to life in the cluster are roller skates, sports clothing, and the trekking boot. Today, the fashion-driven casual city shoe counts for a significant share of the overall Sportsystem turnover (Durante, et al., 2006).

As a result of this history, there is unique local knowledge about footwear in Montebelluna. With mechanized and delocalized production and global distribution, the historical knowledge and manual skills of labourers in the region have slowly been transformed into knowledge of R&D, planning and design, production, commercialization and distribution. Prestigious global sports shoe manufacturers such as Nike, Fila and Asics and snow sports equipment manufacturers such as Rossignol and Lange meet up in Montebelluna because of this local know-how (Durante, 2006b). However, the history and roots of the region and its population still have a great influence on every day practices, especially in the case of industrial designers.

3.2 Product Development and Innovation in the Sportsystem Cluster

Many of the products designed in the cluster, such as casual city shoes and trekking shoes, are not subject to any systematic product development, and new collections are usually restyled versions of last season's collection. Innovations in this product category are often connected to the application of new materials. More of an effort is put into the development of products such as ski boots, roller skates, and protective clothing. Innovations are made here on a more global level and may take into consideration markets, product parts and architectures, materials, use and so forth. Input for new product ideas and needs come mainly from the company sales and marketing departments. Market and trend research is performed in-house or purchased from external agencies. One such agency is the District Vision Lab, which is coordinated from the central "Museo dello Scarpone" and financed by

the Veneto region. This agency researches market trends and consumer behaviour for the Sportsystem. It also organizes courses, seminars and gatherings for designers and others working in the area.

3.3 Design Practice in the Sportsystem Cluster

All the organizations represented in the study use industrial design expertise in their product development. Design practice in the Sportsystem cluster, illustrated in Figure 1, appeared to be organized and performed in different ways and by professionals with different educational and professional backgrounds. The relationships can be roughly categorized as follows:

- 1. Formally trained designers from design or architecture schools, who were employed as:
 - senior in-house designers for larger ski boot or trekking boot companies;
 - senior designers or owners of design consultancies working exclusively in the cluster;
 - senior designers or owners of design consultancies working both for companies within and outside the cluster;
 - apprentices in design consultancies working both for companies within and outside the cluster;
 - designers in consultancies located outside of the Sportsystem cluster occasionally commissioned by companies within the cluster.
- 2. Sportsystem cluster trained designers working as in-house junior designers in larger ski boot or trekking boot companies. These designers are graduates from EU financed one-year courses held at the "Museo dello Scarpone". These courses have been organized since 1995, with the course content based on local industry human resources needs.
- 3. Professionals trained in disciplines other than design, such as engineering or mould-making, who perform traditional design tasks when necessary (cf. Dumas & Gorb, 1987).



Figure 1. An overview of the design practices found in the Sportsystem cluster, where the stars represent designers and the circles represent different types of the organizations.

3.4 Mono- and Multi-Product Type Design Practice

The designers who were interviewed for this study either worked exclusively with cluster specific products in a *mono-product type* practice, or in a *mult-product type* practice, which involved a mix of projects from inside and outside the cluster. Generally, management level design stakeholders in the Sportsystem expressed the need for both mono-product type designers and multi-product type designers. The specialist knowledge, understanding and experience of the first group were used primarily in "incremental" product development and innovation, while the second group was also used in cases when more radical innovations were needed.

3.5 Knowledge, Inspiration and Creativity in a Cluster Context

The multi-product type designer group consisted mainly of formally trained designers, who complemented their in-cluster practice with any kind of product design, such as furniture, medical and industrial products. Many of them expressed the importance of such a project mix for remaining passionate, inspired and creative. In addition, the specialist knowledge from the cluster could also be

used in external projects and vice versa. This latter was illustrated by a designer who applied knowledge from medical orthopedic products to an innovative protective sports equipment project.

One senior multi-product type designer and design consultancy owner mentioned how design apprentices bring fresh ideas to the company. He compared his own experience from inside the cluster to ballast for an air balloon. Ballast is good for balance, but at some point you need to get rid of some of it in order to lift. He explained this process as cross-fertilization between the freshness of the design intern's ideas and his own experience and professional knowledge.

The issues of remaining inspired and creative, and of bringing in fresh ideas, were not just mentioned by consultants. One full-time designer employed by a large ski boot manufacturing organization mentioned a parallel design practice outside the cluster. His external design activities were recognized as something positive by the company management.

3.6 Old Know-how and New Technology

It can be a genuine challenge to combine the region's traditional manual and tacit knowledge that is used to manufacture the soft interior parts of boots and skates with the modern and standardized production that is used to produce the hard parts of the same products. Because designers often intervene on a holistic level, they need to mediate in these situations. One designer illustrated this with a story about an innovative roller skate project:

"We had to attach a mechanical frame made from plastics and metal to an intersole, which was the interface between micro-millimeter precision parts, and the footwear, which is manufactured manually with a 4 to 5 millimeter precision. Matching those two worlds was a real challenge. I'm not talking about culture here, because that is another chapter that I can talk about forever." Davide, designer.

3.7 Old Culture in a Modern World

Another design consultant likened the industrial design practice in the Sportsystem cluster to managing a big multicultural orchestra. He described this cultural complexity as due to a remnant farmer mentality:

"Historically, farmers did not collaborate or interact with one another. Until recently, many company owners were single shoemakers and former farmers who only spoke in dialect, and were therefore not able to communicate in Italian." Renato, designer

Design consultants, especially those working both within and outside the cluster, generally found that many important actors in the cluster harbored a deep lack of trust in designers:

"You succeed with a roller skate, and then you're the roller skate guy, and can go on designing roller skates forever. They see the innovative value in *that* product, but they don't understand that designing is an approach applicable to *any* kind of product." Renato, designer

The interviewees discussed different strategies for overcoming the challenges connected to cultural differences between traditional know-how, the farmer mentality, mistrust and new innovation and technology. One designer and design consultancy owner expressed the value of having different inhouse expertise in order to be able to work in the Sportsystem cluster. The know-how of a model maker and engineer with a shoe-making family background was described as a key asset to the firm:

"Sometimes I bring him with me to meetings with companies that still have the farmershoemaker mentality. He is from here, and his father was a shoemaker, so he understands their approach and can speak their language. He understands both sides, and can act as someone in between, a liaison." Andrea, designer

In addition to conventional design skills, diplomatic skills were mentioned by design consultants as essential for success in the Sportsystem cluster. This involves being communicative, both at a design level and on a verbal level. According to one designer, one strategy for overcoming the skepticism connected to design consultants from the outside was to come to the prototype stage as rapidly as possible, and let the prototype speak for itself: You could say that you speak through the product, he said.

4 Discussion & Conclusions

4.1 Tensions Between Old and New Cultures and Socio-Cultural Complexity

The complexity of a design situation as defined by Stolterman (2008), is a useful concept when trying to understand the industrial design practice in the Sportsystem. Here, the complexity experienced by designers appeared to be connected mainly to the tensions between the old and the new society. It is therefore important to interpret interview outcomes not only from a present perspective, but also through a historical lens. In less than a century, a majority of the farmers of Montebelluna have become entrepreneurs, employees, and even industrialists acting on global markets. The old farmers rarely moved beyond the distance they were able to walk, or ride with a team of oxen in one day (Durante, 2006a). Outsiders visiting the territory were either shepherds whose herds ruined crops, thieves, or soldiers that had to be fed and sheltered, all of which had immense negative consequences for the survival of the farmer families.

In light of these facts, certain skepticism towards outsiders in a family company, or to the cluster can be considered natural. The founder of a family owned shoe laboratory that in just a few years has grown into a multinational organization, may find it hard to delegate important tasks to an outsider. Particularly if this outsider represents a profession that fifty years ago did not exist in Montebelluna.

4.2 Organizational and Disciplinary Complexity

Challenges in interdisciplinary and intra-firm collaboration can be related to the tensions between old manual know-how and new technology and disciplines. The former farmer and manually skilled shoe maker needs to negotiate a design solution with other design stakeholders such as mould makers, and industrial designers. They work within different object worlds and conceive the object of design differently. As found in Montebelluna, designers can mediate such situations, through the use of sketches, prototypes and other visual representations (Bucciarelli, 2002).

4.3 Design Practice, Knowledge Creation, Learning and Innovation in Cluster Contexts

Designers face a challenge in remaining creative, inspired and passionate when they work in a cluster environment where, a majority of the projects relate to the same product type. Many designers in the Sportsystem cluster addressed this challenge by mixing projects from inside the cluster with external design projects. In doing so, fresh knowledge is brought to the cluster, enhancing the probability of new, creative and innovative design solutions.

When the designers of the Sportsystem act across disciplines in the cluster and beyond its boundaries, they play the important part of knowledge brokers (cf. Bertola & Teixeira, 2003). While the monoproduct type designers act as local user community-, organizational-, and within-cluster knowledge brokers, the multi-product type designers perform the additional function of extra-cluster knowledge integrators. Both are important for the innovativeness of the Montebelluna Sportsystem cluster.

4.4 Studying Design Practice in its Socio-Cultural, Historical and Present Context

This paper has illustrated the importance of understanding industrial design practice in industry cluster contexts through both a present perspective and a historical lens. The study outcomes show that there is increased complexity in the industrial designer's everyday practices caused by tensions between local history and culture and modern technology and practice in the Sportsystem. This was manifested in attitudes towards industrial design as well as in interdisciplinary and intercultural confrontations that arose in the course of the everyday design practice.

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Counter-intuitive Design Thinking: Implications for Design Education, Research and Practice

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This paper reports research analysing recent changes to design practice, research and theory in Art and Design fields, relating to increased involvement in the territory of complex socio-technical systems design. The analyses suggest this extension into these new and very different territories of design imply it is necessary for Art and Design fields to re-envisage their theories, research and practices in light of the understanding of design in this complex arena from the field of complex systems design. The findings of these research analyses broadly challenge many of the traditional claims of design theory, practice, research and education in the literatures of sub-fields of Art and Design.

Keywords: complex socio-technical systems design, counter-intuitive design thinking, Art and Design, design theory foundations.

Introduction

Human thinking, intuition and feeling that is the basis of design activity is compromised by cognitive biases, biological limitations and fallacies (see, for example, Fernandez-Armesto, 2004; Gilovich, 1993; Klein, 1996; Knight, 1999; Labossiere, 1995; Schacter, 1999; Stroessner & Heuer, 1996; Warren, 1976). These cognitive limitations are grounded in the evolutionary development of human beings (Damasio, 1994, 1999; Fernandez-Armesto, 2004). Human biology is the result of selection processes from less technological eras. Our human cognitive and affective processes have developed to equip us to respond quickly to direct, simple, causally-obvious challenges in which outcomes are close in time and space and the immediate result of obvious causes. Biologically, these cognitive processes used in design activity do NOT equip us to envisage, predict or make judgments about complex situations in which causes of outcomes are complex, multiple and hidden with outcomes and causes are remote in time and location. In fact, they delude us into erroneous understanding and faulty design judgments when design situations are complex. These limitations of human functioning are an important understanding of the limitations of designers working on complex systems design.

There is little evidence that design professionals in Art and Design fields are aware of, and take account of, these biologically-based limitations of human thinking, intuition and feeling in design education, design practice, generating design solutions, design methods and design theory-making. In contrast, the field of complex systems design (particularly sub-field that focuses on complex socio-technical systems design) has committed extensive effort into understanding the design implications of these human limitations and developing specific design methods to address them. Awareness over time of the high level of failures of complex systems design failures

has led the complex systems design fields to identify, and develop design methods to address, the limitations of human cognitive and emotional functioning in designing in the realm of complex situations.

Recently, design practice, research and theory in all Art and Design sub-fields has crossed extensively into complex design with new sub-fields such as design strategy, design management, ergonomics, post-modern design, rhetoric, participatory design, user-based design, collaborative design processes, reflexive design, reflective design practice, design evaluation, interactivity, interaction design, mass customization, and open source design. This transition brings the Art and Design subfields into the territory addressed by the design research, design practices and design education of complex systems design

To précis, the above indicates that:

- Findings of complex socio-technical systems design research apply to all Art and Design fields involved in this transition into complex systems design.
- Previous tacit assumptions about design practice and the basis of design theory and research across all Art and Design fields may be inappropriate, inadequate and incorrect in terms of addressing these new territories of complex design.
- Outcomes of design activity in Art and Design fields can be improved and failures reduced
- Design education in Art and Design fields may need substantial change along with a deep revision of design research and theory in those fields.

To explain these issues in more detail, this paper focuses on *counter-intuitive design*, a core element of complex systems design research. This focus provides a basis for identifying other aspects of complex systems design important for Art and Design fields and, at a larger scale than addressed in this paper, provides a template for including them into Art and Design theories, practices, education and research.

Changes in the Scope of Art and Design fields

Until recently, the focus in design in Art and Design fields has been on form, attractiveness, simple functionality and responding to non-complex design brief criteria. Design methods and theories of Art and Design have focused on the immediate and close at hand where causes are direct (for example, a user interacts with a computer screen on the basis of what they think and feel that the screen will do in response to their activities in the now). This kind of design activity is an activity for which human brains are evolutionarily well-adapted. To date, design education in Art and Design fields has aimed at refining human skills in this kind of design activity.

Recently, Art and Design fields have increasingly targeted creating designs whose influences and effects are remote in time and place, with multiple causal factors often with feedback loops especially in the socio-technical arena. In parallel, many conventional design situations in Art and Design fields are now increasingly viewed with more sophistication than they were and designers are increasingly expected to take into account complex socio-technical design factors with multiple feedback loops. These changes to the scope of Art and Design

fields' activities reposition many previously 'normal' design issues addressed by Art and Design designers as complex systems design problems to which the findings of the complex systems design field apply.

The research described in this paper has identified a disjoint between the new scope of Art and Design fields with their transition into the complex systems design arena, and the limitations of traditional Art and Design approaches that are inappropriate to complex systems design. In addition, it was identified from the literature that there seems to be extensive blindness across Art and Design fields of these limitations and a naïve presumption that traditional design concepts, theories, design methods, analyses and educational programs typical of Art and Design's earlier eras apply to these new complex systems design situations.

Together, these present a significant problem. Design practitioners and research are using theories and tools that do not work in the new complex systems design arenas in which they are increasingly involved. Worse, design educators are setting up design students to fail.

The Problem: Errors of Thought, Feelings and Intuition in Design

To recap from the first section, humans throughout our evolution have adapted as a result of selection pressures from our environments. This development has biologically limited our cognition, emotions, feelings, intuitions and reflexes to deal with situations that are simple, close in time and space, and where causes are directly and obviously linked to outcomes (e.g. touch a fire and your finger gets burned). Our brains have, however, also learned to occasionally adapt to forecasting the outcomes of situations, but only those with a **single feedback loop** and this has provided designers with the biological attributes by which they can design simple technology unaided by technical support (the room temperature rises, a thermostat cuts in and turns off the heating and the room temperature goes down until that the thermostat cuts in and restarts the heating).

The absolute limit of human thinking and intuition seems to be biologically limited to understand situations with **less than two feedback loops**. Only the most experienced complex systems practitioners are able to intuitively assess the behaviour of a situation with two feedback loops and then only approximately. These biological limitations of human thinking, intuition, feeling and understanding apply to designers as much as non-designers. A simple test: Peter has \$1.10 and buys two items. The first item costs \$1 more. How much is the second item? Most readers answer 10 cents. This is a very simple uncluttered *single* feedback loop problem shaped in arithmetic. The answer is \$1.05 and 5 cents. To test if one can easily predict the behaviours of a simple *double* feedback loop situation try http://web.mit.edu/jsterman/www/Bathtub.pdf .

Most contemporary non-trivial complex design problems, however, commonly have dozens or hundreds of feedback loops (see for example, <u>http://www.shiftn.com/obesity/Full-Map.html</u>). Traditionally, designers from Art and Design fields have dealt with this problem by several approaches, all of which can be seen to be invalid and produce faulty design outcomes:

Define the bounds of the design context so that they exclude feedback loops Ignore feedback loops by calling the situation a 'wicked problem' Avoid thinking about the feedback loop issues and instead attempt to use traditional design tools of bodily feelings, intuition and visualisation that are only appropriate to non-feedback loop problems Attempt to use consultation with multiple stakeholders as a substitute for understanding the situation and the behaviours of proposed designs. This is seductive but unsuccessful: multiple individuals all misunderstanding the behaviour of a situation is no better as a design method than one person misunderstanding the situation.

All of the above four common design approaches used in Art and Design fields to address complex systems design problems result in faulty design solutions in design situations involving 2 or more feedback loops. Experience has shown that many of them will produce results opposite to those intended by the designers.

Humorist Henry Mencken is quoted as capturing the essence of this issue,

'For every complex problem, there is a solution that is simple, neat and wrong.'

The usual design approaches of intuition, visualizing and feeling ones way round a solution do not help when a designer is unable to fully envisage how the solution will behave. Evidence shows that people intuit the wrong answer whilst believing absolutely (on the basis of their feelings and mental comfort) that they are correct.

Meadows (1999) a key author of the seminal book 'Limits to Growth' (D. H. Meadows, Meadows, Randers, & Behrens III, 1972) that sparked off much of the present ecological, environmental and green movements, quoted Forrester,

'Time after time I've done an analysis of a company, and I've figured out a leverage point [the location of the most effective design intervention] - in inventory policy, maybe, or in the relationship between the sales force and productive force, or in personnel policy. Then I've gone to the company and discovered there is already a lot of attention to that point. Everyone is trying very hard to push it *in the wrong direction*!'

This is a significant problem of design research practice and education. Designers falsely feel and believe they can intuitively understand and predict the behaviour of systems with multiple interlinked feedback loops. Erroneously our minds and bodies both give clear indications that we can understand and predict complex design behaviours with 2 or more feedback loops when we cannot.

An additional problem is that complex multi-feedback loop designs ARE produced and designed by designers across all Art and Design sub-fields using the approaches suited to non-feedback loop problems. These designed products, services and systems usually fail. The gap in time between their initial production and their failure are typically such, however, that the failures are not attributed to the designers. Commonly, complex designs function well at first and later when problems emerge due to the actions of the feedback loops, the design failures are blamed on something else.

Counter-intuitive Design

In the complex systems design field, the creation of designs that address the problems of humans' limitations in thinking, feeling and intuition of situations involving two or more feedback loops is known as 'counter-intuitive thinking' and the results are counter-intuitive designs.

The idea of counter-intuitive thinking was raised by Forrester in the realm of Industrial Dynamics as long ago as 1969 (Forrester, 1971). Industrial Dynamics, which later became called System Dynamics, is a core theory and method foundation of the complex systems design field. Counter-intuitive designs(and the methods for identifying them is the process of addressing what are known and avoided Art and Design fields 'wicked problems'. In parallel, Zwicky (1969) developed 'morphological analysis' as a supporting counter-intuitive design methodology for addressing 'wicked problems' that identified the real design space of a 'wicked problem' by excluding design options that are not viable regardless of their apparent attraction.

Forrester and later Meadows (1999) identified there were an uncommonly large number of instances in which highly competent designers, planners and managers involved in creating or intervening in complex sociotechnical and organisational systems designed solutions that in the longer term resulted in movement away from the intended outcomes rather than towards them. The same issues are found in all areas of design involving two or more feedback loops. For example, in the arenas of manufacturing design and organisational design, Deming (1986, 1993) identified it was common for designers and managers of manufacturing systems to make similar errors in the direction of their judgments when asked to resolve production problems and improve the quality of output. In the environmental design field, designers, planners and managers of third world development of food production suffered similar misguided design decision making (Harrison, 1987).

The only approach that has proven success in designing in situations with 2 or more feedback loops is the use of mathematically-based formal representational systems modelling techniques by which the detailed behaviour of designed outcomes in a multi-feedback loop situation can be predicted. Evidence of both the counter-intuitive failure phenomenon and the success of the mathematically-based system dynamics models is particularly strong in the design of social and socio-technical systems.

Complex System Design

Over the last 50 years or so, across complex systems design fields, a range of design and analysis tools have been developed that enable designers to work with design situations involving more than one feedback loop. An example is the use of System dynamic causal loop modeling shown in Fig 1 below that shows the feedback loops in the analysis of a design for a university research motivation scheme. The causal loop model comprises entities (in boxes) and causal relationships (arrowed lines) between them. Feedback loops comprise any closed loop of arrow-headed lines in the Figure regardless of the direction of the arrows. There are dozens of feedback loops in Figure 1. The number of feedback loops is the total number of combinations of lines that make continuous loops.



Figure 1: Analysis of a multi-feedback loop design of a university motivational information system (Love & Cooper, 2008)

The casual loop model has value in itself for assisting with 'thinking out' the causal relationships and checking that the thoughts and opinions and beliefs of all contributors and collaborators in a consultative process have been included. In the form above in Figure 1, the causal loop diagram provides a visible basis for designers to start to understand the feedback loop relationships at least to the point that they can infer the direction of likely

changes in outcomes. This is an important first step in avoiding designing solutions that act in opposition to what is intended.

The more important advantage of the above causal loop model, however, is that it can be converted into a working predictive design tool. The causal loop model in Fig 1. is capable of being developed further into a fully-fledged active system dynamics design model that can be used by designers to predict the behaviour over time of their designs in ways that include all the actions of the multiple feedback loops of the situation.

The problems of counter-intuitive design thinking and the failure of conventional design techniques in complex socio-technical systems design or interventions is particularly significant for new sub-fields of design in Art and Design whose focus is on complex design situations. These new design subfields include, e.g. Design Strategy, Design Thinking and participatory/ collaborative approaches to design. The findings and analyses of the research outlined in this paper suggest the above new design sub-fields are promoting benefits that are likely to be illusory and short term when applied to designing situations involving more than one feedback loop.

Resistance to Change

It can reasonably asked,

'If the above issues and problems are so obvious and so significant, why they are not already mainstream thought in design education and design practice in Art and Design fields?'

Several answers can be inferred from observation; most of which have political and personal dimensions:

- The problem of counter-intuitive thinking and the limitations of current design approaches to multi-feedback loop design situations exposes much of what is currently considered 'design cognition' and the design and emotion literature to be compromised and in need of significant review in relation to new complex areas of Art and Design.
- The nature of many Art and Design fields and their history in craft, which is normally not complex, along with designers' well-established central roles in creating new products and services, all these make it hard for designers and observers of design in Art and Design fields to identify that design thinking, research and education is compromised by human limitations.
- It takes a particular kind of perverse thinking to counter-intuitively identify falsely successful design outcomes. For example, that designed technologies that apparently encourage social interaction and collaboration, for example, iPods and iTunes, result in the opposite: the social isolation of individuals predominately listening to music or watching videos by themselves rather than spending that time engaging in social interactions with others (its primary role is as a 'personal' media device (http://www.apple.com/au/itunes/)).
- Without awareness of the phenomena of cognitive bias and the relationships to counterintuitive design thinking and feedback loops, it is hard for us to see cognitive biases and

biologically-based human limitations on design practices. The lack of design education on this topic leaves designers to presume the phenomenon does not exist.

- It is deeply disturbing to our sense of self as individuals to realise that one's thinking is compromised and likely to be 100% wrong in one's areas of expertise, especially in situations in which by previous design training one is absolutely sure of something and feels that one's judgement is absolutely correct. Sudden awareness of these deep personal failures in the processes of an individual's design judgement typically results in strong emotionally-based and ego-protective forces from within the individual that act to push aside this awareness of their faulty design thinking.
- In cases of obvious failure of complex designs created using design approaches only suited to problems of less than one feedback loop, there are two common responses by design fields. Experience has shown that designers, design researchers, theorists, sponsors and users will typically be persuaded that the problems do not exist (by sleight of media hand) or will claim that the failure of the design is due to some extraneous reason that could not have possibly been seen at the time of the design, for example, that they are 'wicked' problems.

Wicked Problems in Art and Design fields

The above analyses raise a challenge to a core assumption in professional design practices in Art and Design fields. Since 1971, the idea of 'wicked problems' has been central to defining the boundary of difficulty in design in Art and Design (see, for example, Buchanan, 1992; Coyne, 2005; Rittel, 1971; Rittel & Webber, 1974; Rittel & Webber, 1984).

The idea of 'wicked problems' has acted both as a designer's escape clause from responsibility and as a safety belt protecting designers from prosecution. When a design situation can be classified as a 'wicked problem' then it has been assumed by the thinking of Art and Design culture, that the outcomes of design work can only be speculative and designers cannot be expected to guarantee good design solutions.

In essence, a 'wicked problem' is one with multiple feedback loops. A limitation of the design methods of Art and Design sub-fields has been that 'wicked problems' cannot be satisfactorily addressed by the design methods approaches of the fields of Art and Design. In part this has been what has defined the idea of 'wicked problems' in Art and Design fields. In contrast, the 'wicked problems' of Art and Design are typically seen in systems design fields as conventional design issues s to be addressed by the design methods of complex socio-technical systems design.

This invites the question whether wicked problems are not wicked at all. It may be that the idea of 'wicked problems' is best seen as a politically convenient fiction. Redirecting blame, as in the last point of the list in the previous section, raises the question as to whether design failures in the case of wicked problems are merely due to lack of competence in designers. It opens up the question of whether wicked problems could be addressed as a matter of course in Art and Design fields, if designers from those fields used readily available complex systems design methods.

The evidence from complex systems design field as it applies to design fields in Art and Design is that apparently wicked problems can be understood and addressed that this suggests failure to do so lays the responsibility for design failures not on extraneous factors but rather firmly in the hands and bank accounts of designers, design educators and design businesses in Art and Design fields.

Implications

The implications of all of the above analyses reach deeply into and challenge many contemporary practices and beliefs in design education, research and professional practices in Art and Design.

To recap, at their simplest, the findings from the fields of complex systems design indicate that when humans, designers or not, try unaided to understand complex systems, predict their behaviour and create designs that interact with complex situations they will fail. Experience shows that most system outcomes involving two or more feedback loops are counter-intuitive.

Designers will typically produce solutions that are faulty, and they will suggest design improvements in the opposite direction from those necessary those that will produce the intended design behaviours. In addition, designers will typically be falsely confident about their ability to identify the most critical points of the design situation and their design solutions.

Resolving these issues requires designers in Art and Design fields to understand that:

- Human brains are not adapted for envisaging or intuiting understanding of multiple feedback loop systems
- Complex systems with two or more feedback loops is an area of design in which design fails dramatically when it is based on human subjective thinking, intuition, feelings and emotions
- Counter intuitive outcomes are the norm
- Design methods not usually used by designers in Art and Design can help identify and address counter-intuitive design issues that are beyond the limitations of designers brains, intuition and feelings.
- Conventional design methods from Art and Design fields do not work in the complex design arena involving two or more feedback loops.

The analyses also suggest that many design tools, methods and theories, particularly in the areas of design cognition and design thinking, are deeply flawed in ways that are not, or have been not, obvious to students, Art and Design educators, design theorists and design practitioners. This suggestion comes from a realisation that many common design activities in Art and Design fields can be, and are now being, reinterpreted through a lens of complexity. This is particularly obvious in the uptake of 2nd order cybernetic approaches in which the designed object results in learning and a reshaping of what it is to be human. This results in interpreting designs

in terms of multiple feedback issues that by implication then need to be incorporated into design research, theory and competent professional design activity. Conventional design methods and theories of Art and Design fields that are suited to non-complex design situations do not have the scope to address these issues and hence are now insufficient for the design issues for which they were previously developed.

Part of the blindness towards these failures is as a result of the biologically-based delusion by which designers, design educators and design researchers will incorrectly feel good about what they do, feel that it is correct what they do, and designs will appear initially to function. It is later, after handoff of a design, that the influences of a design's multiple feedback loops will emerge, the designs will fail or will produce outcomes that are different or even opposite to those intended (see, for example, the iPod example above).

Implications of these understandings for design education in Art and Design fields include:

- It is important to educate designers, and for designers in practice to be aware, that designing solutions involving systems with two or more feedback loops cannot be thought through, inferred or successfully undertaken by design thinking, designers' intuition or feeling-based design methods.
- It will be important to teach designers to be aware that when there are two or more feedback loops in a design situation, the characteristics of successful designs will most often display counter-intuitive relationships that will 'feel' or be thought of as wrong.
- It is important for design educators and students to be able to distinguish between *complex* design situations involving two or more feedback loops and merely *complicated* design situations, where 'complicated' means design situations with a lot of simple non-feedback factors, as distinct from complex situations with multiple feedback loops (and perhaps less design factors).
- An important aspect of design education and design practice is for designers to be able to identify when they are designing in 'complex' rather than 'complicated' realms.
- It is likely important for design educators to understand that design thinking, feelings and intuition are typically a handicap rather than useful skill in designs involving multiple feedback loops. Traditional design expertise in being able to intuitively feel one's way around a design is mistaken in these types of situations. Designers cannot feel their way around a solution and identify correct solutions by feelings because emotion-based designerly judgement is false in situations involving two or more feedback loops. Solution will be either wrong or sub-optimal. In the case of interventions in designed systems, designers' feelings and intuition-based skills are likely to suggest interventions that will move the solution in the opposite or a different direction from that which they intend in spite of the fact that they will feel happy with the solution at the time of designing.
- Design educators will likely find it useful to emphasise that in design practice the designed system's BEHAVIOUR is the primary issue, and that explicitly understanding how and why a design behaves the way it does is essential to being able to design successfully in a competent and comprehensive manner. In complex designs involving multiple feedback

loops, craft-based design methods that do not require this depth of explicit understanding of behaviour do not result in the solutions that align with designers' intentions or visions.

- It is likely to be important that when designing in complex situations, designers in Art and Design sub-fields are taught to use appropriate design tools from complex systems design fields that describe and model behaviours of the design and its feedback loops. Two appropriate complex systems design tools are 'Causal Loop modelling' and 'System Dynamic modelling'.
- It is important for design educators to be aware there are two different classes of systems tools: *information-gathering* systems design tools and *behaviour-modelling* system design tools. Most systems design tools identify *information* about system parameters and boundary conditions of specific responses. All of this information is necessary in preparation for using behaviour modelling system design tools. They are different from the relatively small group of system design tools used to model and predict system *behaviours*. Designers who only use information-gathering systems design tools such as soft systems methods will not be able to understand or predict the behaviour of a designed system using these tools. They will face identical design problems to those that do not use any systems tools because they will be depended only on traditional design approaches such as feelings, intuition, group discussion responses as in participative design. As described earlier, these and similar design approaches fail in complex systems because of the limitations of all human brains in situations involving two or more feedback looks.

Conclusions

This paper has described research reviewing the insights from the complex systems design field to Art and Design fields that are increasingly involved in designing in complex design spaces involving two or more feedback loops. The paper draws attention to the implications of these findings of the field of complex systems design for recent developments in Art and Design fields. The paper has identified limitations to the design methods, practices and theories of traditional Art and Design fields when applied in complex socio-technical systems arenas. It has suggested that these will consistently result in faulty design outcomes and, from experience, that a range of socially-based illusions and deceptions are used to deflect criticism of these failures.

The analyses outlined in the paper suggest changes are needed within design education and practices in Art and Design fields towards more sophisticated understanding of complex systems design and prediction of the behaviours of design outcomes in complex design solution spaces that involve multiple feedback loops through the use of mathematically-based complex systems tools to address counter-intuitive behaviours relating to usability, emotions, user participation, interactions with other design objects, platform designs, design strategy, and design thinking.

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The Italian Design Research and Practice in Cultural Heritage Exploitation Luigi Brenna, Eleonora Lupo, Alberto Seassaro, Raffaella Trocchianesi, Dept. INDACO, Politecnico di Milano

Abstract

This paper will present, starting from some of the results of Milano Politecnico Industrial design Dept. Research Group in "Cultural Heritage Enhancement", some theoretical considerations about how to develop design research in the groundbreaking field of enhancing Cultural Heritage. In fact, this is an emerging area of knowledge and professional field for design research processes and practice.

The investigations and projects realised provide a wide range of cases which give evidence to the innovative and often tacit role played by design in enhancing the value of Cultural Heritage. Design can in fact enable sustainable cultural awareness and permit people to experience culture in a more involved way.

This paper will illustrate some academic design experiences and exemplary research activities on cultural heritage evaluation, analyzing different contexts and pointing out their implications with design theory and educational approach.

Keywords

Cultural design Heritage fruition Enhancing by design Design tools and processes for Cultural Heritage Design concepts

1 | PREMISES AND DICIPLINARY FIELD

1.1 | Why Design for Cultural Heritage?

Luigi Brenna

Italy is famous as the country which has the largest concentration of cultural heritage sites in the world. The country counts several monuments: churches, castles, museums and other buildings which represent a very unique inheritance which no other country can rely on. Furthermore, Italian territory can be considered a masterpiece of art itself because it is the witness of centuries of history and craftsmanship aimed to preserve and use the land from an agricultural point of view.

For this reason there are many different disciplines which study cultural heritage from different points of view: history; building restoration, literature, architecture and archaeology.

Nevertheless, the ability to enhance this richness is not often satisfied by a singular specific scientific discipline. Each one of the fields mentioned above is a scientific contribution which serves well in its role to preserve the cultural heritage, but most of the time it lacks a broader vision which considers the final users' point of view (Brenna, 2003). Furthermore, the technicalities of each disciplinary field might not express all of the symbolic and communicative aspects which are so important in giving sense to a community and its land. That means that a monument represents only a cost to be preserved instead of a richness to be used in a profitable way. Besides, one should not forget that the concept of cultural heritage is very large and includes an amount of tangible and intangible goods which traditional disciplines hardly consider.

Design then, can bring its approach to the cultural heritage field. The specific field of design is about people and their relation with the product –system (Mauri, 1996)¹. Design studies reality, interprets it in order to produce something, tangible (products) or intangible (services) which permits society to grow and live better (let's think about the Fiat 500's role in after war

period in Italy). For this reason, design must consider the complexity and the variety of the contemporary world and act like a link among different aspects which gravitate around a point of interest.

The case of cultural heritage is considered one of those points of interest in which a wider vision must be brought to light in order to connect and synergize all different aspects involved (building, territory, history, communication, service, fruition and preservation). Design approach permits people to use the immense heritage left by history, and to consider it as a chance to get pleasantly involved, while learning about the territory itself and having unique experiences inside it (De Biase, 2008)².

1.2 | Design and Cultural Heritage

Alberto Seassaro

Design began to deal with the cultural heritage system when it started reflecting on itself, and realized that its original area of application, (in terms of furniture, product, graphic design...) result of the industrial culture, had entered into crisis and evolved into a more complex dimension. At this point design came out of the area of industry to tackle new territories (Seassaro, 2004).

A multiform platform has been built around design for cultural heritage. In this platform there are elements that together allow a mediated reflection and several design opportunities translatable into real or simulated activities that enrich the knowledge about this field. In some areas of intervention it is still not commonly understood that design is the appropriate tool to valorise the heritage and generate several cultural phenomena (Seassaro, 2006).

In design processes for the enhancement of cultural heritage there are three components: - design as a discipline *multiverse* (Bertola, Manzini, 2004);

- cultural heritage which, until recently, was considered to include only artistic or historical and aesthetic values;

- between these two elements there is the user of these processes. While up to some time ago this user was considered a "contemplative user", today it is necessary to identify him as a subject with a more participative role.

There is therefore an interesting triangulation:

1. multiverso design with its dynamically evolving phenomena,

2. cultural heritage as category which tends to become all-encompassing

3. the user, whose ways of fruition are constantly changing.

These elements are compounded by the designer-"metadesigner" as mediator-interpreter of this process.

The "metadesign" action is also expressed by historical-critical scientific profile that accompanies cultural heritage in a new dimension; cultural heritage changes because contextual factors change: as a consequence, there is a new identity, a new cultural product.

If the project aims to answer a specific question, the "metadesign" deals with the question and in doing so, uses innovative scenarios.

1.3 / Design "Calls" Cultural Heritage

Raffaella Trocchianesi

The contribution of design in the cultural heritage context is to identify and shape design strategies, tools and methodologies to enhance the cultural heritage at different scales (from the landscape to the city, from the building to the product, and up to the intangible heritage such as traditions, crafts, etc.). Cultural heritage design is an interdisciplinary matter involving the skills of interior, product, communication and strategy design (Trocchianesi, 2005).

The evolving concept of cultural heritage, which has been extended from specific individual artistic products to a more expanded and complex dimension (often intangible) including cultural identities and material traditions of entire territories and landscapes, needs new approaches

(Trocchianesi, 2006).

Such a broad and complex definition of cultural heritage leads design reviewing its cultural paradigms in order to make them applicable in the interpretation and intervention on territorial cultural resources (Trocchianesi, 2008a).

Currently the issue of cultural heritage is a strategic asset in national and international systems that support and facilitate the use of innovative approaches for the exploitation of cultural resources. Companies, governments, local and regional clusters can become partners and important clients in search of scientific expertise in this field.

Culture in its material and immaterial manifestation is becoming an ideal (political and scientific) platform for the testing of a new "Made in Italy" concept, based on the enhancement of cultural heritage through design oriented practices.

2 | CASE STUDIES

2.1 / Olbia: Stopping the Flow³

Luigi Brenna

The project *Olbia: Stopping the Flow* is the result of an eight day workshop⁴ held in Olbia by Raffella Trocchianesi and Luigi Brenna (Politecnico di Milano) during the summer school SEI (International Summer School) Environment and Design⁵. In this case the cultural heritage to be considered and enhanced was the city of Olbia and its surroundings.

Olbia is known for its very busy port which permits tourists to come and visit Sardinia. Not many attractions justify remaining in town, in fact people prefer to leave as soon as they can, to enjoy other Sardinian places better known for environment, services and vibrancy.

From Research to Vision. The first step was to *explore the city* in order to capture its identity. Students were urged to express in a graphic way (by picture, video, sketches,

photomontages and written thoughts) the impressions they could get by walking into town and by analyzing the communication that Olbia produced in terms of web sites, magazines, articles on news papers, brochures, and pamphlets . Then students were invited to show the "city portrait" to better understand which kind of Olbia came out from their observations. The character of a "passing through" city emerged overbearingly, becoming the basis on which the design concept has been build upon.

Brainstorming followed the first phase of research and a *vision* appeared about the idea that the "grab - and - go" character of the town could represent a real opportunity. Olbia has been interpreted as a creative and subjective gate to the town itself and all of Sardinia. It has been thought as a sort of speaking, artistic and interactive window, able to welcome and emotionally introduce the huge crowd of tourists to the experience they will have. At the same time Olbia has been seen as a place able to preserve and enhance the memories and the artistic expressions experienced by the tourists during their holiday in Sardinia.

Back to Reality. Giving Shape to the Vision. How to respond in a feasible way to the arisen idea? How to convert the vision into a possible shape of reality? Naming the project was the first step we took. "Olbia Pass-Port" seemed to be a perfect name for the concept. It recalls the personal document necessary to travel, but also the importance of the port which brings so many people to pass through Olbia.



Olbia pass-port: the series of travel notebooks

The idea is about a product system based on a tool which finds itself half way from a tourist guide and a sketchbook. A sort of *Moleskine* produced in Olbia, thought to invite users to express themselves in a very personal and artistic way. Tourists were invited to use this particular book; signing, designing, sketching, painting, gluing and writing everything concerning the emotions Sardinian land left inside their souls. The user/composer at the end of the vacation is invited to leave a copy of his best pages which will be part of a continuously changing exhibition about Sardinia. In fact, the most communicative pages can be reproduced in order to be shown in different ways inside Olbia. They can be placed in an outdoor exhibition to display in the main course of the town; the "tourist masterpieces" could also be displayed in corners placed inside bookstores or public buildings; and they can be published by the Olbia Tourist Office either in annual books or on a section of the local websites.



Olbia pass-port: The Corner Point in the Bookshop and the Outdoor Exhibition

By "Olbia Pass - Port" the Sardinian town becomes the emotional window of Sardinia. It prepares newcomers to an emotional adventure; it provides a pleasant exhibition for people waiting for the ship back; it contributes to give a cultural dress to Olbia which can become the "art keeper" of Sardinian beauty and can improve its image in people's eyes by showing that Olbia cares about the people who come and visit Sardinia.



Olbia pass-port: The Web Site

The Product System. It's important to underline the role of the product system inside the project. In fact, design in this case, is not only concerned about making a communication product aimed to promote Olbia, but with the "Olbia Pass - Port" the design is about thinking of a system which can fit only the city of Olbia: build on Olbia's identity." ad hoc" for Olbia. The sketchbook is only one part of the entire system and it works only if all the parts of the system function: communication, distribution, services and players involved.

Conclusion. This case wants to show that no other existing discipline is concerned about enhancing a cultural heritage site (in this case a territory) in such a way. The field of the disciplines which studies cultural heritage are so specific that one can hardly elaborate a wide vision concept such as the one we have just discussed. Furthermore, it can be said that the interpretation ability of design is often closer to the final user than other disciplines are (Brenna, L.; Seassaro, A.; Trocchianesi, R.; under publication)⁶.

2.2 | Gonzaga's Chronicle. Errant Narratives with 8 Tarot Cards⁷

Raffaella Trocchianesi

Gonzaga's Chronicle. Errant Narratives with 8 Tarot Cards is a project developed within an applied research entitled *Mantua: Culture & Commerce City*, which investigates and proposes dynamics to upgrade and valorise a network of shops (principally historic ones) in the old town of Mantua, which is an important landmark of Italian cultural tourism. This research aims to relate, through design-oriented actions, the system of cultural heritage in the old town of the city within the trade system. The research is divided into two phases: an initial phase of "multidimensional" analysis of the territory aiming at building innovative scenarios leading to specific actions of enhancement, and a second phase in which six project groups receive this material previously "processed", proposing a city visual identity with potential contents, in order to develop innovative concepts.

Gonzaga's Chronicle. Errant Narratives with 8 Tarot Cards is one of these six developed concepts. It is a design action for urban enhancement, a system-product with the aim of upgrading the network of boutiques and shops of the old town of Mantua and some artistic and architectural outstanding works, thanks to a system of items (organized in a kit) given to visitors (citizens and tourists). The kit includes: eight playing cards, the game rules, and a city map, including eight tours matched to the cards themselves; and sound-tracks with eight sound trails (corresponding to the cards and the routes; and finally, public displays near the involved shops and cultural buildings.

The game is designed to promote an immersive and specific buying experience allowing a commercial and cultural city's enhancement. The eight cards, which correspond to eight urban

routes (realised and narrated by sound-tracks recorded for this purpose) represent characters, rituals, and values which are part of the history and of the urban culture of Mantua.



Gonzaga's Chronicle. Errant Narratives with 8 Tarot Cards: 8 Tarot Cards

It is assumed that the project is going to be launched during one of the many festivals of Mantua: *Ludicamente*, (the festival of no-technology games), just to accentuate the city's "game" vocation. Some information points, located near the six historic gateways of the old town city, will offer the kit.

This project draws on the historical practice and the iconic fascination of the tarot cards, reinterpreting them in a contemporary key and multiplying their communicative potential. Each user, having received the kit, has to choose a tarot card for his buying experience in the city (the choice is done by following game's actions or by following one's preferences).

The eight playing cards correspond to characters or values of the city combined within specific buying sectors (*Rigoletto*-fashion man, *The Admirable Critonio*-sport/free time man, *Isabella d'Este*-fashion woman, *The Ghost of Agnes*-sports/free time women, *The Underground*-food, *The Company*-self-care/welfare/home fashion, *Sacred & Profane*-culture, *The Black*-luxury).

The graphic language is deliberately not didactic but "visionary", in fact there are figurative elements that allow an immediate recognition, dialoguing with visual suggestions and other decorative motifs. The meaning of each card in its dual version - image upright or inverted, like in traditional tarot cards - is explained by the rules of the game. The map linked to the cards highlights the buying paths into the old town. Each card's itinerary is linked together with a sound-track designed to guide the visitor in a space disseminated experience of the city.



Gonzaga's Chronicle. Errant Narratives with 8 Tarot Cards: the System-Product

The audio-stories are original scripts (written by emerging writers from Mantua) based on the distinctive characteristics (in terms of content and language) of each tarot card, and provide breaks every time the visitor approaches one of the shops or buildings presented in the specific itinerary chosen. The itinerary provides moments of connection, and the sound-tracks go along with these plots, providing with the sound setting different narrative relations between characters and roads. The visual displays, positioned close to the involved shops, help the user to recognize the various stops, thanks to a silhouette image drawn on a particular tarot card.

During this experiential tour through the culture and the trade system of Mantua, the visitor comes in contact with different interfaces and languages of communication: the tarot cards evoke, the narrator's voice says, the map indicates, and the signs verify (Trocchianesi, 2008b).

The legendary and imaginative contextualisation provided for the experience creates new events for a city that proves to be the stage for countless stories (Trocchianesi, 2008c).

2.3 / "Paper Offerings" Active-Action by Design

Eleonora Lupo

"The system of relations explains and therefore increases the value and sense of Cultural Heritage" (Montella 2009), so the project "Paper Offerings Active-Action", developed within the Asian Life Style Design Lab at Hong Kong Polytechnic University School of Design, focused on the meaningful Chinese tradition of paper offerings. It was aimed at exploring, documenting, representing and enhancing this Chinese tangible and intangible heritage as a valuable and experienceable *cultural system* in the contemporary Hong Kong lifestyle, in order to allow people (local community and tourists) understanding and appropriation. This objective is pursued by designing some communication devices and tools called *visual display* ⁸(Goldshimdt, 1994) and *cultural maps*.

*Paper offerings*⁹ are objects made out of paper, which are burnt, and offered to gods, ghosts and ancestors, basically in search of protection or good luck, but they can also be used to solve physical diseases or other problems, or to make an offer to relatives who have passed away (Le Scott, 2007).

Paper is shaped in many different forms, decorated in various colors and sized in many dimensions, according to different purposes and uses. Basically traditional papers are twodimensional (among which is the famous "paper money") and three- dimensional copies of real objects, made up from a frame of bamboo strips (usually every day appliances, food or servants to the more common luxury and leisure products, like portable computers, mobile phones and every kind of fashion item).



Examples of Paper Object for Worship

Everyday items are used for daily sacrifices, while special items should be used for specific events, like festival and funerals. It's also common practice to buy and burn paper shaped as items of everyday life to provide them to the ancestors as gifts for their new life.

Usually, customers go to a paper shop and buy standard sets already packed or sets for particular deities and then go to perform the worship in the temples. Otherwise, customers can ask to the shopkeeper to prepare a personal set of paper offering.

So, even if paper offering has been disregarded and ignored as Cultural Heritage, and has never been communicated in a systemic perspective, it has various valuable elements like people knowledge, artifacts, places and practices, each one with a tangible and an intangible component: - material paper items;

- offering rituals and worship (and values associated);

- worship locations;

- paper production sites and processes;

- paper shops and retail processes.

All these elements together form an intangible cultural system (Kirshenblatt Gimblett,

2004).



"Paper Offerings" Active-Action: the Cultural System

Two hypotheses were basically in the background of this project: one is that a cultural system is a connected system that functions as a whole and could not be understood and implemented without designing all the relations among the elements; the second one, is that in each cultural/material system there are elements that have been deliberately designed and elements that are not designed, or, we could say, that have been collectively shaped and therefore are not easily perceivable and appreciable, because they are habits shared in a tacit way.

So, the design actions have been directed to the identification and documentation of the Heritage in order to enhance, and revitalize the various, less evident aspects in an experienceable way. For instance, strengthening the weaker or more fragile connections and incorporating the heritage value in the contemporary lifestyle, in order to keep the whole system alive. The final result has been a prototype of a design based system of knowledge and experience about paper offerings objects and processes, depicting in a systemic perspective, all of its aspects, through the design of *cultural maps*, useful both for local people (making them aware of its value as common heritage) and tourists (making it possible for them to discover it).

Those cultural artifacts are qualitative maps of Hong Kong, representing connections, correlations, causal relations and meanings among the valuable tangible and intangible elements of this diffused heritage in an enjoyable itinerary.



"Paper Offerings" Active-Action: Cover of the Itinerary 1 Map

The cultural maps have been used to localize objects, places and processes of production and uses of paper offerings. Two types of relations among the elements have been identified and structured in itineraries suitable for tourists: the first relation implies artefacts exchange, the second one implies knowledge exchange. Both of them are deeply connected with the context and the local community.

Using the map, the tourist can enjoy an articulated and complete experience of paper offerings heritage, starting from the shops and the paper items themselves, to meeting, craftsmen and learning about production processes and techniques in some workshops or to increase,

knowledge about rituals and worship, and moving to the temples and to the burning places.



"Paper Offerings" Active-Action: Pages from the Itinerary 1 Map

The map serves also as brief catalogue about paper offerings typologies and as a portable memory of the experience.

3 | CONCLUSION: DESIGNING CULTURAL HERITAGE

Eleonora Lupo

Design for cultural heritage includes that set of theories, methodologies, tools and techniques whose ambit of application is the system of cultural heritage in its broadest sense, as the cognitive dimension, social and symbolic of a territory and a community (Lupo 2007; Lupo 2008b).

More than a disciplinary field, it is therefore a context of application. Within this context, the design approach integrates different technical and operational processes in order to reach results and actions possibly located, recognizable and replicable. The typologies of design interventions

are addressed both on shapes configuration and on procedures and methodology, according to the complexity of the cultural heritage (Lupo, 2006; Lupo 2009b).

Some basic branches of design can be identified, in terms of operational practices and methods of the *traditional* concept design for cultural heritage, such as *exhibition design*, *communication design*, *lighting design*, and *services design* applied to the cultural field.

However, we detached a more articulated "system" of design skills, such as the ability to think strategically about aggregate skills (Seassaro, 2005). Those capabilities translate strategic choices, (such as heritage protection, management and exploitation), into practical activities for knowledge, organization and experience of the cultural heritage, throughout the synergic application of the communicative, specialist and strategic competences of design. (Celaschi, 2004).

The objective pursued by design is to create, activate and increase the value of a cultural asset in its civil, social and developmental role (from "value per se" to "use value", as system and experience). The concept of enhancement evolves from the "representation of culture" (Greenblatt 1995, Karp, 1995) to a system of collective use and development for an area and its community of reference: the heritage enhancement contributes to the construction of identity, integration and social cohesion, development, creativity and innovation (Greffe, 2005), overlapping short term and long term strategies.

Moving from competence to design processes, it is consequently possible to individuate *metadesign*¹⁰ actions aimed, with a *descriptive approach*, at recognizing the value of a cultural object and at providing it as a context more than a content of project for forthcoming interventions, and design actions aimed at the *active-action* (Lupo 2008a) of cultural heritage, improving by design its protection, knowledge (i.e. relief, representation, archive design), fruition, promotion and *production* (i.e. management, exhibition design, communication and corporate identity design, design of educational services and information design, production of multimedia and video, events design).

Design serves as a mediation between a context, a cultural object (or a system of goods) and the user or the community of reference, and has a relational approach among different layers and scales of action, becoming the *form of organization* of cultural heritage, allowing the *legitimacy* of its value (i.e Paper offerings "active-action"), promoting occasions and times of different *access, use and appropriation*, (i.e. Gonzaga's Chronicle), and developing strategies for innovative *recontextualization* of the same value (i.e. Olbia Pass-port), investigating the issues of authenticity (MacCannel, 2005), typicality and production locality (Lai, 2007).

As seen from the case studies, design for cultural heritage helps to facilitate the adoption of an innovative, systemic vision of cultural heritage in all its forms and to make, through a participative process, its active-action and fruition socially sustainable and economically viable for the community, as recommended by the institutional bodies for development (European Commission, 2007).

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¹ The system product concept was introduced by Francesco Mauri in his book (Mauri, 1996). It refers to the fact that an object can be considered product only when it is part of a system composed by distribution, service and communication

² see also the concept of *esperienza culturale "capacitante"* (enabling cultural experience) Sacco, Segre, 2008.

³ In Italian the title is: "Olbia – Sostare i passaggi".

⁴ The workshop was organized by the collaboration between Politecnico of Milano and Sassari's University of Studies.

⁵ In Italian: SEI (Scuole Estive Internazionali) Design e Ambiente.

⁶ see also the concept of *esperienza culturale "capacitante"* (enabling cultural experience) Sacco P., Segre, G. L'accesso alle opportunità culturali nell'economia dell'esperienza in: De Biase Francesco, a cura di, *L'arte dello spettatore. Il pubblico della cultura tra bisogni, consumi e tendenze.* Milano: Franco Angeli.

⁷ *Gonzaga's Chronicle. Errant Narratives with 8Tarot Cards* project by Raffaella Trocchianesi, Elena Enrica Giunta in the research *Mantua: Culture & Commerce City* (scientific manager Fabrizio Schiaffonati; scientific coordination Giorgio Casoni, Daniele Fanzini, Elena Mussinelli; design processes Flaviano Celaschi, project coordination Angela De Marco. Purchaser: Camera di Commercio of Mantua, shopkeepers association of Mantua)

⁸ *Visual display* can be defined as systems and tools for visual reasoning and thinking, to make explicit knowledge and to support creativity.

⁹ This work has been based on field observation and on the anthropological research of prof. Janet Lee Scott in Hong Kong, which is the most complete and systematic documentation of paper offerings and the definitive reference for further details. Our project is meant to be complementary to this comprehensive ethnographic study, providing a way to interpret and visually represent, by design tools and maps, the paper offerings as a system. To see further detail about the project please refer to Lupo, 2009a.

¹⁰ Within the innovation processes the design activity can be synthetically presented as *metadesign* and *design*. The metadesign (Giaccardi, 2005) has often been defined as "design of a design process", and is focused on research and finalized in understanding a problem (analyzing user, context, market, competitors, technology) in order to generate possible solutions (called *visions* and *scenarios*) «already *inscribed* in the reality» (Dematteis, 1995), while the design phase is focused on *concept* generation, modeling and prototyping, testing and evaluation, development and production. Both of them are creative processes that require design thinking and skills, but use different methods and tools: usually the metadesign is considered supporting the design action, but is itself a reflection on the creative process too.

MEDIVENT Biodesign: Innovation to develop medical devices

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Abstract

Respiratory system diseases are currently one of the most significant health problems in Colombia and worldwide. They can cause acute respiratory failure that requires ventilatory support in intensive care units. The Los Andes University of Bogota and the Colombian Pneumology Foundation, with the financial support of the Administrative Department of Science, Technology and Innovation in Colombia (COLCIENCIAS) have decided to develop a system capable of acquiring and storing essential information about patients' respiratory systems while they are receiving ventilatory support.

The process of this project combined an interdisciplinary collaboration between engineering, medicine and design that resulted in the ventilatory variables measurement system (Medivent). This equipment, which includes hardware and software, measures and calculates respiratory flow and pressure and the electric activity of the respiratory muscles, as well as other information. This experience has shown how research and development into electronic devices provides an interesting opportunity for industrial design not only from the anthropometric and ergonomic factors but also by intervening in the manufacturing processes of medical equipment in Colombia.

Keywords: Biodesign, Interdisciplinary research, product development, electronic devices.
1. Introduction

Respiratory system disease evolution has been characterized by the periodic exacerbations, which frequently cause acute respiratory failure, can require ventilatory support in Intensive Care Units. On the other hand the common respiratory complications in acute diseases like trauma, sepsis and major surgeries post surgery have also lead to a much defined necessity of specialized Intensive Care Units on the acute respiratory failure treatment, with mechanical ventilation as the most vital support strategy. The approach of the interaction between the patient and the ventilator has changed from the popular "fight" between them, which ended with the sedation of the patient, to the research of most flexible ventilation systems, which adapt to the necessities and conditions of each particular patient, and involve, compulsory, a deep understanding of the respiratory mechanic during the ventilatory assistance.

Today the goal is the achievement of the best balance between the ventilatory requirements and the risk of leading lung damage. The research of more sensitive and adaptable systems to the ill, with fewer risks for him and that improve the results of the mechanical ventilation application have motivated the development of the Non-Invasive Ventilation (without endotraqueal intubation), and "cleverer ventilators" which let a dynamic monitoring of the ill breathing mechanics, a better adaptability to his necessities, and fewer risks of leading damage.

Currently there is no equipment in Colombia that measures jointly, in real time, the different necessary parameters to have a complete knowledge of the breathing mechanics during the ventilatory assistance to a patient, being in an Intensive Care Unit or in any other hospital dependence, in which that procedure takes place. Even more, the most sophisticated ventilation equipments that can be imported are highly expensive, and they do not do necessarily all have the complete direct measurements that are required for an appropriate understanding of a patient's breathing mechanics. There is not equipment to store the different respiratory flow and pressure parameters together, with the electromyographic information about the respiratory muscles and the cardiovascular system data, as electrocardiography and blood pressure.

The main objective of this project is to develop a capable system to acquire and store information about the essential parameters of a patient's respiratory mechanics, when she is subjected to ventilatory support in an Intensive Care Unit, in order to establish the procedures to be done to improve that ventilatory assistance. The system that will be developed is going to include hardware and software to the direct measurement of respiratory flow and pressure, the electric activity of the respiratory muscles, as well as the calculation of other parameters as volumes, differential pressures and respiratory work. Besides the leading to a better treatment of a respiratory failure patient, the successful development of this project will contribute to the development of high technology research works on the pneumology field.



Image 1. Different views of the Final prototype.

2. The Team.

The performer team is made up of investigators of the Department of Electrical and Electronic Engineering of the University of the Andes, who also are part of the Group of Biomedical Engineering and the Microelectronics Center of the Engineering Faculty. The Biomedical Engineering group of the Universidad de los Andes (GIB) is leader in biomedical investigation in Colombia and is qualified as excellent (group A) by COLCIENCIAS since 2000. The Microelectronics Center of the Universidad de los Andes (CMUA) is leader in Colombia in the development of systems and electronic Microsystems applied to the bioengineering and the automatization. Additionally a group of industrial designers from the Design, Technology and Health team submitted to the Design Department, were part of the group. The Research team of the Neumological Foundation, the beneficiary organization, is leader at national investigation of respiratory diseases physiopatology and their treatment.

3. General Conditions of Design

The equipment was designed to be used in the Intensive Care Unit of the Neumologic Foundation. It was designed for easy adaptation to hoses of the ventilator (for measurement of flow and pressure in aerial route) and to catheters with blowing up ball (for esophageal and gastric measurement of pressures). Ten channels of direct measurement for the following parameters were implemented: Pressure in aerial route, esophageal pressure, gastric pressure, arterial pressure, flow in aerial route (2 channels), electromyography signal (2 channels) and electrocardiography signal (1 channel). Parameters like tidal volume, transdiaphragmatic pressure, resistance to flow and respiratory work load will be calculated in software from the direct measures mentioned above. The system allows the visualization in real time and the storage of the different measured and calculated parameters, as its later reproduction. The design was made in such a way to provides facilities to update it and/or future modifications with the hardware, facilities to modify software and flexibility in the handling and configuration of the graphical surroundings for the medical user. The equipment was made with the required electrical isolation of the patient according to the security norms demanded to all medical equipment.



Image 2. General distribution inside the Intensive Care Unit.

As far as the variables use, the system was adapted to the pertinent protocols in the intensive care unit, generating readings and uses sequences that allow locating the sensors near the patient, avoiding possible injuries in critic situations. In the same way, virtual work spaces were generated for both, the doctor reads the signals, and for the physiotherapist who has the contact between the equipment and the patient (Image 2).

Each group of sensors measurement were grouped according to their function; flow, pressure and bioelectric- - it allowed the generation of anchorage subsystems that allow their easy manipulation while differentiate their use through colors, icons and formal characteristics.

In its internal structure, the equipment was design in dismountable modules, that allows their partial or total dismountable; this allowed the generation of containment subsystems and cards distribution (11 electronic cards that handle the biomedical signals and the calculation system that processes and stores the information).

4. Industrial Design Process.

The process of industrial design consisted on four stages that involved all the interdisciplinary team, these stages are: Background study, Ideas evaluation, Prototyping and Product implementation.

Background Study

In this stage, the Intensive Care Unit practices and modules were studied. The dynamic of the different users (doctors and Physiotherapists) were registered. The advantages and disadvantages of the existing equipments were studied. Doctors and engineers interchanged ideas, which allowed to make projections and to discover not only the needs that the system would have to fulfill, but also to visualize design opportunities they had not been previously projected.

The equipment communication elements, would have to simplify its use, even though has the complexity of regroup variables that traditionally are used in three different equipments and it would be easy to be used by the personnel in an intuitive way. In addition, the system would have to be divided in work areas such as: reading and study of the biomedical signals (specialist doctor), manipulation and use of the sensors (physiotherapist) and finally, electronic components access and dismantling (technical support personnel), (Image 3).



Image 3. Initial constructivists outline design.

Ideas evaluation

With the determinants and requirements of the previous step, all the members (doctors, physiotherapists, system engineers and electronics) carried out brainstorming, concepts exploration, and visualization of the project sessions. Expectations of the Intensive Care Unit personnel had to be taken into account due to the human activity they work on (Image 4).

With this information, alternatives generation happened in a very dynamic way, and the activity of industrial design was centered in its capacity to communicate the different ideas the group had considered in the sessions through sketches, volumetric models and story boards. Now, what in the beginning had been conceived like several isolated systems became into and independent, compact and robust equipment.

Prototyping

The stage of prototyping beginning from the alternative selected by the members of the investigation equipment. From this point, they began to study the variables of production, in special the related ones to the equipment, materials, processes and norms that were required.



Image 4. From the sketch to the virtual model, details of the communication ideas process and details simulated by software.

Parallelly, a scale model was elaborated scales 1:1 to verify dimensions and accesses. This it served us to draw the planes initiates to them of the equipment that soon were re-drawn in a 3D software (Image 5). This stage of instrumental work allowed us to define the functional details of the prototype in the measurement that we could verify them and create situations of usability with real users in simulated surroundings of the unit of intensive cares.



Image 5. From the craft model to the final prototype. From left to right: Real scale model 1:1, design assisted by computer y functional prototype.

Product Implementation

Having selected clarity in the materials and processes, the local technology available in Colombia was come to the hiring of services of manufacture for the different pieces from the equipment, using. Like aspect to emphasize, to have contact with the instrumental and artisan work of the local technological surroundings, allowed one better adaptation of the materials to the structure, making diversity of tests that could be difficult to carry out in controlled situations, like those of a laboratory.



Image 6. Patient under test support in Intensive Care Units

5. Hardware Design and Implementation

The hardware has a modular type with electronic cards easy to change and remove. Each channel will be connected to a card of analogous processing that will include amplification stages of the

signal given by the sensor, isolation, filtering, gain control and offset. All the cards of analogous processing will be connected to a control card and digital conversion. This t will have an interphase to USB port in order to connect it with a portable computer which will have to be mobilized with the rest of the equipment to the area required for measurement within the Intensive Care Unit. All the electronic components are fed by a regulated source that will be designed according to the voltage and load requirements, and with isolation of the amplification stage connected to the patient (Image 7). For the acquisition and preparation of the received signals, four types of electronic cards were developed this ones, process the signals from the four types of sensors to use: sensor of flow, sensor of pressure, electrodes of electromyography and electrodes of electrocardiography.



Image 7. Electronic components details

In the control card a conversion becomes analog-digitalis of hi-res (12 bits) and is used a most suitable sampling possible fraction for the signals to acquire, but that at the same time does not establish an excessive demand to the system in terms of transmission and data collection. The more accurate sampling fraction considered is about 500 samples per second by channel. This sampling fraction enough for flow, pressure and electrocardiography signals. In the case of the electromyography signals, whose phantom contains higher frequencies than the other signals, the LF were taken only (up to 150 Hertz), which provides enough information to check up the basic electrical activity of respiratory muscles.

6. Design and Implementation of Software

Software was designed in the of Visual programming platform C++.Net, it makes the following

functions: data reception sent by the hardware, visualization of the parameters measured in real time allowing the selection of channels the doctor needs to visualize, calculation of other parameters like tidal volume and transdiaphragmatic pressure, hardware components control allowing offset and gain variations, storage of directly measured and calculated data plus the patient information, and finally the reproduction and visualization of the data previously stored (image 8).

The graphical interphase with the medical user was developed handling a graphical language that allows the direct analogy with the equipment functions, taking advantage of the dynamic interactions that allowed by the touch screen. The data are kept in a binary format for greater storage speed and less computer's memory usage, but they can easily be sent to file text to be used by other programs, no matter if these ones are commercial or designed for some special processing.



Image 8. Visualization of the biomedical signals. Medivent allows visualize ten variables in real time at the same time.

7. Scientific and Technological Impacts

Medivent, has had a great impact at academic and technological field in Colombia, because has significantly contributed to improve the knowledge of ventilatory mechanics and to improve respiratory insufficiency treatments, especially those patients that must be attended with mechanical ventilation in an Intensive Care Unit. It reduced the complications related to the ventilator

application and reduced the permanence of patients at the Intensive Care Units. Its contribution to the Neumology investigation field and specialists is considerable. On the other hand, this one is the first equipment of its sort in Colombia. Professional engineers, designers or professionals interested in biomedical area could improve their knowledge in medical equipment design that can be developed in the country in reasonable costs for our hospitals.

The project research group activities, generated spaces where students, teachers and external organizations for investigation and development of innovation projects, have been created, allowing the union of privates companies, the academy and research centers in Colombia

8. Impacts on the Beneficiary Organization Productivity and Competitiveness

Medivent, has allowed to the Colombian Neumology Foundation attends its patients with a higher quality attention at the Intensive care Unit, reducing potentially the morbidity and mortality rate. *Medivent*, would contribute to improve the capacity of the research center in Colombian Neumology field.



Image 9. Sensors according function, from left to right: Electromyography (2 channels), Electrocardiography (1 channel), Pressure: (5 channels) and Flow: (2 channels)

Traditionally the health organizations in Colombia use most of their resources in the acquisition of imported equipment, due to the lack of confidence in its own research centers. **Medivent** appears like the first equipment of its kind that unified different professions and recognized importance groups in the research and innovation fields demonstrating the local possibilities for biomedical products design using national manufacture.

9. Results

Beyond the functionality and coherence with which the system has carried out its tests medical, the most ambitious results are intangible and show the reach of the interdisciplinary work, in so competitive areas at global level, as it is it the design of biomedical equipment in Colombia.

Originally the project was conceived to unify the functions of three equipment of attendance ventilatory in a single system of measurement that had to fulfill of the best way the registry of 10 biomedical variables, nevertheless, the work of observation and investigation with its future users allowed to go beyond, and to design experiences, protocols and special sequences of work, according to the medical specialty of each user.



Image 10. Final presentation of the system, winner in IDEA - International Design Excellence Awards 08. *Medivent* got bronze medal in the research Project category.

One of the main contributions of design was the subsystem of anchorage and distribution of sensors that allowed to locate cables in the neighborhoods of the patient; this subsystem allows to create an interphase between the patient and the equipment, being avoided sudden accidents in situations of urgent attention. In order to conclude, *Medivent* not only is an equipment that adapted to the protocols of the room of intensive cares, but that is a system that allowed to design new experiences

in the way to work in a space of these special characteristics, generating use situations that protect the patient of emergency situations, and allows to a greater efficiency for doctors and physiotherapist that works with a technology that often this sensitized to the situations you do not criticize of its patients.

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Aboriginal Architecture Merging Concepts from Architecture and Aboriginal Studies

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Abstract

This paper adopts a cross-disciplinary research approach which merges concepts and knowledge from architecture and from Aboriginal studies to explore how the process of design can support the future social and cultural needs of Indigenous building users. Through case study analysis, the paper presents observations that assist in creating new practices, processes and knowledge in architecture. In addition, an important component of the paper is its conceptual or theoretical framing. In this paper, literature on Aboriginal architecture is critically interpreted from the point of view of the Indigenous Research Methodology; an approach which sets a strategic agenda for planning and implementing research in a clear and conscious attempt to reclaim control over Indigenous ways of knowing and being. Accordingly, this textual research uses, for the first time in the discipline of architecture, a "decolonising methodology" that acknowledges the research project's post-colonial framework while actively considering the racial identities of Indigenous designers and building users.

Key Words: Australian Aboriginal cultures, contemporary architectural productions

Introduction

While in the architecture discipline, new models for representing Aboriginal identity in the form of a building are being constantly developed, they are typically only tested or critiqued from an architectural perspective. Mathilde Lochert (1997, p. 8) argues that such works are examples of colonial discourse which creates and entrenches specific and constraining concepts of Aboriginal peoples, identities and cultures. Architectural and design discourse, and especially as it is represented in the media, tends to function from within such existing colonial frameworks; the same frameworks which shape contemporary community perceptions of Aboriginal peoples in Australian society.

This practice is problematic because mainstream media is responsible for perpetuating the colonial conceptual framework wherein representations have a tendency to simplify and romanticise ideas of "Aboriginality" and "authenticity" that are framed within readings of the historic past, the Dreaming or a connection to country. From the point of view of this colonial framework, Aboriginal cultures are fixed in an unchanging past and delineated by a singular set of values. Architectural design strategies that work within this fixed perspective attempt to recover the past through incorporating traditional Aboriginal attitudes, customs and beliefs that are presented through unchanged historical descriptions. In recent years this practice has resulted in a growing number of buildings that evoke or resemble abstract representations of Dreaming Ancestors and animal totems. From a colonial or fixed theoretical perspective this may be seen to be reasonable, but, through a case study of such a design, the present paper identifies a range of problems with the approach and suggests alternative strategies.

The case study at the centre of the present paper is the Karijini National Park Visitors Centre (2001) designed by John Nicholas from the Perth architectural office of Woodhead International BDH. The Karijini National Park Visitors Centre in Western Australia supports an interpretative experience of the surrounding environment. In addition, the plan of the Visitors Centre abstractly refers to a significant cultural symbol for the local Aboriginal peoples. The Visitors Centre contains Aboriginal cultural references and symbols in an attempt to represent the identities of the local Banyjima, Kurrama and Yinhawangka Aboriginal peoples. The purpose of the paper is to question the use of Aboriginal animal totems as a design strategy. At the heart of this endeavor is a critical shift in theoretical framing away from the colonial or *fixed* perspective and to an alternative, "decolonising" or *fluid* perspective.

The shift in theoretical framework this research adopts is an important first step in addressing one component of the problematic history of cultural mis-representation that exists between Indigenous and non-Indigenous peoples. The project relies on an interdisciplinary approach that combines concepts and knowledge drawn from architecture and from Aboriginal studies. This approach contrasts with the majority of architectural scholarship on Indigenous peoples that tends to focus on the significance of the architectural design or on the way in which Aboriginal peoples use and perceive



Figure 1: Decolonising Methodology in Architecture. Source: Based on Smith (1999).

space (for example see Rapoport, 1975). In contrast, this research uses a decolonising methodology or Indigenous Research Methodology (Battiste, 1996; Rigney, 1997; Nakata, 1998; and Smith, 1999). This implies that the research acknowledges its post-colonial framework while actively considering the racial identities of Indigenous designers and building users. This conceptual framework relies on consideration of the attitudes, values and epistemological traditions of Indigenous peoples (Fig. 1). The decolonising methodology explicitly "reframes" actions and events from Indigenous perspectives. Thus, architecture is not investigated from a singular, architectural perspective. Instead, the proposed method critiques examples of Aboriginal architecture from an understanding of the practices, needs and beliefs of Indigenous peoples in an attempt to transcend current boundaries and thinking. The ultimate aim of this endeavour is to explore how design practices, processes and knowledge can support the future social and cultural needs of Indigenous building users.

The decolonising methodology acts through a process of "reframing" that seeks to correct false claims, to interpret or re-interpret actions and events from Indigenous perspectives and to re-think current definitions of Aboriginality in architecture. Thus, "reframing" takes greater control over the methods used to discuss and position Indigenous issues (Smith, 1999, pp. 153-154). This conceptual framework centres the Indigenous voice of the researcher within the architectural discipline and engages with the emerging field of Indigenous architecture.

In summary, this paper is an examination of key concepts and issues associated with the way in which Australian Indigenous cultures have been portrayed within contemporary architecture and the wider built environment. The "built environment" in this context incorporates urban design, landscape architecture, interior design, and some industrial design in addition to architecture. This investigation will occur through an analysis of existing literature, primarily drawn from the field of architecture. This review is supplemented with literature from the fields of Aboriginal studies, art, sociology and anthropology to consider Aboriginal peoples' identities and their connection to Dreaming Ancestors, animal totems, country and the environment. Furthermore, the discussion and analysis is informed by first hand observations and recordings of the case study building and by an analysis of primary and secondary texts and materials (architectural plans, design sketches and models). This information is then synthesised into a critical textual analysis. Importantly, the present paper does not attempt to define what an "authentic" Aboriginal architecture might be, and it is not concerned with the relative success of this building from a financial or social perspective. It is also impossible in a short paper to explain the full complexity of the Aboriginal peoples of Australia and the Torres Strait Islands.

Karijini National Park Visitors Centre

The Karijini National Park Visitors Centre is surrounded by the semi-desert landscape of the Karijini National Park (formerly Hamersley Range National Park) in the remote, iron-ore rich Pilbara region of Western Australia. The Karijini National Park is at least 1400 kilometres drive north from the city of Perth. Alternatively, it is 120 kilometres north-east of the town of Tom Price (Fig. 2). The Karijini National Park is the second-largest national park in Western Australia. It is a flat, arid terrain that is dissected by a contrasting, network of ancient geological formations, tree-lined gorges and plunging waterfalls. The purpose of the Karijini National Park Visitors Centre is to provide an introduction to the natural and cultural history of the region. The stated goal of the centre is to support an interpretative experience of the surrounding National Park, its geology, flora and fauna, in addition to the local Aboriginal peoples and their culture (Anon. "Karijini Visitor Centre").

According to the architects, Woodhead International, the Karijini National Park Visitors Centre represents "an endeavour to interpret its setting and give expression to Aboriginal culture through modern architecture" (Anon. "Karijini Visitor Centre"). This suggests that the Visitors Centre was shaped by two main themes or approaches. First, the local Aboriginal community's relationship with the landscape was used as a source of design inspiration. For this reason, the striking weathered, deep red-brown, curved steel walls that emerge from the landscape represent the "rocky escarpments created by geological forces and weathering over time" (Department of Environment and Conservation). Whereby, the shape of the twisting and turning walls conjures up images and memories of the impressive, geological formations of the National Park gorges (Fig. 3). Second, the building's design was intended to conceptually represent the local Aboriginal community through the metaphoric application of Aboriginal totems. Furthermore, it is reasoned that this image of a culturally significant symbol "was abstracted and extruded into a series of simple curved walls that symbolize the footprint of European settlers on the Australian landscape" (Muir, 2004, p. 20). The later design intention will be further considered in the remainder of the paper.



Figure 2: Location of the Karijini National Park Visitors Centre.

It is commonly stated that the local Aboriginal community chose the *Kurrumanthu* or goanna as a culturally-significant symbol to be represented in the design of the building (Muir, 2004, p. 20). Maitland Parker, the National Park's chief ranger and member of the Banyjima tribe, comments that the *Kurrumanthu* was chosen because it "symbolises us in coming from our beliefs, our country and earth" (cited in Susskind, 2001, p. 45). In an attempt to make the use of the goanna reference more acceptable, and to move away from "kitsch" theme park representations of Aboriginal animal totems, the architects at Woodhead International generated organic, curving walls to create an abstract, goanna-shape in the plan of the building. Anne Susskind (2001, p. 45) claims that the goanna is present in three parts. First, the tail represents and accommodates information on the local Aboriginal peoples' history. Second, the head contains the shop that symbolises the future business direction of the traditional Aboriginal custodians. Lastly, information about Aboriginal law is located in the centre of the Visitors Centre, or stomach of the goanna, which emphasises its importance in guiding all aspects of Aboriginal cultures.

In order to understand the significance of animal totems, it is necessary to briefly consider the Dreaming. There is no single or holistic definition of the Dreaming; different Australian Aboriginal peoples possess variations on their understanding of the concept. During the Dreaming, Ancestral



Figure 3: The twisting and turning walls evoke the geological formations of the National Park gorges. Karijini National Park Visitors Centre (photo), Pilbara region, 2001, Architect - John Nicholas. Source: Author.

Beings travelled across the world shaping the landscape. The topography and geography of a place are thus significant and sacred features; indicators of the Ancestral Beings' creation journeys. To Aboriginal peoples, the landscape is a literal record of "who were here, and did what" and "who are here now" (Strehlow, 1947, pp. 30-31). The Ancestral Beings also specified and outlined systems of beliefs and values, rights and obligations, relationships and the lore for everyday living. Information about the Dreaming and Ancestral Beings has been passed on from generation to generation through Dreaming stories, songs, dances and art works. Consequently, all aspects of Aboriginal peoples' lives and knowledge are intertwined with the Dreaming. The Dreaming is the basis of all aspects of life in traditional Aboriginal societies (Edwards, 1988, p. 13). In addition, in the Dreaming, Ancestral Beings established Aboriginal peoples' relationships with their totems. Totems are important in traditional Aboriginal communities because they provide "a way of ordering the entire universe and all the species who inhabit it" (Voigt and Drury, 1998, p. 117). They define who a person is and organise their rights, relationships and responsibilities to each other, Ancestral Beings, plant and animal species, and particular places or sites in the landscape. For this reason, in a spiritual sense, there is no division between the individual, Ancestral Beings, totems and the landscape. The Dreaming transcends time in the way in which it connects the land and the people to the past and the present, while also shaping the future.



Figure 4: **Building floor plan imprinted on a bronze plate**. Karijini National Park Visitors Centre (photo), Pilbara region, 2001, Architect - John Nicholas. *Source*: Author.

However, the building's association with the goanna is only obvious through a close inspection of the floor plan. In order to make this connection more apparent, in the external display area a life-like sculpture of a goanna is positioned alongside a floor plan of the building that is imprinted on a bronze plate (Fig. 4 and Fig. 5). Although, when entering the building, the display of the life-like sculpture of a goanna and the building floor plan is almost overlooked, because the brightness of the exterior contrasts with the dark, covered interior area. Also, the meandering walls direct the visitor to enter and explore the building, rather than stop to contemplate the meaning and significance of the floor plan. Without this explanation of the architect's source of design inspiration, the reference to the goanna would be overlooked (Toland, 2003, p. 53). Susskind (2001, p. 45) argues the Visitors Centre is based on an abstracted goanna, which is "in line with the [A]boriginal tradition of expressing connectedness to the land through the depiction of animals." Although the question necessarily arises: from whose perspective does this make the Visitors Centre "Aboriginal"?

From the project's initiation, it took six years of community consultation, where "the architects and exhibition designers followed strict [A]boriginal protocol, often travelling for days to listen to the thoughts of tribal elders" (Susskind, 2001, p. 45). The local Aboriginal peoples were consulted on the site selection, design concepts and the interpretative displays (Toland, 2003, p. 54). Aboriginal peoples in the Pilbara want employment and training prospects in the resource and tourism industries (Olive, 1997, p. 12). However, no employment opportunities were provided for the local Aboriginal peoples



Figure 5: Life-like sculpture of a goanna in the external display area. Karijini National Park Visitors Centre (photo), Pilbara region, 2001, Architect - John Nicholas. *Source*: Author.

throughout the construction of the building or the installation of the exhibits (Toland, 2003, p. 54). The Visitors Centre also only provides employment for a small number of local Aboriginal people in the retail shop. As a result, Aboriginal peoples from nearby communities consider the Karijini National Park Visitors Centre to be "a White Man's building" that is designed by "the White Man", for the use of "the White Man" (cited in Toland, 2003, p. 54). This is also due to the fact that the huge imported steel panels from Perth were used in preference to local labour and materials. Thus, regardless of the inclusive design process which engaged with the local Aboriginal peoples, and the suggestions from the local people that the building might be inspired by the shape or form of the goanna, the building has somehow failed to become Aboriginal Architecture and has become instead its antithesis: "white fella" architecture. Here the tension between the colonial conceptual framework (which positions the building as "authentic") and the Indigenous, recolonising perspective, (which sees it as touristic and potentially degrading) begins to become apparent.

In their search for "genuine" sources of Aboriginal design, the architects of Karijini Visitors Centre have used the abstract image of an Aboriginal animal totem and the local Aboriginal community's relationship with the landscape as sources of inspiration. These representations of Aboriginal culture are literal; they propagate the mis-representation of Australian Aboriginal peoples as "primitive". As



Figure 6: **Graffiti imprinted onto the exterior curved walls**. Karijini National Park Visitors Centre (photo), Pilbara region, 2001, Architect - John Nicholas. *Source*: Author.

such, this "fixed" design approach endeavours to salvage traditional Aboriginal beliefs that are unchanged from pre-contact times. For instance, the architect Nicholas likens the graffiti imprinted onto the exterior curved walls of the Visitors Centre to contemporary rock art (Susskind, 2001, p. 47) (Fig. 6), in a dubious attempt to further "Aboriginalise" the building through the media. It is problematic for the Karijini National Park Visitors Centre to be considered a "white fella" building by the local Aboriginal people while tourists view it as a reasonable representation of local Aboriginal culture. An appropriate cultural centre should express aspects of Aboriginal culture from a range of perspectives, and include contemporary as well as past practices and beliefs.

While the fixed, colonial nature of the formal strategy employed in the building is potentially problematic, there are aspects of the building which appear to reflect a more sensitive and appropriate, decolonising or fluid framework. For example, the Karijini National Park Visitors Information Centre's large frameless glass windows assist to reveal to the visitors in the interior of the building the incredible external surrounding environment (Fig. 7). The Visitors Centre also has the ability to adapt and adjust to future periods and continuously shifting needs of building occupants. Both of these strategies support the "fluid" understanding of changing cultural values and forms of representation. However, in adapting the Visitors Centre in plan, the building form, function and meaning would lose its original significance because the metamorphic shape of the Aboriginal animal totem would be compromised. Whereas, in elevation, the Visitors Centre can maintain its original association with the



Figure 7: Windows frame and reveal the surrounding landscape. Karijini National Park Visitors Centre (photo), Pilbara region, 2001, Architect - John Nicholas. *Source*: Author.

initial source of inspiration, even as it develops. Consequently, in regards to possible future alterations and additions, the Karijini National Park Visitors Centre is: from a cultural perspective, partially fixed and rigid (in plan, in the building's siting and in its capacity to represent the goanna); as well as being fluid and flexible (in elevation, in its formal ability to evoke the landscape). It was anticipated that the building "will become the focal point for the establishment of Aboriginal cultural tourism [in the Pilbara] while tourists will have the opportunity to learn about the park's natural, cultural and historical values" (Department of Environment and Conservation). The RAIA Awards Jury argues that, architecturally, the Visitors Centre "is a spectacular contribution to the Karijini National Park and to Australian architecture" (Jury Comment, 2001). However, the Karijini National Park Visitors Centre's cultural expression is debatable, due to the attempts to "Aboriginal peoples' relationship with the landscape as sources of design inspiration. Furthermore, the design of the building did not provide the anticipated employment opportunities for the local Aboriginal peoples, either during construction, or after the completion of the Karijini National Park Visitors Centre.

Merging Concepts

The current paper explores the way in which certain discourses about Aboriginal peoples and cultures are maintained through architectural form, expression, materiality and program. Ultimately, the

simplification, mystification and appropriation of Aboriginality denies the possibility of an architecture that thoroughly addresses local Aboriginal peoples' needs (spatially and symbolically), in addition to respecting their natural environments. As researcher Ian McNiven (1998, p. 47) argues, the "problem is more than a clash of belief systems – it is a clash of powers to control constructions of identity." As a consequence, "[w]ho controls the past controls the future: who controls the present controls the past" (Orwell cited in Russell, 2001, p. 93). For example, the use of totemic representations appeals to the "authentic" and "primitive" concepts of traditional Aboriginal cultures and continues the flawed colonial tradition while reinforcing contemporary touristic expectations. This is not a reasonable representational strategy. Therefore, there is a need to eliminate the classification and categorisation of Aboriginality in architecture, to create a new language that is focused on the future, rather than continually looking at the past. Furthermore, the concepts of "authenticity" and "primitive" must become redundant in order to create a "decolonised", culturally appropriate Indigenous architecture.

Finally, representations of Aboriginality in architecture are a relatively recent addition to the discipline. Consequently, a great deal of critical evaluation still needs to occur in architecture, while simultaneously taking into consideration concepts from Aboriginal studies. Such future research to assist in creating new practices, processes and knowledge in regards to Aboriginal architecture may include:

- investigating alternative spatial and symbolic design strategies to appropriately address the variety of Aboriginal cultures;
- creating a new language for Aboriginality in architecture that is focused on the future;
- processes to increase the principles of a "decolonised", culturally appropriate Indigenous architecture;
- restructuring the architectural syllabus to consider and understand the history of Aboriginal cultures and their implications for contemporary Indigenous peoples and their built environments; and
- further architectural representations of Aboriginality, so as to assess their consequences and to verify how future discourses about Aboriginal peoples and cultures are being preserved.

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Digital Feedback Assemblages

Portfolio Feedback in the Industrial Design Studio

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Traditionally in Industrial Design studios, the review and assessment of student learning occurs within the context of verbal critiques and a paper-based portfolio. Students are constantly required to assimilate various points of view within the critiques and display their understanding in the further development of their design portfolio. A number of weaknesses are associated with this process, including students' ability to remember what occurred during the critique and then to apply it in practice. To respond to these issues, as well as to give more effective feedback, students were asked to create and submit a digital portfolio of their work for feedback and assessment. This digital portfolio was then reviewed and an assemblage of textual, visual and audio feedback was returned to the student for reflection and integration into their subsequent design work. While the assemblage of textual, visual and audio feedback had some demands, overall the advantages far outweighed these. It was found to support student learning and was well received by students. For the lecturer, using this method contributed to enhancing practice in the design studio.

Keywords: studio, design, education, digital feedback

1. Introduction

Providing verbal feedback on design work is central to design learning. Feedback has been provided verbally for well over a century and is now well recognised as a signature pedagogy in design studio learning and teaching (Andia, 2002; Kellogg, 2004; Koch, Schwennsen, Dutton, & Smith, 2002; Schön, 1988). Traditionally, the method involves students submitting a paper-based folio of their work to a panel of lecturers and peers who provide feedback on the portfolio in the form of a critique (Andia, 2002; Bender & Vredevoogd, 2006; Schön, 1988; Woodward & Nanlohy, 2004). In this paper, we report on the trialling of an alternative method of providing feedback on design work. Feedback is embedded textually, visually and verbally in a digitally submitted portfolio in order to overcome the drawbacks of traditional paper-based portfolios submitted for assessment within the

industrial design studio and the verbal critique is also recorded. We outline the reasons for moving towards this method, describe in detail how it worked in practice, share students' feedback on the process and, explore lecturer reflections about the effect of this change on studio learning and teaching practice.

2. Portfolio Assessment in Industrial Design

In the discipline of Industrial Design, the traditional student portfolio is a bound document of paperbased materials containing the students' design work. This may contain hand drawn concepts, text and printed media arranged to best represent students' design ideas in response to a design brief. The portfolio records a narrative of students' learning and skill development during the life of the studio. In the university context, this document is a visual and textual representation of their design ideas and outcomes. As such, it is not only the formal source of evaluation for the lecturer, it is a learning tool for students beyond weekly discussions and set presentations. The traditional paper portfolio has advantages in that it is a tangible document that looks good and the students feel a sense of accomplishment when they hand in their portfolios at various times during the semester.

However, paper-based portfolios have limitations. Printing hard copies for pin-up are costly to produce and often students limit the amount of information they include because of this factor. In addition, paper-based portfolios limit the scope for effective feedback as lecturers are often reluctant to mark-up or 'visually damage' portfolio pages or pin-ups. To avoid this lecturers often work out other ways of providing feedback on the work such as attaching sticky notes with drawings, in addition to a written feedback sheet. Portfolios are therefore difficult to mark and handling them is cumbersome. Given the volume and weight of paper portfolios, it is often difficult to take submissions beyond the work place to mark. This is particularly difficult for sessional lecturers with limited office space and storage on campus.

In terms of providing feedback using traditional formats, communication channels are limited to verbal discussion on the day and written feedback provided post the critique. Most importantly, the effectiveness of such feedback relies on the students' ability to listen to and act on verbal feedback given in class. Students are required to assimilate complex information about their work from the lecturer, 'crit' panel and student reviewers, and to then act on that information. A weakness of this is the varying ability of students to retain feedback and apply it iteratively to improve their design work. Many students find the public critique of their portfolios stressful and heightened anxiety levels may prevent them from being able to listen attentively to what was being said (Blair, 2006; Kluger & DeNisi, 1996; Pope, 2005). Often, there is a lag between receiving verbal feedback and subsequent application of that feedback as students revise their designs. This requires that they remember what

was said or find some other way to note the comments on the day. For example, students may ask peers to take notes, use their phones to video critiques etc.

Turning to the literature reveals extensive research on the provision of feedback that supports learning (Biggs & Tang, 2007; Boud & Falchikov, 2007; Gibbs & Simpson, 2004-05; Hattie & Timperley, 2007; Hounsell, 2007, 2008; Nicol & Macfarlane-Dick, 2006). Studies have shown that feedback is most effective when it is underpinned by a number of educationally sound principles (Adolphus, 2009). Principles include, providing feedback that is 1. 'constructive', 2. 'timely', 3. 'given at the right stage', 4. 'engaging' and 5. 'does not have to be resource intensive'.

Principle 1. Constructive feedback involves going beyond making judgements and critical comments to helping students question 'where they are going', 'how they are going' and 'where they are going next' (Hattie & Timperley, 2007, p. 86). Constructive feedback, thus, involves indicating "...successful features of the work and those that are less so; how the work could be improved; how the student might do better in the future" (Adolphus, 2009, p. 3). *Principle 2. Timely* feedback is often reported as one of the most contentious aspects for the teacher and the student. Typically students receive feedback too late to incorporate to further their learning. Feedback that is line with *Principle 3. Given at the right stage*, can make a significant contribution to student's learning and growth. In fact, "to support learning, assessments must evolve from being isolated occasional events attached to the end of teaching to becoming an ongoing series of interrelated events that reveal changes in student learning over time" (Stiggins, 2008, p. 3). *Principle 4. Engaging* involves students reflecting on the feedback and using it to inform future learning rather than it being a once off at the end of the studio.

In order to address these issues, some educators are turning to the use of technology to enhance the feedback process in the design studio (Bender & Vredevoogd, 2006; de la Harpe et al., 2009; France & Wheeler, 2007; Jeffries, 2007; Oxman, 2008; Taylor & McCormack, 2008). A number of advantages for the lecturer integrating digital feedback into the studio feedback process are reported by Bender and Vredevoogd, (2006). These include, the lecturer being able to see all student work before making any comments, identifying format issues quickly, tracking progress from week to week easily allowing the evolving design process from 'concept to final presentation' to be seen, reducing marking time by having to listen and provide feedback on similar projects (especially problematic in large classes), streamlining feedback, avoiding repetition of similar feedback and increasing turn-around time, which is in line with *Principle 5. Does not have to be resource intensive*. In Table 1, the comparison between the traditional and digitally modified studio assessment and feedback process put forward by Bender and Vredevoogd (2006, pp. 119-120) is presented.

Table 1A comparison of the two instructional Models

Traditional Design Studio	Modified Design Studio
Assignments are introduced by the instructor and submitted by the students during class time.	Assignments are introduced in the same manner but are submitted electronically 24-48 hours before class time.
Class size is typically 15-20 students to one instructor per section. The same instructor may oversee two or more sections.	Class size remains the same but the instructor can handle an increased number of sections with assistance.
seldom shared with other class members. Therefore, the same feedback may be repeated to several students within the same class period.	critique and group feedback during the weekly lecture period.
The critic repeatedly corrects the same or similar student errors.	The critic needs to address student errors only one time.

In addition, there are no print costs for digital portfolios, they are quicker for students to assemble, review, and mark-up occurs without damage to the portfolio. The resulting documents are easily packaged and transported for grading. Importantly, the lecturer no longer handles heavy documents and work can be digitally sent to students reducing the risk of losing or misplacing paper-based portfolios during grading and at collection periods. Finally, creating digital assemblages, using various digital tools, allows students to easily rework their projects and emulate and gain insights into the real world practices occurring in their industry.

In order to emulate this kind of industry practice, and enhance the feedback process in two industrial design studio classes (one in second year and the other in fourth year), a digital feedback process was introduced. Students submitted a digital file of their drawings and the lecturer created an assemblage of voice, text and visual feedback that was embedded into the student's digital portfolio. The digital portfolio work submitted was in response to particular design briefs set as a part of the core design studio program. Students were required to adapt their current paper-based techniques to digital PDF documents. A series of participatory lectures were run in week two where students discussed the various approaches for creating digital portfolios in conjunction with their preferred software programs, students were also introduced to web-based submission using BlackboardTM through the RMIT 'Learning Hub'.

3. Digital Assessment Feedback Process

3.1. Digital portfolio process

Students used a combination of various mediums such as scanned images, digital sketches, text, computer aided design (CAD) models and digital visualisations and renderings for their digital portfolio.

Imaging: Adobe Photoshop® and Illustrator® allowed students to edit and create drawn visualisations. SolidWorksTM represented student designs as a parametric driven 3-dimensional models that are rendered as images and converted to Adobe Universal 3D®, U3D, files for dynamic real time viewing in Acrobat PDF®. Various scanning technologies were utilised to represent large drawings and reverse engineer 3- dimensional design mock-ups in digital form.

Textual: Microsoft Word® was typically used by students to write the written portions of their assignments and research reports. This allowed students to formulate, respond and reference the written content of the design studio for desktop publishing.

Publishing: Adobe InDesign® allowed students to assemble and automate the entire digital content and to create an assembled PDF portfolio.

The ability to proficiently use these various tools allowed students to easily combine the different elements into one digital portfolio. Students saved their portfolio as a PDF file and submitted it via the University's web-based learning management system, BlackboardTM. This web-based learning tool was critical to the lecturer, as it automatically notes a submission time, generates reports and packages the assignment submissions to a single compressed file for download. Moreover, this process significantly reduced the time taken in traditional portfolio submissions.

3.2. Digital mark-up feedback process

At mid-semester and for final review, portfolios were submitted via the 'learning hub' and downloaded to a tablet PC for detailed lecturer feedback to be added. In order to provide effective and personal feedback to students regarding progress and final grading, a tablet PC was used. The tablet PC has a form factor similar to a laptop with the addition of a swivelling interactive pen display that is pressure sensitive through a stylus pen. The interactive pen display is similar to a Wacom Cintiq® digital sketching display ubiquitous to industrial design practitioners. The advantage of the tablet PC is its flexible adaptation and portability when compared to alternative solutions.

The tablet PC allowed for an assemblage of verbal, textual and visual feedback to be embedded directly into the student's PDF portfolio without physically damaging the work. This form of

assemblage required the lecturer to use three main software tools, Acrobat Pro – mark-up tool, Audacity – audio tool and Sketchbook Pro – drawing tool. These digital tools allowed the lecturer to flexibly view, comment and mark-up the PDF portfolio using Acrobat Pro; record personal audio feedback using Audacity; and precisely visualise alternate solutions to students' sketches using Sketchbook Pro. These files were then embedded appropriately inside the PDF portfolio with Acrobat Pro. After reviewing for feedback or marking, the lecturer uploaded the PDF portfolio via the webbased learning tool to the assignment portal for confidential collection by the individual student.

A marking sheet (Figure 1) was created in Microsoft Word saved as PDF and inserted at the end of each student's PDF portfolio. As each section of the portfolio was reviewed the corresponding section of the marking sheet was digitally filled in. In addition, drawings were visually annotated using the two main tools, text edit and drawing, similar to the way track changes works in Microsoft Word.



Figure 1 Marking sheet containing mark-up, embedded audio, critique and final grade.

Visualised sections of the portfolio were captured through the snapshot tool, Acrobat Pro, and pasted into Sketchbook Pro. This allowed for the provision of high quality visualisation feedback by drawing ideation over the student's original image. The resulting detailed drawing was cut and pasted into the student's portfolio through the functionality of the stamp tool, Acrobat Pro. This process allowed the

lecturer to quickly detail a PDF portfolio (Figure 2), increasing the depth of investigation and conceptual development of the student's ideas.



Figure 2 Detailed PDF page representing typical portfolio.

3.3. Audio feedback process

Formative feedback in weeks 4, 8 and 11 was provided using a combination of digital and traditional presentations. These in-progress presentations consisted of a lecturer panel and peers. In-progress portfolios were submitted and downloaded by the lecturer via the learning hub to a tablet PC. At the in-progress critique the digital portfolio was projected simultaneously alongside the traditional paper-based pin-up of the students' work in-progress. This hybrid visual medium allowed the critique panel to refer to various design pages, old and new, during the presentation while the lecturer marked up relevant notations within the PDF file. Students were then given a copy of the marked up file to review at a later date and an audio file of the panel critique as well as an individual feedback audio file from their lecturer.

4. Feedback from students

At the end of the design studio, students from second year (n=13) and fourth year (n=8) were asked to complete a paper-based survey in class (containing both closed and open-ended questions) regarding

their perceptions of the digital feedback method. The survey asked them to comment on whether they listened to the audio feedback or not and if they found it useful; when they listened to it; and how often they did so. It also asked whether they found the digital mark-up feedback process useful and their preference for creating a paper–based or digital portfolio, and why.

In terms of digital mark-up, students found receiving feedback in this way useful. They mentioned that they were easily able to identify the particular parts of the portfolio that required attention, including: problem identification, research, concept design, detailed design and digital modelling. It also saved on print costs and saved paper commenting as follows:

Very useful, I found it easier to look at. I can read the comments directly. Easier to read exact feedback. I can see what was wrong with it [portfolio] more clearly. It highlighted very specifically what could be improved. It made improvements easier and quicker to make. Saves time much easier to do. Better presentation, less costly and easily re-usable. It's less waste of paper and money plus, it's easy to re-do No hassles of printing and cost of money. Less stress regarding [associated] printing [and] problems.

While most students were positive, there were two students who reported that they actually preferred to create a paper-based portfolio. One did so because he/she, 'like[d] the physical copy to handle/show people' and the other because he/she didn't 'trust the safety [of the digital file]'.

In terms of the audio feedback, all students (N=20), with the exception of one, reported downloading the audio feedback. All of the students who downloaded the feedback also reported finding it very useful. Students reported predominately downloading the feedback at the end of the studio session and listening to it within one week after class. They also reported replaying it to focus on particular points of view and listening to it on average 3 times. Reasons for why they found it useful included:

It helped me remember the comments more easily; I did not miss a single thing! After presenting I'm still nervous and can't get everything into my mind. Hard to remember all feedback, this reminds you and is more in-depth/ explanatory than note taking. Yes, it's really useful for me, because I can re-listen many times and each time I actually came out with something new. When I needed some feedback or ideas I could get inspiration from the audio feedback.

5. Reflections from lecturer

The adoption of digital technologies has dramatically changed the way in which the lecturer assessed design portfolios. This demanded the lecturer to invest time and effort into developing and implementing this new practice. That said, along with these extra demands came some really positive advantages.

5.1. Demands

The demands of the new approach include, changes to the assessment method, submission time frames, methods of in-class critique, and rethinking the approach to marking the portfolio. The traditional feedback sheet also required modification for the digital application including the embedding of audio feedback. In addition, time and effort were required for the lecturer to become proficient in using and engaging with the tablet PC and software, for example, how to draw with the pen and how the available tools could be combined in order to provide an effective form of feedback, and the assessment tools in Blackboard.

Time and effort were also required for students to master the process of creating a digital portfolio. They needed to learn how to adapt their current paper-based process to the digital environment. For example, students needed to allow for extra space around the drawings for digital notes. The change in workflow also required them to rethink communication methods, layout, illustration and design software that includes the Adobe Creative Suite®, Microsoft Office Suite® and SolidWorks®.

Another demand in the process was managing file sizes. The lecturer needed to set page limits for digital portfolios. Since the digital portfolio did not need to be printed, students tended to submit large files of many pages in length. Typical portfolios could contain between 80 - 180 pages at week 12. Size limits needed to be carefully managed when using this process because downloading and uploading files can become unwieldy. In addition, a carefully thought out and systematic process for file version control and organisation of student work was required.

For students, file sizes were also an issue. They needed to ensure that if they were uploading their digital portfolio off-campus that their internet bandwidth would allow them to do so since digital portfolios files are typically large.

5.2. Advantages

Overall, the ability to provide audio feedback saved considerable time in comparison to providing written/typed feedback and did not interfere with the studio dynamic once students were accustomed to the equipment in the room. The lecturer was able to cover in more detail, particular aspects of the

students' work and offer numerous alternate solutions for the project that were captured in the moment and enriched by the simultaneous link to the visual mark-up without damaging the work. Providing effective feedback proved to be easier for 3-dimensional modelling since students no longer needed to present accurate detailed 2-dimensional drawing sheets and 3- dimensional rendered cross-sections of their intended design. Since students were able to submit their work electronically and feedback was provided in the same way, this reduced the amount of weekly student face-to-face appointments and consolidated the workload required to assess and moderate design studio portfolios for the lecturer. The digital portfolio allowed members of the 'crit' panel to review the portfolios prior to the 'crit' session enabling richer discussion and feedback on the day. In this case the use of storage sites such as Mobile MeTM, 4sharedTM or ISSUUTM were ideal for sharing a single PDF file or a complete folder confidentially.

The use of Universal 3D files allowed the lecturer to view inside the PDF portfolio an accurate and dynamic rendition of the students design (Figure 3). The components of the 3-dimensional design can be hidden, rotated or cross-sectioned. In addition, dynamic annotated notes identifying original and deficient areas for consideration by the student were able to be easily added.



Figure 3 U3D file embedded in typical portfolio page.

The lecturer also found that there were advantages for the students. The use of digital workflow required student to re-evaluate the drawing process and posed new ways of drawing for digital presentation. Setting page limits encouraged students to be more thoughtful about what to include in their portfolio, encouraging them to be more critical and concise about their portfolios. Most
importantly, the digital approach also allowed students to modify their work easily, encouraging them to incorporate the feedback to enhance their designs and their approach to the design process. In Table 2, the demands and advantage of adopting the digitally modified studio feedback process are listed.

Demands	Advantages
Making changes to assessment practice	Saved time
Learning new technologies and software	Allowed submission from off-campus
Adapting workflow for the digital environment	Reduced travelling time
Organising and managing large files	Removed handling of hard copy portfolios
Maintaining version control	Enhanced 'crit' panel preparation
Managing change	Increased feedback turnaround time
	Allowed dynamic 3-D model view
	Avoided visually damaging portfolios
	Allowed for richer more detailed feedback
	Encouraged the integration of feedback in the
	next iteration of the design portfolio
	Encouraged reflection on portfolio design

Table 2Demands and Advantages of digital feedback compared

6. Conclusion

In this paper we have described the use of a feedback method that required students to submit a single digital portfolio for feedback and assessment. The process that we trialled replaced the traditional review method which requires students to submit their design studio work in hard copy in order to receive verbal formative and summative feedback at various stages during the design process (*Prinicple 1. Constructive*). Feedback from students showed that the digital feedback method was successful with the overwhelming majority of students listening to the feedback many times and engaged them in a process that reflected industry practice and suggesting that it be adopted in other studios (*Principle 4. Engaging*). They also found that it reduced printing costs, saved time, was easier to rework, could be sent globally, and created a permanent digital record.

Overall, the use of technology in the studio allowed the lecturer to provide feedback which was less repetitive and more streamlined. This method of feedback accommodated more students than was previously the case due to its ease and timeliness (*Principle 2. Timely*). In addition, it was also more satisfying in terms of providing thorough and comprehensive feedback on student work throughout the studio (*Principle 3. Given at the right stage*) – this was reflected in the student submissions. The lecturer also found the process saved time, less cumbersome to handle than traditional paper-based folios and was easier to verify student work and provide detailed feedback because it was faster and

easier to give feedback verbally (*Principle 5. Doesn't have to be resource intensive*). As technology advances, adopting and adapting digital assessment and feedback practices in the design studio is a challenge worth embracing and after using these techniques, there is no going back.

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24 Hour Cross-sector Design Challenge "Invisible Boundaries" Transcending Disciplinary Boundaries: Creating New Practices, Processes and Knowledge

Abstract

65 cross-sector participants took part in the 24 Hour Design Challenge "Invisible Boundaries" on February 12/13th 2009 hosted by the National College of Art and Design (NCAD) in Dublin, Ireland. The main objective was to find viable socially responsible design solutions in the form of potential cross-sector research projects. International experts were invited to present ethical design themes and to introduce preliminary challenges. Six carefully selected teams of cross-sector participants worked continuously for a period of 24 hours to find innovative solutions. The 24 hour design challenge is a highly productive research model that helped the NCAD to create a new more clearly focused cross-sector research platform. Strategically, we identified a new network of multidisciplinary crosscommunity partners willing to exchange knowledge as part of an ongoing creative commons. Consequently, a number of innovative projects are now being developed by new cooperative research clusters.

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24 Hour Cross-sector Design Challenge "Invisible Boundaries" Transcending Disciplinary Boundaries: Creating New Practices, Processes and Knowledge

In February 2009, 65 cross-sector participants took part in a postgraduate 24 Hour Design Challenge "Invisible Boundaries" organised by the National College of Art and Design (NCAD) in Dublin, Ireland. The objective was to investigate social responsibility problems, find viable solutions through design, and create collaborative research projects. The challenge was organised by a small group of practice based lecturers who founded the NCAD Design Ethics Group in 2008. Our motivation was to consolidate common staff and student research interests in ethical design. The event would help us build multidisciplinary cross-sector research clusters and establish real-world communities of practice (Wenger, 2004).

Strategically, we aligned the content of the design challenge to recognised funding mechanisms that could potentially support the intended research outcomes. Consultants were asked to present predetermined design themes and introductory challenges. Six multidisciplinary teams, consisting of ten stakeholders, would work continuously for 24 hours to develop innovative solutions to social responsibility problems.

A physical space was provided where many participants achieved greater levels of self-worth by contributing to team research inquiry in an environment of mutual respect. By sharing, informing and generating new knowledge, stakeholders were better able to transcend pre-conceived limitations. Subsequently, a number of exciting practice based research projects were generated. Significantly, a more coordinated and meaningful research platform is now emerging within our institution. The event was instrumental in helping the NCAD define a collective research agenda towards design sustainability.

The agreed themes and challenges were introduced at the start of the event. Presenters then assumed the role of team leaders. Each team began their initial discussion by addressing their team leader's question(s). Teams were actively encouraged to expand their investigation and to re-direct their focus as appropriate.

We sought new cross-sector partnerships that could augment our present institutional research capacity. Creating the right balance of knowledge and experience within each team was not a straightforward process. We believed the strategic selection of the six teams was critical to the success of our event. The Design Ethics Group invited participants in relation to the design challenges then handpicked the design teams. Participants were permitted to switch teams during the event. However, very few participants changed teams.

Importantly, leading representatives from local government agencies attended the challenge. A new intercollegiate network was established with representatives from all the third level institutions in Ireland. Indigenous community groups including Concern, Focus Ireland, and the Rediscovery Centre were represented.

Initially, it was essential to discuss and define the characteristics of ethical design collaboration before addressing specific problems. We provided opportunities for two thirty minute discussions for participants to address this issue using a "World Café" conference format. Teams were asked how can successful ethical design collaboration be achieved? Shared creative vision and design methodology would inform cooperation leading to viable solutions to real world problems.

A code of conduct was outlined to help facilitate internal team and group debate. Each participant embraced the ideal of collective creativity or "we-think" (Leadbeater, *We Think*, pp.82-83). The World Café format allowed participants to state their agenda as part of a creative commons.

Frequent team updates provided a great opportunity for the cross-pollination of ideas throughout the event. In addition to flip-charts, teams were provided with a computer for research and presentation purposes. Teams were required to deliver at least one research outcome during the challenge. Establishing new cross-sector design research networks was a priority. Comprehensive digital presentations of team research outcomes were presented at the conclusion of the event. A series of design challenge podcasts was also produced and posted on the <u>www.ncad24hourdesignchallenge.com</u> website after the event.

This paper briefly outlines the structure and success of our design challenge, isolating several important research outcomes and unforeseen opportunities. It is an excellent case study for academic institutions interested in propagating collective ecology based research through grassroots organisational leadership.

Themes, Consultants and Design Challenges

The team leaders were selected for their ethical and socially responsible design experience. The design challenges posed complimentary research questions. Therefore, six teams worked towards common goals. The following summary outlines the nature of team activity. (Please note: more attention is given to the research outcomes where institutional breakthroughs were achieved during the event and in the months that followed.)

How to Address Ecosystem Awareness and Concerns on Different Scales, From Policy to Industrial Objects?

French product designer Alexandre Tonneau was asked to lead a team because of his experience working as a waste management and eco-efficiency consultant to the French government. Tonneau was eager for his team to develop mechanisms to increase the level of social intelligence through collective contextualisation. "Using what we know, how do you make the right choices and what are the action priorities?" Tonneau introduced the design challenge "How to address ecosystem awareness and concerns on different scales, from policy to industrial objects?"

Tonneau's team consisted of inter-institutional industrial design academics, professional product designers, and waste management consultants. The debate centred on waste resource life cycle analysis and the pursuit of ideals outlined by "cradle to cradle" philosophy (McDonough & Braungart, 2002). The team developed a range of research ideas encompassing education, recycling/upcycling, and waste processing. They chose to advance an innovative concept for a children's combined educational recycling playground. The idea encourages families to bring their reusable waste to a playground where children can playfully recycle them. The playground also functions as a recyclate processing centre. Reduced bulk recyclates will be generated and reused in product development by manufacturing plants across Ireland.

Following the event, we moved quickly to strengthen strategic links to specific challenge participants to take this concept further. Community leaders who had worked on other challenge teams now became pivotal to the success of this project. In partnership with the Dublin based company RPS, the Ballymun Regeneration Limited and Rediscovery Centre we have created a comprehensive research project called "Ballymun as a Centre for Design Sustainability". Ballymun is a working class suburb in north Dublin with mass-unemployment and significant social problems.

In May 2009, the Irish Government launched a new Market Development Programme for Waste Resources Action Plan. We met with the programme directors to discuss our research proposals for Ballymun. The Market Development Programme for Waste Resources has confirmed that they will support our initiative with necessary resources, and a cross-sector partnership agreement has now been established. Two postgraduate design students will be funded for two years to research, design, and assist construction of the playground in Ballymun. The project officially commences in January 2010.

The NCAD plan to strengthen its design sustainability research platform using the "Ballymun as a Centre for Design Sustainability" research initiative as it generates opportunities to establish numerous multidisciplinary cross-sector design ecologies.

Community Regeneration Through Design

Since 1993, Carmen Hijosa has been collaborating with the Philippine Textile Research Institute and Product Development and Design Center in Manila rationalizing, identifying and developing products for the export market, using local skills and raw materials. Influenced by Hijosa, NCAD textiles staff developed a similar craft-based community regeneration project in Nepal. Hijosa's team focused on developing design models for community regeneration in rural Ireland.

Team members had cross-sector experience in craft, business, and community welfare agencies. Believing they could utilise craft practice to promote social, cultural, and economic regeneration, their goal was to develop a proposal that addressed the need to achieve commercial success while integrating social and cultural development. They explored uses for indigenous resources, attempting to create new resource based product and service opportunities. Currently, Ireland exports 90% of its wool as waste. Now the focus is to use wool for diverse product development, including domestic and industrial insulation applications. The ethical imperative suggested in books such as *Cradle to Cradle* and *In the Bubble--Designing in a Complex World* (Thackara, 2005) were touchstones throughout the dialogue.

Their concept was presented as a business plan in the belief that the current economic conditions will continue to shift political and consumer interest towards more sustainable living and socially responsible agenda.

Since the design challenge, meetings with agricultural and business communities have taken place. Their research will be expanded to encompass design services, specifically those that incorporate waste management systems. A range of cultural tourism events are being developed in partnership with rural communities. These actions include identifying related opportunities that work towards innovation in design and education leading to social, cultural and economic growth.

Good Design Enables -- Bad Design Disables

Cearbhall O'Meadhra is an Associate Research Fellow at the NCAD. He is working to develop a design reference model for accessibility. Prior to his appointment to NCAD, he was working on secondment to the Institute for Design and Disability to help further develop the concept of Design for All and to support the implementation of the Barcelona Declaration by the Irish Local Authorities. O'Meadhra strives to change the mindset of primary decisionmakers and designers to enable people with disabilities to participate fully in every aspect of society, including the design process for products, systems and environments. Stating that "Good design enables -- bad design disables", O'Meadhra asked his team to discuss mechanisms to further develop his reference model for accessibility.

The term "accessibility" is used to refer to the model systems that dictate the way people interact with their environment. Participants at the challenge were asked to more deeply investigate specific systems in terms of accessibility leading to much improved future design. The initial focus centred on the impact of embedded information technology in services and systems.

This team consisted of information technology consultants from German industry, staff and PhD students from Graduate School for Creative Arts and Media (GRADCAM), as well as nano-technology academics from other institutions. The team debated the necessary steps to implement and test the reference model. Initial tests will now be made using industrial design applications within the NCAD and GRADCAM.

Following the design challenge, an NCAD/GRADCAM User First research cluster was established to develop specific design research strands. The User First research group submitted a proposal to the European Union Marie Curie FP7 Programme, under Social and Human Sciences, as the most appropriate funding mechanism to support their research agenda. They received an initial €23,000 for exploratory project development.

Expertise from leading international European institutions and businesses has now been harnessed to augment the knowledge base within this team. Four European academic institutions in Lapland, Germany and Portugal, as well as The Research Agency: the European Institute for Design and Disability, are now collaborative partners. Specific research divisions within the Intel Corporation provide expertise in the area of digital healthcare, ethnography, and manufacturing research and development. The National Disability Authority and Centre for Excellence in Universal Design provide the necessary knowledge as agencies to the Irish government. Emphasis will focus on social failure regarding the lack of application of proven ergonomic theory by manufacturers and policy makers, in relation to the development of Universal Design products. They plan to address this situation by developing a collaborative research project focussing specifically on the implementation of ergonomic standards in the manufacturing and development of school children's classroom furniture. They will also extend this research to evaluate the use of classroom digital technology. This initial research strategy is driven by the need for social change in the educational environment.

Eco-Design is Good Design and Good Business Practice: Effective Eco-Design Requires Joined-up Multi-Stakeholder Approaches

Dr Frank O'Connor and Simon O'Rafferty from the Eco Design Centre, Wales, illustrated the role of design and the designer in addressing environmental and social responsibility issues. They introduced a range of case studies that demonstrated the need to adopt a connected multi-stakeholder approach to embedding eco-design in a wider regional innovation system. They posed the question "Is Eco-design good design and good business practice?"

Their team were asked to develop an educational platform for socially responsible design research in Ireland. They created a concept model called The Liberties Art and Design Parliament. As the NCAD is located in the working class Liberties area of Dublin, the parliament would focus on the development of numerous art and design initiatives in the vicinity of the NCAD. Concepts were developed to incorporate specific community based research practice. This platform could incorporate cross-faculty research in the areas of culture, tourism, heritage and contemporary practice.

The team suggested the creation of design innovation units to underpin existing knowledge transfer partnerships between academia and industry. They appropriated the Co-Design Laboratory concept, developed by Ursula Tischner's team. The Co-Design Clinic is a select group of experts representing academia, business, and the wider community. The Co-Design Clinic would facilitate a series of scheduled surgeries where community problems could be resolved using co-creative design methods. It was suggested that design graduate business incubation units also be incorporated into these related concepts, making use of vacant council housing in the local area.

Strategically, these concepts all link into existing research funding mechanisms such as the Intertrade Ireland "Fusion" research scheme and the Enterprise Ireland "Innovation Research Voucher" and "Research Partnership" schemes. Collaborating with new partners in Wales where parallel projects could be run should attract seed capital through the Ireland/Wales Programme.

The Liberties Art and Design Parliament model fits rather well into current institutional planning. The NCAD intends to build a Creative Economies Research and Innovation Centre, including a Public Cultures Laboratory to support diverse research strands. Facilities are planned to bolster research in design, design heritage, material culture and immateriality (contemporary performative art practice). The proposed centre will also house the National Irish Visual Arts Library.

What Form of Design Education Will Lead to More Creative Sustainable Design Solutions?

Ursula Tischner, the Director of Econcept, Germany, provided necessary expertise in the area of sustainability production and consumption by design. With more appropriate knowledge, tools and strategies, designers can be empowered to challenge the notions of mass-consumerism, mass-production and unsustainable lifestyles. We invited Tischner to illustrate this assertion using case studies. Tischner asked her team, "How might the designer stake a claim for a more strategic position or role in the product development chain? How can more sustainable product design solutions be found through more appropriate research? What form of design education will lead to more creative sustainable design solutions?"

This team consisted of a strong group of sustainability expertise from academia and industry. Team dialogue centred on how design education and research can be better linked to developments in the other sectors. Several interesting design consultancy concepts were developed, including the co-design concept mentioned previously.

How to Develop the Role of the Socially Responsible Design Entrepreneur?

Crister Lidzélius, Director of Kaospilots, Denmark, was invited to lead a challenge team. For more than 15 years, their design programme for social entrepreneurs has been developing design tools that enable working groups to address sustainability and social inclusion problems. Kaospilots have worked with disenfranchised communities, city planners, and regional businesses developing design systems thinking and tools to properly equip the socially responsible design entrepreneur. Lidzélius used case studies to illustrate how this practice works.

This team used the challenge to discuss and more clearly define the nature of design research, identify essential design research attributes, and develop a model for cross-sector collaboration.

Design Challenge Achievement

The fact that some teams were able to rapidly develop new research opportunities as a result of the design challenge while some were not does suggest additional discussion beyond this delimited document. Unequivocally, each team made a considerable contribution to a creative commons where ideas and advice were liberally exchanged. Two teams focused more on the nature of design education and the tools required for it to function more purposefully in relation to ethical design and social responsibility. This dialogue not only established core values for other teams to employ but also created ideas for them to latch onto. Stakeholders enjoyed a greater level of self-worth by adopting an appreciative inquiry process (Hall & Hammond, 1998) of research development to push the work forward.

The most successful research outcomes were driven by team members who seized the opportunity to develop concepts linked to levels of self-interest. For instance, the generation of the educational recycling playground concept was created by multidisciplinary stakeholders specifically interested in the management of waste resources and the use of

recyclates. Subsequently, we were very successful in creating a dynamic research cluster to quickly move this concept forward. Knowing The Rediscovery Centre in Ballymun has an extensive recycling programme, we requested their involvement in the project. Coincidently, the Irish Government launched the Market Development Programme for Waste Resources three months after our design challenge. Fortuitously, RPS will now coordinate this programme for the Irish government. Forging academic research links to indigenous industry will be an important part of their new remit. Therefore, not every team was starting the challenge from the same point of departure. However, I would stress the importance of the appropriate blend of cross-sector knowledge and experience to foster the realisation of successful research outcomes. Prior to the challenge, the Design Ethics Group spent considerable time getting this task right.

At the conclusion of the challenge, as participants dispersed and everyday work and life resumed, we found it difficult to maintain the high levels of enthusiasm necessary to develop some research outcomes. Without commitment it is impossible to stop the rapid evaporation of energy which eventually leads to project stagnation.

We have now entered a post-industrial era which presents enormous challenges for society, including education. The NCAD Design Challenge "Invisible Boundaries" created exciting and unexpected possibilities for multidisciplinary, cross-sector, cooperative research clusters to address many of the issues. The challenge became an essential strategic tool in expanding our practice based design research agenda to include more cooperative endeavour. It successfully achieved research outcomes that indicate strong cross-sector interest in more human-centric, social inclusive design practice. For the first time, a macro-research discussion has produced viable concepts which will also substantially add value to our institutional reputation.

For some, the event created a cooperative process that acted as an antidote to the growing feeling of academic anonymity, dehumanising contemporary design practice, and real-world commercialism. This form of grassroots research organisation now appears more appropriate than most traditional top down management systems. Our paradigm proposes a

non-linear approach to problem solving. Consequently, the current NCAD research agenda is shifting towards a new form of organisational leadership.

The challenge format prioritised the pursuit of the collective over the individual. We established an equitable democratic forum to investigate cross-sector ecologies. Design procedures, tools and techniques where employed to help participants overcome preconceived limitations, offering participants the opportunity to contribute in a serious but fun environment.

The research outcomes clearly demonstrate intellectual profitability through crosssector collaboration. For a new collaborative practice-based research platform to embed within our academy, we must develop much deeper learning opportunities through specific context based initiatives. Our design curriculum should now provide experiential modules incorporating social responsibility and cultural learning as integral research elements. Specific context based research priorities have now been identified as essential pedagogical components that will lead to more viable ethical and socially responsible design. The dividend from such design research provides substantial gain not just for the academy but for diverse communities. New design intelligence will be generated using the community as an external laboratory, classroom, or playpen. This requires the design institution to look beyond the confines and comfort of the familiar. The success of our cross-sector challenge clearly demonstrates the benefits of design research transcending design.

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A visual narrative teaching model in graphic design

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This paper explores a teaching model that situates the student in a visual narrative environment that reveals the complexities of real world situations. The model follows the professional process of a graphic designer and client as they engage with the wide range of issues and skills needed to create a successful corporate identity.

The teaching resource interface is a graphic novel that utilises a flexible mode of delivery to internal and external graphic design students. It builds upon a preference that most design students have for visual–spatial learning by exemplifying the visual aspects and situating the issues within a context of a character-driven story.

The package encourages deeper learning by interactive involvement, multimedia and parallel exercises to transform the narrative into knowledge. This teaching resource showcases a model of design practice that enables discussion to assist students to form an understanding of the skills needed to be a professional graphic designer.

Conference theme:

Shifts in art + design practice and technology, defining new ways of working



Image 1: A still from the graphic novel teaching package introducing the brief from the client.

Introduction

Changes in technology and the underlying economic constraints of students have called into question the efficiency of established methods of studying design while also creating opportunities for developing new methods for student involvement. This paper documents the search for a match between the potential of on-line learning with a form of teaching that can deliver content, engagement and an understanding of professionalism and the processes in graphic design.

This paper investigates a teaching package resource delivered to a blend of internal and external on-line students in graphic design in a second year subject 'Design for Industry' which is focused on teaching corporate identity, professional practice and the process of design. It has modules on corporate identity issues and logo design as well as on design issues such as the client dynamic, briefs and quoting and printing. Utilising the influence of practice-based learning, the focus is on emulating a realistic experience of the process of design and the professional practice of being a designer.

The project creates an online environment following a narrative of a designer and client working together to resolve a corporate identity for an eco tourism resort. It situates the student within a professional process going beyond the visual artefacts to an experience of the thoughts, emotions and process which is enhanced with interactivity and feedback to promote deeper learning.

Background: Changes in Graphic Design Teaching

Graphic design education has grown out of the craft paradigm of master/apprentice studiobased learning where the student observes the master and is guided directly by him/her. This model has floundered with the proliferation of the computer as the indispensable tool for graphic design. It has led to each student having a complete individualised production studio that is their communication device, research tool, entertainment system and core to their lifestyle in their own home environment where they feel more comfortable in exploring their design solutions. Students feel a major restriction when having to work on different computers and within time restraints. Studio-based learning seems illogical and inflexible to a majority of students who would much rather work within their own environment and in their own time than in structured classes.

With the expansion of net-based communication such as blogs, forums and social networks that are encouraged by the university, the students are more inclined to learn by themselves or with the assistance of their peers. With peer feedback they can obtain the gratification of near immediate response that they expect within their normal communication use of SMS and online chat. Peer learning and self motivated learning are very important to gain independence and individual solutions but in the early years it sometimes creates limitation of possibilities through lack of software knowledge or focusing too much on the outcome rather then the opportunity to learn by exploration of the possibilities.

A compounding issue is the financial necessity for students to engage in long hours of paid part-time work that has made flexible delivery increasingly important, but has created an internal student who works in a very similar way to those in the external or distance mode of learning. This has taken the student further from assisted learning to self-initiated exploration that may perpetuate inefficient or superficial processes.

Previous Teaching Materials

Over the past eight years I have been experimenting with different approaches to building distance-teaching resources trying to maintain some of the qualities of studio-based teaching without the face-to-face aspect. I have trialed audio and image enhanced podcast lectures, screen-capture video software tutorials and assessment methods, resource and problem based learning and blog-based learning journals and I have been considering the nature of the next step in teaching resources.



Image 2: Still from the teaching package investigating the scope of the project in a mind map.

The subject that I am looking to improve is focused on professional practice and building a corporate identity where the students explore the designing of logos and create identities from

a brief with content modules on clients, ethics, design process, brain storming printing/paper and quoting.

Case Study Teaching

The difficulty in this subject is little material available which documents the way designers work. Most books specifically on graphic design do not provide much background but focus on the results of the design process. They lack background information on the struggles and the influences of the client that perpetuate the dominance of style over thinking in design. The best form to deliver this sense of detail seems to be something akin to the case study, which "has been widely used in other disciplines and it can be used effectively in design" (Breslin and Buchanan, 2008, p. 36).

Case studies are used extensively in law, medicine and the social sciences to emulate real world situations and get the students to apply previous learning to a specific situation and generate discussion on the multiple factors leading to decision-making. "An essential component of designing an effective learning environment is that it reflects all the complexities of the real world in which the learners will function after the planned learning activities" (Kanuka n.d.). A case study model allows skills and knowledge to be applied in context and "prepare them for the diverse and complex problems they will encounter within their profession" (Kanuka n.d.).

The discussion and delivery of the brief to students examines avenues to pursue and aspects to be aware of but without specific full process examples it is difficult to generate further meaningful discussion. "Cases present solutions to past problems that may compensate for learner's lack of experience and may help learners develop an understanding of concepts and strategies useful in similar situations" (Bennett, B. Harper, B & Hedberg, J. 2002. p. 4). Currently students seem to establish their own individual process without a strong model to guide them.

Design is a multi-discipline pursuit and students should be informed of the pressures, influences and problem solving issues as they move through their studies to go beyond mere visual solution towards a professional level of integrated problem solving. Bennett et al. reinforces this point when she wrote "case based learning involves complex, authentic situations in which the learner (usually a novice) must learn to think like a practitioner (an expert). This reflects a view that learning is a process moving towards greater expertise." (Bennett, Harper and Hedberg. 2002, p. 2)

The appeal of situating learning in a case study type environment is that issues that are normally isolated can be matched to problem solving and provided in context of the real world situations. Instead of focusing upon assessable outcomes of skill acquisition and visual resolve, this type of focus to learning directs towards understanding of the multi-faceted issues and processes for a career.

The introduction of case study structure in UNSW (industrial design) concluded that it was helpful in "providing a structure upon which design decision-making can be based; it also makes the overall thinking associated with the design process more apparent and transparent" (Green n.d. p. 1).

Teaching is episodic and normally a topic driven exploration of projects and aspects in the field of study. A detailed case study can give access to the cognitive processes and influences on the designer through all aspects, from client contact to quoting, brain storming, ethical issues and designer frustrations etc. that prepares the student to the real life situation and can provide a methods of coping with it.

A case study can address the difficulty in teaching 'how to design' which is extremely hard to communicate and quite individualistic but fundamental to the student's ability to be successful. This is especially important in early years of study where it is more important to have a good design process than a great result. The case study can provide a specific design process model to discuss approaches in design and the possible alternatives in process.

Learning preference focus to the teaching package

A large scale, eight university study of engineering students in the USA identified that an average of 84% of their students were predominately visual learners (Felder and Brent). A test done on my students found their preference for visual learning overwealming, which allows me to utilise the extensive research in focusing teaching materials directly to their preference and connect students to their natural mode of thinking and learning.

Those who choose a career as a visual designer are often visual-spatial learners and these students do not benefit from traditional verbal lectures, rote learning, verbal presentation skills and time-based exams. As Silverman stated "visual-spatial learners may dislike school because of the over emphasis on lecturing rote memorization, drill and practice exercises, and the lack of sufficient stimulation of their powerful abstract visual reasoning abilities. (Silverman n.d, p. 3)"

The current research has identified "the undue emphasis given to sequential logic, and current theories of higher order thinking have endorsed a definition of higher order thinking which includes both creative (intuitive) and logical reasoning components" (McLoughlin and Krakowski. 2001, p. 4). My teaching has tended to follow the Silverman example because of my own preference for visual-spatial learning but it encourages me to direct the teaching this way while looking for a balance to creative and logical approaches put forward by McLoughlin and Krakowski.

Silverman (1989) established a list of techniques for the teaching of visual-spatial learners that defines a direction to my teaching program. She suggests the use very visual methods in explaining, building metaphors to connect ideas to visual parallels and the strategy to "let them observe others before attempting new tasks (and) show examples of the finished product" (Silverman 1989, p.22). This defines the basis of what a visually rich case study is designed to do. The teaching resource will also present overviews, give structure and is a continuous example that visual-spatial learners can 'attach' information to. This will be reinforced by visual design exercises outside the environment to encourage deeper learning. Added to this, the encouragement to search for creative solutions and build personal design process models should give the stimulation and resolve an environment that Silverman proposes will encourage visual learners to flourish.



Image 3: Getting feedback from the client on initial research to define the design direction.

Resolution: The search for the form

Visual-spatial learning preferences, real-life simulation and deep learning of a case study defines the intended teaching package. I then turned to the search for an appropriate form to create the environment that would enhance the content. To align with the authentic learning model, the environment should be rich in emotional and visual cues that can give a sense of suspension of belief. Possibly the best and most popular form to do this is video, though the production time, costs and complications make it a difficult choice. The students certainly have a rapport with film but also an expectation of quality, which if not reached may break the suspension of belief and the student will find it more annoying than immersive. It is also very hard to modify and add things to the resource in this form.

The second form investigated was an on-line digital comic that would give an opportunity for wonderful and unconventional visual extravagances, multimedia opportunities and interactivity. That form has a connection to the visual design world and is a good conveyer of information in written and spoken word, music, images and animations that seemed an ideal medium. It has a sense of teaching by its own visual nature in solving the picture frame and multimedia choices as well as a great conveyer of content. Yang states "the five identified strengths of comics - that comics are motivating, visual, permanent, intermediary, and popular - can be harnessed in practically any subject and at practically any grade level" (Yang 2003). This being said, it gives me confidence in the decision to go in that direction over video where it might not be quite as immersive but compensates with greater interactions and attraction as well as being easily retraced.

These obvious strengths are reinforced by Chris Wilson's comment that "Comic literature is unique in that it combines text and art, which makes use of Multiple Intelligences" (and the) "two modes of input allow students to grasp meaning quicker and more efficiently" (Wilson 2008). Moving from here into movement and sound as well is a potent tool that I feel has been under-utilised maybe because of its production time and skill that it takes to build it.

When investigating the look and feel of the comic I initially examined animated simulated characters that use the computer to speak out the dialogue but the visual and audio quality was not representational for the quality that I saw as acceptable in a visual design course. It did give a sense of personal interaction but I thought I might be able to achieve a greater visual outcome by doing it myself.

I started sketching characters but for speed and a better rapport to be built up between the students and the characters I decided to use photography. I investigated a combination of filters to emulate the comic feel and made a rich visual styling. This graphic outcome allows the manipulation and re-composing of images and backgrounds and experiments with the visual dynamics that can be used to carry the emotional impact of the story.



Image 4: Still from the graphic novel showing variation of a logo moving towards resolution after feedback from interested friends.

Digital graphic novel is the message

The famous McLuhan phrase 'The Medium is the Message' might apply here, not to reflect that the medium of the comic/graphic novel as an important statement about graphic design but to infer that the movement towards this use of the popular street culture sends a message about what it is to learn and how education has been refocusing student accessibility. The idea, that the educational resource is aligning the 'message' or content to a more accepted cultural pursuit of the students is probably more to the point. Federman (2004, p. 2) explained "that it is not the content or use of the innovation, but the change in inter-personal dynamics that the innovation brings with it". I am hoping that the change that this generates will create a mesh of creative ideas between the students and lecturer.

The medium of the comic/graphic novel, being something unusual in higher educational teaching, might instil a welcome sense of breaking down barriers that students may have to text based instructional material and open up the opportunity for enjoyment of the learning experience. A digital comic has a recognised form that brings an anticipation that is based on extravagant expectations of visual dynamics. We know that the form has structure and expectation, the use of it as an educational tool may not be that innovative but it can be enhanced by multimedia opportunities.

Multimedia

The sequence of images is important to the visual-spatial learner but learning needs a structure which multimedia can produce in the many layers of visual messages, audio and interactivity with feedback. Mayer states that students "actively engage in cognitive processing to construct a coherent mental representation of their experiences...(including) organizing incoming information and integrating incoming information with other knowledge" (Mayer 2001, p. 50). Mayer maybe right but without reflection this process could loose interest for the student. This teaching resource will have multiple choice interactions set out throughout the package, not to test the retention but to foreground the active learning in context to other things they know so that they can reflect and make sense of the learning. An example of this is a question relating to the reasoning for the designer's motivation to take on the project with options such as "It is something I really believe in" then with a feedback of "Passion and design are good bedfellows".



Image 5: Reflective quiz to resolve designer motivation with audio feedback

Another section instigates reflection by identifying the stress and pressure to resolve the design by asking a question of the student as to what to do. One of the options was to "Just leave it now for the weekend" with the feedback of "It is great to leave the subconscious to do some of the work". These questions have no right or wrong answer but are designed to get participation in building up their own design process and methods of coping.

One of the main opportunities of multimedia is its interactive nature and I had planned to have multiple paths of choose-your-own-adventure decision-making leading to a number of alternate outcomes. Branching options would have been at critical decision making points like font choice, colour direction and then shape etc and I think it could be very appealing though it didn't seem achievable to include this because of the complexity that this project already aimed for. So, I have instead created exercises outside the graphic novel that get the student to explore different avenues and alternative outcomes.

Integration into the subject

The graphic novel will cover the first five weeks of the second year subject generating discussions each week on the issues and skills involved. Running parallel to that will be five exercises that ask the student to utilise the scenario, their new knowledge and pursue alternative design outcomes. This will bring the student out of the comfort zone of drifting with the story and make them engage in the deeper learning of analysing the decision of the designer in the scenario and create their own personal responses. Exploring alternative models of how to design with discussion of the processes has been hard to generate without this teaching tool.

The experience of watching a detailed process and having designed alternatives will give them some understanding of what is involved and how to go about designing corporate identity with some confidence.

The second half of the subject will ask the students to transform their new knowledge to a completely different corporate identity project that will utilise their established design process and understanding of the techniques to solve the brief.



Image 6: Follow-up interview with the client and final lecturer comment

Conclusion

I see the form and structure of the proposed graphic novel in the case study style narrative as very appealing in educational potential to expose the real life issues to the students. The online graphic novel seems an engaging medium to focus the visually orientated students to an understanding of the design process and the design reality as well as creating an integrated environment to stimulate discussion.

This project will be tested by students who have previously completed the subject to gauge reactions, feedback and understanding as to how it differs in possible learning outcomes and engagement to the lecture mode in the previous teaching delivery. The next time the subject is taught, I will investigate the teaching model and how it can be expanded into other subjects in promoting deeper learning and its ability to prepare students for the industry.

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Design: Knowledge, Practice and Research

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Abstract

With the current emphasis on research through practice in design discourse, theoretical discussions have shifted: Practice itself has itself become an object of study, either in a straight-forward, self-reflective way (i.e. simple practice as research), or as a critical examination of accepted design principles. How new knowledge is to be gained from this additional approach is not yet exactly clear and in fact, is contested.

It seems to me that new insights—new design knowledge—can be gained by developing research strategies that engage with what could be described as an ontology of practice in a way that is congruent with approaches found in process philosophy. Exploring practice from this point of view will lead, potentially, to research strategies and theories that are unique to design. This new knowledge can then be the impetus for further, fruitful elaborations of design theory.

Keywords:

Ontology, Process philosophy, Methodology

Panta rhei: Everything is in a state of flux. Simplicius

Potamoisi toisin autoisin embainousin, hetera kai hetera hudata epirrei: On those stepping into rivers the same, other and other waters flow, or, No man ever steps in the same river twice, for it's not the same river and he's not the same man. Heraclitus

1. Introduction

This paper is an essay at making a preliminary sketch of one strategy for creating design knowledge through practice-based research. Discussions of (design) research are often prefaced by the explicit or implicit acknowledgment that that the object of research is the production of knowledge. However, once this has been stated, the discussion then proceeds immediately to the particular aspect of research to be examined, without dwelling at length on knowledge itself.

2. Knowledge

Limitations on time and restrictions in length for this paper would prompt me to follow suit, nevertheless I think it worth noting that the definition of knowledge—often given as 'justified, true belief'— is a matter of ongoing epistemological debate. There is also a general recognition, and it is of some import here, that distinctions can be drawn between kinds of knowledge. Two significant distinctions for design research are the differences between explicit and implicit knowledge, and declarative and procedural knowledge. Michel Polyani (1966) distinguished between explicit and implicit knowledge. Explicit knowledge is conscious and can be communicated; implicit or *tacit* knowledge is unconscious and cannot be communicated. The importance of tacit knowledge in design thinking is generally recognized and has been the subject of a number of articles, e.g. Rust (2004).

Similarly, important distinctions must be made between declarative and procedural knowledge. The former is based on facts and can be expressed in declarative statements whilst procedural knowledge is derived from or based on actions that may or may not be expressible. The importance of these distinctions for discussions of design practice is obvious, but it is not my aim, nor is it possible, to revisit them at length in this paper, nevertheless they constitute a background for my thoughts. One other aside I think worth suggesting is that these distinctions could, perhaps, be incorporated, in potentially useful ways, into the ideas of 'designerly ways of knowing' developed by Nigel Cross (1999, 2001, 2006, 2007). In these writings, Cross also articulated a taxonomy of potential design research fields:

Design epistemology -study of designerly ways of knowing Design praxiology -study of the practices and processes of design Design phenomenology -study of the form and configuration of artifacts I intend to focus on the second of these categories: Practice. Cross's choice of the term *praxiology* is evocative.

3. Praxiology

J.J. Ostrowski (1968) has concisely recounted the etymology and applications of the term.
(Two spellings are current: praxiology and praxeology.) It is, however, perhaps most commonly associated with Ludwig von Mises's (and the Austrian School of Economics) theories of (trans)actions and decision-making; these are outlined in his treatise *Human Action* (1949, 1996).
Pierre Bourdieu, for his part, developed his own praxeology in 1972. In his *Outline of a Theory of*

Practice (1977), he addressed the classical opposition between the 'subject' and the 'object,' but this is not our immediate concern, nor is von Mises's ideas. Rather, it is on Tadeusz Kotarbinski's (1960; 1965) philosophical investigations of *efficient* human action, which he also called praxiology, that I wish to build. Kotarbinski writes,

The business of praxiology is to investigate the essence of the process of action, and to clarify all those concepts which are indispensable for the description, appraisal, and planning of action, and for the general theory of efficient action (1960).

Henry Hiz (1954), in his elucidation of Kotarbinski's ideas, writes that,

Praxeology is a search for general statements concerning action.... Praxeology, ... records the methods applied by workers. The subject matter of praxeology is workers and not that on which they work. Moreover, praxeology does not invent new techniques of working. It merely records, systematizes, and analyzes the existing techniques. The practical gain from praxeology is not in obtaining new means of success but in making explicit the methods already in use. Practical values are different from ethical values. To evaluate a deed from a practical, technical point of view is not to evaluate it morally. A deed can be performed with technical mastery and still be morally repulsive and esthetically neutral. Efficiency by itself is neither noble nor beautiful, as truth by itself is neither good nor pleasant. Practical values do not imply other values. Neither are they necessary conditions for other values. Efficiency can be repulsive and inefficiency charming.

Kotarbinski has developed an'operative theory,' which is concerned with action itself; this is distinctly different from a 'substantive theory,' which provides knowledge about the object of action (Bunge, 1966; cf. Franzen *et al*, 2009). This is a significant distinction.

4. Process

There is a long history, not without contentions, within design discourse about methodology, i.e. design processes. A process can be understood as a series of events or actions occurring over time. (See for example Cross [1984; 2007] for summaries. Prominent in these discussions, in addition to Cross were Herbert Simon (1969), Horst Rittel (1973a; 1973b), Christopher Alexander (1964; 1971), and Bruce Archer (1965), to name only a few of the many contributors to the debates.)

It's worth noting here that the term 'methodology' is a potential source of some semantic confusion; it is somewhat diffuse in its application. The German draws a useful distinction between the term *Methodik* and *Methodologie*; the former is the teaching of methods used in a particular discipline, the latter is the theoretical reflection upon those methods.

Kotarbinski's praxiology is thus, nominally, concerned with *Methodologie*, however, it seems to me that his considerations are still, in the main, substantive, or 'object-oriented,' not operative. That is to say, although he is concerned with the study of process, the study is predicated on an assumption of its end or outcome. Similarly, although Donald Schön (1983) also engaged a similar distinction in his book *The Reflective Practitioner*, in which he set out to establish "an epistemology of practice..." founded on what Cross named 'designerly ways of knowing,' he too is implicitly substantive in his assumptions.

5. Techne / Praxis

The nuanced appraisal offered by Aristotle helps to clarify the perceived differences. He, in Book VI of the *Nichomachean Ethics*, distinguishes first between practice or *techne*, and knowledge or *episteme*. (Aristotle means knowledge based on certainty, i.e. knowledge that is for lack of a better modifier, scientific, but derived from a science that is non-experimental.) Techne can be understood as the method or process used in the production of an object or in the fulfilling of a purpose; episteme can be understood as pure theory. However, techne resembles episteme to some extent because it implies an understanding of principles, but the aim of the former is making or doing while the latter focuses on disinterested understanding. (For a comprehensive discussion, see Parry [2008].)

Aristotle also distinguishes techne from virtue (*arete*) *per se*; he does this by distinguishing making something (*poesis*) from acting (*praxis*). Arete is a necessity for acting. The end of the poesis is a product separate from the making whereas praxis is an end in itself; hence, the value of poesis is in the product whilst the value of virtuous praxis is in the actor or agent her– or himself.

In addition, Aristotle holds episteme and techne as two of the five virtues of rational thought; the others are *phronesis* (practical wisdom), *sophia* (wisdom), and *nous* (intellect). Phronesis, also understood as prudence, is the ability to consider action with a view to effect change, especially for the good. But, it is not simply concerned the 'how' of change. It also demands the ability to

reflect upon the outcome arising from a given or specific circumstance. In short, it is about knowing how to act in unforeseen situations.

6. Techne / poesis; praxis / phronesis

Thus, when investigating practice, we can draw a distinction between *techne / poesis* on the one hand, and *praxis / phronesis* on the other. The first pair concerns the 'what' and 'how' of doing something; the second asks 'why.' Praxis / phronesis is thus ethically motivated, and is therefore profoundly political and moral in nature. Politics after all are about effecting change for the good. A straightforward examination of techne—Kotarbinski's praxiology—is disinterested and, by definition, amoral. Herbert Simon in his *The sciences of the artificial* (1969) used this difference to distinguish between scientists and engineers, stating that scientists care about *how things are* and engineers care about *how things should be*. Similarly, Henryk Skolimowski (1966) wrote that science cares about *what is* and technology about *what is to be* (Cf. Franzen et al, 2009).

7. Ontology / Deontology

In the same vein, Vilem Flusser, in his *Gesten, Versuch einer Phänomenologie* (1993), addresses these same issues of ontology and deontology and extends the categories to include the 'how.' He examines the tensions between 'what,' i.e. the scientific, 'why,' the political and 'how,' i.e. ontology, deontology, and methodology, and points out the risks of having the 'how' collapsed into 'what' —as perhaps illustrated by the oft-heard sentiment, "this is just the way things are, so just show me how to do it"—with a concomitant devaluing of the 'why.' (Cf. Gänshirt, 2007.)

I think that Flusser's ontological and methodological discussion is of fundamental importance to design thought, but I note it here foremost because it is illustrative of what I hope to suggest as a research strategy. Flusser points out the risks of having methodology— practice—hierarchically subservient to ontology and deontology. Practice is implicitly accepted as the instrument with which to effect the transition from one, static ontological state (of being) to another, preferred, static ontological state (of being). I would like to suggest that focusing on design practice from a metaphysical point of view, i.e. as an ontology of *becoming*, rather than from the scientific stance that is materialistic, is one avenue for developing practice-based or action research. This in turn could lead to the development of an epistemology of process.

8. Process philosophy

Ontological study of processes is not novel in itself; indeed it has a long, though understated, philosophical history, but I do think the approach has not yet been incorporated into design discourse. It is perhaps best known as 'process philosophy,' and as such is most closely associated with the thought of A.N. Whitehead (1925; 1929), Charles Hartshorne, and further with George Herbert Mead, John Dewey, C.S. Peirce, Samuel Alexander, and William James, among others. Its 20th-century development is centered in America, but it is also resonates with the thinking of Henri Bergson, Friedrich Nietzsche and Pierre Teilhard de Chardin. Nicholas Rescher (1996; 2000; 2008) and J.R.Hustwit (2007) both offer concise synopses of its tenets and hallmarks.

Process philosophy categorically opposes the view, illustrated above, that processes are subordinate to 'things' in any order of being or understanding. Indeed, process philosophy puts processes at the forefront of ontological concerns. This is in direct opposition to the dominant Cartesian view that places epistemology—the investigation of all aspects of knowledge—above ontology—the study of the principles of being. In this Cartesian schema, ontological study follows upon, and is based upon epistemological foundations.

In process philosophy, process is understood in the usual way; it comprises a sequence of steps or phases that unfolds over time. These stages or phases are seen as a unitary complex—a structure—that is temporally coherent. Process is regarded as an essential aspect of everything that exists; in fact process thought would have it that actuality—the real—is made up solely of 'actual events' or 'actual occasions;' these occasions are seen as self-determining and contingent (Whitehead, 1929). Thus the world is a web of internal and external relations and interdependences. In other words, the real world comprises a network of dynamic processual relationships rather than a collection of (related) objects arising from simple, subsidiary, linear processes.

To recap, some of the basic propositions of process thought maintain that process is a fundamental category of ontology and that processes have a status that is at least equal to things in ontological discourse. Significant for design is the understanding that time, change, contingency, emergence, innovation and creativity constitute important, even fundamental, categories of metaphysical understanding.

9. Resistance / accommodation

Interestingly, these ideas resonate in the investigations of some sociologists of science. They are reflected, for example, in Andrew Pickering's work (1995) on the scientific experimental process. Pickering sees experimentation as a sequence of resistances and accommodations. At each stage a resistance or an accommodation, arising from a multitude of circumstances, either internal or external to the experiment itself, can affect the process and its outcome.

Integral to Pickering's ideas is an acceptance of material agency, i.e. non-human agents, either objects or sets of relations, can affect the processes. This is, in the main, congruent with the ideas developed by Bruno Latour (1987, 2005), Michel Callon (1986, 1987), and John Law (1999) in Actor-Network Theory.

Design activity involves the same kinds of resistances and accommodations, the same contentions with external agency. Donald Schön (1983; cf. Cross, 2007) wanted to establish 'an epistemology of practice implicit in the artistic, intuitive processes which [design and other] practitioners bring to situations of uncertainty, instability, uniqueness and value conflict.' Perhaps by first focusing on an ontology of 'becoming,' we can then work towards a corpus of knowledge about practice upon which to build.

10. Conclusion

Process philosophy inherets a number of approaches: empiricism, rationalism, and speculation (Hustwit, 2007). The knowledge thus gained through experience, deductive thinking, and imagination, which to me encapsulates design thinking, framed within process philosophy offers an opportunity not only to develop design knowledge, but also, importantly, to articulate, communicate and apply design thinking in a variety of other fields and disciplines.

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Repositioning Art & Design's Role in Society – a catalyst for social change.

Art, Environment and Ecology – Poetry of Water paths Dr Colleen Morris, Northern Melbourne Institute of TAFE

An integral part of my professional art practice is to raise the public profile and the community awareness of our fragile and ephemeral rivers. I have been developing and engaging in art and science symposia, and projects that communicate the need for both urgent and long term action related to this environment. The aim has been to encourage a responsible contribution by governments in order to enable appropriate community involvement in the restoration and maintenance of the Murray – Darling River System. I have broadened my personal involvement and participation in those seminars which can include art, community and environment and which relate to world water issues, with particular reference to the Australian river system and its ecology. It has become evident that water related problems are a global issue. At present I am in the process of planning a series of new initiatives that will involve some collaborative 'Eco art' projects, with the possibility of working with international artists across a range of disciplines. The direction of the installations/artworks for example may relate to water purification, by raising awareness of water as an element, and the significant role of rivers and waterways in our ecology and culture.

The following excerpt is from a seminar in Madrid 1995 that was dealing with the degradation of river landscapes, referencing two rivers, the Rio Olivenza and Rio Gabriel in Spain.

'Art in nature helps us to perceive the beauty of nature and to understand that time as a dimension is an aesthetic element in its development. We need artists to work on designing the restoration of landscapes and rivers that have been destroyed. Their work enriches the scientific view of things that explains how the ecological functions fit together. Working in a spirit of ecological aesthetics, artistic interventions integrate the changes that are at work with time, leaving it to natural processes and transformation.' (Gonzalez del Tanago, M. & Garcia de Jalon, D. 2004 p.193)

It could apply equally to the ecological state of the Australian river landscapes and the proactive role artists could play in this process. The environmental artist creates an awareness of the human position within the global framework. There is an understanding that a real interconnectivity should be established, by placing environmental conservation and sustainability between a personal responsibility and society's ethical community practice. National and international forums such as 'Cultivating an interdisciplinary approach to environmental awareness' Israel 2002 and the World Water Conference 'Thinking Ecoart Through the World Water Forum, Kyoto 2003 "As part of the debate on "Water as Public Good", the organizers produced an art festival alongside the conference and a two day session under the title - "Water & Cultural Diversity" and "Water in Art". The sessions included mostly indigenous presentations of water problems." (Shai Zakai 2003. greenmuseum.org/content/artist_content).

Earlier this year I arranged a meeting with the English ecoartist David Haley in Manchester, to discuss our common areas of interest and the water related artworks with the possibility of linking two cities/two countries in a 'twin' project. In the following he talks about his work as '... our ability to survive climate change as the enactment of an evolutionary narrative. My interdisciplinary research attempts to integrate quantitative and qualitative methodologies into the creative process. This informs my practice to generate poetic dialogues that resonate as creative interventions in pursuit of aesthetic diversity to develop communities of inquiry for an eco-centric culture.' (greenmuseum.org/c/enterchange/artists/haley)

David Haley was involved with the exhibition and presentations at the 2003 Kyoto Forum, and since 2001 has been working on the River Life 3000 project, a project of a community's relationship to the Severn River and 'issues such as reclamation of damaged areas and new connections which help people become involved and aware of what already exists under their own backyards' (Shai Zakai 2003)

The location of the artworks - human intervention into the space and place:

Consider how location and notions of place, landscape and environment have shifted in emphasis over a period of time – with a history of viewing land as 'landscape' to land as 'environment'. Currently the concept is more likely to be as follows;

'Landscape is the scope of nature, modified by culture, from the locus and in that sense, landscape is local, located. Humans have both natural and cultural environments; landscapes are typically hybrid. An environment does not exist without some organism
environed by the world in which it copes. An environment is the current field of significance for a living being.' (Rolston, Holmes111October 1995.p.379)

The Mungo-Willandra Lakes region is part of a series of ancient river channels, anabranches and billabongs within the Murray-Darling Basin in New South Wales Australia. The Basin is defined by the catchment areas of the Murray and Darling Rivers and their many tributaries.

Lake Mungo is an area of great historic significance with a multi – faceted character. Elements to consider relate to the place, the people (at least 36,000 years ago) and its history. This site has an ancient human history and is a place of ongoing geological change. It is also a site of early settler occupation (late 19th century - to mid 20th century) when it was a sheep station, and has since become a formally recognised site of major archeological and historic significance – which lead to the World Heritage listing in 1981. Three aboriginal tribal groups, the elders from Paakantyi (Barkindji), Muthi Muthi and the Ngiyampaa now jointly manage the region with the New South Wales Department of Parks and Wildlife. Mungo has an unusual beauty and a sense of poetry related to the vast expanse and its ancient history. The sounds of silence exist across the site – the magic whispering and sighing of the belah trees, small insect sounds in the sands, the morning sounds of awakening and evening sounds of settling and sleeping.

This series of installations were symbolic of an absent site, or site of memory. In his essay <u>Mapping Site : Robert Smithson</u>, Nick Kaye refers to a definition of site;

'As site being precisely a function of absence', observing that 'absence is either the trace of a previous presence, it contains memory, or the trace of a possible presence, it contains immanence'. (Kaye, Nick, 2000. p.96)

In this way the works became metaphors for memory of place, significance of site, and through their aesthetic they indicated the poetic aspects linked with the presence of water. When viewing these installations, it was evident that both the artworks and philosophy were positioned primarily in relation to issues of the land, the environment and ecology. The works responded directly to the poetry and aesthetics of both the land and its inland waters. I contend that in this combination, the significance of ecological and environmental issues can be communicated to a wider audience in the community. The installation referenced and interpreted water paths and watercourses, in relation to the aesthetics of water. They acted as a visual metaphor: a poetic vision threatened by damage to the broader riverine ecological environment.

Interpretation and identity: Space of Nature - Imprint and impact on the land

The placement and scale of the installations and digital work created an incongruous and critical link in the midst of the greater space/site/location. This particular site appeared to go on forever, an infinite distance – leading to one revisiting and reinterpreting the artwork in the specific location. By constructing a site - specific artwork physically located in an area of great historical significance, one created links within the layers that addressed both site and history. In this context, the installation also acted as an interceptor of the site and the space – a visualisation, representation and interpretation of a 3D environment.

There were several key factors that affected the work – archaeology including history of both ancient and more recent times, and the geographic location and geological character of the site. The works attempted to straddle these disciplinary boundaries. The art responded to and intervened in the location, using the role of metaphor to communicate by artistic means, the historic and geological focus and to create a public link that translated to a broader audience. In the context of World Heritage sites, the Willandra Lakes region is considered to have outstanding cultural values in relation to its evidence of a past civilisation and of natural values relating to the representation of the major stages in the earth's revolutionary history and the significant ongoing geological processes.

How does this siting interpret or reinterpret the location – at Lake Mungo within the Murray Darling Basin? The scale of work can create or indicate significance, in this instance the site creates the significance and the work creates the incongruity. The large format digital prints were images of multiple 'mini – scapes'. They were metaphoric landscapes that increased in number and became an integral part of the three dimensional installation of 'samples' or imagined microscopic views of riverine and water environments. The accompanying distortion of image created a sense of environment that was reminiscent of both infinity and intimacy. It was an environment that reflected ecological degradation and a design aesthetic which also reflected a poetic and mysterious environment, one that engendered contemplation and awareness. From this perspective, the images could relate to either an objective or subjective space, creating an interesting and confronting spatial shift.



1. Colleen Morris. *Poetry of water - Riverine Lakes, 2005* Digital Print100 x 350cm Another series of installations encompassed a format that enabled the inclusion of a sound environment– the atmospheric sounds of water, from locations as varied as rivers and creeks, wild weather of thunder and rain storms. The water sounds and the related sounds of birds, insects etc within the water environment formed an integral part in these installations –giving a voice, listening to the speech of the water environment. In a sense these recorded sounds created a listening space, an invisible environment that evoked the site or place of waters and memories of the riverine environment of the Murray – Darling Basin, in particular the Murray River.

Sound recordings –sounds of water from a metaphoric site 'elsewhere', sounds of wind across the boardwalk. The many recordings of water sounds were edited and the most appropriate were selected for sections of each installation – rain and thunder of storms, birds calling on water, the hum of insects and other water creatures among the river edges, streams in flood, river quietness, pumps, waterwheels, falling water from weirs and lochs, rushing and gurgling around overhanging branches and snags - creating a dialogue between ear and environment.



2. Colleen Morris. Pro Tools: Waveforms Display Two 2006

Place and Identity – more than location or region

The focus of the work was on identity, location and responsibility in relation to water paths and the landscape. I investigated our imprint and impact on the landscape in general, referencing a specific site/ location and the relationship between the space of nature and human interventions into this space; Waters of Place, Waters of Space, Waters of Site, Waters of Memory. The installations explored aspects of space and memory of place, the artist as alchemist creating both an intimate site and an infinite space. The mixtures in Petrie dishes gradually evolved to large-scale digital prints evoking aerial landscapes of the river system.

By encompassing several threads or links with the past and the present of the waters of the Basin, it could be read as a memory of perception, one that evoked both public and private consciousness. This piece acted as a memorial to the passage of time and place, nature and culture, inheritance and extinction and loss and memory. It reflected an enhancement or transformation of memory as it receded, to a more mythical 'memory of memory' in time. It symbolised site as the cultural and environmental landscape of memory, where water is perceived as the primary life source, where the beauty and flow of the water course becomes a regenerative agent acting both as a restorative and a provider for the mind and the body.

Landscape as land:

'All landscapes are underpinned by a personal history. Some are designed to relay specific messages about culture, ecology, people and place.' (Amadion. Jane, 2001 p.156)

The installation interceded in the ephemeral – a place of stories, a place of mystery. It was in a particular landscape and responding to the ephemeral qualities of light, wind, colour and water. It underwent visual and material adjustments that 'key in observers' to natural phenomena. The sensations of nature changed appearance from moment to moment, the phenomena was distilled for the eye to glimpse.

In situ there appeared to be a coordinated response to the particular place/site/location – natural phenomena of weather and light. The geometry (installation structure) was absolutely simple and not intended to impress its own existence – it was designed and constructed to exist on site just like a mirror of the environment. Wind currents mirroring ancient water currents.

The message incorporated natural elements of the 'site context' and became an interpretation, invention and modification. Sites tell stories and there were evident layers of the site's history. As Creates says 'The land is important to me, but even more important is the idea that it becomes a 'place' because someone has been here.' (Creates, M cited in Lippard, Lucy 1997 p.32.) The philosopher Tuan, (Tuan Yi- Fu 1974b 2004) refers to 'topophilia' as the affective bond between people and place. The bond or sense of attachment is fundamental to the idea of place as a 'field of care' The philosophies of phenomenology and existentialism were at the core of the humanist geographer. Tuan refers to place as being seen as a universal and transhistorical part of the human condition. Place is the central concept which most perfectly expresses how humans create centres of meaning and fields of care in order to feel at home in the world.

In Australia, our idiosyncratic river system can both send its waters deep within as they journey through the vast expanse of the land, or as is the case of several of the rivers, they have the capacity to fill and flood rapidly and then disappear within weeks. I wished to construct a series of works that could convey both a sense of beauty and an environmental awareness, acting as a mirror or partial reflection of the complexity of our water.

There has been a significant change of viewpoint, where the experience of nature is as process rather than the picture, and occurs by shifting the emphasis from 'landscape' to environment'. The geographer, Denis Cosgrove relates to this sense of landscape and the subjective experience of landscape, stating that:

'When a landscape becomes an environment, the scenic sense would be only one of many ways in which what becomes holistically the current field of significance. The interaction between landscape and artist now becomes more complex.' (Andrews, Malcolm.1998 p.193)



3.1 Colleen Morris. Riverine Lakes - Poetry of water. Detail: Lake Mungo installation 2006



3.2 Colleen Morris. Riverine Lakes - Poetry of water. Detail: Lake Mungo installation 2006

Over a number of years many of these constructed artworks were site - specific installations or events for exhibition at the Palimpsests # 1 - 6 located in the Mildura region since 1998 and in conjunction with Art & Science Symposiums. Palimpsest in this instance was defined as something bearing visible traces of an earlier form, a parchment or other surface in which later writing had been superimposed on effaced earlier writing. In addition to the formal aesthetic concerns of space, placement and repetition, these artworks specifically addressed issues related to the ecology, and the damaged environment of the Murray – Darling River System. Through my studio artworks and site – specific installations I encapsulated a key part of childhood memory and significance of place, and thus established a sense of its importance within my integral identity. Simultaneously I explored the duality of this water path and riverine environment and captured its atmospheric moods by encompassing the meditative qualities and beauty of this specific environment. The works included an investigation of social and ecological factors related to the presence and usage of water in the Murray - Darling Basin. In Jale Erzen's essay he refers to today's artists and the notion of ecological aesthetics,

'.....many try to understand the land as a living entity with qualities that are intuited with experience through time; they try to make those at first sight unapparent life qualities surface in their designs. As opposed to Modernist or Minimalist design practices, the "identity of place", "locus solus" comes back to life in their work.' (Prigann, Herman 2004. p.24)

In the imagination, water is almost always in a fluid state, a vision in transition, water that refreshes water that quenches thirst, as evidenced by pleasures experienced of the sight and sound of rain, rivers, irrigation channels, a water storage tank, a sprinkler and gurgling stream. The word or image of a water path or watercourse often acts as a mnemonic. It may relate to the power of memory, aiding or designed to aid the memory or trigger for childhood memories of the riverine environment. At times it may be a signifier, a sign's physical form or symbol (sound, printed word, image) as distinct from its meaning or sense. The sight, thought or image of a river has many associations, guises and enhanced aesthetic that reference other places and times. I liken my response to Gaston Bachelard's thoughts in 'Water and Dreams' when he writes of his memories and dreams associated with waters presence.

'I still take pleasure in following a stream, in walking along the banks in the right direction, the way the water flows and leads life elsewhere.....it does not have to be the stream at home, ...The same memory flows from all fountains.' (Bachelard, Gaston. 1999.p.7)

Dr Colleen Morris, September 2009

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Photographic credits:

Image 1 & 2: Digital print and Protool computer image. Colleen Morris

Image 2: In the Pro Tools environment whatever is displayed in a track can be edited. The waveform display represents the amplitude of the sound across time. This does not change. The sound can be softer or lower in the overall mix. The dotted line represents the volume of that soundmix. In the image one track is set to display the waveform and the other displays the change in volume

Image 3.1 & 3.2: Details of Installation at Lake Mungo. 2006. Jeannette Hope

Storytelling in e-Learning

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"Easy-Peasy Ltd, a festival arranger in the virtual city of Craftopolis, needs new ideas for their festivities. Your task is to make a moodboard for different emotions. Development Coordinator Ernst Kuokka is your contact person and gives you more information."

The E-CIT project aimed at developing a creative e-learning environment for vocational institutes of handicraft sector in the EU. The a-CIT combines e-learning with creativity: the e-learning environment guides students to creativity and to problem-oriented methods in order to increase their skills in developing consumer-oriented products.

The method of storytelling is used to combine creativity and ICT and to increase the level of usercenteredness of the learning environment. Storytelling is an ancient educational method. Stories collect fragmented information and build larger and meaningful entities, easy to understand and remember. Storytelling is noticed to be a useful way to perceive the complicated world full of information.

Key words: storytelling, e-learning, handicraft, creativity

1. Introduction

This paper concentrates on reflecting the possibilities to unify e-learning with creativity and problem solving by using storytelling. The case study discussed is Craftopolis, a creative e-learning environment developed during the European Leonardo da Vinci pilot project e-Craft Idea Tutor (e-CIT). The project aimed at developing and testing a creative e-learning environment to handicraft students and teachers in secondary vocational institutes in the EU. Craftopolis aims to guide students towards creative thinking, problem solving and in combining multidisciplinary information in order to be able to develop consumer oriented products. Craftopolis uses stories as sources of inspiration, and as elements of pedagogy, usability and user-centeredness.

Handicraft projects are often realized on local or national level, and focus on developing enterprises. Craftopolis moves the development focus to international level and to the future work force and their trainers, that is students and teachers. Craftopolis starts preparing students to the challenges of the working life. The learnt will be applied in the working life. Teachers selecting the learning material influence on what and how students learn. Craftopolis aims to modernize learning material and methods to better correspond to the European strategies and to modernize the image of the craft sector.

1.1. The Importance of Creativity in Competition

The economic competition and saturation of the markets are pushing societies to find new ways of competition. According to Florida (2002) creative societies will be the most competitive. In fact creativity has also become an important part of the EU's strategies of competitiveness.

Societies are moving towards the reality of the Storytelling society, where the new catalysts of the action are stories, events and experiences (Jensen, 1999). Products must appeal to consumers' feelings. Conscious consumers pay increasingly attention to the connection between the products and their own lifestyles creating pressure on markets as well as on the quality of products.

1.2. The present situation of handicraft in the EU

Handicraft forms an important part of the European cultural and economic heritage. Most of the handicraft companies are small, formed of one person only, where the know-how holds on the artisan himself. The manual skills are not enough: to be successful the craft companies need to find new ways to act, acquire business knowledge and to pay attention on cultural heritage and internationalism (SEMA Study, 2001).

Traditionalism and out-of-date products are the main problem of the European handicraft influencing negatively on the living conditions of craft companies and the image of handicraft. There is a need to

understand consumer lifestyles and to transform user trends into new business. (Luutonen & Äyväri, 2002; SEMA Study 2001). The sector also lags behind the development in e-learning.

The EU emphasized developing the preconditions of the craft companies seeing young people as potential (SEMA Study, 2001). The level of creativity and independent thinking of the students must be increased, and working life oriented problem solving and use of the information technology needs to be integrated to studies. The competition of students among vocational institutes, and teachers' search for new ways of teaching open doors for new learning methods, know-how and new ways of thinking.

1.3. The purpose and objectives of the paper

The purpose of this paper is to discuss of possibilities to use storytelling and constructivist approaches to teach creativity and problem solving using e-learning. The issue is discussed under the case study of Craftopolis, a creative e-learning environment.

First the elements of e-learning and usability are observed. Secondly the role of stories and emotions are observed. Thirdly creativity in learning and the pedagogic background of the learning environment with storytelling is presented. Forth the structure of and using the learning environment, and fifth an example of a storytelling task is presented. Finally results and conclusions are presented.

2. Craftopolis, the creative e-learning environment – development of the case study

The creative e-learning environment Craftopolis aims to guide students towards creative thinking and problem solving, and combining multidisciplinary information in new meaningful ways in order to be able to create consumer oriented products. Craftopolis was developed in an international team of nine partners from six European countries and representing different educational levels and sectors.

The main challenges in the development work were how to teach irrational and organic creativity using rational, linear and impersonal e-learning, how to stimulate virtually real life situations, what could be the right pedagogic solution, and how to guarantee the usability of the learning environment.

One of the starting points and demands of the project was the Storytelling Society (Jensen, 1999). Also the solution used in Craftopolis is storytelling.

2.1 e-learning and usability

E-learning refers to teaching, learning and studying supported by informational technology, for example video lectures and electronic learning material (for example DVDs, CDs). The non-printed learning material is easy and cost-effective to update. Being independent of time and place, virtual

learning material can be accessed whenever desired. Teaching can be fully or partially virtual (blended learning). However e-learning overall lacks human and emotional impact leaving the learning experience detached. This influences negatively on the attractiveness of the learning situation and experience. In addition tutoring and transferring tacit knowledge is difficult in a virtual form.

Usability and user-centeredness are essential in learning material. The learning material must be clear, logic, accessible by all and correspond to the needs, aims and skill level of the target group. The learning situation should be comfortable and give the possibility to concentrate on the subject to study instead of the learning tools. Lacking one or more of these elements immediately decreases the level of motivation, attentiveness and the ability to learn. Effortless use of the learning material is essential especially when studying new things or issues containing insecure elements. A person can hold in the working memory only about 7 (+/–2) units, that is chunks, at the same time (for example Baddeley, 1997; Hakkarainen, Lonka, & Lipponen, 2002; Zimbardo, McDermott, Jansz, and Metaal, 1995). Unfamiliar things require more of the working memory than familiar things (Hakkarainen, Lonka, & Lipponen, 2002). If having to concentrate on supporting elements the working memory is disabled to process the proper learning contents.

2.2 Stories and emotions in learning

Stories are an important part of our cultures and societies. Stories are full of symbols, which people recognize and identify with. People think and communicate using stories. Stories help to structure meaningful and understandable unities of fragmented pieces of information (Aaltonen, & Heikkilä, 2003). Stories are the oldest way to teach, learn and to study. Being independent of time, culture and place, but yet globally meaningful and understandable (Aaltonen, & Heikkilä, 2003) stories adapt well to virtual learning.

Stories are emotion rich material. Plenty has been written to demonstrate the importance of emotions mood and attitudes on memory (Baddeley, 1997; Herrmann, & Palmisano,1992; Levine, & Bluck, n.d.; Phelps, 2006). According to Phelps (Phelps, 2006) emotions can alter three components of episodic memory: encoding, consolidation and the subjective sense of remembering. Emotions influence on attention and perception (Phelps, 2006). Attention is part and a requirement of the memorising process (Kuikka, Pulliainen, & Hänninen, 2001). People are easily tuned to things which are familiar and important to them. New experiences are built on existing information creates new thinking schemes orienting attention again (Neisser, 1982; Neisser, 1987). Unfamiliar information are easier to store and retrieve when connected to something already known and schemed (Nisbet, & Shucksmith, 1988), for example to cultural schemas. Containing emotional and cultural material, and directing attention, stories functions as mnemonic material promote learning.

2.3. Creativity in learning and the pedagogic background of the learning environment

Creativity is about finding new solutions and seeing things differently. In creativity no information is absolute, and no right and wrong answers exist. Creativity can be a result, a process, a way of thinking or an ability to detect problems and possibilities. Creativity enables the problem solving process.

Teaching has traditionally aimed to absolute answers. In the closed-ended system the problem solving process is linear, logical and controlled. New uncontrolled elements are not allowed. In the openended system instead the problem solving process is open, avoiding linear controlled situations: new unexpected elements appear and boundaries can be redefined during the process. (Rickards, 1975).

The pedagogic theory of the Craftopolis is constructivism with elements of experiential and problem based learning, both processed through stories. In constructivism the information processing is active. The student continuously and consciously processes information building new information on existing and previously apprehended information (Rauste, & von Wright, 1994). The new information is used in detecting and solving new problems. Constructivism as an open-ended system enables learning creativity. In constructivism no objective information exists and each subjectively built image of reality has the same importance (Rauste, & von Wright, 1994). Active processing and cognitive constructing of information affect positively on motivation which is an important part of acquiring new skills and the ability to apply the learned in practice.

Learning by doing is part of the experiential and constructive learning processes. In Craftopolis these and creativity have been approached through problem based learning and storytelling in the following ways:

- Stories as learning and simulation material, and part of the pedagogy: situations are created and simulated using stories; each task is a story presenting a problem to solve, and stories are used in tasks as sources of inspiration and understanding lifestyles of consumers. Students are guided to use multidisciplinary information to solve problems hiding in the tasks
- Stories as security: stories, examples and elements contain universal cultural material creating feelings of familiarity and comfortableness, and a safe environment to practice skills
- Usability: universal elements in stories support the usability of Craftopolis
- Visual and metaphoric stories: the learning environment is a visual and metaphoric narration Craftopolis. Each task takes place in visual scenes of the city. The visual and metaphoric narration decrease formality in learning enabling memory retention and opening minds to creativity
- Storytelling Society is one of the elements forming the need for the learning environment.

Concrete experiences, virtually simulated using stories, raise the level of observation and reflection, forming and constructing abstract concepts which, when memorized, can be used in new situations (Kolb, 1985).

Learning creativity in Craftopolis is also supported by its tasks based on creativity methods. Through tasks students automatically learn creative practices and thinking.

2.4 The structure and using of Craftopolis

The structure of the learning environment respects the chosen pedagogic theory, constructivism. Students are encouraged to acquire ideas from several disciplines during the problem solving process. The 54 tasks of Craftopolis are prepared around nine themes, all responding to the challenges the field of handicraft face and general development alignments. The themes are: creativity, culture, entrepreneurship and real life, handicraft, marketing, problem solving, product development, stories and history, and trends. The tasks are built on three levels of difficulty as described in the Figure 1.



Figure 1. Structure of the tasks in the learning environment

Firstly basic skills in different subjects are practiced on the level one. On the level two students start to combine the earlier learned. The third level is the most demanding requiring independent reflection and holistic problem solving using the skills obtained on the preceding levels. The level of tutoring decreases while raising the level. Each learning level must be finished before moving to the next one. It is to the teacher to decide when to move the whole class to the next level.

The structure of the levels of the tasks is comparable to the description of the process of creativity by Wallace (Guilford, 1966): level one is preparation; level two, incubation and practicing; and the level three are illumination, verification and testing the solutions.

Verbal and visual interaction is part of Craftopolis. Interaction is important in learning. It helps to develop critical thinking, change ideas, and to present and give reasons for one's own opinions. A true dialogue also helps to originate new ideas.

The structure of the Craftopolis is flexible and versatile, adaptable according to different curricula, educative system and pedagogic needs including time duration and the learning needs. A learning module can be constructed according to the students' needs by selecting the suitable tasks for the purpose from a pool of tasks. The possibility to adapt tasks according to the needs, to realize learning fully or partially virtually and the possibility to present works visually in the gallery of Craftopolis create multiple possibilities to use the learning environment.

2.5. An example of a storytelling task in Craftopolis

"Botanic Garden" is a task from the first level, and creativity as theme. It takes place in the Botanic garden of Craftopolis. The creativity technique used in the task is bionics, where ideas are produced by using solutions given by nature.

The students are supposed to create product concepts to the European PlantProduct competition. The products should take inspiration of the plants in the Botanic Garden. Students need to combine the given elements of handicraft, names of products, bionic pictures and names of materials in different ways into three product ideas. Techniques used in works can be named, for example "caterpillar carving". The ideas are later discussed in groups.



Figure 2. A scene of a task.

3. Results: the user testing of the learning environment

Craftopolis was created during the e-CIT project. Instead of a longitudinal study to measure the change on creativity levels using the tool, the testing focused on weather Craftopolis, that is the tool, contained elements enabling learning creativity, such as usability, visual and verbal narration, experiences and examples, multidisciplinarity, and the pedagogic approach. Craftopolis was tested and evaluated twice during the development process. The results directed the development process.

In the first testing, concept testing, the three different concepts of the learning environment were tested. Each concept had a different visual, narrative and pedagogic approach: "Craft Scene Investigation, CSI" - investigation and team work, "eCITy" - communication, and "Mothership" – constructive spaceship towards entrepreneurship. The concepts were tested with 25 teachers and 20 students in the partner counties (Estonia, Finland, France, Portugal and Slovenia). Most of the teachers were craft teachers, but some were cultural studies and arts teachers. Less than half of them were familiar with e-learning. In teacher testing the concepts were presented on a PowerPoint document and answered on a Microsoft Word document. Some answered independently; others were guided to the concepts. Despite the different methods, there were no significant differences in the answers. The student testing was a web inquiry with verbal and visual descriptions of the concepts.

Teachers and students were asked which concept was the most interesting and which the most suitable for teaching and learning. All the concepts received positive feedback and none was evaluated the best. The teachers liked visually most the "eCITy" but found the "Mothership" the most suitable for learning because of the constructive approach. Students liked most the visually the "Mothership", which teachers instead did not find interesting for the students. The real life metaphor in the "eCITy" and the investigation and team work in the "CSI" were considered positive. Problem solving and multidisciplinarity were considered important by both students and the teachers. The proto version of Craftopolis was developed based on the testing results: the visual and narration from the "eCITy", the pedagogic approach of the "Mothership" and the team work and investigation of the "CSI".

The Craftopolis proto version was tested during the proto-testing. The testing focused on the functionality and usability of the learning environment, on the possibility to teach and learn with the developed method, and on opinions of the tasks and of the role of the teacher. The proto-testing was carried out in three partner organizations in Finland, Portugal and Slovenia. Altogether 10 students and 10 teachers participated in the proto-testing. The students tested the student version, and teachers tested the student and the teacher version of the learning environment including tasks. A www-link of the learning environment was sent to both the testing groups which answered on a Microsoft Word document.

Both students and teachers found possible to teach and learn with the Craftopolis method. The overall feeling of the learning environment was positive: it was considered clear and logical to use, easy to

access with simple navigation and clear and informative instructions. The teachers found easy the forming and adding of classes. Only the language was a problem: some preferred a learning environment in own language.

The students found the learning environment and the tasks interesting, modern and practical. Students preferred some level of support from the teacher. The possibility of doing the tasks outside of class was considered positive. According to both, students and teachers, it would be possible to learn from the tasks, and Craftopolis could act as a supportive method of teaching.

The testing demonstrated highly positive attitudes towards stories in learning since both the target groups found possible to learn using the story method. Globally meaningful and understandable stories seemed to adapt and be welcomed to virtual learning, unlike the game-like aspects. The narrative element (stories, visual and metaphors) enabled the clarity (Aaltonen, & Heikkilä, 2003) and usability of the learning environment and constructive learning. Stories containing universal elements provided security and raised attentiveness created preconditions for learning creativity (Aaltonen, & Heikkilä, 2003; Kolb, 1985; Kuikka, Pulliainen, & Hänninen, 2001; Neisser 1982; Neisser 1987; Nisbet, & Shucksmith, 1988). Stories open minds enabling appearing of new unexpected elements and refining of boundaries during the problem solving process (Rickards, 1975). Also the pedagogic solution functioned: the creativity enabling constructive pedagogy (Phelps, 2006) was the preferred one by the teachers, and used in the final version of Craftopolis.

4. Discussion

Challenges rising from the society modify learning needs and curricula. Creativity and innovation are skills needed in today's society (Florida 2002). In order to make creativity a part of the society in a sustainable way, it is essential to introduce creative and multidisciplinary processes to students.

Information technology (ICT) is gaining increasingly ground in teaching. Many existing e-learning environments are developed for managing studies, some are book like and some are learning games. Although a welcome and useful tool, e-learning often lacks of human dimension. Yet the possibilities of ICT learning are many, for example simulations, presenting examples and special effects.

In the case study Craftopolis the opposite elements, organic creativity and linear ICT are unified (Rickards, 1975). Many existing educational methodologies seem to concentrate on building understanding of logical structures. Many of these methods can be considered as good reception, storing and repeating techniques. (Heikkilä, 1981). Using ICT the effect of linear and closed-ended learning increases. However, creativity is rather a contrast to logical thinking: creativity harnesses the pre-conscious and unconscious areas of thinking (Heikkilä, 1981). So do stories as well.

5. Conclusions

Based on our experience of the e-CIT project (Craftopolis) it is possible to teach and learn creativity and problem solving using ICT. The ICT as such does not provide tools for this, but storytelling contains the following useful elements for teaching and learning creativity:

Stories transform intangible into meaningful and understandable units (Aaltonen, & Heikkilä, 2003) using examples and simulations, and contain familiar elements. Unfamiliar things and information are easier to store and retrieve when connected to something already known and schemed (Nisbet, & Shucksmith, 1988). This way stories enhance learning, including the intangible creativity, problem solving and multidisciplinary. The testing results support this finding from the literature: stories were welcomed and both the target groups found possible to learn and teach using stories.

Making sense to the world (Aaltonen, & Heikkilä, 2003; Nisbet, & Shucksmith, 1988), stories influence positively on usability and the feeling of security. Both are essential in creativity and problem solving because enabling concentrating on the essential. Usability is essential especially with persons with lower ICT skills.

The constructive approach is building internal story on layers (Rauste, & von Wright, 1994). Constructivism enables learning creativity and problem solving (Rickards, 1975). This is how stories are part of the constructive process. The learnt can later be used in new situations (Kolb, 1985). Learning issues can also be hidden in stories. In Craftopolis creativity techniques were integrated into tasks. The target groups did not find this confusing, but evaluated the tasks and the learning system positively.

Stories stimulate imagination, essential in creativity. This helps redefining boundaries and problems during the problem solving process (Rickards, 1975). Stories are known to promote learning and memory [for example Baddeley, 1997; Hakkarainen, Lonka, & Lipponen, 2002; Kuikka, Pulliainen, & Hänninen, 2001; Neisser, 1982; Neisser, 1987; Zimbardo, McDermott, Jansz, & Metaal, 1995). Stories offer memory hooks, give examples and simulate feelings and situations. Without these elements creativity cannot be learnt.

Tolerance and understanding other points of views are essential in creativity (Florida, 2002) Stories are a tool to present other realities. This with the possibility of team work, multidisciplinarity and visual and verbal communication enable tolerance.

The positive testing results are in line with the findings from the literature: according to this Craftopolis would indeed support learning creativity and multidisciplinary work life oriented problem solving, and this way correspond to the EU's development strategies (for example SEMA Study, 2001).

Perhaps the most interesting finding was that stories still seemed to be an effective and welcome teaching method. Stories have many possibilities to be applied from virtual simulations to learning

diaries. Stories form logic unities revealing connections between things. Stories occupy our minds making us reflecting on the learning issues. Stories combined with creativity and problem solving can be applied to many purposes and fields of study. Also other applications are possible, such as strategy thinking of companies and communities, health care, service sector, and why not also in solving social and environmental problems, for example global warming.

Craftopolis is an example how to teach creativity, and one step towards integrating creativity to pedagogy and curriculum.

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Changing Consumers' Energy Behaviour by Industrial Design

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Climate change is today one of the most discussed topic around the world. Energy consumption in the household sector has been growing constantly. Due to the climate change there is a strong need to reduce this connsumption.

Desme project's aim was to analyse the possibilities to change consumers' energy behaviour by industrial design. The main focus was in studying how consumers react to the concepts of smart energy applications that focus on showing and guiding consumers' energy usage.

In the Desme project five energy consumer segments were found. Instead of being heterogeneous group of people, energy consumers differ a lot in their energy awareness, attitudes and current energy behaviour. Also their reasons and motives for saving energy are different.

When motivating consumers in energy saving, communication as well as energy saving products and services need to be innovative and desirable. Industrial design can be very effective tool in creating new kind of user-oriented solutions helping consumers in energy saving.

Keywords: industrial design, consumer behaviour, energy consumption, concept design

1. Introduction

In their report Energy Saving Trust (1996) claims that even though climate change has become one of the most talked social issues around the world, people have trouble in making the link between changing climate and the energy that they use at home. This claim is easy to accept because energy consumption in the household sector has been growing, even though energy efficiency is widely recognized to be the fastest and most cost-effective response in the battle against climate change. (Behave, 2007)

According to Jackson (2005) consumer behaviour is the key to the impact that society has on the environment. Consumer behaviour has both direct and indirect impacts not only on the environment, but also on personal and collective well-being. It has widely been acknowledged that household energy consumption contributes significantly to global energy-related problems, and that attempts should be made to reduce household energy use. (Abrahamse, 2007) The matter is very important because for example Energy Saving Trust (1996) found that household energy use accounts for more than a quarter of the UK's total carbon dioxide emissions.

One of the unsolved problems with environmental attitude research is the relationship between environmental attitude and actual behaviour. (Ewert & Galloway, 2004) Numerous studies report that people have positive attitudes towards sustainable development and pro-environmental activities. However, when comparing the actual level of pro-environmental activities we notice that the actual behaviour of the consumers often does not match the level of positive attitudes expressed by the same individuals. Despite the good intentions people may have, they still do not seem to act in an environmentally sustainable way. (Ewert et al., 2004; Löfström & Palm, 2004)

This paper presents the main results of the Desme (Designing Smart Energy) project (2007-2008). Desme was an international research project funded by Tekes (the Finnish Funding Agency for Technology and Innovation). The purpose of the Desme project was to investigate how design can be used in order to change consumers' energy behaviour. In the Desme study, we focused on households direct energy (electricity and gas) use.

As Darby (2006) has noted, most domestic energy use is invisible to the user and because of that many people have only a vague idea of how much energy they are using at home. In order to make energy easier to control, energy needs to be made more visible and more understandable. There seems to be a strong societal and environmental need, to develop smart energy applications. However, we do not have knowledge on how consumers would react to such applications. This was the main focus of our Desme study: how consumers react to the concepts of smart energy applications that focus on showing and guiding consumers' energy usage. In order to develop innovative product and service concepts for energy saving, Desme research integrated industrial and product design to the broader knowledge of what drives the behaviour of the energy consumers.

2. Energy consumer types

All products and services are designed for people. However, they will fail in cases where they will not solve peoples' problems, or will not solve them at a competitive cost (for example time, money, effort). The product is not an end in itself; it is always a means towards the end of providing a good experience for the user. (Peltonen et al., 2009)

Understanding people's everyday lives, their routines and ways of doing things at home was an important starting point in the Desme project. This was seen important because energy saving solutions need to find their place in everyday life, and the solutions must meet the user's needs in terms of usability, usefulness and acceptability. New products and services should fit people's current way of doing things at home or they should somehow change the current way into something else. (Peltonen et al., 2009)

In the Desme project, we conducted a survey study during the summer of 2007. The aim of the quantitative study was to find out how consumers differ from each other in the way they think and act towards using and saving energy. The questionnaire was sent to 3,000 Finnish households chosen at random. Response rate was 44 %.

One of the main findings was the five energy consumer groups. Even though these energy consumer groups need to be studied more, they give us some confirmation, that it is important to have more variation in communication, products and services. This variation would enhance consumers' energy saving activity. Based on the Desme survey we can present the following summary (Table 1) of these five consumer types.

Table 1 Summary of energy consumer segments (modified Peltonen et al., 2009)

Passionate ecologists	Active energy savers	Insensitive energy users	Reluctant energy saver	Unaware energy consumers
 -always tries to save energy in daily routines -is willing to lower the standard of living in order to save energy -saves energy even if it makes everyday life more complicated - high knowledge and awareness - thinks that society should make people save energy - Very positive attitude towards energy saving - feels that every action counts and that one really can make a difference 	-Active energy savers are almost as active in their energy saving actions as Passionate ecologists, but they save energy for money -feels that energy saving should not complicate daily life -knows a lot about energy efficiency and follows the energy consumption but behaviour does not always reflect the high competence and engagement level -positive attitude towards energy saving if it brings monetary benefits - believes that energy saving leads to smaller energy bills and doesn't doubt his own energy saving capability	 Insensitive energy users are as into personal wellbeing as Active energy savers Insensitive energy users have a negative attitude towards energy conservation and they don't save energy because they feel there's no point in saving actions for several reasons (can't save so much electricity that it would have a significant effect on the electricity bill, why should I save if others won't do the same, energy saving doesn't even have much importance because most of the energy is spent elsewhere) low knowledge and awareness level insensitive and skeptical attitude towards energy saving feel that no one should interfere with others' energy consumption 	 Reluctant energy savers don't have any interest in energy, which is reflected in their attitudes and their actions as well they have the most negative attitudes and are the least active in energy saving least active energy saver is not interested in the whole subject and uses energy without worries has no willingness to lower his own convenience in order to reduce energy consumption has more important things than energy saving to think about 	 Unaware energy consumers have positive attitudes towards energy saving and they are quite active in their energy saving actions they think following energy consumption is complicated at the moment and they want to learn more about energy saving quite active in energy saving actions would like to do even more but do not know enough about the best ways to save main motivating reason in energy saving is saving money interest ed in energy saving and would like to know more thinks it is important that everybody tries to save energy

When trying to influence consumers and to get them to use energy more efficiently, it is important that different kinds of consumers are taken into account better than at the moment. The most relevant issues to be taken into account are the awareness level of consumers, the attitude towards energy saving and the willingness of consumers to save energy. Different kinds of products and services are needed in order to meet the needs of these consumers with a satisfactory way. It is also important that the communication is directed and modified differently according to its target audience. (Peltonen et al., 2009)

3. Energy saving scenarios

Poortinga, Steg and Vlek (2004) referred to a study where the respondents were asked to evaluate future household energy use scenarios. The scenarios were systematically varied in the focus of energy saving, the way of energy saving, and in the amount of energy saving. Energy saving scenarios were also used in the Desme study. Product and service ideas were presented in four separate scenarios, each presenting a collection of ideas under the same intervention type. Tested intervention scenarios

were (1) different kinds of energy meters in everyday life, (2) communication as a channel to affect people, (3) Rewarding people for saving energy and (4) Intelligent systems. (Peltonen et al., 2009)

In the visualised scenarios the products were left secondary, because consumers were asked to pay their attention to the user, the context of use and the benefits of the product/service. The interviewed consumers were asked to evaluate each idea presented in the scenario. (Peltonen et al., 2009) One scenario is presented here as an example in Figure 1.



Figure 1 Scenario presenting different kinds of energy meters in everyday life

The scenarios were created in order to collect feedback from consumers and to investigate how consumers find these ideas in general and how they evaluate the capacity of each idea to contribute to energy saving and making the household's energy consumption more visible and understandable. Important feedback was received from scenario testing and the results guided designers forward. Based on the consumer interviews we can agree with Stern (2000) that the most effective behavior change programs need to involve combinations of different kind of intervention types like appealing to values, education, monetary rewards and penalties etc.

4. Desme concepts for enhancing energy saving of consumers

Several product and service ideas were produced after the scenario testing. Four concept ideas were chosen for further development. These four final concepts were tested by consumers via the Internet and in focus group discussions. The concepts and a short summary of the consumer testing results are presented next.

4.1. More consumption information with Home Display

According to the Desme survey, 43 % of the respondents agreed that it is too complicated to follow their energy consumption at the moment and 45 % of the respondents found that it is important to get

more precise information of the consumption. 62 % of the respondents found it important to follow households' energy consumption in real time. However, 68 % of the respondents agreed that energy saving should not complicate daily routines at home. The need for more informative energy metering device is quite obvious; 67 % of the respondents were hoping to get more information out of their energy meters. (Pakkanen & Peltola, 2007)

Also Camarata, Bregel, Yi-Luen Do and Gross (2004) found in the discussions with homeowners that people find the task of following their energy consumption often too tedious. The means of representation, the granularity of information, and the location of the meter were the main factors to blame. (Camarata et al 2004)

Because following energy consumption was found to be too complicated, time consuming, and hard to understand, the Home Display was created. The Home Display will give the energy information in a pedagogical, understandable and visual form. The Home Display is placed in such a place at home where it is easy to access during normal everyday activities. The main idea is to give direct and real time feedback from energy consumption.

Home Display (Figure 2) is not a new idea as such, but in Finland these kinds of energy information centers are not widely used. What was new in this concept was the idea that Home Display can be placed freely at home. It can be placed for example in the kitchen, which is often a center of everyday actions in many families. Also the information presented in the display is designed to meet the needs of energy consumers. Other interesting features can also be included in the Home Display. Such features could be for example calendar, recipe bank and shopping list.



Figure 2 Home Display

The Home Display was mostly liked by people who wanted to have exact and real time information concerning their energy consumption. More direct consumption information would make energy saving easier, more interesting and motivating. The Home Display would also help people to understand how and where the energy is consumed.

The Home Display was expected to be a too expensive investment, especially if the device is used only for monitoring the energy consumption. Also some people found that the device might be too stressful when being on view all the time.

4.2. Saving hot water with Shower Duck

As much as 30-40 % of all energy which is used in heating goes to heating of service water. (Työtehoseura, n.d.) People tend to forget that warming water consumes a great deal of energy. The Shower Duck (Figure 3) concept was designed to give instant response to a person in the shower.



Figure 3 Shower Duck

The duck was chosen as a character of this product, because the duck is a universal symbol for bathing and it is connected to a playful positive experience. The Shower Duck will react to the sound of running water and registers when the water starts to pour and sets a time limit. When the time is up, the duck becomes angry and quacks loudly or turns transparent, revealing its beating heart. (Peltonen et al., 2009)

The Shower Duck was especially appreciated by parents who wanted to teach their kids reasonable water usage. Shower Duck was also seen to do this in a positive and nice way. The main drawback with the Shower Duck related to the moment of showering. Many people regarded showering as a relaxing moment and they wanted to enjoy their moment in the shower without interruption or bad conscience. Also more illustrative and well-defined consumption information was asked for both the time and the amount of consumed water.

4.3. Saving standby energy with Key Hanger

A great amount of energy is wasted by keeping electrical devices in stand by mode. According to Green Living Tips (2007) website electricity bills can be reduced by as much as 10 % simply by unplugging appliances or switching devices off when they are not in use. Stand by power consumption is estimated to be responsible for about 1 % of the world's carbon dioxide emissions. (Green Living Tips, 2007)

In order to reduce unnecessary stand by electricity consumption Key Hanger (Figure 4) concept was designed. The Key Hanger is placed in the hallway near the front door. The Key Hanger will automatically cut down on unnecessary consumption by switching off unnecessary electrical devices when no one is at home. Keys hanging in the Key Hanger are the indicators to the system telling whether someone is at home or not.



Figure 4 Key Hanger

Interviewed people found that safety is a very important point in the Key Hanger. It was seen even more important than energy saving. Consumers appreciated the Key Hanger because they found it makes everyday life easier. However people saw that the product does not motivate people to be more careful with their electrical devices and it does not cultivate people's sense of responsibility in energy issues. Acording to Eggen, Hollemans and van de Sluis (2003) one main fear towards the technology at home is the loss of control; people want to control when and how things are done at home. The same came up also in our concept testing.

4.4. Energy information in design object

Löfström et al. (2006) argue that presenting the energy consumption information in a more intuitive way than traditionally in a numerical display, supports the idea of ambient information. The ambient nature of energy information could also be one major factor when thinking about ways to make energy information easier to approach.

Numerical information is not understandable or intuitive enough in order to motivate all people to energy saving. Energy Plant (Figure 5) concept was designed as a beautiful design object that gives qualitative and more appealing energy information than traditional energy meters. The Energy Plant is a decorative transparent display placed on the windowsill or attached directly to the window. The Plant grows in response to the electricity use. Moderate energy use is rewarded with a plant that thrives and grows fast. Using a lot of energy makes the plant wither. (Peltonen et al., 2009)



Figure 5 Energy Plant

Energy Plant was especially appreciated by those who found numerical data hard to understand or who did not like technical looking devices. The product indicates the consumption in a positive and pleasant way. It emphasises that energy saving can also be fun. The product was perceived as less informative and not so effective in saving because of its abstract and mainly decorative outlook.

5. Applying the framework for design intervention strategies to Desme concepts

Bhamra, Lilley and Tang (2008) have identified seven intervention strategies for design. These intervention types are classified by the degree of power for decision making between the user and product. In Figure 6 the concepts created in the Desme project were placed into the framework of design intervention strategies. One intervention strategy was selected for each of the Desme concepts.



Figure 6 Desme concepts in the scale of seven levels of design intervention strategies presented by Bhamra et al. (2008)

The Home Display is placed into the class of Eco-information because the product educates the consumer by providing them real time, exact energy consumption information. Home Display makes energy consumption more visible, understandable and also more accessible. Consumers still hold the full responsibility for their energy saving actions.

The Shower Duck clearly informs consumers on how long they have been showering. This concept is placed into the class of Eco-feedback. The Shower Duck gives consumers real time information right there where the consumption happens, in the shower. The Shower Duck does not force consumers to act in an environmentally friendly way, but by reminding consumers it gives them the possibility to do so.

The Energy Plant concept is placed into the class of Eco-spur. The product aims to inspire the consumer for energy saving behaviour by giving them positive or negative feedback in the form of a digital flower. The main idea of the Energy Plant lies in giving visual rewards or punishments based on the amount of energy consumption.

And finally, the Key Hanger is placed into the class of Clever design. This product does not try to change the behaviour of consumers; instead it automatically prevents unnecessary energy consumption while nobody is at home. Consumers do not learn to be more energy efficient, but still they will save electricity.

6. Energy saving concept for each consumer segment

More tools and services are needed when aspiring to a low carbon lifestyle. (Valtioneuvoston kanslia, 2008) Thereby, it is important to develop different concepts like the ones created in the Desme project. It is important to make these new products and services attractive to different consumer types. In order to do so we have to evaluate what kind of products fit to certain types of people and create variations, so that products will satisfy the needs and desires of different consumers. (Pitkäjärvi & Peltonen, 2008) Some indications were found already in the Desme project, but the subject needs to be researched more deeply. For example, energy consumer groups that wanted to get more exact energy information (Active energy savers and Unaware energy consumers) would certainly appreciate products like the Home Display.

According to Abrahamse (2007) it is important to focus on enhancing households' perceived possibilities to save energy, and to emphasize that energy saving will not cause too much discomfort. We may confirm this based on the results from the Desme survey. Especially consumers, who have negative or insensitive attitude towards energy saving, need to be ensured that energy saving does not mean lower standard of living or less convenience. For example 39 % of Insensitive energy users found that energy saving should not complicate daily life and 26 % did not believe that they could save electricity so much that it would have a significant effect on the electricity bill. (Pakkanen & Peltola, 2007)

At the moment, Insensitive energy users do not save energy because they do not find any motivating reason why they should. Thereby, a device that offers other benefits as well suits best for this segment. According to Desme survey 61 % of Insensitive energy users always try to switch off the machines and avoid leaving them on stand-by. (Pakkanen & Peltola, 2007) Because Insensitive energy users are not interested in energy saving, the result might indicate that Insensitive energy users are more interested in the safety of their home and belongings. That is why the Key Hanger might interest this consumer group.

According to Futerra (2006) it is very important to give feedback and remind consumers exactly when they are taking the action that needs to be changed. In the Desme study we found that Reluctant energy savers are not interested in energy issues. For this reason the device which does not require any action from the consumer is probably the best for this consumer group.

7. Conclusions

The first step in lowering the energy consumption is to make people more aware of their energy use. Roberts (2004) notes, that the poor amount of information available to consumers limits the ability of consumers to sustain awareness of their energy consumption and assess the impact of energy saving measures on their consumption. When only few homeowners know what consumes the most electricity in their home and even fewer look at the electricity meters attached to their house (Camarata et al., 2004), the need for new kind of tools, devices and services for encouraging people to monitor their consumption is evident. Hjelm, Gustafsson and Gyllensvärd (2005) see design as a useful tool when creating awareness of electricity consumption and finding ways to reduce the consumption. Mazé & Redström (2008) find that design could also have an important role in exposing, debating and intervening in values and introducing new openings for awareness and change. In the Desme project we created four product concepts in order to help the discussion with the consumers.

Kumar & Whitney (2007) emphasise that the patterns of how people live, work, learn and play, along with most other activities central to daily life, are becoming increasingly complex. Because consumers are less predictable in how they are living their lives, understanding consumers' everyday life is crucial. Based on this knowledge strong user oriented approach should be followed when designing new energy saving solutions for consumers. Future research in the area of energy saving needs to apply segmentation and persuasive design to encourage and help consumers to save energy. The developed solutions must be close to the users' everyday activities in order to be effective. (Peltonen et al., 2009)

Rundle-Thiele, Paladino and Apostol (2008) argue that there is a need for deeper understanding of the characteristics of the consumers. More accurate segmentation would provide a wide range of opportunity in communicating more effectively with the customers. Rundle-Thiele et al. (2008) also argue that behavioral bases for segmentation should be pursued as an alternative to demographic and psychographic characteristics. Based on the results in the Desme study, there are significant differences in attitude and behaviour towards energy saving among consumers. We found five energy consumer segments and they all need to be approached with specific reasoning in order to encourage them to save energy in their everyday life. Energy consumer groups do not share the same reasons and motives for saving. Where one person finds the environment a very motivating factor in energy saving, some other person may find this same argument a provocative attempt to interfere with his daily life. (Peltonen et al., 2009)

For example, Halme & Anttonen (2007) suggest that ecological services need to be communicated in new ways because currently used arguments covering mainly environment and effectiveness are not enough. New arguments should cover convenience and painless everyday life because they are important things for consumers.

Consumer behaviour and how to change it, is a central issue when trying to enhance energy saving in households. Bhamra et al (2008) argue that designing for behavioural change needs to be seen as a design challenge. Design can bring some fresh angle and new approach to energy saving discussion. Design can be a tool to make a difference.

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Utilising Agent Based Models for Simulating Landscape Dynamics Nikolay Popov Unitec Institute of Technology Faculty of Creative Industries and Business Department of Landscape Architecture New Zealand

Abstract:

Cities and landscapes are now understood as systems that are open, chaotic, unpredictable, irreversible, and in constant flux - i.e. complex adaptive systems. This is why designers need to develop new modes of practice that can cope with open systems design.

The term 'model', on the other hand, is now central to our thinking about the way we understand and design cities and landscapes. They are mediators between reality and theory and have a central role in bridging the gap between these two domains.

This paper describes a new type of morphological modelling known as Agent Based Modelling (ABM) and investigates its applicability in landscape architectural design and planning.

ABM assemble a wide range of theories and tools and offer an interesting view of urban and natural phenomena as a collective dynamics of interacting objects. They explore the connection between micro-level behaviour of individuals and the macro-level patterns that emerge from the interactions of many individuals.

This paper examines, through a set of examples, the advantages, the drawbacks and the limitations of this type of modelling, with respect to their applications in landscape architecture. Finally, there will be some speculations about the future of these techniques in landscape design and planning.

Keywords: Agent-Based Modelling, complexity, landscape, systems

1. Maps, Models, and Complexity Science.

Even though mapping has become a central activity in landscape architecture, design and planning, it doesn't sufficiently capture and describe bottom-up relationships. Maps, via data capturing and formatting protocols, make abstract and partial snapshots of reality, and importantly are devoid of feedback mechanisms that could assert the felicity of the maps or the formatting and capturing protocols.

Analysis, representation, and exploration of bottom-up relationships, on the other hand, are of core interest to designers and planners. This interest can be directly traced to the adoption of viewpoints derived from complexity theory across design disciplines. For example, New Science=New Architecture? a special issue of AD edited by Charles Jencks, was one of the many journals of the 1990s devoted to the emergence of complexity theory in architecture, urban design and landscape
architecture. It should be also noted that there is no single definition of complexity, although as Michael Batty (2005, p. 63) asserts, "...it is generally agreed that complex systems consist of "many basic but interacting units" (Coveney and Highfield 1995, p. 7) and are "systems in process that constantly evolve and unfold over time" (Arthur 1999, p. 107)".

One of the important characteristics of complex systems is their ability to "unfold" in unpredictable ways over time, i.e. they have emergent properties. Emergent properties of a system can be explained as its capacity to form unexpected and complex spatial configurations simply by following set of local rules. There also is certain asymmetry between how complicated the rules are and the level of complexity of the emergent patterns. This asymmetry is clearly summarized by Goldenfeld and Kadanoff (1999, p. 87)"Nature can produce complex structures even in simple situations, and can obey simple laws even in complex situations". The emergent properties of complex systems lead to self-organization "in which global patterns emerge from the action of local processes" (Batty, 2005, p. 66). Complex systems are inherently dynamic or they are always in away-from equilibrium states, "...manifesting disequilibrium in its various forms ranging from periodic to catastrophic and chaotic change..." (Batty, 2005, p. 65). All these viewpoints render mapping inadequate to "explain" complex systems. In order to make more profound use complex systems in landscape architectural design and planning, tools and techniques are needed that can handle bottom-up relationships.

The term model is also frequently used in design in planning in a wide range of ways from ideal strategies to models of actual decision and design, which depict far from ideal processes. The focus of this paper is on models as simplifications and abstractions of reality. Models can be defined as "mediators between reality and theory, between the past and the future and have a central role in how we bridge the gap between these two domains" (Batty, 2007, p. 5). Models have inputs, outputs, as well as, set of "assumptions which are external to the model, hence theory" (Batty, 2007, p. 9) that transform the models inputs into outputs.

2. Agent Based Modelling.

In recent years new generation of models, based on a novel concept known as spatially-related automata (Benenson & Torrens, 2004, p. 24), have come to the fore and offer interesting view of urban and landscape phenomena based on collective dynamics of integrated objects. This generation of models is known as Agent Based Modelling (ABM). ABM has origins in Object-Oriented Programming, Distributed Artificial Intelligence, and Geographic Information Science and is paradigmatically supported by contemporary Complexity Theory.

Agent Based Models consist of agents that "operate within environments to which they are uniquely adapted" (Batty, 2005, p. 211). Agents are the elementary units, spatially nonmodifiable digital entities that interact with each other and with their environments according to their strategies. The agents' strategies are driven by transition rules. Any number of rules can be devised to govern the

activities of agents, such as the goals that agents seek to satisfy (e.g., minimizing travel distance using some form of traveling salesman algorithm), or the 'preferences' that agents might have (e.g., 'likes' and 'dislikes' for certain spaces). Agents also have set of attributes, or states that describe their characteristics. States can be formulated to represent the attributes of real urban or landscape entities. True mobility and dynamism are inherent characteristics in this type of models. Agents can be designed to simulate the behaviour of virtually any type of architectural or landscape objects i.e. trees, vehicles, people, households, etc. In an urban and landscape context, any number of artificial environments might be designed for agents to inhabit, from buildings to open spaces and cities. ABM offers the possibility of constructing dynamic simulations at different time-scales. Time is discrete and proceeds in iterative steps, 'jumping' from one point to the next: t; t+1; t+2; t+3; ...; t+n. The goals of ABM are not predictability but scenario-based outcomes. The models generally answer "what if' questions and are capable of producing numerous possible outcomes depending on the abilities of the simulated system to resist and adapt to disturbances in the simulated environment.

3. Agent Based Models for simulating urban and landscape systems.

Agent Based Models have been extensively applied to cities, for example, simulations of traffic and pedestrian systems, crowd dynamics, land use / land cover change, urban population dynamics, residential location dynamics, urban growth to name just a few. There is no time to elaborate on the variety of scales, conceptual frameworks, and levels of abstraction used in urban models in this paper.

It is probably worth mentioning two examples with real-world applications in urban planning and assessment. The first one is developed by Berger (2001) for evaluating policy options in agricultural land-use in Chile. In this model, independent agents choose among presented options of production, consumption, investment, and marketing. Water is the main restrictive factor in the model, and the combination of economic and hydrologic processes facilitates feedback loops in the use of water for irrigation.

The other example is Urbansim (Waddel, 2002) a modular system that focuses on assessment of longterm results of alternate plans for urban growth in terms of land use, transportation and environmental impacts. Briefly said, Urbansim is a large software system consisting of number of models that represent different urban agencies and processes. The interested reader should consult <u>www.urbansim.org</u> for more information.

The consequent examples utilize Agent-based Models as a generative tool in a more speculative ways and will be explained in detail. The author of the third model is Alasdair Turner from the Bartlett School of Graduate Studies. He explores several algorithms or optimization strategies to generate an ecomorphic environment around the notion of 'theatre' (2006). The term "ecomorphic design" was coined by Turner himself and could be explained as a design method that investigates the structural coupling between being, including collective social being, and its environment.

In this set of experiments, the process to be engaged in is a performance or a theatre play. The simulations are initially set up as a 20x20 grid of boxes, with a 5x5 stage and 375 seats. Every member of the audience has to be able to view the stage, as well as, to have an accessible seat. Accessible seats are defined as seats adjacent to other accessible seats with the same height, one level higher or one level lower of the accessible seat. Tracing the path from the viewer to the stage assesses the visibility. The generative process is the bottom-up growth of an environment that supports these activities.

The first experiment was using an individualistic algorithm i.e. each audience member finds a seat, raises it if she or he personally benefits from the change (Fig.1). However, as the system grows, audience members near the front block others from viewing, and as the system evolves, the seats are raised up so that other locations within the system are no longer accessible (Fig. 2). As Turner (2006) points out:

"There are just 52 audience members remaining, from the 375 that started, although each has a completely unobscured view of the actor. In order to overcome this problem, we moved to a second form of algorithm, where columns are raised, but only if the overall fitness of the system is increased by doing so".



Figures 1 and 2 Individualistic growth. Agents in front block others from viewing (Fig 2). Source: Turner, A. (2006) An Ecomorphic Theatre as a Case Study for Embodied Design. in GA2006 9th International Conference.. Milan, Italy.

The result of the second experiment was that all 375 audience members could view the stage (Fig. 3). Based on the first two algorithms, Turner (2006) makes the following conclusion.

"This system however lacks interest, and can only ever reach an optimum based on 375 audience members. In order to increase the viewing audience, we allowed any accessible space to grow not only upwards but outwards (in any direction). The growth starts as before, but after a while the higher cells start to grow towards the stage, allowing more audience members to view the stage".



Figure 3 Evolution of collective growth – all 375 members of the audience can view the stage. Source: Turner, A. (2006) An Ecomorphic Theatre as a Case Study for Embodied Design. in GA2006 9th International Conference.. Milan, Italy.

This experiment showed many unexpected results After 30, 000 iterations 759 audience members could view the play obscured only by one other audience member (Fig. 4).



Figure 4 759 members can view the stage after 30000 itterations.

Source: Turner, A. (2006) An Ecomorphic Theatre as a Case Study for Embodied Design. in GA2006 9th International Conference.. Milan, Italy.

The final two experiments were conducted using evolutionary algorithms. These followed standard genetic algorithm operators for mutation, crossover and selection (Fig. 5). Despite the unusual and interesting spatial configurations and seemingly many seats, the system performed at best "around 500 places, with each audience member on average obscured by approximately 2 others" (Turner, 2006).



Figure 5 Evolution of the system using genetic algorithms. Source: Turner, A. (2006) An Ecomorphic Theatre as a Case Study for Embodied Design. in GA2006 9th International Conference.. Milan, Italy.

My example is a bottom-up tropical forest dynamics (Fig. 6). This simulation is part of an academic research project. The research was set out to test the feasibility of a disturbance ecology model for settlement re-building on Pacific islands after cyclonic events. The concept is that after cyclonic disturbance, plant recovery occurs according to environmental rules and conditions.

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Figure 6 Tropical Forest Dynamics – Model Interface.

The focus of this simulation is twofold -to investigate the interdependence between specific reproductive strategies of plants and specified land suitability conditions, as well as, to study the possible impetus for regeneration of the forest after programmed cyclone event.

The model comprises four subsystems:

- Trees that reproduce by mobile and immobile (or fixed) methods.
- Reproductive agents seeds and birds.
- Environment comprising two elements terrain and suitability.
- A destruction gradient, consisting of cyclonic force winds, flooding and tidal waves.

A set of operations or feedback loops bonding both the elements of each system and the elements from different systems together was devised (Figs. 7, 8 and 9).



Figure 7 Tropical Forest Dynamics - One tree wind dispersal colonization.



Figure 8 Tropical Forest Dynamics - One tree bird dispersal colonization.



Figure 9 Tropical Forest Model - Two trees (bird and wind) dispersal colonization.

Even though it is a simplification, this model proves that ABM are suitable to simulate forest system dynamics with plausible results i.e. they are capable of generating, similar bottom-up trends and patterns to those observed in real-world landscape systems. This model takes on board the notion of ecosystems as complex adaptive systems; bottom-up, self organizing, and ever-emergent due to disturbance. The model operates in a nonlinear colonization – succession - disturbance sequence. The simulation clearly visualizes this sequence. Moreover, the simulation generated interesting findings. For example, the simulation revealed that after a cyclone disturbance, the emergent colonization patterns are more dependent on the tree's reproductive strategies rather than on the soil suitability (Fig. 10). After experimenting with the model numerous times, it also became obvious how the initial patterns of occupation become less and less explicit and the forest appears as a random matrix of trees i.e. in the second phase – succession emerges. If no disturbance is introduced into the system it

reaches higher degrees of complexity and it looks completely random and static - only the 'tree counter' shows that there is still some activity. If a cyclonic disturbance is played out, a different picture emerges. Initially, a random matrix appears which consists of vegetation patches and some surviving stand-alone trees. After several tests and careful observation, however, the matrix does not appear to be random any more. There is a clear connection between the forest in its succession phase, the power of the disturbance and the patches of vegetation that survived. This connection, however, makes more intuitive and visual sense. The observations and findings clearly showed the usefulness of the model. Another important point was that the rules and the model were devised by the research team without any help from mathematicians or computer programmers. This demonstrates the wide accessibility of ABM.



Figure 10 Disturbance simulation sequence.

4. Conclusion and further research.

The objective of this paper was to illustrate the ability of Agent-Based Modelling to describe and analyze landscape systems dynamics from complexity science viewpoint. The examples and theoretical stances included in this paper allowed me to conclude that these types of simulations have an important future in the landscape architectural design process. They make it possible, on one hand, to test design theories and assumptions in simulation and to investigate numerous future forms of the system of interest under a wide variety of inputs.

Models also exemplify how a system functions; this is why they are not designs in themselves – they are diagrammatic in nature. Even though ABM can be used to explain urban and landscape dynamics and morphologies they are far from the real world. They necessarily contain reduction, simplification and idealization of real world entities. They also tend to be much more sensitive to simulated changes and disturbances while real systems seem to be more robust. Another drawback of Agent Based Models is that they operate entirely bottom-up but lack in efficiency when there is a need to simulate top-down processes. This modelling technique predominantly exists in academia and is still in its infancy. There are also various technological and scientific limitations. The issues that necessarily arise from this research, such as how long a simulation should run, how to make a simulation into a landscape design or how to evaluate different future scenarios are left unexplored and require further research.

This paper focused on applications of complexity modelling techniques in landscape architecture. Central to complexity paradigm are notions about bottom-up aggregations, away-from-equilibrium states, and unpredictability of systems. If we are to understand cities and landscapes as complex adaptive systems and to shift our interests from objects to processes, forces, flows and networks inherent in the landscape, we need to move away from top- down design strategies such as mapping. If we formulate planning and design as controllers in terms of keeping the real cities and landscapes within certain targets, then the notion of entirely top-down planning and design methods becomes simply impossible. It is clear that any system of control should operate bottom-up.

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Devising A Standards Model For Assessing Design Work In Education

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The paper reports on a project currently being undertaken by the School of Communications and Arts at Edith Cowan University and The Curriculum Council of Western Australia to support a standards based assessment system for design work in education. The research rests on the premise that a standards based assessment system for design education has two functions; to provide feedback to modify the teaching and learning activities in which teachers and students are engaged (Black and William, 1998) and to increase the potential for learning by giving students greater insight into the assessment process itself (McDowell and Sambell, 1999).

The paper situates the research in the context of reflexive assessment strategies, describes the practicalities of compiling and presenting authentic samples that might contribute to setting comparable standards across design disciplines at a secondary level, and raises the implications for design education in the tertiary sector. These samples to include examples of a variety of two-dimensional design work, including graphic design and technical graphics. The project commenced in February 2009 and is planned to end in December 2009. Stages completed so far include the recruitment of teachers within the state to provide student exemplars; following up with students and parents to receive 'permission to use' forms; establishment of a storage database; review of samples; recruiting students at two universities to provide samples. Future work includes selection of a matrix of 100 or more samples, demonstrating a variety of abilities; ranking of samples using a 'pairwise' method; distribution of outcomes to stakeholders; in December a symposium for design educators to demonstrate and further discuss outcomes.

Introduction

In 2002 in Western Australia, *Our Youth our Future*, the report on the Review of Post-Compulsory Education, was published by the Curriculum Council of WA. It laid out a series of programs to reform the final years of secondary education with the intention of equipping equally those students who leave school to work and those students who go on to further study. By 2009 Western Australia will have introduced a suite of new courses in senior secondary education. Previously only a limited number of subjects could be used to obtain a tertiary entrance rank, by which students are selected for university entry, this will now grow to 52 courses. One of these courses is Design. In the design area one of the most demanding aspects of this curricula reform has been the attempt to create a series of assessment standards that are of value to both institutions and students. How does one provide a series of assessment processes for a design curriculum that has to provide discipline specific skills and also broader transferable knowledge? In addition to the acquisition of skills, the new design course

emphasises the social and cultural contexts of design. This paper addresses the attempts to devise and use a series of authentic samples of visual material that can act as models of best practice and that can complement written exam questions; thus integrating the student's conceptual investigation and commentary on design along side the production of design work. By authentic samples in this paper we mean work produced by students in response to tasks set by teachers in a school situation.

The project to unravel the circumstances and value of authentic sampling has been undertaken in partnership between the Curriculum Council of Western Australia and The School of Communication and Arts at Edith Cowan University and began in January 2009. Originally the project was to gather examples of work that demonstrated student achievement in all three stages of the Design course so that students could use them to model their practice. In the course of this task it has become increasingly evident that the concept of authentic samples and its potential to operate across professional and educational borders also deserves detailed attention. It is clear for example that authentic samples have to allow for a realistic modelling of student work at different levels, but at the same time explicit visual evidence of how process and concept are made manifest can be equally valuable at secondary and tertiary level. Equally a sense of excellence in the manipulation of material and ideas crosses both educational and professional spheres. The following paper has been divided into three parts; a contextualisation of authentic samples in the contemporary reframing of the teaching/ learning relationship, a reflexive justification of authentic samples in the role of assessment in the modelling teaching and learning activities, and a descriptive summary of the practicalities of the project itself.

Two key issues lie at the centre of the current project. The first is the paradigm shift that has taken place in the last decade from an emphasis on teaching to learning (Rust, 2002, p. 146). The second is the potential for reflexive engagement that a departure from transmissive teaching methods unveils.

Boud neatly summarises the intention of assessment. Firstly, the intention of assessment is to improve the quality of student learning. The second intention is to accredit the student's achievements institutionally (1990, pp. 102 -103). A stress on student learning has the potential to shatter the transmissive model of teaching that an emphasis on the role of the teacher/lecturer as the sole source of knowledge privileges (Biggs, 1999). Transmissive models of teaching tend to encourage student passivity because knowledge becomes institutionalised and is detached from the life world circumstances of the student (Couture, 1993), as it is associated exclusively with the information provided by the teacher/lecturer (Gilbert &Watts, 1983). Assessment in this kind of teaching environment has the potential to degenerate into a measurement of the relationship of the student with the body of information validated by the teacher and her institution. Authentic samples however have the potential to establish a set of discipline criteria that transcend the teacher/institution value system,

and can place the student in a learning culture in which there is a dialogue with a wider set of criteria for best practice. As Brown observes, if the purpose is to change student learning patterns (which the West Australian curriculum initiative is) then it is necessary to change the methods of assessment (1997, p.7).

The context of the project

Modelling best practice through existing examples has always been a component of design education, but it has its limits. The educational flaws in presenting a student of any age with decontextualised imagery should be self evident (Tallack, 2004), but it might be worth quickly rehearsing how this process can sometimes fall short of its aspirations. Eisner has argued there are four ways in which art and design and its objects can be understood; through making, looking, understanding cultural context and by making judgements about quality (1989). To ignore context is to de-socialise design, to withdraw it from its arena of existence and to limit our ability to make judgements about its quality or value. To de-contextualise design is to reduce it to a series of formalist canons of practice and reduce down the conception of design from problem solving to its making alone. To formalise design into a series of modelled solutions is to ultimately reduce its ability to transform our world.

Models of best practice, whether authentic or not, are not solutions by themselves to the two intentions of assessment, in the same way that explicit assessment criteria do not automatically produce better work; students need to be able to negotiate with the institution's expectations of them (Donovan, 2001). Authentic samples have to be considered within a wider curricular structure that allows a reflexive engagement with the problems and solutions that are embodied within the exemplars by both staff and students. In the project this paper addresses, authentic samples are chosen in alignment with the objectives and the aims of the curriculum, obviously, but perhaps less obviously they are being considered as an essential part of formative assessment processes.

If summative assessment is explicitly tied to the intention of assessment that institutionally validates the student's work, then formative assessment is more closely allied to the function of assessment that improves the quality of the student's learning. Authentic samples used within a summative framework provide a clear indication of institutional standards. In this way they act as an exemplar of practice and can be used to measure of student success against them. Used within a formative assessment structure they have a further role as a dialogic partner. The relationship between sample and curriculum needs to be a structured one, and one in which the posing of problems and the offered suggestions as to their solution are explicit. Authentic samples have to be considered within a framework of speculative, rather than absolute, solutions.

Authentic samples can be used as part of a strategy to provide feedback to modify the teaching and learning activities in which teachers and students are engaged. They can act as a marker of practice against which the teacher can articulate their aspirations for the learning process that the student is engaged in. They explicitly model the solutions to the problems raised in the curriculum and demonstrate how students in the past have fashioned solutions in the past. They model tasks for the student that are "either replicas of or analogous to the kinds of problems faced by ... professionals in the field." (Wiggins, 1993, p. 229). In this way the sample can address both the broader relevance of the task within the discipline, and allow it to be incorporated within the life world experience of the student. Research into the use of authentic samples in New Zealand schools (Poskit et al, 2003) identified that whilst teachers found the samples useful for making assessment judgements, their influence on the processes of teaching and learning, particularly planning and reflecting, was a still more significant justification of using them.

Authentic samples also have a role to play in increasing the potential for learning by giving students a greater insight into the assessment process itself. Student exposure to the contexts of their learning experience facilitates their learning (Biggs & Moore, 1992) and the potential to develop ipsative assessment in relation to authentic samples would facilitate the development of a reflexive student engagement with their studies (Crouch, 2007, Roebuck, 2007).

The project

During 2007 and 2008 student work samples were collected to form part of a standards package developed by the Curriculum Council. This work depended on a number of variables, most significantly the availability of student samples relevant to the new course content. Sources for these authentic samples were limited largely to a group of teachers who had been a part of the development of the course. These included teachers who had participated in action research and early adopters, who took a professional interest in the Design course and trialed elements with their own students. The collected sample work was used in a series of workshops in which teachers acted as expert raters. In most of the new courses a pairwise process was used to rank samples; work was copied and sets were distributed to participants, who then carried out a series of paired comparisons (David, 1988). Samples were judged in pairs and raters were asked to simply select the best example of the two. Judgment was made on criteria decided by the teachers involved. Comparisons are entered on a spread-sheet and a computer program is used to create a ranked list. In the case of the Design course a modified process was used, where samples were ranked by consensus. This method was used for several reasons; firstly the number of samples available was low; secondly the number of teachers willing to act as raters was low.

The next stage in the process used at the council was to look for clear transitions in the samples where there was a noticeable shift in quality. These samples then became 'grade boundaries'. Using these boundaries samples on either side were described and differences in their qualities noted. These differences then became the basis for 'grade descriptors'. Grade descriptors are used by teachers to report on student achievement at the end of each year.

In 2005 and 2006 the council commissioned two research papers by Professor David Andrich (2005) and Professor Jim Tognolini (2006) to review assessment practices relating to the development of the new courses. These papers led to the recommendation that teachers adopt analytical marking keys to assess students tasks, and that these keys be derived directly from the content of the tasks. Marks established by the use of these keys are then used to rank students. After the ranking process grade descriptors and grade samples are used to establish the final end of year grade for each student. A grade descriptor website has been developed and is currently being updated to facilitate the development of teachers' understanding of the grades.

This continuing work has highlighted a number of issues relating to the collection and use of authentic samples. The Design course is delivered in four stages, Stage P units provide opportunities for practical and well supported learning to help students develop skills required for them to be successful upon leaving school or in the transition to Stage 1 units. Post-school pathways may include Technical and Further Education (TAFE) and the workplace. Units in Stage 1 provide bridging support and a practical and applied focus to help students develop skills required for them to be successful upon leaving school or in the transition to Stage 2 units. Post-school pathways may include TAFE, apprenticeships, traineeships and the workplace. Stage 2 units provide opportunities for applied learning with more focus on academic learning for transition to Stage 3. Post-school options may include TAFE, apprenticeships and traineeships, university and the workplace. Stage 3 units provide opportunities to extend knowledge and understandings in academic learning contexts. The post-school pathway is typically university with some students opting for the workplace or to enrol in TAFE courses. Grades are used in reporting stages 1, 2 and 3.

These examples show descriptors for A grades in Stages 1 and 2:

Stage 1, A grade

Interprets the brief appropriately and communicates effectively to the intended audience.

Clearly articulates design and composition principles in the work; discretion is used to select relevant principles.

Executes technical aspects relative to the discipline to a high standard.

Uses type to enhance and complement the theme.

Manages colour and employs colour theory competently.

Presents a range of relevant research from a variety of sources.

Makes relevant comments on the work.

Stage 2, A grade

Demonstrates a well developed and clear relationship between the purpose of the brief and the intended audience.

Design and composition principles are consistently and clearly articulated in the work; discretion is used to select relevant principles.

Technical aspects relative to the discipline are executed to a very high standard.

Demonstrates a consistent use of type and uses it to enhance and complement the theme.

Demonstrates a consistent management of colour and use of colour theory.

Presents a range of relevant research.

Makes relevant comments relating to all aspects of the work

Attempting to rank student samples from a variety of teachers, none of whom had run the course live, meant that the initial decision about which stage the samples represented was made by a best fit approach. Teachers who had been teaching in year 11, usually thought of their students' work as representing Stage 1. Year 12 student work was usually thought of as representing stage 2. The problem with working to these assumptions was that there was next to no work that had been dealt with as Stage 3. There wasn't sufficient confidence among teachers to say that the work represented work in that stage because up until the implementation of the course in 2009, there had been no tertiary entrance subject in design. The teaching contexts in the new course were devised from Visual Communication Photography, Art and Design, and Technical Graphics. As a consequence of this the first sets of samples were generated for stages 1 and 2. Stage 3 descriptors were extrapolated from what was seen in stage 2. Some of the students whose work was used to represent stage 2 were in a class that provided work for the states major student work exhibitions and others were winners of Curriculum Council judged prizes for top students in their subjects. Clearly student working in these classes could be thought of as stage 3 students. This dilemma raised the need for a broader ranking exercise. The logical approach would be to create a ranked set of samples that included at least from stage 1 to stage 3 and probably further samples testing both the top and bottom ends of this range.

Other concerns about the process came from a natural reluctance by some teachers to present work at the lower end of the scale. There were many examples of teachers who said that they had cohorts of students who exemplified low achievement, but none produced sets of work that could provide the basis for a ranking exercise. This was further compounded by the fact that these students' were also the least likely to return permission slips signed by themselves and their parents. To this end the current research project was formulated by the authors with the following aims and objectives:

To establish an analytical review of current assessment strategies in design, and to position reflexive and authentic assessment strategies within the field.

To develop a pilot assessment scheme in which the assessment of authentic standards and assessment for reflexive learning can be understood through the establishment of grade boundaries on an assessment scale.

There were four tasks to be carried out:

1. A scoping exercise and literature review on assessment in design. This will include a review of current practices in both education and professional spheres.

2. Devising common assessment tasks, with the intention of finding tasks that fit the four discipline contexts for the Design course that tie in with reflexive assessment strategies for ECU. Tasks will be devised based on the samples already prepared by Curriculum Council for its sample units. These samples will be tested on students before being adopted.

3. The production of assessment samples and the devising of a presentation format. A continuum of work samples covering what would be expected from grade C in stage one to Grade A in stage 3 will be compiled, using both authentic school student work and work obtained from other sources, including university and TAFE students. These samples would include work from all four course contexts and a range of teaching contexts. This work would be a contribution to setting comparable standards across design disciplines.

4. The organisation of a symposium on assessment in design to be held at ECU at the end of 2009. This symposium would provide opportunities for teachers, university and TAFE staff to learn about and contribute to the development of standards in design.

Method

The project uses a qualitative case study to consolidate the first phase of what is an ongoing investigation into assessment practice within a design education context. This draws on the foundations laid by Eisenhardt (1989) and Yin (1984) and recently developed by Brown, Gough, and Roddis (2004).

Data collection and participant selection. Teachers and lecturers in state university and school networks will be used to identify as broad a range of student design work as possible, with the aim of collecting a range of work from below Stage 1 (years 8 to 10) to above Stage 3 (1st year university). Whilst this is a single mode collection system, the researchers think this can be justified because of the wide range of interpretative positions held by the agents involved in gathering the material. The breadth (one might say difference) of opinion that will be evident in individual

evaluation of what is representative precludes criticism that the data collection is prescriptive, and could in this way be considered multi-modal.

Data analysis. There are two purposes for the analysis: to look for patterns among the data and to look for patterns that give meaning to the case study. Since the coding of the data is subjective and is ultimately dependent upon its success on consensus amongst the samplers this work will be ranked using teacher judgment using a cut down 'pairwise' process.

Reporting outcomes. Merriam (1985) suggests preparing specialised summaries for different groups. This will be entirely appropriate for the stakeholders in this particular piece of research. The student work will be coded and assigned a position on a matrix grid representing a range of exemplars in at least four teaching contexts.

Gaps will be identified and work commissioned to complete the matrix. All samples will be digitised for ease of handling and distribution. Most of the work will have student permission slips attached to them. Those that don't will be clearly identified as not for publication.

The expectation is that the final count of work will include 30 plus examples representing each of the four main course contexts: Photography, Technical Graphics, Graphic and Dimensional design. Samples will be selected to demonstrate the course's core outcomes: Design Understandings, Design Process, Application of Design and Design in Society.

Conclusion

This paper has mapped out the educational context of the project, and has laid out the processes by which the project has been established and will proceed. What started out as a task in the collection and storing of samples to facilitate the assessment of student work has raised many further questions for the researchers, two of which we wish to address here in way of conclusion.

Firstly whilst the procedural processes are in place to acquire and store authentic samples and to make them authoritive, it is not just the identification of those samples in the first place that is one fraught with practical problems. The initial gathering together of samples relies upon a network of peer trust in establishing not only their existence value, but also their worth. If one is to be serious about the value of samples for the teaching community, then that community must bestow value upon them initially. Practically this involves a great deal of organisation and consultation that must be seen to be equitable and must become part of a broad based educational strategy that explicitly contributes to effectively integrated curriculum, pedagogical and assessment practices (Poskitt, 2003, p.3). As Poskitt demonstrates, confidence in the value of the use of authentic samples appears to be directly linked to the ways in which those samples are seen as reinforcing the teaching program in ipsative and formative assessments as well in summative form.

Secondly and finally, authentic samples, which are the work of students, must be seen to be owned by the students using them in an intellectual partnership with their teachers and the examining authorities. The purpose of authentic samples is to model design practice realistically, and they must address practical skills and provide ways in which those skills can be identified as transferable. This has both practical and theoretical implications. Samples need to be continually updated, and they need to be used in the classroom. If samples are not integrated and related to the students' work practices, then they remain outside the students' life world and thus unassimilated. In order for students (as well as their teachers and lecturers) to engage with samples as valuable markers of design created by their peers they must have processes in place that encourage and develop reflexive engagement with their samples and thus a dialogue with the educational practices in which they are engaged (Giroux, 1983). If the learner exercises agency reflexively a deeper learning takes place (Bebbington, 2007), an ambition that this project has at its core.

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Designers' Experiences of Intuition

Coaching intuitive skills as part of creative design process

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Abstract

The intuitive discovery of ideas is an important for creativity. Yet there is limited discussion on how intuition is experienced and understood by designers themselves. Experiences of intuition are often absent or neglected. Lack of discussion and understanding on intuitive experiences can hamper the education of novice designers who have limited experience with their creative process. Novice designers are often unsure and rely heavily on normative models for understanding their experiences.

Based on our experience in coaching intuition for designers, interviews with designers, and a survey of intuition literature, we call for legitimization of personal intuition experiences. We propose an approach to advance experiences as part of the personal creative process for utilization and development of intuition as a skill.

Keywords: Design, intuition, education, experience, development

1. Intuition essential to creativity

Intuition is considered to be essential to the creative process (Goldberg, 1983; Boden, 1994; Policastro, 1999; Bastick, 2003). In addition, intuition in decision making can also be highly useful, accurate and in some situations superior to rational reasoning (Gigerenzer, 2007; Klein, 1999). Yet there is very little overall agreement as to how the process of intuition exactly works (Betsch, T. 2008; Sinclair & al., 2005; Bastick, 2003). The confusion surrounding intuition has lead historically to mystification of intuition as a form of 'divination' or as something completely unexplainable (Atkinson & al., 2003).

Intuition has also historically been grouped together with the body of tacit knowledge and the act of serendipitous tacit knowing (Polanyi, 1962). Further, highly developed intuitive creative professionals appear to be using intuition also as an active and intentional skill for making decisions, which in turn may draw from tacit knowledge sources (Sternberg et al., 2000).

Recent research has shown that the process of intuition can be at least studied at the periphery – that is right before and after moments of intuitive thought (Hogarth, 2008; Petitmengin-Peugeot, 1999; Policastro, 1999; Klein, 1999). In addition, there are plenty of non-scientific explanations for intuition that attempt to model and make sense of intuition (Brennan, 1988; Lloyd-Mayer, 2007; Sheldrake, 1995; Vaughan 1978).

This paper discusses *experiences* of intuition described by designers and creative artists, attempts to explain their importance, and focuses specifically on *how to handle intuitive experiences and how to develop intentional intuitive skill*. The paper does not make an attempt at *modeling* intuition further and the concept of intuition is taken from the monolithic definition implied by the dual process models of cognition (Betsch, 2008).

2. Significance of personal intuition experiences

Personal intuitive experiences can be extraordinary, multi-sensory, and appear as extra-sensory in their character (Lloyd-Mayer, 2007; Guiley, 2001; Petitmengin-Peugeot, 1999). Due to their character and difficulty in verbalizing them, such experiences are often not studied personally or researched at more general level (Petitmengin-Peugeot, 1999). However, based on the literature and the our own experience it is important to accept and reflect on the personal experience for the development of intuition (Hogarth, 2001; Brennan, 1988).

We have interviewed two dozen of highly experienced creative artists as well as students and professional designers about their experience and use of intuition. In addition, literature search has uncovered more of personal stories of intuition. The stories are important for two purposes. First, they show how personal and sometimes extraordinary experiences appear as highly important to the person

who has experienced them, granted they are given a trusting environment in which to accept, share and make sense of them. Second, these experiences lie often beyond the normative and as such are very delicate. They easily lose their meaning if they are over-fitted to pre-given normative models of how designers ought to think and act in order to be considered respectable or professional. That is, the personal truth embedded in such experiences becomes useful only when they are made visible and accepted as they are – without overt rationalization, which risks denying their meaningfulness.

Novice design students are at the beginning of their journey as designers, just getting started in managing their personal creative process. Many are also very unsure of their professional competence. We have noticed that the students interviewed face challenges in expressing and verbalizing their experiences of intuition. It is not easy to talk about the highly personal experiences, partly due to the fact that their vocabulary might be limited in describing such experiences (Wallace, 2007; Brennan, 1993). The students also find it demanding to admit the existence of extraordinary experiences, or to talk about them without distorting them through rationalizations.

Rationalizing one's own experiences through normative cognitive models can hinder the development of intuitive capability: experiences can be denied altogether (e.g. 'trick of the mind'), they can be over-fitted to certain categories (e.g. 'a mere heuristic'), or their explanations can be evaluated as erroneous (e.g. 'your reasoning is just biased towards that outcome'). This rarely advances the students' understanding of their own intuitive experiences. For the purposes of modeling intuition with the intent of developing it, we have found it beneficial to include several different, even contradicting models of intuition in their education practice (see references, particularly Bastick, 2003; Betsch, 2008; Gigerenzer, 2007; Hogarth, 2001; Lloyd-Mayer, 2007; Polanyi, 1962; Sheldrake, 1995; Sinclair, 2005). As no single specific definition of intuition exists (Sternberg et al., 2000; Betsch, 2008), it is likely that the multitude of varied intuitions also manifest differently (Goldberg, 1983). The plurality of intuition models has made it easier for students to find meaning in their experiences by fitting a suitable model to their personal context of experience rather than vice versa. The aim is to give tools to designers for personal sensemaking, and therefore several alternative non-scientific models have been introduced to the students (Brennan, 1993; Sheldrake, 1995; Vaughan, 1978). Designers' have the luxury of not being limited by validity alone and should consider the utility of models alongside with their scientific validity (Nelson & Stolterman, 2002).

The student feedback appears to confirm that making sense of personal experiences increases the understanding of personal intuitive process. Better understanding in turn leads to an increased ability to use the knowledge gained through intuition. The highly experienced designers and artists interviewed report further that intuition is the most significant method guiding their creative process. The intuition has

grown during years or decades of personal experiential experimentation. Our teaching experience suggests that understanding intuition at large and on level of personal experiences in particular can lead to a positive feedback loop, where use increases understanding, which in turn further increases the use of intuition in design.

3. Coaching intuitive skills

Intuitive thinking appears to be both a personality trait (Bastick, 2003) and a developmental skill or ability (Bastick, 2003; Hogarth, 2001). As a skill, intuition potentially develops through a continuum that changes according to practice and experience (Baylor, 2001; Mielonen, Keinänen, Raami, Rouhiainen, 2009). Designer's domain intuition can develop through acquisition of expert knowledge (Hogarth, 2008). Further, the development of intuitive skill may benefit from managed practice, which is dependent on quality of corrective feedback (Hogarth, 2001, 2008). Due to the initially non-conscious nature of intuitive thought it is often modeled as utilizing the tacit knowledge source created by implicit experience. However, the source and the act are at least partially different (Sternberg et al., 2000). While tacit body of knowledge is an important source to intuitions, if the skill of using intuition is under-developed or unused, this tacit knowledge may offer very little additional benefit for a designer. Further, while the skill of rational thought is officially accepted and taught, the skill of intuitive thought is often bypassed or assumed as a given (Hogarth, 2001). What remains for education of intuition is the accumulation of potential intuitive knowledge sources (e.g. tacit knowledge) through continued experience and the subsequent development of expertise in particular knowledge domains.

Our experience is that designers often lack access to more intentional training of the thinking intuitively (for brevity, 'intuitive thought' is referred to as 'intuition' for the remainder of this paper). While non-professional intuition is undoubtedly used every day, it's intentional application and development is often neglected. This is due to many factors, some stemming from cultural-historical baggage such as changes in educational trends (McCoy, 2005), and others from difficulty of consciously training non-conscious processes (Varela, 1999). However, we believe that intuitive skill can be practiced, even if no clear-cut practice methods that guarantee success exist.

We have been coaching more than hundred design students on a course called *Coaching Creativity* in Media Lab at the University of Art & Design, Helsinki. In this class we have experimented with different educational approaches that we believe can foster the students' understanding of personal intuitive experiences. Based on student feedback to these approaches described below, we observed positive qualitative changes in the use of intuition among students. The students report that they experience the exercises from course as meaningful, and that they help them to trust and learn more about their personal intuition. Based on our teaching experience on the courses, the following approaches have been found constructive (details follow after the list):

- Create an environment of trust for sharing intuition experiences
- Accept and appreciate the personal experiences
- Linger in the personal sensations and perceptions
- Embrace the ambiguous and the extraordinary
- Open up to all sensations and tune into intuition
- Practice recognition and separation of internal signals
- Reflect on the process and accuracy of personal intuition
- Deepen understanding of intuition by sharing, discussing and reading

When the social environment feels safe students are able to share personal stories and experiences outside the norm. Some students achieve a feeling of trust sooner and their stories encourage others to join the discussion. Feelings of acceptance and safety have been best achieved in small groups through informal discussions. One of the most important factors to promote is personal validity. Since each student's intuition may appear differently, and as the reactions are very personal, it is important to stress that there is no one true way to experience or interpret intuition. Discussions focus on reflection of personal perceptions and processes connected to intuitive moments (e.g. emotions, stimuli), which students have documented in their personal learning diaries.

Further, students can be guided and encouraged to develop methods for sensitive observation. This starts by accepting personal feelings, affects, sensations and states – however minute. Being sensitive to one's own internal states helps to develop the ability to monitor them and find meaning in them. Observation, sensitivity and meaning-making form the basis of intuitive practice and reflection: intuition is practiced as a way of knowing and judging, and this process is then reflected on.

We feel it is essential to foster the appreciation of everyone's own authentic experience, instead of over-fitting one's intuitive experiences to a single pre-given model of intuition that does not make personal sense. Therefore the student as well as the teacher needs courage and patience to face ambiguous and incomplete situations; this requires tolerance to linger in the original sensations without trying to normatively grade these perceptions. As an example, some students report that their intuition is based on emotional responses, while others stress the total absence of emotions is essential in order to get reliable information through intuition. Tuning into intuition is about opening up all senses to all perceptions, including those that feel extra-sensory. An important part of the process of accepting unusual personal experience is opening one's mind to new sensations and perceptions that may have been previously denied, and acknowledging their part in the creative process (Lloyd-Mayer, 2007). Great benefit have been found from mental exercises, in which the placement of consciousness is 'moved' either within or outside of the body (e.g. feel one's thought inside the stomach or above one's head). Through these exercises students appear to get closer to the original sensations. For example, one exercise encourages students to observe the sensations outside of their bodies by stating that their body is not limited to what's inside their skin. The students report they are able to reach new kind of information, which many of them feel as clear, trustworthy and easy to access. Sometimes students report that the new information is contradictory to their previous reasoned judgments, but that the new intuitive understanding is what they trust more when making decisions.

We have discovered that observation of personal perceptions develop a sensitivity to distinguish signals related to intuition. Observation combined with shared discussions help students to develop the ability to recognize their specific intuitive signals. This is essential when practicing intuition as a skill separate from unconscious behavioral habits, emotional response patterns and the like.

We encourage students to constantly apply intuition in small matters of personal life. If a student is lacking trust in intuitive skills, it can be beneficial to nourish intuition through imaginary trust, i.e. believing and acting to be an intuitive person. Through trust, even if initially a fake one, one can observe vague signals, which may give hints on how intuition operates. This feeds back encouragement to further personal experimentation, resulting in a positive feedback loop: the signals become clearer, trust grows, and practice increases.

Practice and trust appear to be crucial steps when interpreting intuitive signals and reliability of intuition (Nadel, 2006). Remarkably, the trust in intuition can grow even if it turns out that not all intuitions are correct. This requires appreciating the fact that intuition is a skill that can be improved and that not all signals rising from the non-conscious are necessarily worthwhile intuitions. Further, reflection after the intuitive moment may reveal essential information of the process of personal intuition: sensations that originate from valid intuition or sensations that are may mask reliable intuition (e.g. strong moods).

We have been using several exercises to practice these skills, i.e. meditation, mindfulness, focusing of attention, breathing, relaxation and concentration exercises. For reflection it has been beneficial to keep a diary of intuitive process, observing specifically awareness and quality of sensations, actual intuitive judgments and decisions made, as well as resulting success and satisfaction. Through this,

the nature and causality of personal intuitive process may slowly reveal itself, and its intentional application can be increased.

When eliciting students' personal stories of intuition it has been beneficial to present various models of intuition. We have been using stories of famous artists and designers where they reveal the intimate and sometimes extraordinary nature of their personal intuitions, which students can compare to that of their own. Through this reflection students are able to deepen their personal understanding of intuition on personal level and in general. Alternative non-scientific literature presents alternative models of intuition and consciousness, which we have found to be beneficial in helping students give meaning to their own intuitions (Mielonen, Raami, Keinänen & Rouhiainen, in preparation). It is important to engage students in sense-making of their own intuitive experiences and also to let them share these meanings trough reflection with peers.

4. Legitimizing intuitive experiences

Much of the experiences told by students on courses or which appear in the literature may feel extraordinary, even supernatural when experienced. A novice designer often reflects himself with a public image of the designer – which these days usually excludes such experiences. However, intuition is a very personal experience (Bastick, 2003). Therefore it is important to remain open-minded towards all kinds of feelings and perceptions, and consider them valid in the sense of first person lived experience (Petitmengin-Peugeot, 1999).

According to psychologist Elizabeth Lloyd-Mayer we suffer from an underlying cultural disinclination for publicly acknowledging certain highly subjective, highly personal experiences. We're especially reluctant to credit those personal and subjective factors when it comes to things we prefer to be dictated by rational and objective thinking. The fear of appearing credulous leads many people to disavow their personal reality, which can paralyze their creativity (Lloyd-Mayer, 2007).

One of the methods of the coaching course has been a first person perspective on intuition. The highly personal intuitive experienced are legitimized: the experiences are subjectively true, regardless of how scientific models. This act frees the designer to pay attention to the intuitive signals, to learn more about personal intuition – as well as to acknowledge the information gained through intuition. In the progress of our teaching we have seen students frame their intuitive experiences as meaningful events to themselves and become encouraged to use them in their creative work. Through a transformative process students' progress step-wise in their attitude towards personal intuitive experiences: First they understand that is it is common, even desirable to have these experiences even if the they cannot be always put into words properly or that they may appear quite unusual when explained. Then the students learn to

appreciate that these intuitions can be used to guide their own design decisions – alongside with their rational, deliberate faculties. Finally, the designers can intentionally utilize these experiences and even develop them further as a skill.

In addition to personal sense-making, students have been introduced to models that view intuition primarily as a judgment heuristic, which is prone to judgment errors and reasoning biases (Betsch, 2008). This leads easily to grading of one's experiences normatively with cognitive models. This is not often fruitful for the purposes of developing intuitive capabilities.

The normative grading of personal intuition experiences according to models poses problems for the development of intuition. Especially the scientifically educated designers can often err on the side of over-rationalization when thinking about their own intuitive experiences: experiences not accepted or legitimized by models may be rationalized as useless or denied altogether before their usefulness has even been tested. We have experienced this type of "validity over utility" attitude in their own and in their students' thinking. Often the suspension of judgment of experiences requires considerable effort and justification on the part of the one experiencing. Without actually trying to use intuition and suspending one's disbelief, further development of intuition is difficult.

Regardless of the models chosen, we argue that students benefit from not only making sense of, but also from accepting and trusting their own intuitions. This acceptance is fostered through external legitimization: shared stories and presented descriptive models can ease the students in accepting the sometimes peculiar nature of their intuitions, and help them to further use their intuitive capabilities (Taylor, 1998; Brennan, 1993). In effect, students frame their intuitive experiences as desirable and meaningful events to themselves and become encouraged to use them and talk about them. Based on our experience, this process can lead to a transformation in the students, which becomes evident as marked qualitative leaps in student's creative process and creative output.

5. Conclusion

We have argued for the essentiality of personal intuitive thought in developing designers' thinking. Further, we have noted how important and yet delicate the personal experiences of intuition are for the people within the creative process. We believe that by accepting, trusting, observing and testing these experiences it is possible to develop intuition further as an *intentional skill*. We also believe in helping people to make personal sense of their own experiences, instead of fitting them normatively to models of thought. In addition, the application of stories and alternative models frame even the more extraordinary personal experiences as acceptable, thus legitimizing their existence and enabling their sharing. Through this process, reflection on the personal experiences of intuition becomes essential to the development of intuition.

Yet, many issues are unknown for the development of a more integrated approach towards intuition education. The developmental continuum of intuition appears unmapped and the targeted methods for specific types of intuitions within this continuum are incidental at best. We are pursuing further educational experiments to advance these issues in practice.

Acknowledgements

This project has been funded by the Academy of Finland.

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The *Product Effect*: A New Technique for Automotive Market Research

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Abstract

In competitive markets the appearance of a product is crucial to its success. In the automotive industry, where competition is fierce, market research is customarily conducted as part of new product development. The methods used are predominantly variants of the focus group and the survey-questionnaire. A common feature is their focus upon the product *per se*, and how people perceive and evaluate it. An alternative method, and the subject of the research described here, focuses upon the person associated with the product: in other words, the effect the product has upon how people perceive its owner. This method derives from environmental psychology. Termed the *Room Effect*, it explored the effect the setting had upon perceptions of the person. Until now this method has not been applied to products. The research described shows its use with both cars and motorcycles, and in application within Malaysia and Australia. The results indicate a distinct product effect, and one subject to both nationality and gender differences.

Keywords: Room effect, Automotive, Market research, Product

1. Introduction

Gaining insights into consumer perceptions of products is increasingly important, and normally falls within the remit of market research. Within the automotive industry a wide range of techniques have been adapted for application, some from the social sciences and most recently from neuroscience. Their application reflects the increasingly competitive segmentation of the global automotive market. It also reflects the speed of new product development and the shortening of product life-cycles. Segmentation is particularly problematic, whereby a product is designed for a specific demographic. The difficulty here is that the design may satisfy that particular demographic in one country, but not in another. Even something as apparently trivial as the naming of vehicles needs careful market research. For example, the Citrôen C4 is unlikely to sell in China because 4 is a homonym for *sī*, meaning death. The Alfa Romeo 144 will have double the problems. Similar associations need to be considered for colour. Even the sound of a vehicle name can have negative associations: thus, Proton Malaysia's attempt to export the Waja (a version of the Proton) to English speaking countries was bound to experience problems, which it did. Styling is potentially even more problematic whereby the top and the bottom of the market may be understood, but

the vast topographic battleground of the middle segment may vary from country to country. In response to such complexities, a range of techniques have been adapted and applied in the automotive industry.

2. Existing Automotive Market Research

Several techniques have been incorporated to better understand consumer behavior. Automotive companies apply such methods such as activities, interests and opinion (AIO) studies, large-scale clinics (Parker, 1999), listening in (Urban & Hauser, 2004), empathic design (Leonard & Rayport, 1997), focus group (Morgan, 1996), consumer expression and experiences (Murphy, 1996), ethnographic (Bhattacharya & Sen, 2003) and motivation (Arvidsson, 2001).

Volvo, for instance, used a customer-oriented strategy during their design development stage. The development of the Sports Utility Vehicle (SUV) called the XC90 was the first Volvo step towards customer involvement. Within this, interviews were conducted with the potential customers to ascertain their views and attitudes. These were fed into the concept development phase of the project (Rojek, 2004). For Toyota, observation was one of the methods used in the development of the Lexus, whereby teams of technicians were sent from Japan to survey parking lots of up-market restaurants, garages and neighborhoods. They wanted to have cars that would fit in well in terms of design. They wanted to know how valets parked cars; where did the Benz go in relationship to the Cadillac Seville or the Tercel? (Dawson & Patrick, 2005). Besides observation, listening in is another method used by Toyota to identify new product opportunities. The Toyota Scion website was designed as a listening post for customer feedback and suggestion (Cina, 2002). The ethnography method used by Harley Davidson was found effective in increasing sales for this established motor cycle company (Schouten & McAlexander, 1995). Between 1991 and 2002, the U.S. heavyweight motorcycle market grew at a compound annual rate of about 15%. Within this market, Harley Davidson had a market share of 48% by 2002 (Frigo, 2004). Piaggio an Italian company that produces scooters under three brands, Vespa, Gilera and Piaggio, applied motivation research to discover new market niche and opportunities (Arvidsson, 2001). Using this technique, in-depth interviews were carried out in order to uncover previously hidden or allegedly repressed desires of the youth market (Arvidsson, 2001).

A common feature of the above methods is that they focus upon the vehicle *per se*. In so doing they overlook a key feature of products, namely the capacity of the product to confer its characteristics onto the owner. These characteristics can be overt or more subtle. In the overt category, ownership of, say, a

new Rolls Royce indicates obvious wealth, and this crosses national boundaries. In any country, such ownership confers wealth and status and, by implication, success on its owner. At the top end, signals of success are apparent in ownership of a Bentley, Lamborghini, Ferrari, and down to the second level of Mercedes and BMW. Similarly at the bottom end, 'aspiring to success' is indicated by ownership of vehicles from developing nations. It is the wide band of the middle level that is highly complex, with a large range of competitors that may move up and down in their status by virtue of advertising, design or even sponsorship of motor racing events. This is a shifting area in which the majority of Western consumers lie. As such it is highly sensitive to trends, style and technical innovation.

At a more complex level, the objects that we possess communicate aspects of personality, group membership, and aspirations. This was first articulated by Thorsten Veblen in his classic book, 'The Theory of the Leisure Class' (Veblen, 1899). It was Veblen who invented the term 'conspicuous consumption', and he described the role of possessions in the definition of our social identity. A later advocate was Goffman with his 'The Presentation of Self in Everyday Life' (Goffman, 1959). This again identified the role of objects in socially positioning people, epitomized by the role of the living-room as a stage in which people perform to guests. The theatrical props were, of course, the furniture and furnishings. Empirical evidence exists for this (Laumann & House, 1970) and theorists of the materials culture fraternity have since extended this. Its latest empirical manifestation is in what has been called the 'Room Effect'.

3. Room Effect

The Room Effect derives from environmental psychology. The technique that established the Room Effect is very simple. A photograph of a person was incorporated into different photographs of rooms. Thus the person remained the same, but the room changed. Observers were asked to judge the person on a range of personality and social dimensions, interest being in the effect the different rooms had upon their judgments of the same person. In 1974, Canter, West and Wools (1974) found that the characteristics of the room were transferred to the person seen in the room (Canter, West, & Wools, 1974). Thus a warm room would equate with a warm occupant and a powerful room with a powerful occupant. Earlier, in 1956, Maslow and Mintz (1956) observed a similar Room Effect, whereby the characteristics of the room impacted upon judgements of people's faces associated with the room (Maslow & Mintz, 1956). Thus faces in a 'beautiful' room were judged higher in 'energy' and 'well-being' than those in an 'average'

room, which in turn were higher than those in the 'ugly' room (Wilson & Mackenzie, 2000). Campbell (1979) also found an association between the design of a professor's room and the presumed characteristics of the professor who would be found there (Campbell, 1979).

To investigate the potential application of the Room Effect to products – what might be termed a Product Effect – a pilot survey was conducted using two sets of products, cars and motorcycles, and two sets of subjects, Malaysians and Australians. The intention behind the latter was to test for possible cultural differences in effects. The same technique was used as in the original room studies: images of males and females were digitally incorporated into settings involving different motor vehicles. Thus the person remained the same, but the vehicle changed.

4. Subjects

The survey involved a total of 148 participants from Malaysia and Australia. Since it is known that product judgment can be influenced by background factors such as age, education and socio-economic status, students were selected as being a relatively homogenous group (Wilson & Mackenzie, 2000). First year students of the School of Film and Television (Swinburne University of Technology, Melbourne, Australia) and the Faculty of Accounting (Universiti Teknologi MARA, Sungai Petani, Malaysia) participated. Their distribution in terms of age and gender is given in Table 1. The Australians were predominantly Caucasian and the Malaysians predominantly Malay.

Demographics	Number	Percentage		
Country				
Australia	68	46.0		
Malaysia	80	54.0		
Gender				
Male	57	38.6		
Female	91	61.4		

Table 1: Background characteristics of participants

5. Stimuli

In order to test for possible effects, clearly different products were paired. These consisted of Mercedes Benz against Proton for cars and Vespa against Modenas for motorcycles. The rationale for this choice was that if product effects were not realized for such comparisons, then they were unlikely to manifest for more similar products. Associated with each product – and therefore the recipient of the presumed Product Effect – were a Malaysian male and female and an Australian male and female. Considerable effort went into finding two pairs of Malaysians and Australians of comparable age and comparable looks. The rationale for this was that males and females of extremely good or bad looks were unlikely to be effected by a Product Effect, and therefore more neutral looks were the target. Furthermore, only the head and shoulders were shown, thereby limiting the amount of information available to those participating in the survey. As drivers of cars tend to be older than drivers of motorcycles, certainly in Malaysia, the figures for the former were older than those for the latter. Finally, each Malaysian and Australian was positioned similarly to the vehicle, and the vehicle was digitally modified to be as similar in size, orientation and colour as possible. The four compositions are given below:

- a) A picture of an Australian and Malaysian man in the foreground with either a Mercedes Benz or a Proton car as background.
- b) A picture of an Australian and Malaysian woman in the foreground with either a Mercedes Benz or a Proton car as background.
- c) A picture of an Australian and Malaysian man in the foreground with either a Modenas or a Vespa motorcycle as background.
- d) A picture of an Australian and Malaysian woman in the foreground with either a Modenas or a Vespa motorcycle as background.



Figure 1: 8 pictures stimuli of Proton and Mercedes Benz car



Figure 2: 8 pictures stimuli of Modenas and Vespa motorcycle

6. Questionnaire and Procedure

The questionnaire was designed to elicit the participants' views of the Malaysians and Australian pictured alongside their vehicle and, in so doing, to assess the impact of the vehicle. Two sets of questions were employed. One focused upon essentially physical and demographic characteristics, as follows:

- 1. How tall do you think he/she is? (In cm)
- 2. How heavy do you think he/she is? (In kg)
- 3. How old do you think he/she is?
- 4. What level of education did he/she achieve?
- 5. What do you think his/her annual income will be? (for car)/What do you think his/her parent's annual income will be? (for motorcycle)

The other focused upon personality characteristics. This employed eighteen scales derived from a standard five-factor model of personality traits covering Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience (McCrae & Oliver P., 1992) (Table 2).

Table 2: Types of personality	adjectives	used in t	the qu	uestionnaire	based	on the	basic	dimensions	of the	five-factor
model of personality traits.										

	Extroversion	Agreeableness	Conscientiousness	Neuroticism	Openness to
1.	Masculine / Feminine	Friendly	Positive Attitude	Unstable	Creative
2.	Elegant	Trustworthy	Reliable	Anxious	Stylish
3.	Sporty	Generous	Efficient	Vulnerable	Open to New Ideas
4.	Attractive	Kind	Organized		

A set of statements was devised corresponding to the above factors. The statements were randomized and administered to participants in either the first order or its reverse. This counterbalanced for possible order effects. The statements were as follows:

He/She looks like he/she has a positive attitude to life.

He/She is creative.

He/She looks friendly.

He/She looks unstable.

He/She looks masculine/feminine.

He/She looks trustworthy.

He/She looks anxious.

He/She is elegant.

He/She looks sporty.

He/She looks stylish.

He/She looks open to new ideas.

He/She is attractive.

He/She appears generous.

He/She looks reliable.

He/She looks efficient.

He/She looks organized.
He/She appears kind. He/She looks vulnerable.

Each statement was accompanied by a nine-point Lickert scale to indicate the respondents' level of agreement/disagreement (Quester, Karunaratna, & Goh, 2000). This uniformity has a number of statistical advantages, including permitting multidimensional scaling to be performed upon the data. Malaysian respondents received a Malay language version of the questionnaire while Australian respondents received an English language version.

7. Results

The purpose of this pilot research was to test whether the Room Effect would generalize to a Product Effect. In other words, would the product influence perceptions of the person associated with it. The results reveal some distinct product effects and also both gender and nationality differences in such effects. Initially, ANOVA was performed to determine where differences lay and then t-tests to isolate such differences. The results that follow are a sample of statistically significant differences for both the car and motorcycle.

7.1 Car

Question 4: What level of education did she achieve? (Malaysian/Australian female)

The results reveal a highly significant difference in the perceived 'educational level' of both females (p= .000), whereby both are perceived as more educated with the Mercedes Benz than with the Proton. This was consistent for both the Malaysian and Australian respondents (as are the results that follow).



Figure 3: 4 pictures stimuli - Malaysian/Australian female with Proton and Mercedes Benz car



Illustration 1: Female (Malaysian/Australian) with Proton/Mercedes Benz car – Education Level (Only the first seven of the 9-point scale are displayed, the last two being redundant).

Question 5: What do you think her annual income will be? (Malaysian/Australian female) As might be expected, both the Malaysian and Australian female were judged as having a higher income when associated with the Mercedes Benz than with the Proton (p= .000).



Illustration 2: Female (Malaysian/Australian) with Proton/Mercedes Benz car - Annual Income

Question 15: She looks stylish. (Malaysian/Australian female)

The results indicate a highly significant difference in perceived 'stylishness', with both females appearing more stylish when associated with the Mercedes Benz than with the Proton (p=.001).



Illustration 3: Female (Malaysian/Australian) with Proton/Mercedes Benz car - Stylish

Question 21: She looks organized. (Malaysian/Australian female)

Both Malaysian and Australian females were perceived as significantly more 'organized' when associated with the Mercedes Benz rather than with the Proton (p = .000).



Illustration 4: Female (Malaysian/Australian) with Proton/Mercedes Benz car - Organized

Question 5: What do you think his annual income will be? (Malaysian/Australian male) Perceived annual income was significantly higher for both Malaysian and Australian males when associated with the Mercedes Benz rather than with the Proton (p = .000).





Figure 4: 4 pictures stimuli - Malaysian/Australian male with Proton and Mercedes Benz car



Illustration 5: Male (Malaysian/Australian) with Proton/Mercedes Benz car - Annual Income

7.2 Motorcycle

Question 8: She looks friendly. (Malaysian/Australian female)

The results indicate that the Malaysian and Australian females were perceived as more 'friendly' when associated with the Vespa than with the Modenas (p = .005).





Figure 5: 4 pictures stimuli - Malaysian/Australian female with Modenas and Vespa motorcycle



Illustration 6: Female (Malaysian/Australian) with Modenas/Vespa motorcycle - Friendly

Question 17: She looks attractive. (Malaysian/Australian female)

Both females appear significantly more 'attractive' with the Vespa than with the Modenas (p=.003).



Illustration 7: Female (Malaysian/Australian) with Modenas/Vespa motorcycle - Attractive

Question 22: She is kind. (Malaysian/Australian female)

Both females appear significantly more 'kind' in association with the Vespa than with the Modenas (p= .003).



Illustration 8: Female (Malaysian/Australian) with Modenas/Vespa motorcycle - Kind

Question 7: He is creative. (Malaysian/Australian male)

Both males were judged significantly more 'creative' when associated with the Vespa than with the Modenas (p=.001).



Figure 6: 4 pictures stimuli - Malaysian/Australian male with Modenas and Vespa motorcycle



Illustration 9: Male (Malaysian/Australian) with Modenas/Vespa motorcycle - Creative

8. Discussions

The intention of this pilot study was to investigate the possible carry-over of the Room Effect to products: in other words, is there a Product Effect? The results prove confirmatory. Given the sample size it was not anticipated that major differences would occur. However, highly significant differences were observed for some of the measures used, with indications of strong cross-cultural agreement for some and less for others. While generalization from a pilot study is somewhat premature, never-the-less, the results suggest that the Product Effect was more pronounced for the females associated with both the cars and the motorcycles. Furthermore, this was consistent for both Malaysian and Australian participants.

The next stage of the research is to obtain a much larger sample of participants. This is underway and involves an international survey using internet facilities that have been developed in-house. With a larger sample the intention is to test for possible gender and cultural differences, and to construct a more sophisticated statistical model of the outcomes.

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Making it real: Authentic achievement in design orientated vocational learning

Abstract

Authentic achievement is, according to Newmann and Wehlage (1993), when a student experiences cognitive shifts that enable construction of meaning production of knowledge, use of disciplined inquiry and production of discourse, product or performance that has value or meaning beyond a student's experience of formal learning. Vocational courses are in an ideal position to provide authentic achievement that is connected to the 'real' world and can motivate students to use knowledge in real-world settings. However some students experience instruction and assessment as separate entities, experience knowledge at a superficial level and are not challenged to make use of higher level thinking.

Drawing in Shephard's (2000) social-constructiveness conceptual framework, this paper will explore how an Australian TAFE Institute has provided opportunity for students to engage in authentic achievement. This cohort of students have design as a common core to their studies, experience open-ended performance tasks that support the development of metacognition through application of critical reason and problem-solving.

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The provision of training and education in the vocational sector in Australia is predominately through training packages. Training packages are defined as a "*set of nationally endorsed standards and qualifications for recognising and assessing people's skills in a specific industry sector*" (Back to Basics, 2004). Training packages contain not only the qualifications that are deemed as being relevant to the industry but also the inherent skills and knowledge presented as competencies. These embody the expectations and outcomes that students are expected to demonstrate at the end of their study (Spady, 1994).

What vocational education and training (VET) practitioners provide as learning and assessment experiences can fall within a dichotomy of transmission/transformation. There is a challenge to enabling work ready graduates and life long learners. VET practitioners need to create and facilitate opportunities for students to interact with sources of knowledge, reconstructing with knowledge, and taking responsibility for their learning. At the same time practitioners make use of pedagogical practices that facilitate learning rather then just transmission of data (Campbell, 2000, Malan, 2000).

The provision of opportunities for authentic achievement becomes a critical nexus for transformational VET. In the case study to be described in this paper authentic achievement can be demonstrated in the work of media, design and arts (MDA) students participating in their graduate exhibition. These students are required to build on the knowledge and skills that they have developed through their study to generate a body of work to showcase as well as experiencing the 'real world' of exhibiting their work (Meyer, 1992; Newmann & Wehlage; 1993, Palomba & Banta, 1999). These two aspects provide considerable leverage in that they constitute elements of the student's assessment and facilitate learning in their own right.

This paper provides both some discussion about authentic achievement with a VET context. It looks at how training for the creative industries can be facilitated through transformational delivery where there is capacity for students to engage in learning and construction of meaning that goes beyond the formal classroom.

Training for creatives

If VET is about providing a sound basis for work and employment then it is groups other than educators who make decisions about what is important learning in VET. The emphasis of competencies continues to reflect the priorities of the New Right agenda of productivity, effectiveness, efficiency and accountability (Ball, 2003, Clements, 1996; Goodman, 1995; Jackson, 2003; Klenowski, 2009; Reid 1991). In spite of what structures and funding that are put in place learning is a very human and individual and lived experience and therefore is not always 'efficient'. The dynamics occurring between the teacher and students and between the students and the time shared in the classroom provides an important context that cannot be accounted for solely in behavioural outcomes (Goodman, 1995).

The critique of outcomes based education (OBE) from a socio-cultural perspective is represented in concerns about hegemony, cultural elitism, issues of equity and debate about the very purpose of education and training within society. According to Karmel (1995)the main concern about the application of competencies is not that they cannot provide for a 'good general education' but that they "have been conceived in terms of work and employment" (p173). The development of an individual's human capital for work and employment is only one element in the human experience and that OBE that privileges transmission of data/learning "is highly problematic for those areas which have an aesthetic dimension" (p174).

The delivery of VET for the Australian creative industries is firmly grounded in OBE. As a result the reality for VET providers for the creative industries is to provide programs that

can balance the imperative to produce work ready graduates against the development of student capacities as creatives. To facilitate this it is necessary to transcend VET experiences as solely for the generation of human capital to also facilitate "a process that involves the apprehension, expression, and embodiment of a continuously changing and evolving self" (Smith, 2008, p8).

Authentic achievement

Facilitating the provision of training programs for the creative industries is heavily dependant upon students finding their creative voice (Burnaford, 2007)The development of student capabilities to create and design makes use of students constructing meaning about their work, producing knowledge through methodical inquiry and that the work has an inherent value that exceeds the immediate learning environment (Newmann & Wehlage; 1993).

The delivery of VET programs for the creative industries develops the student capacity to engage in self-directed learning as they build technique and explore their work. As a result classroom practice can include identification of goals, strategies to becoming an expert learner, understanding their learning in context of the workplace (simulated or real), and negotiating a learning plan (Smith, 2001; Wilson, 2000).

The facilitation of connectedness with others in the creative industries is as important as the development of the self as artist. There is substantial benefit to the artist in working and interacting with diverse groups in the creation of a shared project (Wilson, 2000; Sindberg& Lipscomb, 2005; Fisher, 2007). The benefits to working in a community of creative practice includes students developing an understanding of their dual role as learners and workers; and their ability to take on increasing responsibility and complexity as learning increases is facilitated and supported when working in proximity with more those who are more expert

(Smith, 2001). By working with teachers students experience learning within a community with more experienced practitioners – teachers – and where they construct new and different knowledge of themselves as artists (Dysthe, 2007). Students are simultaneous participants – in the limited communities that are their classes or the course as well as in their wider discipline or professional community of practice (Wenger, 1998) who through the transformational nature of the course – delivery and assessment – develop understandings of professional knowledge through the interaction of voices of their peers and teachers

By facilitating authentic achievement with VET students there is opportunity for value adding to their skills and knowledge. Learning is undertaken in a 'deeper' way not only by engaging in higher level cognitive process but also because students can generate 'new' knowledge that has currency beyond their formal learning (Newmann & Wehlage, 1993). Students gain a sense of being connected to the 'real' world and are able to recognise and perceive how the creative industries function (Welch & Russo, n.d.).

Background to the Graduate Exhibition

Three years ago MDA moved from offering several small exhibitions of graduate work to only one. In doing so the intention was to reduce a silo mentality amongst staff and students based on specialities and to highlight the shared design principles. There was also the benefit of being able to maximise the impact of the exhibition by showcasing furniture with interior design, jewellery with fashion; and paper based design with digital media. MDA has been able to invest in its self by leveraging the purchase of exhibition space, resources and logistics.

When harnessing the whole Centre to participate in the graduate exhibition it soon became clear that students and staff were being asked to participate in a process that required them to work in solo, as a part of a specialist group and of an eclectic ensemble. When

students were asked to provide particular pieces for the exhibition it was but one of several tangible outcomes. Other outcomes included the creative process to generate the pieces; a need to be innovative about how to showcase often disparate pieces in an effective way; how to operate as a sole creative and as a member of a co-operative through communication and teamwork; and engaging in problem solving and logistics. To be successful in their contribution to the exhibition students demonstrated learning in specific competencies – both in isolation and holistically.

The involvement of students in the graduate exhibition demonstrates how a cohort of students undertaking studies in media design and arts in a VET environment participate in tangible authentic achievement. The exhibition is run in partnership between staff and students. Students develop their own presence for the exhibition and operate in a self-directed manner to generate a body of work. They also work in a community of practice that includes others with experience of exhibitions, to create a cohesive whole. The follow case study provides detail of how the exhibition facilitates learning that is very of the 'real world'.

Authentic achievement: a case study

Assessment can be used as an essential component in the process of learning (Shepard 2000). The VET sector claims a close relationship between its ability to develop vocational competencies of its students and meet the training needs of industry. It is therefore incumbent on the VET sector to engage in authentic assessment where student learning exceeds the classroom experience and enables access to a community of practice that is their industry. Assessments when used in varied ways can be described as authentic. The remainder of this paper describes how Shepard's (2000) constructivist view of learning has been used to demonstrate how students participating in a graduate exhibition can also be claimed as evidence of authentic achievement.

1. Generating a learning culture within the classroom

Learning cultures are the product of an amalgam of organisation and interaction as well as previous experience (Evison, 2007). Rather than reinforce a culture where students are assessed as a means to measure milestones of expected or pre-ordained achievement within a dichotomy of winner/loser the classroom with a learning culture uses assessment as a means for learning. The challenge for students to prepare for and set up at exhibition requires a classroom that is democratic in nature as every student contributes and has their needs met in tangible ways. Getting to exhibition provides motivation for students to participate in assessment of their work as a means to an end. For instance assessment of installing and dismantling exhibition elements requires students to not only to determine what they need for their work, but to be able to negotiate their requirements within context of the class and of the whole exhibition. Further at exhibition each student and group re-assesses the display according to what is actually possible in situ.

2. Providing assessment that is dynamic and on-going

Drawing on Vygotsky's zone of proximal development (Vygotsky, 1978) teachers, assisting students with their exhibition related assessments, gain greater insights into how the student understandings can be extended. As students document the work they are undertaking teachers provide critical feedback that can related to what the student is attempting to demonstrate/produce and how the work can be best mounted. In doing so the teacher assists the student to develop mastery within what Lave and Wegner (1991) call a community of practice within, in this instance a specific creative industry.

3. Determination of prior knowledge

Assessments are often constructed in a way that the focus in on what is delivered in the classroom in a formative manner. However it is possible at the initial stages for students to identify what they already know and therefore be assessed on what is a needs assessment of learning. In order to engage in authentic assessment students need to demonstrate their learning – not only of cognitive compentencies (problem solving and critical thinking) but also social competences (communication and collaboration; and metacognitive competencies (reflection) (Birenbaum, 1996; Gulikers, Bastiaens, & Kirschner, 2007). As a part of the exhibition student are required to invigilate and to work with the public. Within this role they have obligations to work and operate in a safe manner and to provide assistance in the event of an emergency. Occupational health and safety is an integral part of the students' course of study and it is assumed that student do appreciate the rights and responsibilities of safe workplace activity. In working at Exhibition students' prior knowledge is accounted for and to built upon so that they are able to apply their knowledge to a new environment and context.

4. Feedback to the learner

Rather than control student learning, staff communicate with students about what is valid knowledge (Sheppard, 2000) as it specifically relates to the exhibiting artist. Feedback should provide a student with insights for self-correction and improvement. Rather than limit the experience and understandings of the students at exhibition teachers have tended to allow student latitude when their activity offers possibility for insignificant error and to forestall if a student may repeat an error they or others have made. In preparation for the exhibition students are provided with scoping about what exhibition elements are possible and permitted. The requirements for this were stringent in situ because the exhibition was held in a building that was heritage listed. As a result students were briefed about what was possible in the initial stages. Subsequently teachers and exhibition staff would meet with the students to refine and finalise their exhibition needs.

5. Transfer of knowledge to new contexts

Students involved in the exhibition have been challenged to not only demonstrate their learnings but to do so in a variety of ways. Each student works to the exhibition as a solo artist. They are also a part of a work team and a representative of the centre to the public. Students have developed specific knowledge and skills attained within the course but also about the course. In responding to questions and inquiry from the public, students need to demonstrate robust understandings about their course of study and how it is offered at BHI. While they have an imitate understanding about the course students need to re-contextualise, to consider the course in a new way – for a perspective student and to draw new connections – what they will do after graduation and what they have achieved other than a qualification. The students develop relevant professional thinking skills to "integrate and coordinate knowledge, skills, and attitudes, and the capacity to apply them in new situations" (Gulikers et al, 2007, p76).

6. Use of explicit criteria

Students work towards the exhibition across their final semester. They are given detail of what they are expected to provide – artist statement, requests for exhibition materials, tasks for invigilation. These expected products or outcomes were arrived at after discussion with teachers who are also practicing and exhibiting artisits. These products and outcomes contribute to authentic assessment in that they mirror contemporary, professional practice ((Gulikers et al, 2007). The Exhibition Steering Committee provides opportunity for the student body to present ideas, concerns and resolutions about the exhibition. Graduates from the previous year's exhibition speak to classes and describe their experiences, teachers set staged activities or milestones so students experience an unwavering, guided move forward across the semester towards the exhibition. They have also been observers of the previous year's

exhibition and have some insight into what a graduate exhibition looks like for MDA students at BHI.

7. Self assessment

Students are asked to assess their own progress against agreed to milestones and requirements. For instance teachers work with students to create their artist statements. They are given opportunity to analyse and review the statements with the teacher and their peers so that they 'own' the evaluation. In working to develop their contribution to the exhibition individual students have had to be critical about their own work and how well it relates to the work of others. There have been a number of instances when students reworked their exhibition elements or elected to reposition their work to create a more cohesive display. Students become active participants in the assessment process causing the teacher student dichotomy becomes blurred as teachers are also recognised as learners and students teach other students. In doing so it "strengthens the practice of assessment as communication about and negotiation of what counts as valid knowledge within a domain" (Havnes, & McDowell, 2007, p6).

8. Evaluation of teaching

As students completed their invigilation at the exhibition, exhibition staff actively sought feedback about the process and the experience to elicit possibilities for improvement in subsequent exhibitions. From some of this feedback teachers have re-crafted the ways in which the exhibition is developed within the classroom experience and the exhibition staff have refined their processes. Teachers are also asked to provide a PMI evaluation about their experiences. In doing this students and staff are provided with tangible examples of how teachers and the exhibition staff are also active members of a community of learners. In

determining the competency of students while also reflecting on the exhibition experience, teachers discuss assessment and define what knowledge is valued (Havnes, 2007).

Conclusion

The provision of training for the creative industries through VET programs can, when using authentic achievement, build student capabilities in several ways. Students develop the ability to work in a self-directed manner and operative with a community of practice. By participating in a specific project as the graduate Exhibition students experience an event that is 'real world' and facilitates opportunity for students to problem solve their way to a communal goal.

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A Web 2.0 Recipe for Effective Feedback

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One of the most powerful tools for learning is feedback. In design education feedback is vital and integral to the learning process. Verbal feedback, while used regularly in class, is often forgotten or misinterpreted later. Depending on the delivery and timing of feedback it may have a negative effect on learning outcome.

Reviewing the existing feedback given in a design education unit a decision was made to improve the type and methods of feedback given. With the expeditious growth of Web 2.0 technology, a part of students' daily routine, we incorporated it to augment feedback. The Web 2.0 technology has embedded skill-building properties and extended design education through peer-to- peer collaboration, analysis and critiquing the visual. Student outcomes improved through highly interactive and collaborative feedback techniques.

Students now have access to a vastly superior system where feedback is accessed anywhere, any time, increasing knowledge and developing design principles.

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Reviewing the existing feedback given in a design education unit a decision was made to improve the type and methods of feedback given. With the expeditious growth of Web 2.0 technology, a part of students' daily routine, we incorporated it to augment feedback. Web 2.0 technology has embedded skill building properties and extended design education through peer-to-peer collaboration and analysis and critiquing the visual. Student outcomes improved through highly interactive and collaborative feedback techniques.

Students now have access to a vastly superior system where feedback is accessed anywhere, anytime, increasing knowledge and developing design principles.

Keywords

Feedback-on-learning, feedback-for-learning, Web 2.0, photography

1. Introduction

This paper describes how a focus on feedback for effective outcome-based learning has created a new dynamic in teaching photography in a design unit. The unit employs a blended learning and teaching approach, using face-to-face and Web 2.0 technologies as tools to assist teachers and students interact with direct and regular feedback.

The authors in this paper have advanced their initial work using Web 2.0 for image sharing, critique and peer interaction in 2007. This work is now augmented to support teachers and students improve feedback processes. The immediacy and flexibility of Web 2.0 has enabled students and teachers more frequent and timely opportunities to give feedback. Feedback is now a recognised and formal requirement of the unit. Teachers and students must critique and comment on the work of others, giving feedback on learning achieved as well as on the learning needed for improvement.

A new approach has facilitated deeper critical and analytical thinking by students about their own photos and the comments written on the work of their peers. Providing students with new skills and strategies on how to use the feedback they have been given has allowed them to understand more about the type of feedback they want to receive, and what they should communicate to their peers. Students have responded to this new approach with deeper consideration of the type of feedback they give to their peers. Students not only appreciate and act on the feedback they receive but realise the

importance and impact feedback has for continued learning. The success of this approach has been achieved by establishing a collegial, collaborative learning community in the first week of semester. This has underpinned a framework that has set the scene for proactive, participatory feedback delivered in several ways.

Research on the impact of feedback on student learning has gained momentum in recent years. Research undertaken by (e.g. Black & Wiliam, 1998; James, McInnis, & Devlin, 2002; Krause, Hartley, James, & McInnis, 2005) on the feedback highlights the importance of teacher-student interactions and its impact on high-quality learning.

Data gathered from the Australasian Survey of Student Engagement (AUSSE) survey have provided key information on student engagement. The 2007 and 2008 AUSSE report indicates profoundly poor results on student engagement (AUSSE, 2009). One of the underpinning scales of engagement used is student perception on the level and nature of performance on their contact and interaction with teaching staff. This was scored on a scale of zero to 100% with the latter indicating total satisfaction with staff contact and interaction. In 2007, the average score for first-year students was 18.3% and later-year students 23.9% and in 2008 the average score was 19.8% for first-year students, rising to 24.5% for later-year students.

Of particular note for the authors of this paper is the result on student's receipt of prompt written or oral feedback from teachers/tutors on academic performance. A concerning 61.4 % of first year students and 59.7% for later year students reported on 'never' or only 'sometimes' receiving prompt written or oral feedback on their performance. Results from the AUSSE report impacted on our determination to review and improve feedback in the design education process. This is also confirmed by the Blair, Blythmen, & Orr (2007) report that examined the use of the critique in art and design teaching and learning. This report highlighted 'that there is a perception of art and design students that they are not getting enough feedback' (2007 p. 3).

Effective feedback plays a major role in supporting successful learning and should be valued by students. It must be immediate, timely, focus on achievement and provide guidance for future improved performance. Feedback guidance and advice should include detailed informative and successful ways to achieve required outcomes. Feedback should assist learning, be encouraging, and motivate students by focusing on the work rather than the individual, which could reinforce inabilities and undermine self-confidence (Gibbs & Simpson, 2005).

Feedback that is progressive and immediate, aids a scaffolded learning approach, encourages and identifies areas for improvement, reinforces attainment and leads to a higher standard of final

outcome. Hounsell (2007) advocates that 'well-crafted feedback can enhance learning in three significant ways:

- by accelerating learning;
- by optimising the quality of what is learned; and
- by raising individual and collective attainment' (2007 p. 101).

Feedback to students is possibly more influential and important in students' ability to learn than the impact of teaching itself. It is the role of the teacher in the assessment and feedback process that profoundly impacts on student learning. This is supported by Race's (2007) comment 'that feedback is the oil that lubricates the cogs of understanding' in response to John Cowan's statement that assessment is the engine that drives learning (2007 p. 74).

While teacher to student feedback is essential in the design disciplines, the interactive process of peer review plays a substantial and valuable role. The Web 2.0 has provided a tool that facilitates interaction and peer review but supports timely, accessible, motivating feedback opportunities, for teacher and student alike, and can be 'intrinsically embedded in day-to-day teaching and learning activities' (Laurillard, 2002 p.55).

The aim of this paper is to showcase a framework for using feedback (both giving and receiving) as a central core to learning, by providing students with scaffolded learning tasks in a Web 2.0 learning environment. This has encouraged proactive, anytime critique and commentary on peer work as well as furthering the teacher's range of feedback options. The approach adopted is supported by the literature on feedback for learning. A particular emphasis in the approach adopted is the role of the teacher. Black & Wiliam (1998) assert in their studies that improving the teacher's role in formative assessment can raise the standards of student performance. They point to the benefits of feedback that is specific, descriptive and immediate. They also argue that 'the quality of the interaction [between pupil and teacher] ... is at the heart of pedagogy' (1998 p.16).

This paper identifies methods particularly suited to getting feedback on learning in the design studio class using a blend of face-to-face and online practical strategies. It describes an approach adopted using Web 2.0 technology. Building on our experience of the successful implementation of Web 2.0 for image exchange and peer interaction (Robbie & Zeeng, 2008), the authors have expanded their work to explore innovative and effective methods of feedback to improve engagement, motivation and learning.

2. Background

Design education is traditionally studio-based with emphasis on communication of ideas and visual outcomes. Within the studio, teachers critically analyse student's concepts and suggest the most effective plan of action within the confines of designated class time. Teachers may look at a number of 'drafts' and suggest the best way to execute an effective, creative and aesthetically positive outcome. Students within each studio are involved in the process and give feedback related to their peers work. This is restricted to the small number present in the studio class only and not the entire cohort enrolled.

A traditional model of peer review is executed by having a wall "pin up" of work/ideas during class which allows the teacher and students to discuss each concept. This is undertaken on a regular basis throughout the design process. While in practice this experience is invaluable for student learning, in reality there are instances where insufficient individual feedback is received.

Similarly, in teaching design photography, students would capture and print their images for weekly feedback and critiquing in the smaller class groups. However difficulties occur when student's experience technical or financial problems, resulting in work unable to be reviewed. This reduces the amount of feedback received, and unresolved or unseen problems impede the students' learning process.

In photography classes, students are instructed in the basic elements of photography for design through lectures and studio classes. A one-hour intensive weekly lecture describes and exemplifies photographic techniques and genres. Students attend two-hour studio classes and undertake practical application of the technical knowledge and discuss expectations of the set tasks.

This is equivalent to the traditional format, however now with the addition of Web 2.0 the ways of delivering feedback can be vastly improved by extending the scope and availability of feedback for students. Face-to-face is a pivotal element of the studio classes and supports students to critically analyse the design process and improve their fundamental technical skills. This has also been extended in the Web 2.0 environment.

A new teaching and learning approach, implemented in 2007, predominately uses the opportunities offered by Web 2.0 technology (in this case Flickr). The online learning community within Flickr offered a variety of collaborative and engaging learning experiences for students.

Within this innovative teaching format, completed images are uploaded simultaneously to individual Web 2.0 pages plus the site for the whole photography community. Once uploaded the entire cohort of students and teachers can then critique and analyse the work of individuals. Assessment tasks

require students to make three comments/critiques per week on the work of their peers. They are encouraged to choose a variety of images each from a different student and preferably images from students who are not in their studio classes. This increases their scope of potential inspiration, improves their critical and analytical skills, and includes them as part of the broader community. They are expected to give constructive criticism, reflecting on the technical and aesthetic qualities of the image. These comments become an assessable portion of their semester's work.

At the beginning of each semester students are given instructions, with accompanying suggested vocabulary, on how to analyse and critique the photographic image and the interaction expected from them during the semester. Lecturers and students can comment anywhere anytime on any image that becomes available on the group site. They are shown examples of the tasks they will need to fulfil. As each task is issued, further examples are shown and any technical considerations are demonstrated. The outcomes, expectations and the level of achievement are made very clear. Any student with concerns or misunderstanding can request feedback or clarification from teachers or fellow students via email or discussion boards.

Students can receive individual feedback/comments, from peers or teachers, on their images as soon as they are uploaded to the group. In the studio classes, a group style of feedback is delivered where examples of best practice of images from the cohort are viewed. Time in class may also be given to individual students when required or requested. Teachers undertake a weekly review to ensure that all students are receiving sufficient individual feedback. Together with this timely feedback, as each task is completed, teachers appraise the outcomes and make suggestions on how to improve or better resolve the task. The student can then act upon the teacher's comments, review, edit or re-shoot the images then resubmit. This revised set of images can be further commented on by the teachers prior to end of semester hand in.

3. Method

An evaluation of student's perception and effectiveness of feedback given was undertaken. The following key evaluation questions were identified:

- What do students feel about the feedback they receive?
- How do students use the feedback they are given?
- How can teachers improve the feedback they give?

Data was collected from centrally distributed student feedback surveys and anecdotal online and faceto-face discussions to find answers to the questions above. Specifically, the following data was reviewed.

- Questions related to 'feedback' in the Student Feedback Surveys (SFS) conducted in 2007 and 2008 by the university
- 2. Anecdotal feedback within the unit discussion boards and in studio classes from students during 2007, 2008 and 2009.

3.1 Review of Student Feedback Surveys 2007 and 2008

At Swinburne University of Technology, the Strategic Planning & Quality (SPQ) unit administers the central Student Feedback Survey (SFS) on subjects and teachers. This survey provides feedback to academic staff on the delivery of subjects and on their teaching practice and provides a comparison across the university.

The survey asked students for feedback on curriculum, delivery and assessment. The question item related to this evaluation asks students to respond the question "I have received helpful feedback", using a Likert rating scale of 6 where 1= 'strongly disagree' and 6='strongly agree', and provide comments on the helpfulness of the feedback received.

The survey also asked students to rate the teaching in their units. One of the criteria is framed around 'approaches to assessment and feedback that foster independent learning'. The question item relevant for this evaluation asked students to respond to the question "This lecturer/tutor provides helpful feedback on my progress" using a Likert rating scale of 6 where 1= 'strongly disagree' to 6 = 'strongly agree' and provide comments on whether the lecturer/tutor provides helpful feedback on progress.

3.2 Anecdotal feedback from students in discussion forums (Flickr comments & forums)

During the semester students had the opportunity to give feedback to their teachers informally via email and discussions boards. Students actively provided feedback throughout the semester.

4. Results and discussion

Data from the SFS, on the question related to students receiving helpful feedback in their subjects, is itemised in Table 1. The score indicates the percentage of responses in agreement or strong agreement (that is, 5 or 6 on the Likert scale).

Q. I have received helpful	2006	2007	2008	2009
feedback				
Photography Unit	85%	100%	96%	98%
	agreement	agreement	agreement	agreement
Representative comments			1 1	
• the assessments were relevant	and helpful, I receiv	ed useful feedback	on submitted wo	rk (SFS 2009)

Table 1. Responses to SFS on the question "I have received helpful feedback"

- Flickr was very helpful and it was great having to give constructive criticism to others (SFS 2008)
- The feedback on the weekly tasks gave me an indication of how I was going, how accurate my interpretations of the material were (SFS 2008)
- Could also see other students work and comment on it helped me push myself further (SFS 2008)
- Being online was great it allowed plenty of feedback from both teachers and students (SFS 2007)

In 2007, the standard mean, in a scale of 1 to 6, for photography was 5.32, which was above the university average mean of 4.51 (i.e. mean across the 6 answer options). In 2008, the standard mean for photography was 5.08 again, well above the university average mean of 4.58. The SFS for 2008 shows a minimal drop possibly due to increased numbers of student responses than previous years but it is still higher than in 2006 before Flickr was introduced. In 2009 the average mean of 5.16 continues to be higher than the university average of 4.54. A high rating of feedback has been sustained over the 3 years that Flickr has been used for teaching and learning.

Data from the SFS on the teacher providing helpful feedback on progress is itemised in Table 2. The score indicates the percentage of responses in agreement or strong agreement (that is, 5 or 6 on the Likert scale).

Q. This lecturer/tutor provides	2008	2009
helpful feedback on my		
progress		
Photography	93%	95%
	agreement	agreement

Table 2. Responses to SFS on the question "this lecturer/tutor provides helpful feedback on my progress"

Representative comments

- I was able to approach her for help when I needed it and I found this very helpful in my studies (SFS 2009)
- Provided personal feedback to get better photos (SFS 2009)
- Every week we receive great feedback on our tasks (SFS 2008)
- Helpful feedback has inspired me (SFS 2008)
- Teacher used some good methods to teach (sic) us, when we've got problem we can get feedback what we've required (SFS 2008)

In 2008, the standard mean for the teacher in photography was 5.20 significantly above the university average of 4.70. In 2009 the standard mean was 5.21 and again higher than the university average of 5.08.

Most comments received anecdotally throughout the semester, related to regularity of feedback, timely responses of teachers and ideas to improve their understanding. Feedback from students indicated that viewing and reviewing images, receiving and making comments had improved their learning. This suggests that the activities within the blended learning environment had raised their skills of critiquing and analysing and supported them in understanding creative photography, design principles and practices. Examples of the type of comments students provided included:

- This is a great way to learn what makes a great photo. Having to critique your pictures as you take them as well as other peoples is good for this. (Flickr discussion forum 2008)
- I could spend hours on here looking at everyone's photos. I find that because of Flickr where we can access anyone's photos at anytime I am learning from the people who are more advanced comments are always helpful because I am getting feedback from someone else's perspective and they will notice things about the photo that I wont. (Flickr discussion forum 2009, semester one)
- The comments have been useful. Through making them, I have been able to improve my analysis skills and work out how to put my opinions and thoughts into words. It has also been valuable having other people's opinions on my own images. (Flickr discussion forum 2009, semester two)

In reviewing the formal and anecdotal feedback it is apparent that student's valued the diversity of feedback they received and were able to use it to improve their camera technique, and analyse and critique their own and others images. In particular, the feedback that assisted their learning was:

- from peers and teachers;
- regular and immediate;
- received through a variety of media and modes;
- verbal and/or written;
- not about the individual but the work they have done;
- shared across larger cohorts of students rather than small class groups; and
- contributing to improved learning and not just on what they have achieved.

The type of comments students valued most related to feedback that focused *on* and *for* their learning. Students responded more positively to commentary that provided information on their achievement and performance with suggestions for improvement and enhancement to guide further learning. The following comment is one example of feedback-*on*-learning

• you've captured the movement and high energy of urban areas really well with this blazing trail of light leading off into the distance. Composition is very good, with the lights leading our gaze down the road and towards the blue skyline. (Flickr comment student to student 2009, semester one)

The following comment provides an example of feedback on and for learning

• This is a really interesting colour shot. I like the contrast between the blue orange and yellow of the background. The only thing that would make this even better is if the background were cropped so that the full on colour of the background didn't break up toward the back of the shot with the pink and green interrupting the flow. (Flickr comment student to student 2009, semester one))

The teacher and student focus on feedback *for* and *on* learning has produced extremely successful and effective outcomes. Findings so far suggest that this two-tiered feedback has been very valuable in contributing to increased motivation and enthusiasm for learning. It also highlights the importance of feedback that:

- is communicated clearly;
- is discursive and relevant ;
- is shared, valued and encouraged in a community ;
- informs practice; and
- contributes to improved learning outcomes.

5. Conclusion

In this research we explored strategies for acting on feedback by evaluating students' perceptions on the guidance and feedback they receive. We discussed the types of feedback students like to receive for guidance and motivation. In the process we have identified strategies that students possess for 'using' feedback and how they interpret the feedback they are given.

A review of how students use the feedback they receive did highlight a concern. Students tended to use the feedback to look back at what they've done rather than how the feedback could contribute to further learning. While students commenced the semester with a view that feedback was a summary of what they have done, this new approach provided a framework for them to use it to advance their learning.

A change in the teachers approach, frequency, timeliness and type of feedback has encouraged very positive reactions from students throughout the semester. This study on students' perception on feedback has shifted the nature of feedback given by the teacher from feedback-*on*-learning to feedback-*for*-learning. Studies by (e.g. Black & Wiliam, 1998; Brinko, 1993; Ende, 1983) and others, along with the AUSSE report (2009), helped inform a paradigm shift where feedback, given and received, was not just about achievement on student learning but also for improved learning.

The positive responses from students on the feedback given has encouraged us to share our experiences with other staff to explore opportunities for feedback in multiples aspects of their teaching i.e. studio classes, online forums, and email exchanges.

At the end of each semester a review of the current unit and lessons learned inform new developments. Conducting student focus groups with new cohorts of design students to compare perceptions and responses from previous years is underway. To date we believe we have fully exploited the Web 2.0 features available in the Flickr social software and are keen to trial some new generation technologies to further support and improve feedback mechanisms.

Current ideas under consideration include the use of audio feedback to allow teachers to incorporate tone into their feedback and perhaps assist in reducing the workload experienced in written feedback. The use of auto response systems such as Opinio polls and Votapedia are also being explored. We are of course extremely mindful that we do not jump on the bandwagon and use any new technology just because it is available. Our focus is to get the right mix and quality. We agree that it is 'Better to turn a screw with a screwdriver than a hammer — a dime may also do the trick, but a screwdriver is usually better' (Chickering & Ehrmann, 1996). The next stage of our work will discuss how we have worked towards finding the right 'screw' or 'screws' for giving feedback.

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Commenting on Society -South African Social Documentary Photography:

Original Versus Contemporary Visual Communication Roles

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Abstract

With the increase of photography used as social-historical evidence current research trends are rethinking the significance of the image in relation to the social context of its production rather than simply according to its artistic significance (Wells, 2000). This has led to a new awareness of photography, its role in society, and its historical evolution. Contemporary studies, for example Rosenblum (1997), *A World History of Photography* and Fizot (1998), *A New History of Photography*, and Marien (2002), *Photography: A Cultural History* combine the histories and trends taking place in America, Europe and Britain, promoting a particular version of photographic history acknowledging the western world as leaders in the photography. South Africa has a rich social documentary photography heritage. This paper reviews factors that contributed to the success of South African social documentary photography, produced prior to and during the 1980s, as visual communicators; firstly in their original role as a visual weapon in the fight for democracy and secondly in their contemporary role as a visual collective memory articulating public histories of apartheid.
1. Introduction

At the beginning of the twentieth century, the way that people communicated was on a local level – the neighbourhood, town, state or country. Photography and its relationship with technology has played a major role in society, particularly as a catalyst for social change. The world is now made up of informed and well-documented societies, which are no longer evoked but are directly represented. Thanks to photography, the number of images the average individual confronts has been multiplied a million fold and documentary photography or photojournalism combined with digital technology has made it possible to know of an earthquake in Afghanistan and warfare in East Africa within minutes or hours of the actual event taking place, or as in the case of Twin Tower bombings while the event is in progress. The social documentary photographer is out there trying, sometimes under extremely difficult circumstances, to inform the world of societies in need or acts against humanity, and in so doing is "revealing layers of societies that may otherwise have gone unnoticed" (Chapnick, 1994, p. 12).

Photographic images represent a model of social life that can effectively provide a catalyst for social change and when viewed in the future, provide historical evidence to a particular mindset of the culture, social situation and politics of that particular period. The history of the 20th century is full of examples of socially rousing photography for example Vietnam, Rwanda, Ethiopia and South Africa to mention but a few. Unfortunately mainstream media narratives often work to encompass public perspective on these seminal issues by presenting limited viewpoints and images. In most cases media corporations are focused on creating profits rather than social justice and the many answers that we demand as conscious global citizens become conditional. Between the process of taking the photograph and viewing the photograph the international understanding of the term conflict photography. The term has different meanings to different countries by virtue of the events covered. And although in most cases the protestors were searching for freedom from one or the other form of tyranny, the motives, objectives, approaches and experiences of those who photographed the process of liberation were extremely different (Yapp, 1996).

The 1980s and early 1990s was a period of great significance for South Africa. It was a period where the fight for democracy intensified and resulted in the election of the first-ever-national democratic government. Overthrowing the apartheid regime that preceded it came at a high price, one that many South Africans paid for with their lives. According to Hill and Harris photography took on a particular significance in this period of South African history as "it provided irrefutable documentation of popular resistance and state brutality" (1989, p. 7). These images were instrumental in bringing the South African struggle to the international arena and serve as part of a collective memory that stands against the apartheid government's efforts to blot out this reality.

I therefore endeavour, through literature study, to clarify the term social documentary photography and its historical significance as well as to place the study in context by briefly viewing photography as a tool for social change in South Africa. As part of a discussion to establish original and contemporary roles of the social documentary photograph I review the iconic images (for the purpose of this paper iconic image refers to a single image that can successfully sum up the cause they represent), *Migrant Mother* by American photographer Dorothea Lange and *Hector Pieterson* by South African photographer Sam Nzima according to the approach of the photographer to the subject, the original intended use of the photograph and subsequent roles of the photograph.

2. Understanding the term 'social documentary photography' and its historical significance

Categorising photography can be a difficult task and both Scott (1999) and Rosenblum (1997) caution against attempting to define its essential nature too narrowly. Many would question whether it has an essential nature at all. John Tagg talks about "photographies" rather than "photography" – "photography as such has no identity. Its status as a technology varies with the power relations that invest it. Its nature as a practice depends on the institutions and agents which define it and set it to work" (1993 p. 63). Scott advises "any writer who takes photography as their subject to avoid being too categorical about any aspect of it as it is a fluid, mobile, unstable medium which is diverse in its application" (1999 p. 14). While Rosenblum emphasizes that "all photographs defy narrow categorisation especially works that have social change as their prime goal as the passage of time has been especially effectual in altering purpose, meaning and resonance" (1997 p. 341). The photographic image can therefore have different meanings or readings depending on its representing agency.

The term social document initially referred to most of the documentary work done from the turn of the 20th century to 1945, reflecting social themes and social goals that are linked to some sort of social commitment or program. Although the style of work and approach of the photographer has varied according to changes in society and advances in technology, the social documentary approach to photography still has a strong appeal for photographers who are concerned with social issues and convinced that through a compassionate portrayal, the viewer may become emotionally disposed to support changes in iniquitous conditions, or at the very least "create an awareness of dire need, inequality, injustice or a breach of human rights" (Chapnick, 1994, p. 21). Many of these elements are still echoed in contemporary practice or philosophy of social documentary photography.

It has always been difficult to maintain a universal understanding of the photograph as a document. In Newbury's (1999) opinion both documentary photography and photojournalism play a role in the way that societies inform themselves about their own identities and values and those of other cultures and societies. Although some may argue that the terms documentary photography and photojournalism represent two different approaches, there are many who have come to use the terms interchangeably. The social documentary photographer could also be referred to under the broader term of documentary photographer or as a photojournalist. However this is not just about the interchangeability of the terms but also the fluidity of the boundaries in terms of the intended purpose of the work and how the images were regarded by the viewer both in their original capacity as well as from a historical point of view. For the purpose of this essay the term social documentary photography narrows the field of either documentary work or photojournalism signifying that the photographer's work represents either the cause of social upliftment or concern for humanity.

3. Photography as a tool for social change in South Africa, 1928-1990

Early photography in Africa had a definite colonialist interpretation by white men for white men, for example ethnographic studies carried out in Africa such as the anthropometrical photography of A.M. Duggan Cronin (Grundlingh, 1999, p. 244). In America the plight of the poor and the disenfranchised galvanised dedicated reformers who saw photography as an instrument for social change. People's living and working conditions were among the earliest subjects for photography (Rosenblum, 1997). The 1930s and 1940s showed a growing concern for humanity, especially in the work done by Farm Security Administration photographers documenting the effects of the depression in America with the underlying idea that "these were good people experiencing hard times" (Willis, 1998, p. 379). In South Africa social anthropological studies conducted by Ellen Hellmann and the campaigning for slum eradication done by Epstein indicate a move towards using the photographic image as evidence with regards to socio-economic circumstance rather than as a form of classification (Du Toit, 2004a). During the 1940s *Libertas* magazine became one of South Africa's first magazines to publish pictorial essays and the work of photographer J.P. Vorster became synonymous with their drive to "conscientise and spur their readers to appropriate action" against poverty (Du Toit, 2004b).

The evolution of techniques used in the photographic commentary on war, as well as the awakening of a political consciousness resulted in a more subjective, metaphoric approach to everyday concerns on an international level. In South Africa during the mid-1940s Eli Weinberg began introducing the basic principles used internationally by the Photo League, identifying with the social-political need within the photographic comment on society by using photography as a witness to the effects of the policies introduced by the apartheid government (Weinberg, 1981).

Within ten years of the success of the picture story magazine on a worldwide scale, the South African alternative press boasted a picture story magazine success story of their own in *Drum* magazine. Black photographers in South Africa from the 1950s tended to be more progressive within the social documentary approach than their white South African counterparts. They were exposed to the work

and techniques of European immigrants to South Africa, such as Eli Weinberg and Jurgen Schadeberg, and identified with the media coverage of the African-American lifestyle (Schadeberg, 2001).

In the 1960s the triumph of humanism seen in the Family of Man exhibition was short lived. Although a few photographers in Europe continued in the humanist tradition, most Americans took metaphoric documentary to a new level, one of the forerunners being Robert Frank in his book *The Americans*. This restlessness became more apparent as the photographer began to comment on the volatile sociopolitical situations in America, Africa and Europe. In the late 1950s some of the worst race-motivated riots in Britain were taking place. At the same time the coverage of the Civil Rights Movement in America highlighted the efforts of the African-American to gain equality. This was almost simultaneous with the start of the South Africa black photographers' drive to document the inequalities within the Apartheid state of South Africa, which filled the pages of *Drum* magazine. It can therefore be determined that British, American and South African photographers were all dealing with race-related issues at approximately the same time, but not necessarily relating to their audience in the same manner.

There was an 'alternative press' running parallel to the mainstream black press who were noncommercial (in the sense that profit was not the primary criterion for its establishment), fulfilling a role in the resistance within South Africa, providing political, social and economic alternatives to the status quo (Johnson, 1991, p. 24). According to Tomaselli:

The left presses aimed to provide the ideological conditions within which oppressed people could identify themselves as 'subjects' of particular communities and related anti-apartheid practices. While issues which bound these communities together were primarily negative in nature, by developing cultures of resistance they were able to articulate their struggle in positive rather than negative ways, and hence assist in the construction of alliances that could defeat apartheid. Communication within communities thus became crucial in focusing the direction of social change (1991, p. 163).

It was also during the 1960s that David Goldblatt emerged as one of the first ethnic white South Africans to comment on the political situation in the country within the metaphoric tradition. Goldblatt chose to work on an individual basis covering issues that did not necessarily represent the struggle, but still documented a society living under apartheid rule. Peter Magubane became the first black man to exhibit photojournalism in South Africa (Grundlingh, 1999) and Ernest Cole the first black photojournalist to publish a book. His book, *House of Bondage*, highlighted the atrocities of apartheid in South Africa. Due to growing worldwide concern for the actions of the apartheid government the state began to clamp down on publications drawing attention to the human rights violations of black South Africans and after the publication of *House of Bondage*, Cole was banished from South Africa and remained in exile. The alternative press was forced underground and the African National Congress banned. The coverage of the 1976 Soweto riots lead to a resurgence of the alternative press and South African photographers started supplying images to the growing number of publications and organisations within the resistance movement. At the same time the international press began to publish images of the resistance in South Africa and South African photographers found there was a demand for their images internationally, for example Magubane photographed for *TIME* magazine. The international audience, educated by the Vietnam media coverage, were becoming more concerned about international injustices.

It is important to understand that concerned photography acts as a propaganda tool highlighting the 'cause' of the image through the interpretation of the photographer and also the fact that the audience is only receptive of the images if they are sympathetic to the cause. A good example of how the public's opinion is taken into account when determining what is acceptable for public viewing is the difference in the way that the Spanish Civil War was commented on in France and Britain, the British culling scenes "too gruesome for public showing" (Brothers, 1995, p. 196), while the French public was more accepting of representations of harsher truths. Images of war began to show the evidence of crimes against humanity and display proof of the unbelievable. This choice is reflected in what modern newspapers and magazines, which were to become the major vehicles of concerned photography during the 1980s and 1990s, chose to publish within a particular society.

During the 1980s many social documentary photographers took the side of the oppressed and in so doing evoked the wrath of the government. They formed collectives working towards a common cause making sure that the images were distributed both locally and internationally. The coverage of the resistance movement had the support of an international media market that was expanding and had a growing demand for images. South African social documentary photographers presented the rest of the world with a body of work that gave greater insights into the oppression that the majority of South African society were forced to live with.

Although the time period of production of the following two case studies of photographs differs, the images are recognised worldwide as successfully able to sum up the cause that they represent within a single frame.

5. Case Studies

5.1. Case Study: Dorothea Lange's Migrant Mother



Figure 1: LANGE, Dorothea.1936. *Migrant mother*. *Midweek Pictorial Newspaper*, 17 October. Library of Congress, Washington, D.C. (Marien 2002:284).

In 1933, United States president Franklin D. Roosevelt declared a state of national emergency. The economic depression in the United States sparked a photographic survey of rural deprivation, sponsored by the United States government under the auspices of the Historical Section of the Farm Security Administration or FSA, began in 1935. The FSA photographic project was run by Roy Stryker, an economist. He realised that photography could be a powerful tool in mobilising the support of the Americans to help the cause of the growing army of agricultural poor. Stryker's intent was to dramatise real subjects in their actual settings, linking them to specific cultural messages so that viewers would form a favourable response to the new government programs. Stryker's agenda was to be positive and portray rural people working to improve their predicament, underlying the idea that these were good people experiencing hard times. The project generated "approximately 270 000 images" of rural, urban and industrial America between 1935 and 1943 (Willis, 1998, p. 379).

The photograph popularly known as 'Migrant Mother' has become an icon of the Great Depression. Figure 1 above shows the image as it was originally used within a news context. The compelling image of a mother and her children is actually one of a series of photographs that Dorothea Lange made in February or March of 1936 in Nipomo, California. Lange made the photographs toward the end of a month's trip photographing migratory farm labour for the Farm Security Administration (Library of Congress, n.d.). Lange gave this account of the photographic encounter:

I saw and approached the hungry and desperate mother, as if drawn by a magnet. I do not remember how I explained my presence or my camera to her, but I do remember she asked me no questions. I made five exposures, working closer and closer from the same direction. I did not ask her name or her history. She told me her age, that she was thirty-two. She said that they had been living on frozen vegetables from the surrounding fields, and birds that the children killed. She had just sold the tires from her car to buy food. There she sat in that lean-to tent with her children huddled around her, and seemed to know that my pictures might help her, and so she helped me. There was a sort of equality about it (1960, p. 22).

In order to articulate the re-use of the social documentary image from an international perspective I briefly review Choi, Hyunju's (2003) Paper presented at the annual meeting of the International Communication Association, Marriott Hotel, San Diego, May 27, 2003 entitled "Analysis of Discourses Encompassing the 'Migrant Mother' Picture". The paper examined how each discourse directs the meaning of 'Migrant Mother' picture by analyzing how the photographic image had different meanings, along with different written texts and visual structures, depending on its presenting agency.

Within his study, Hyunju (2003) classified genres of media representing the Migrant Mother picture into four –photojournalism, documentary photography, government public relations, and art photography in order to analyze how the meaning of the same image undergoes a transformation when it is presented within the contexts of a different genre. He then examined how the meaning of the photograph is altered by its accompanying captions, texts and other photographs referring to this as the internal context of the photograph.

The result shows that the Migrant Mother picture was differently represented according to its accompanying texts and other photographs: as plight of migrant workers suffering from poverty; as a symbol of the strong will of migrant workers; as a symbol of people who need public aid; or as a symbol of people who worry about the future of America. It shows that the specific meaning of a photographic image is strongly influenced by its accompanying verbal text. While the presenting agency of a photograph influenced how the photograph is accepted by viewers, rather than altering the specific meaning of the photographic image. Putting these results together, internal and external contexts of a photograph work together to form a discourse, and the discourse directs a specific and implicit meaning of a photographic image (Hyunju, 2003).

5.2. South African Case Study: Sam Nzima's photograph of Hector Pieterson



Figure 2: Newspaper clipping Natal Daily News, Thursday, June 17, 1976 (Retrieved on 27 June 2009 from http://hubpages. com/hub/Writing-against-forgetting---16-June-1976)

The June 16 Uprisings was a protest by the students against the forceful introduction of the Afrikaans language as a medium of instruction in Black schools. It was organised by the students themselves. It took place at a time when liberation movements were banned throughout the country. The protest started off peacefully in Soweto but it turned chaotic when the police opened fire on unarmed protesting students. By the third day the unrest had gained momentum and spread to the townships around Soweto and other parts of the country (South African History Online, 2009). Sam Nzima is famous for the photograph of Mbuyisa Makhubu carrying Hector Peterson's body away from the rioting crowd at the student protest on June 16 1976. Figure 2 above shows the image as it was originally used in a newspaper. When Nzima took the photograph of Hector Peterson he was covering the strike for the paper. Towards the end of 1976 the South African Security Police started targeting and going after students and journalists, as well as photographers, who had been at the June 16 uprising. Nzima then decided to leave *The World* and in 1978 the newspaper was banned. The *Star* and *The Rand Daily Mail* newspapers wanted Sam to join them but he was unable to do so for fear for his life (SA History, 2009).

Sam Nzima's photograph of the mortally wounded Hector Pieterson carried by a horrified Mbuyisa

Makhubo and accompanied by his wailing sister have came to represent the anger and tragedy of a day that changed the course of South African history, sparking months of clashes between police, schoolchildren and protesters (Davie 2006). According to Nzima photographer of *The World* newspaper: "I saw a child fall down. Under a shower of bullets I rushed forward and went for the picture. It had been a peaceful march, the children were told to disperse, they started singing Nkosi Sikelele. The police were ordered to shoot" (as cited by Davie para. 1). Fellow schoolboy Mbuyisa Makhubo picked Hector up and, together with Hector's sister Antoinette, ran towards Nzima's press car, into which he was bundled taken to a nearby clinic, where he was pronounced dead.

The photograph has been used countless ways, firstly in the South African newspaper *The World* on 16 June 1976, secondly in British newspapers on 17 June 1976 and thereafter on countless newspaper pages of the world to tell the story at the time, later on T-shirts and posters to memorialize those who died in the uprising and to recall their image in support of the struggle that continued. In a massive art-installation project, it was cast onto the walls of the Castle, probably the oldest monument to colonialism in South Africa. Using squares of gray and white duct tape, artist Kevin Brand replicated the tonal dots of the newspaper photograph, on the outer wall of the Castle, for 'Fault Lines: Inquiries into Truth and Reconciliation,' an exhibition in Cape Town in July 1996. Organizer Jane Taylor explained that it was the purpose of the exhibition "to explore the relationship between history, memory and representation" (as cited by Gutenberg 2009, para. 1) In 2001 the image was exhibited in Germany along with photographs by Alf Kumalo and Peter Magubane. In 2002 The Hector Pieterson Museum was opened, situated where Hector Pieterson was shot and killed on 16 June 1976 at the start of the Soweto student uprising. According to Newbury (2005) photography defines the very possibility of this particular memorial to the anti-apartheid struggle.

6. Conclusion

Photography in general has provided a visual history unduplicated by images from any comparable period of human existence. The role of the social documentary photographer has played a major role in providing this visual history with images that are directly related to issues that have concerned society. Chapnick believes that documentary photographers, and amongst them the social documentary photographer, of the 20th century have:

...without being trained or educated in anthropological techniques, produced an astounding body of work that has given society greater insights into the way we live, the way we think, the way we act and the way we are (1994, p. 15).

It was determined that for the purpose of this study the term social documentary photography narrows the field of either documentary work or photojournalism signifying that the photographer's work represents either the cause of social upliftment or concern for humanity. In order to contextualise the study I reviewed major turning points in photography's comment on South African society culminating in its use as a tool for social change in South Africa.

As part of a discussion to establish original and contemporary roles of the social documentary photograph I reviewed the iconic images, *Migrant Mother* by American photographer Dorothea Lange and *Hector Pieterson* by South African photographer Sam Nzima according to the approach of the photographer to the subject, the original intended use of the photograph and subsequent roles of the photograph I managed to establish that the social documentary photograph is indeed multifaceted. Although the essential nature of photographic image remained relatively constant it had different meanings, along with different written texts and visual structures, depending on its presenting agency and the viewing audiences acceptance of the work. It should also be restated that the passage of time has been especially effectual in altering purpose, meaning and resonance; South African struggle images used originally as a tool in the fight for democratic freedom have become windows on the past, a visual reminder of the cost of freedom and a salute to those who paid the ultimate price. Documentary photography therefore not only has a direct effect on the way that society informs itself but has been proven over and over again as a catalyst for positive social change even in the reuse of images that society has come to identify particular events with.

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Evolutionary Biology & Visual Composition

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Abstract: Evolutionary biology has provided an explanation for the aesthetics of garden and park design due to our species' earlier adaptation to the savannah environment. However, how can we account for our sense of visual composition? Evidence now indicates that other 'cultural' behaviours (maths, music, language) are rooted in our evolutionary biology. The experiment described here demonstrates that a part of our sense of visual composition also has an innate basis and supports other work identifying universal organisational principles favoured by our perceptual system for visual composition. The proposed evolutionary explanation for our sense of visual composition is that it is derived from our innate ability to recognize organic forms. The benefit for the art and design curriculum in identifying these organisational principles is that they provide a generative grammar. Unfortunately, many educators are sceptical of such formalisms although nature produces unlimited possibilities from limited means.

Key words: design education, evolutionary biology, universal grammar and instinct of visual composition.

1 Introduction

The study of visual composition and its perception is the study of a facet of human behaviour within human biology. Theodosius Dobzhansky showed the way when he wrote: ""Nothing in biology makes sense except in the light of evolution." Evolutionary biology is, of course, the scientific foundation for all biology...." (Nesse, R. M., & Williams, G.C., 1998).

In this paper I want to summarily draw together (in section 2) some of the evidence showing that several of our generally regarded cultural behaviours are actually rooted in our biology and evolutionary past including: our savannah garden aesthetic, maths, music and language. My researches since 1984 support the hypothesis that our sense of visual composition is similarly rooted in our biology, evolution and genetics. Some support for the inherant and universal basis of our sense of visual composition is, I propose, provided by the results of the experiment described here (in section 3) due to their consistency across different cultures.

This knowledge is significant for the basic design curriculum since it identifies a behavioural universal which contributes (together with work published elsewhere: (Stebbing; 1998; 2003; 2004a & 2004b)) to a generative visual grammar for design composition.

In order to place this paper in its correct context: the question remains 'why should we possess an innate sense of visual composition?' This leads us to the broader context of my researches where I have proposed that our sense of a visual composition (and visual grammar) is the extended use of our evolved ability to recognize organic form in all its diversity (in section 4). This organic or visual grammar is visually summarized in a diagram.

2.1 Some of our Innate Responses

"Research on landscape preferences strongly indicates that savannah-like environments are consistently better liked than other environments..." (Orians, G.H., & Heerwagen, J.H., 1992) and that following test preferences Balling, & Falk, (1982) propose "that humans have an innate preference for savanna-like environments that arises from their long evolutionary history on the savannas of East Africa." Further evidence for the effect of 'nature' was illustrated in a key paper by Ulrich (1984) in which he compared the recovery rates of hospital patients whose windows had different outlooks. The rooms of one group of patients had windows which overlooked a brown brick wall, whilst the view of another group of patients overlooked a stand of deciduous trees. All the other variables were reduced so that even the same nurses tended both groups of patients. The statistically significant results showed that the natural scene had a therapeutic effect so that the 'tree group patients' required less medication and left hospital sooner than the 'wall group patients.' More recently, researches in the UK, Scandinavia and the US (Pretty, 2007) has provided evidence that being active outdoors, so called "green exercise," produces substantial health benefits by reducing stress and enhancing mood. Furthermore, Edward Wilson (1984), the internationally acclaimed American biologist has proposed the "biophilia hypothesis" which he defines as "... the innate tendency to focus on life and lifelike processes. ..." because our own survival is inextricably interconnected with the organisms with whom we share the biosphere.

2.2 Instincts & Universals

In addition to the evidence for our fundamental innate response to nature, further work in recent years shows that generally regarded cultural behaviours such as maths (Cohen, 1996; Butterworth, 1999; Callaway, 2009), music (Zatorre, & Krumhansl, 2002; Ball, in press) and language (Pinker, 1994) also possess an innate basis. In describing these behaviours as instincts implies three important criteria. The first is that these behaviours are under genetic influence; secondly, they are products of our evolution; thirdly, they are universals occurring throughout our species. Eibl-Eibesfeldt (1989) observes that "*Linguists and ethnologists often speak of universals when referring to characteristics which occur in all groups of man independently of race and*

ethnicity. Mostly, this is inferred from a broad sampling of the characteristic in question." One of the most thorough accounts of our behavioural universals is that by Brown (1991) who writes that *"human biology is a key to understanding many human universals."*

2.2.1 The Math Instinct

Animals (Callaway, 2009) and babies use subitizing (Butterworth, 1999) or the ability to identify the number of objects in a display without counting but with merely a glance. Further confirmation comes from the work of Veronique Izard (New Scientist, 2009) from Harvard University. "*Our ability to think of numbers as abstract concepts seems to be innate. Babies just a few days old are already able to do it. Abstract numerical thought is the ability to percieve numbers as entities independently of specific things.*"

Even honeybees can subitize (Holden, 2009; Callaway, 2009) and they are able to distinguish between two and three and between three and four. Jürgen Tautz who lead the investigations found the distinction of "up to 4" and "a lot" intriguing, as it is mirrored in many human cultures," furthermore their work demonstrates "that 'even simple animals don't just associate visual signals with rewards but can extract [quantitative] features' from them."

In a *Nature* review (Nature, 2005) Andreas Nieder referred to the developments being made to understand the neural basis of our numerical ability and it is now clear that there are biological primitives for human numerical competence. This ability lies deep within our makeup since although both infants and animals lack language ability, they nonetheless "*possess basic numeric capabilities-indicating that our cultural achievements are built on pre-linguistic competencies*." Clearly, there are survival advantages in being able to distinguish four bananas from three!

2.2.2 The Music Instinct

The ethnomusicologist John Blacking (1973) has proposed that "...the structure and function of music may be related to basic human drives and to the biological need to maintain a balance among them." Although the idea that music has some biological basis has been denied by Steven Pinker (1997), Ian Cross (1999) countered Pinker claiming "... that music is not only deeply rooted in human biology but also critical to the cognitive development of the child." (Mithen, 2006). Furthermore, "No recorded human culture–whether extinct or extant–has ever been without music production" (Wallenstein, 2009). Zatorre (2005) has also described the remarkable musical sensitivities and capabilities of babies and that their nervous systems are capable of structuring sounds into a grammar, or system of rules.

"The brain seems to have evolved simple empirical rules of interpretation that furnish a good guess about the nature of the sounds we are hearing. As nearly all natural sounds are harmonically complex, the brain attributes related tones to a single sound source, combining them into a single auditory object. This is one of the 'Gestalt principles' the brain uses to decode sounds." (Ball, 2008). Therefore, when the world was filled with only natural sounds our sensitivity to their sources was an important adaption for our ancestors' survival. Consequently, since music is rooted in our biology we find music "... *in all cultures and has a remarkable diversity of forms...*" Furthermore,...."*Music seems to depend on specific brain circuitry, because it can be dissociated from processing of other classes of sounds, including speech...*" (Zatorre, & Krumhansl, 2002). Interestingly, neuro-imaging reveals that there is also frequent overlap between regions in the brain which are activated by both language and music (Mc Dermott, 2008).

2.2.3 The Language Instinct

In *The Language Instinct* Steven Pinker (1994) has drawn together substantial evidence that our ability to speak is an instinct. In 2002 genetic support for our innate linguistic ability came with the discovery of the *FOXP2* "speech gene" (Holden, 2004) which affects both language and the ability to articulate. "*In birds and mammals, it seems to be involved in the general development of neural circuitry that ensures the smooth, fast delivery of sequential movements.*" (Szathmary, & Szamado, 2008). The gene was discovered when a family was found that had speech difficulties due to a mutation of the *FOXP2* gene. The mutation caused a loss of the motor control of the face and mouth and difficulties in the shaping of words, for example "*the regular verbs in the English past tense.*" (Szathmary, & Szamado, 2008).

Most recently Wolfgang Enard *et al.* (2009) have provided proof that a gene influences behaviour by substituting two amino acids in the mouse Foxp2 protein to create the humanized type. The researchers found that the neurons in the brain circuit associated with speech in humans had structural, neurochemical and neurophysiological changes. Furthermore, the isolated pups' made calls which had a different structure from those of normal mouse pups.

The true significance of the *FOXP2* gene however, is not only is it essential for human language but also for "... *the smooth, fast delivery of sequential movements*" (Szathmary, & Szamado, 2008) on which our existence and also that of other vertebrates depends. Consequently, for example, "*Zebra finches have FOXP2 gene that is 98% the same as ours*" (Yong, 2008). Genes which program for a key capability can open the way for new behaviours to evolve. Obviously, sequential control is essential for behaviours generally and not just language, maths and music and so it becomes clear that genes contribute to the expression of different behaviours. "*Mark Hauser, a cognitive scientist at Harvard University, believes that the capacity for language and*

mathematical instincts have much in common. Both require the manipulation of mental constructs acording to the rules of arithmetic or grammar." (Cohen, 1996).

A further example illustrates a link between cultural attributes and their a genetic basis; birdsong. Olga Feher *et al* (2009) demonstrated that songbirds' melodies have their roots in both genes and the environment. Reviewing Feher's work, Fitch (2009) observes that "...both birdsong and language are generated by a species-typical 'instinct to learn' that constrains, but does not fully determine, the final outcome. Birdsong acquisition provides, in this sense, an animal equivalent of human cultural transmission."

2.2.4 Cultural universals have an innate basis. Is there a Grammar Instinct?

Maths, music, and language are universally expressed throughout human cultures and appear to be rooted in our neural structures and byproducts of our evolutionary biology. It is clearly advantageous to be able to recognize the difference between two and three bananas. Our perception of music is based on our evolutionary response to natural sounds. Furthermore, some scientists (Cohen, 1996) consider that there are links between maths, music and language and references have been made to grammars of music and maths. This poses the question: do we possess a 'rule or grammatical perception system or grammar instinct?' It may be that we touch on a key principle here since the perception of rules enables us to make predictions and informs the choices we make which can have enormous survival value. The fact that the *FOXP2* gene originally evolved for sequential movement illustrates an important characteristic of certain genes, namely their wide influence in different behaviours. Consequently, it is biologically feasible for an innate ability such as organic form recognition to play a key role in our aesthetic behaviour.

What evidence is there that the our sense of visual composition has an innate basis and what would have been its progenitor? The experiment I now describe provides support for an innate basis.

3 An Investigation into Visual Balance

The location of a small disc in a square is a well known basic compositional exercise for visually exploring balance. When I taught visual composition, I had the idea of asking my students to firstly locate a disc in an 'unpleasant location' and secondly followed by locating the disc in 'pleasant location.' I then collected all the students' results onto one square for each exercise. What I initially found was that the response to the request to locate the discs in a 'pleasant' location resulted in many of the discs being located on the square's diagonals while the response to the 'unpleasant' location resulted in no recognizable pattern. The results provided a parallel to

the work reported by Rudolph Arnheim (1974) in chapter one of his classic book *Art and Visual Perception* describing an experiment by Goude & Hjortzberg (1967). Subjects were shown a square (46cm) in which a small black disc (diameter 4cm) was located and then asked if the disc had "...*a tendancy to strive in any direction*." The disc was shown to the subjects in different locations and the results tended to cluster along the diagonals and principal axes or "*structural skeleton*" of the square. My results repeated those of Goude & Hjortzberg's experiment but without making any suggestion to the subjects by the question of the disc's tendancy towards movement.

3.1 Method

Since 1989 I have occasionally provided students with a A4 sheet covered with 12 squares and asked them to draw one disc in an attractive/pleasant position in the top 6 squares. Then to repeat the procedure in the bottom 6 squares of the sheet but locating the disc in an unattractive/unpleasant position. I have also deliberately reversed the order of my request with different groups but this has had no significant effect on the results. None of the students had previously performed the "exercises" prior to the experiment. As before I copied the groups' results onto just two squares, one for all the attractive responses and another for the unattractive responses. I also substituted the discs for dots because otherwise the concentration of discs would obscure each other.



Figure 1.

The top 3 squares of an A4 test sheet of originally12 blank squares showing the example disc (which also indicates the 'top' of the sheet) with a first semester student's responses to the request to locate the disc "in an attractive position in relation to the square." (11.12.1995 Hochschule fuer Gestaltung, Schwaebisch Gmuend.)



Figure 2.

The collective response of a mixed group of product design (2nd semester) and jewellery design (3rd semester) students to locate discs "in an unattractive position in relation to the square" (8.10.1991, Hochschule fuer Gestaltung, Schwaebisch Gmuend.)



Figure 3.

The collective response of the same group of students as for Fig. 2 to locate discs "in an attractive position in relation to the square" (8.10.1991, Hochschule fuer Gestaltung, Schwaebisch Gmuend.)



Figure 4.

The collective response by some students at the Hubei Academy of Fine Arts, Wuhan, China, to locate discs "in an attractive position in relation to the square" November, 1992.



Figure 5.

The collective response by some students at the Hubei Academy of Fine Arts, Wuhan, China, to locate discs "in an unattractive position in relation to the square." November, 1992.





The collective response by pre-degree / school leavers on a Design Workshop to locate discs "in an attractive position in relation to the square." (11.9.2006, "Design Campus," Hochschule fuer Gestaltung, Schwaebisch Gmuend)



Figure 7

The collective response by the same group as for Figure 7 of pre-degree / school leavers on a Design Workshop to locate discs "in an unattractive position in relation to the square." (11.9.2006, "Design Campus," Hochschule fuer Gestaltung, Schwaebisch Gmuend)

Naturally, the response to other forms can also be investigated and one example has been included below.



Figure 8

The collective response by some students at the Hubei Academy of Fine Arts, Wuhan, China, to locate discs "in an attractive position in relation to the triangle." November, 1992.

3.3 Conclusion

A visual assessment of the results clearly shows that when the subjects are requested to locate the discs in an attractive/pleasant location then many are positioned such that the diagonals of the square become perceptible. Meanwhile, the request to locate discs in an unattractive/unpleasant location resulted in either no or a less apparent relation to the square's diagonals (although the results from the Chinese students shows some relation to the diagonals, nonetheless their response to locating the discs in an attractive position produced a clearly stronger response.) Space does not permit here the publishing of all the results from over the last 20 years and consequently, a typical selection has been included. The pairs of results from each group of subjects are consistently the same with the request to locate discs in an attractive position resulting in the square's diagonals becoming clearly visible and less distinct or not apparent at all to the request to locate discs in an unattractive position. What are we to understand from these results? Firstly, the students results are created without any awareness as to how their results will be evaluated. Secondly, an attractive composition (harmony) apparently results by the location of the disc in relation to the square, i.e. its diagonals. Relationships are indicative of organisation typical of organic forms whilst randomness indicates the converse. I posit that the results clearly indicate an inherant response and therefore a genetic basis for our sense of visual composition and that they cannot solely be a product of cultural behaviour since no training takes place. This simple experiment enables us to witness an innate behaviour operating in an aesthetic context.

The experiment is very easy to perform and I recommend that readers should repeat the experiment as a means of verification. I would also be interested to hear of any results.

4 An Instinct for Visual Composition? The Broader Context and the Hypothesis.

Therefore, when considering our savannah aesthetic, maths, music and language behaviours and their universality and comparing them with our similarly universal sense of visual composition; then, because of the consistent evidence described here we can propose that our sense of visual composition is an instinct similarly based in our biology. What is the evolutionary significance for our sense of visual composition? In order to answer this question we must consider this work in the broader context of my research into visual composition which has been reported elsewhere (Stebbing, 1988, 1998, 2003, 2004a, 2004b) identifying the four universals: contrast, rhythm (pattern), balance (symmetry) and proportion (CRBP).

My hypothesis is that our sense of visual composition is a characteristic of our perceptual ability to recognize the diversity of organic forms because our survival depends on them for food, avoiding predation and reproduction. Regardless of the level of complexity, CRBP are fundamental organising principles of life forms. Consequently, our visual perception favours these same organisational or relational principles when we create visual compositions. We can summarise the hypothesis as follows:

1. CRBP are key principles and universals of organic form organisation (physiology, anatomical, perceptual, biological etc).

2. Consequently, our perceptual system has adapted to the recognition of CRBP because they are indicative of organic forms especially when they occur collectively in one form as shown in the diagram below:



Fig. 9

CRBP appears to be a basic visual grammar for our sense of visual composition (and so we can substitute aesthetic form for organic form in the diagram above).

3. CRBP have therefore become visual primitives because our perceptual system has evolved to respond to them and therefore they have also become a basic visual grammar for our sense of visual composition. Consequently, '2' is an evolutionary adaptation (exaptation) to '1.' '3' is an cultural spinoff due to our evolved perceptual preferences for CRBP (2). The question might be posed as to whether we possess an inherant organic form recognition ability? Here the evidence is unequivocal: there are parts of the brain specifically associated with the identification of organic and inorganic forms. Farah (1995) described Warrington's researches into a number of cases of brain injured patients in which the ability to recognize "living things" was unimpaired whilst they were unable to recognize "nonliving things" and where the opposite also occurred. "*Living things" appear to comprise animals, plants, and foods; "nonliving things" are most typically exemplified by small, manipulable, man-made objects.*" These results indicate that these recognition capabilities are localized at specific sites within the brain (Farah, McMullen, & Meyer, 1991).

Furthermore, infants only as old as 3 months "are able to distinguish animate from inanimate objects, as indicated, for example, by their ability to distinguish biological from nonbiological motion...and that the 8- 10-month old infant's ability to distinguish animals from nonanimals is unlikely to be merely perceptually based but is most likely conceptually driven..." The authors Caramazza & Shelton (1998) concluded that at "...One very basic level of organization reflects neural adaptations in response to evolutionary pressures for the rapid, successful recognition of animate (and plant life) objects. This is the only true categorical organization of conceptual (and perhaps perceptual) knowledge in the brain."

Clearly, much more neurophysiological knowledge is required to complete our understanding of how, for example, pattern and symmetry, indicative of organic forms, contribute to our recognition of living organisms. Here the pioneering work of Semir Zeki (1994) on the visual cortex regions must be mentioned and will undoubtedly play an essential role in our future understanding of organic form perception but space does not allow here further description of his work.

5. Conclusion

In conclusion, it appears from the experiment described here that at least a component of our behaviour concerning visual composition is innate. Furthermore, although not reported here, our responses to symmetry and pattern (Wallenstein, 2009) appear to also have an innate basis. Contrast, visual rhythm (pattern), visual balance (symmetry) and proportion appear to be an innate perceptual grammar possessed with the creative potential, like all grammars, for producing unlimited creative possibilities from limited means. This is of some significance for both art and design since both fields are reknown for following fashion and abandoning knowledge rather than building on it (Ball, 2000).

6. Acknowledgements

I would like to thank both Prof. George Burden for conducting the experiments for me in China and to Prof. Ulrich Schendzielorz for technical help with the images.

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Reintegrating Craftsmanship Into Digital Design Praxis

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Abstract: Digital fabrication practices have allowed for a level of exactitude and precision unattainable by the designer's hand. While the design community has benefited tremendously from developments in technology, certain qualities reflective of craft have been lost as a result of the overwhelming dependency on computer-based processes. In order to reinvigorate a sense of craftsmanship and personal expression in design, modalities of education must evolve to incorporate these characteristics with contemporary digital techniques. These modalities will require an approach to the education of design that will enable young designers to recognize and utilize the potentials of materials, adapt to the physical realities of their design ideas, and achieve a phenomenological understanding of concept, form and structure. By combining craft and digital processes a new breed of designer will emerge – one that finds a personal voice in a globalized world. This paper outlines these issues as they were explored in an experimental design studio that focused on the integration of craft with digital fabrication methods that included both students of graphic design and architecture.

Introduction

"Since the thing is made by human hands, the craft object preserves the fingerprints – be they real or metaphorical – of the artisan who fashioned it. These imprints are not the signature of the artist; they are not a name. Nor are they a trademark. Rather, they are a sign: the scarcely visible, faded scar commemorating the original brotherhood of men and their separation. Being made by human hands; the craft is made for human hands: we can not only see it but caress it with our fingers." – (Paz, 1974, p. 21)

The Industrial Revolution brought the advent of mass production and since that time, there have been designers, artists and craftsmen who have fought to retain traces of personality, individuality, and human creation in the artifacts produced by an age of mechanization. Today, in the age of digitization, the desire for corporeality in design persists despite the overwhelming application and exploitation of digital technologies. Digital production with its ease of use, affordability, and capacity for "perfection" has resulted in an abundant creation of artifacts that lack all trace of the human hand. These seemingly ubiquitous objects lack marks of the process of creation or a sense of identity associated with its maker or the context in which it has been designed.

While technology has provided us the ability to expand the potential of mass production, it has also enabled us new opportunities in mass customization. As we embrace emerging possibilities in digital design and fabrication, it is imperative that we take advantage of the freedom that technology allows through mass customization by finding methods that allow us to reinsert aspects of craftsmanship into designed objects. The term craftsmanship may be defined as follows:

"Craftsmanship...means simply workmanship using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on the judgment, dexterity and care which the maker exercises as he works." – (Pye, 1968, p. 2)

By deemphasizing the technology and reducing it to its initial purpose – simply a tool among many that exist to serve the intent of the author – and establishing the integration and celebration of craftsmanship within the design and fabrication process, contemporary design praxis has the potential to transform in such a way that personality, individuality, and humanity may, once again, be evident in the objects that are designed and produced.



Najwan Al Araji sanding her model that was designed and fabricated digitally and then worked by hand.



Digitally produced, hand-plastered object with rubber mold - Marieh Dialmeh



Final poured resin, digitally and handtooled acrylic model - Sara Al Harbali

Pedagogy

"An architect must be a craftsman. Of course any tools will do; these days, the tools might include a computer, an experimental model, and mathematics. However, it is still craftsmanship – the work of someone who does not separate the work of the mind from the work of the hand. It involves a circular process that takes you from the idea to a drawing, from a drawing to a construction, and from a construction back to idea." – (Buchman, 2003)

The desire to express the tactile or corporeal in design requires the integration of craft and digital practices as a unified and inextricable approach to design and fabrication. As new tools are adopted to suit the emerging needs and trends of design industries, the application of tools and methodologies of the past have tremendous potential to enhance technology-centered practices. Digital tools from disciplines outside of the design profession – such as aeronautics, fluid dynamics, and genetics – have been embraced by a new breed of designer and have found a permanent home in this

partnership. As technology advances, software develops, and new computer-controlled machines are produced, these tools will continue to gain in prevalence. The technology allows the designer to push ideas and concepts beyond newly defined limits while software provides an efficiency and productiveness that enables the designer to explore novel, complex iterations in shorter spans of time than ever before. The value of these tools hinges on their being introduced during the education of the designer in conjunction with the synthesis of craft-based methodologies, rather than being approached as a sole means of production.

The hybridization of digital media with an ideology founded in craft serves many purposes in the service of education. First and foremost it enables students to get in touch with the reality of materials and their limitations in the physical world. Students are asked to translate digital designs into physical models in a manner that requires them to interact with the material and to discover its unique characteristics and limitations. Without this synthesis material attributes usually remain hidden in the vacuum of the digital realm as actions are taken upon a virtual entity without regard for the laws of physics, material properties or other real world phenomenon. Students have, in essence, "fallen out of touch" with the real world. While the ignoring of physical limitations during the early stages of the design process is potentially positive in that it allows students to design freely based purely on ideas and concepts without reservations or preconceptions, the knowledge of material qualities and their properties are critical to determining how their virtual objects will exist. For students new to design, many of whom begin the design process in the virtual realm, this interplay between the digital and the physical is key to gaining a holistic understanding of what they intend to create and how they might push the potentials of the design beyond the banal.

Another benefit resulting from the synthesis of digital tools with tools of craft is that students are put in an advantageous position to respond to their designs through adaptation. The digital medium offers a level of exactitude that gives designers a false sense of security. This level of precision tends to lead to unattainable expectations concerning the physical artifact, wherein one anticipates the final product to be an exact duplicate of the digital model. Tolerances and subsequent adaptation to errors in the translation of digital data to physical objects are rarely predicted in advance, and as a result, time is lost in the process of redesigning for unforeseen variances. These are important lessons for beginning designers and should be introduced early in their academic careers. By exposing students earlier to the notion that the precision of the computer is an illusion, they become more open to embracing the inexactitude as a welcome result, opening the door for those "happy accidents" that make design unpredictable and unique – craftsmanship. It also demystifies the computer and its software, forcing the students to see that the machine is merely a tool at their disposal, designed to help them to accomplish a desired goal.

Finally, through enabling the engagement of both the digital and material during the first stages of the design process, students are confronted by the sensory and psychological impressions of

the physicality of what they have created and may better assimilate these qualities with their conceptual and creative ideals. Only through a direct and haptic experience with materiality can the designer begin to draw poetic connections between concept, form and structure. Often in a digital design process, it is not until the final steps that the object begins to take physical form. Introducing physicality during design conception allows students to respond to the subtle and phenomenal qualities of a material. Providing students the opportunity to hold, touch and experience prototypes or elements of a design in material form enables a level of education that may not be duplicated via technology. In the aim to develop designs and objects that express a sensory understanding and connectivity to their human makers, it is vital to accept that the deep design in which we hope to foster is unobtainable through purely digital means.

Through the application of these ideas, the final outcome is likely to reveal signs of the creator. Objects will adapt and respond to design decisions that have occurred during the process of development. Digital media that was previously used on its own terms can now be directed to the terms of the designer. The synthesis of the technological and the tactility of craft will reinsert the designer back into – and in touch with – the design process. Attention can once again be directed to the process of making and in locating the unpredicted potentials along the way, a process unrealized through digital means alone. By weaving age-old practices with new technologies, an expanded approach to design can be cultivated and the idea of craftsmanship will be reinserted.



Sara Al Harbali developing a digital model of her project.



Integration of texture, pattern, transparency with laser-cut acrylic and wood veneer -Talin Hazber



Final model of poured resin and acrylic with laser-etched texture - May Al Joody

Course overview

"The hand is an important metaphorical signal for the presence of the individual in craft and is central in the symbolism surrounding the historic tension between man and machine and more recently between global and local culture." – (Crow, 2008, p. 23)

The course work developed as a result of these ideas was instituted at the American University of Sharjah as an interdisciplinary elective in the School of Architecture and Design during the 2008-2009 academic year. Located in the United Arab Emirates, AUS offers students of Architecture and Design a comprehensive education based on the American model. Our international

student body includes 500 students from 72 countries including the Middle East, Asia, Europe and Africa. Teaching design in this diverse context is highly rewarding in as much as it is challenging: our body of students exhibit tremendous amounts of intellect, enthusiasm and rigor despite communication barriers. Perhaps most challenging is the fact that nearly all of our students have no prior art or design experience entering into the program and many students received their pre-university education within cultures and institutions that do not support creative thought or expression. Design education, therefore, begins at a rudimentary level and quickly matures and diversifies throughout the student's four or five-year undergraduate degree program.

Although the students in both the Departments of Architecture and Design at AUS consistently produce work that meets high international standards, the need for this exploratory curriculum has been made evident by the general over-reliance of digital technologies throughout the design process. In the Department of Architecture, for example, students frequently utilize the computer controlled laser cutter to produce designs and models that are flat or extruded in nature and are devised as planar structures that rarely incorporate complex volumes or juxtapositions of materiality and texture. Likewise, the majority of work produced in the Department of Design is created primarily on the computer often resulting in work with a signature of the software in which it was created. Under the misconception that the computer is the only means of production, students have forgotten how to play, how to investigate the potentials of both materials and processes, and how to utilize skills that rely on dexterity and craft in the production of their design ideas. Instead of building upon the assets of digital technology with tools from many sources, students have become complacent in limiting themselves to the computer and the software provided to them. The need to reinvigorate craft into digital practices is not unique to the students of this region: as design is now situated within a global context it seems likely that the need for a re-evolution of digital design practices, one that embraces methodologies founded in tactility or craft, is applicable within contemporary design education on a global scale.

Asserting the notion of synthesis on as many levels as possible within the curriculum, the course was a cross-disciplinary, collaborative endeavor taught by two professors; one from the Department of Architecture and the other from the Department of Design, each offering experience and skills in digital and craft-based design and fabrication methodologies. These departments coexist within the school but, other than during the initial shared Foundations program, an inter-disciplinary mix between students and/or professors rarely occurs. The collaboration of a skilled professional from each domain was key to developing a unified approach appropriate for the entire school. This partnership was a major step toward reaching the goal of developing a pedagogy that embraces the hybridization of both digital and craft practices.

As an interdisciplinary elective, students from both departments, representing second to fourth year, worked side-by-side in an open studio environment; a situation that resulted in a rich and

layered dialog previously unprecedented in the School of Architecture and Design. Students were given the opportunity to share with one another a range of diverse methods and approaches through carefully planned projects that allowed for individual design solutions. This cross-pollination was evident in the work of students as they produced drawings and models reflective of all areas of study in the School of Architecture and Design. As an example, students of Architecture were found to incorporate elements of typography as texture and pattern into their designs while students of Design developed images through the physical layering of material and space. The diversity of ideas that emerged during this interdisciplinary learning environment aided in the development of a flexible, exploratory design process as the notion of *synthesis* was accepted as the norm throughout all levels of both design and production.

Considered curricular support for the student's primary design studios, the intention of this elective course was to develop the desire and ability in the students to undertake inventive, complex and personal approaches to potential design solutions. To this end, besides introducing conceptual modes of thinking, the course also focused on increasing the skills of the students, both in digital and analog/hand-based practices. Introductions were provided for modeling software such as Rhino and 3D Studio Max, digital fabrication processes such as laser and water jet cutters, mold-making and casting processes, as well as in the use of traditional metal and wood-working equipment. The introduction of these tools was carefully orchestrated to coincide with course objectives and timed to require the students to use digital or analog means during specific parts of their assigned work for short periods of time. The constant flux between digital and analog methods was key to teaching an understanding of these skills as a set of tools and not sole producers of the designed object.

While emphasis was placed on gaining technical knowledge and engaging in a fluid, nonlinear design process, assignments were introduced foremost as conceptual endeavors with loosely defined parameters. Students initiated the design process by researching their chosen concept via observation (dissecting, probing, testing, drawing, collages, photography), through reading and the collection of images (books, internet), and then by developing a series of preliminary studies in order to establish a visual language based on their ideas and findings. Short assignments resulting in studies and sketch models were conceived to be exploratory and playful, enabling students to discover abstractions and to draw unforeseen relationships among the disparate elements that they have catalogued. Poetics was often discussed as a way to approach both the gathering of information as well as the organization of material and images used in the creation of process sketches and models. Final project guidelines were structured not to fulfill specific functions relating to either Architecture or Design, but to enable students to develop their concept formally through the inclusion of design principles such as transparency, layering, pattern and texture. In this way students were given the opportunity to expand their formal vocabulary without the inhibitions, constraints and self-inflicted habits employed during their typical course of study. Over the course of a term students were given two primary projects that involved the production of a resolved, "final" object, with each project entailing no less than five secondary assignments through which the design process was guided. While each project was outlined to cover a range of skills, approaches, and fabrication practices, the process studies often went beyond these intentions as students explored unique methods and unexpected juxtapositions. In regards to exploring the various assignments, preliminary studies and related tasks were produced in two and three-dimensions both digitally as well as by hand and, as a rule, regularly entailed a synthesis therein. As noted previously, processes introduced included various methods of computer-driven design and fabrication in addition to the employment of multiple construction techniques that required hand skills (such as printmaking and casting), as well as the use of wood, plastic, and metal-forming equipment. Beyond the requirement for students to engage in a complex design process and diversified methods of fabrication, each project entailed the combining of disparate materials. The incorporation of newly developed design and technical skills involved in the merging of methods and materials proved, by far, to be the greatest challenge for the students.



Wood and steel model with elements of laser-cut wood veneer - Roudha Alawadhi



Digitally fabricated studies in bentlaminated wood veneer - Rami Alotaibi



Final model: Hand-shaped wood with laseretched veneer and steel mesh - Sara Al Harbali

Projects outlines

The first project included, but was not limited to, the following:

- Materials: Cast resin and acrylic sheet
- **Concept:** Abstractions based on a natural form (fruit, vegetable, plant)
- Parameters: Concept-driven; incorporating both materials in the production of a complex, unified physical object; expressing transparency, layering, pattern and texture; not to exceed 40cm in any dimension.
- Process assignments: Drawings; photographs; collages; small-scale studies in moldmaking, resin casting and acrylic forming (*investigations in expressing transparency*, *layering, texture, pattern, and form*); digital renderings

Methods and skills explored: Mold-making (rubber) and casting (resin); plastic forming (heat applications, cutting); surface applications (heat applications, cutting, etching, printmaking); digital design and fabrication techniques (Rhino, 3D Studio Max, laser cutter)

The second project included, but was not limited to, the following:

- Materials: Sheet steel, solid wood, wood veneer
- **Concept:** Abstractions based on a system of natural transformation
- Parameters: Concept-driven; incorporating elements utilizing all materials in the production of a complex, unified physical object; expressing transparency, layering, pattern and texture; not to exceed 40cm in any dimension.
- Process assignments: Drawings; photographs; collages; small-scale studies in folded paper, metal forming, bent laminations, and wood-working (*investigations in expressing transparency, layering, texture, pattern, and form*); digital renderings
- Processes and skills explored: Metal forming (cutting, shaping, joinery); bent laminations in veneer; wood working (milling, cutting, shaping, sanding, joinery); surface applications (heat applications, cutting, etching, printmaking); digital design and fabrication (Rhino, 3D Studio Max, laser cutter, water jet)

In addition to these assignments students were asked to produce a portfolio that describes in detail the processes explored during all steps of the design process within each project. This final project was a key element of the curriculum as it forced students to scrutinize their individual approaches and actions during the entirety of the design process. The portfolio served as an invaluable tool for the students as well as the professors in reflecting on points of success and weakness with specific regard to accumulative learning, rigor and personal development.



Digitally fabricated prototype of the computer generated model - Marwa Hasan



Digitally cut typography in wood veneer – Vida Riahi



Model with hand and laser cut wood -Marieh Dialmeh

Conclusion

"The seduction of CAD lies in its speed, the fact that it never tires, and indeed in the reality that its capacities to compute are superior to those anyone working out a drawing by hand. Yet people can pay a personal price for mechanization; misuse of CAD programming diminished the mental understanding of its users." – (Sennet, 2008, p. 81)

In reflecting on the proposed outcomes of the curriculum it is apparent that many of the pedagogical ideologies outlined were successfully achieved and many unforeseen benefits realized. The interaction with various materials allowed students to understand their properties and limitations and required them to consider materiality during initial stages of the design process, where previously these may not have been considered at all. Students developed an appreciation for understanding materiality in a psychological, sensual manner and how to utilize these phenomena as a means toward expressing an intended concept or idea. They learned how to adapt to a complex design process and to integrate newly acquired skills and modes of thinking. Students embraced the process of adaptation and allowed it to enhance the unpredictability of their designs. They discovered that some of the tools which had previously been regarded as *precise* actually lack the anticipated precision when confronted with real, physical limitations. They also learned how to open themselves to a process-driven design approach that invites creative influences and utilizes an array of tools to achieve highly crafted results. The final outcome of their work went far beyond any preconceived notion they may have started with and was successful due to this process-oriented design mentality. It is fair to say that the students learned more while immersed in the process of making than they did from the final product. In the end, the advantage of this immersion and their documentation of the design process was evident to the group as a whole.

The idea of locating signs of craft, individuality, and humanity in the work of designed objects is not a new cause. Ever since society has relied on a mechanized means of production, the fear of losing the mark of the maker has existed. The misuse and overreliance of digital tools has seemingly resulted in the creation of an overabundance of sterile, homogenous material objects, many of which define the environments in which we live. The ideas presented in this paper demonstrate that technology is not the cause of this deficiency but rather can be an important element of the solution. It is the role of academia to instill an ideology based on synthesis and individuality into future designers in order to re-evolve the process of design beyond one steered by technology alone.

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A Healthy Balance integrating design, health and community issues into the graphic design curriculum

by

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ABSTRACT

KwaZulu-Natal (KZN) is at the epicentre of the HIV/AIDS pandemic in South Africa and given the significant number of people (and by implication, students) infected and affected by the disease it is essential for academic institutions to respond accordingly. This paper aims to demonstrate how the Department of Visual Communication Design at the Durban University of Technology (DUT) in KZN has met the challenge by integrating health and community issues with a particular emphasis upon HIV/AIDS into the Graphic Design curriculum.

In the process this paper will describe how the Graphic Design programme at DUT has embraced the notion that design can act as a "catalyst for social change" over the past two decades. This is a significant timeframe that spans the period between South Africa's first and fourth democratic elections. It is also a period when the department was called upon to transform itself from a diploma awarding institution to a University of Technology with an appropriate research focus.

Introduction

When Prof. David Gere of the University of California Los Angeles (UCLA) opened the "Not Alone: An International Project of Make Art / Stop AIDS" exhibition at the Durban Art Gallery with the question "can art stop AIDS?" the response of the audience was undecided (2009). However, as the playwright Tom Kushner points out in his *Foreword* to the text *The Design of Dissent* while art may not have the capacity to change things "art changes people, and people can make everything change" (2006, p. 222).
In a media saturated world it is important to acknowledge and understand the power of images to influence and communicate. Graphic and advertising design uses a visual language that is highly effective in persuading people to change their consumption and behaviour patterns. However, this is the same language that can be "subverted" to become effective "agitprop" when official channels of communication are closed. This was particularly true of how design was used by designers of the Aids Coalition to Unleash Power (ACTUP) in their "Silence=Death" campaign in the face of initial official government indifference in United States (US) and the Treatment Action Campaign's (TAC) play on the ambiguity implicit in the term "HIV POSITIVE" as a protest against government denial in South Africa two decades later.



HIV/AIDS

There has never been a disease more "politicised" than HIV and AIDS (HIV/AIDS). As the musician Bob Geldof maintains "the condition is medical [but] the solution is political" (2003). Most of the early reported cases of infection in the late 1970s and early 1980s involved homosexual men in New York and California and was perceived as a "gay plague". Significantly, the first acronym to describe the condition was GRID, which stood for "gay related immunodeficiency disease" (Behrman, 2004, p. 6). The fact that the next minority group to be infected were intravenous drugs users only added fuel to the conservative fire of President Regan's government. At a critical juncture national health budgets were trimmed and political interference in scientific matters became obvious in the lack of response to the growing epidemic (Bronski, 2003).

By the time the first International Aids Conference was convened by the US Centers for Disease Control (CDC) in 1985 not only had Regan still not uttered the word AIDS in public but when Harvard scientist Max Essex did speak he "averred that the origins of the disease could be traced back to monkeys in central Africa" (Behrman, 2004, p.15). The implications of this claim and the exaggerated media coverage at the time proved to be deeply offensive to Africans. Over inflated statistics could not be trusted and many believed that there was a neo-colonial agenda at work. One could argue that the confused HIV/AIDS policy of the South African government and the AIDS skepticism of the former South African President - Thabo Mbeki are a consequence.

Design as a weapon

According to Milton Glaser "dissent protects democracy" (Glaser & Ilic, 2006, p. 226) and dissidence is what characterized the Silence=Death Project formed in 1986 that created the slogan "Silence=Death" that has become synonymous with HIV/AIDS awareness This slogan confronts the crude assumption that "Aids=Death" of earlier messages and acts as an indictment against the US President's reluctance to talk about the subject while at the same time calls for supporters to defy official policy and "break the silence." It is a potent call to arms to take the power.

During this period in South Africa very little was done about the virus and the minority government remained silent. South Africa was in the throes of a low intensity civil war in which another "call to arms" was the notion that art and design could be used as a weapon in the struggle against Apartheid. While many professional international campaigns were launched, it is significant to note that very few qualified designers in South Africa were active in the production of anti-Apartheid materials. The majority of T-Shirts, pamphlets and posters were the products of community arts centres, students, untrained unionists and political activists (The Poster Collective, 1991, p. 2). However, these works provide another potent example of design with the power to inspire people to challenge the status quo.

M.L. Sultan Technikon

It could be argued that one possible reason for the lack of engagement by local designers was that prior to the 1980s access to design education was reserved for the white minority. It was only in 1982 that Graphic Design courses were established at the Peninsula Technikon for so-called "coloureds" in Cape Town and for Indians at the M.L. Sultan Technikon (MLST) in Durban. At the MLST Graphic Design was developed within a larger Department of Design Studies that also incorporated Textile Design.

Twenty years later, as a part of the transformation of the post-Apartheid education landscape the MLST was merged with Technikon Natal (TN) to form the Durban Institute of Technology in 2002 and subsequently became the Durban University of Technology (DUT) in 2006. Unlike most Fine Arts courses that were an established part of the academic university sector, nearly all design departments and schools were located within Technikons. The emphasis within these colleges was primarily upon education and training of students for a role in industry. The National Diploma was the highest qualification offered and the curriculum had a very narrow focus upon meeting the perceived needs of an industry that was increasingly under siege due to international sanctions and boycotts.



PRIDE (1994)

In a post- apartheid South Africa colleges such as the MLST were referred to as "historically disadvantaged institutions" (HDIs). While clearly the term "disadvantaged" correctly describes lack of resources it was an unfortunate choice of words that would need to be contested in due course. Institutions such as the MLST began to allow access to black students throughout the second half of the 1980s and it soon became clear that a significant number of students were genuinely "disadvantaged" by not having had access to art and design education at secondary level. In order to "level the playing field" the Department of Design Studies initiated an independently funded bridging programme - the Positive Response in Design Education (PRIDE) in 1990.

The introduction of PRIDE ensured an effective vehicle for the transformation of the student demographics during what was to be a decade of tremendous change. The release of Nelson Mandela in 1990 was followed by four-years of negotiations that abolished Apartheid and

developed a Constitution that led the first democratic elections with universal suffrage in 1994. During this period along with the euphoria came a feeling of great apprehension as the nation began to transform itself into what was referred to as the "new" South Africa.

Professional designers and design educators were called upon to deal with issues of a new national identity. National symbols were redesigned and many private companies were eager to associate themselves, their products and services with the new order. The colonial mindset of both industry and educational institutions had not prepared them well to deal with the challenges. Motifs of traditional African crafts such as beadwork became a convenient signifier for all things African but often resulted in some very dubious design solutions.

This raised the question of what constituted an "appropriate" design education and to this end the MLST convened the first International Design Education Forum of Southern Africa (DEFSA) conference - "Design Education for Developing Countries" in 1993 to address the issue. Ironically, the conference had to be relocated at the last moment due to violent student unrest. As exciting this period was it was also a time of many dangers as the transitional government could collapse at any minute and black campuses became prone to student action to press demands for change. The multi-racial, multi-lingual student profile within Design Studies was not replicated elsewhere in the institution and consequently the department was vulnerable. In order to attend to this situation the local chapter of Amnesty International was invited to present a series of Human Rights workshops to help create an ethos for mutual respect.

In an endeavour to affirm the notion inclusively and the promotion of an "African" aesthetic PRIDE students were teamed up with professional designers to produce an edition of an industry publication *ijusi – putting the squeeze on graphic design in a new South Africa* (1995). "It's like Ray Gun meets Africa" is how the editors described it (Walker & Gunning, 1997, p. 2). This edition was followed by two more that involved collaborations with students and designers in Europe and the US - the student's *Life Story* (Walker & Gunning, 1997) and the *Celebration of 50th Anniversary of the Universal Declaration of Human Rights* (Walker, 1998). In the uncertain environment of dramatic political change these international collaborations and the Human Rights workshops were aimed at addressing the mental well being of students, improving self-esteem and the affirmation of local culture.



Zama, M. i-jusi 5, (1997)

PBL

In another response to "levelling the playing field" the department adopted a Problem-Based Learning (PBL) approach that had been used with great success at the University of Natal Medical School. According to Finkle and Torp, PBL is "a curriculum development and instructional system that simultaneously develops both problem solving strategies and disciplinary knowledge bases and skills by placing students in the active role of problem-solvers confronted with an ill-structure problem that mirrors real-world problems" (Finkle & Torp, 1995, p. 1). It is a mode of delivery that is ideally suited for teaching design teams which were supervised by different lecturers acting as facilitators.

Within the PBL model projects were be set in a way that reversed the notions of "advantage" and "disadvantage". Students who were isiZulu speaking were able to undertake valuable research in areas that were no-go zones for others. Students had to rely on each other and were also invited to undertake self-evaluation thus removing the lecturer as the voice of "authority". The first health related project focussed on an awareness campaign about learning disabilities with specific reference to dyslexia for the Association for the Learning Disabled (ADL). However, the first project that focussed HIV/AIDS was a promotional campaign for blood donation at the local Blood Transfusion unit. In this project Human Rights issues collided with the rules of South African National Blood Service that excluded homosexuals from donating blood (Crookes 2006). Students were quick to recognise the ethical implications and that demanded that in future projects be identified with great care.

HE Link (1997 -2001)

At this juncture it needs to be noted that the primary focus on community involvement was not within the Graphic Design programme but in Textiles. South Africa's re-integration into the world economy occurred at a time of rapid globalization. Inevitably, one of the first industrial sectors to be adversely effected was Fashion and Textiles that had previously been shielded by import substitution in the face of international sanctions. In response the department undertook its first community outreach project in 1995 with a woman's cooperative called "Phakamani" convened by staff member Gem Melville to help re-skill retrenched workers for the National Union of Clothing and Textiles. But, the crisis within the industry also forced the department to review the direction of the National Diploma course.

The potential to shift the focus of the Diploma course from preparing students for a shrinking formal industry to the promotion of indigenous craft production proved to be an important line of enquiry. To this end in 1997 the British Council approved funding for the establishment of a Higher Education (HE) Link between the MLST and Middlesex University in London, England. The focus of this HE Link was upon staff and curriculum development within the context of an investigation of "Design Education for Sustainable Development". Of primary concern was the need to investigate the extent to which the growing recognition of "craft" as a unique carrier of "identity" could be developed to create employment opportunities.

As mentioned earlier, the transition to democracy in South Africa was a tense process and the country could easily slide into civil war and chaos. Little wonder that the health issues were to take a back seat but after 1994 the statistics were too alarming to ignore. The National HIV prevalence amongst antenatal clinic attendees in South Africa indicated that while in 1990 only 0.7% of pregnant women tested were infected but by 1996 this figure had risen dramatically to 14.2% (Department of Health South Africa [DOHSA], 2007). This was the year in which Prof. Kate Wells convened a series of craft and product innovation workshops assisted by Prof. Jackie Guille of Middlesex University as part of the HE Link. The intention of bringing the craftswomen into the department was, once again, to affirm the indigenous culture and skills for both the women and the students who participated as translators and designers of all the requisite instructional and promotional materials.

Aids Ribbon

One product that the women were already producing in large quantities were beaded red ribbons within the traditional Zulu love letter format. Curiously, when asked about the significance of the ribbon most of the producers admitted that they knew very little other than that they sold well to tourists (Wells, Sienaert and Conolly, 2004, p. 75). During the 1980s a group of artist and designers in the US called Visual Aids established the wearing of the red ribbon as a way of supporting people living with HIV/Aids. In the US the use of a yellow ribbon as a remembrance symbol was well established and became particularly widespread during the Gulf War when ribbons were tied around trees as a prayer for the safe return of soldiers (Washington Profile, n.d.).



Beaded Ribbon (c. 1999)

Volunteers of the Red Ribbon Project, as it became known, sent letters and red ribbons to attendees at the 1991 Tony Awards where one of the hosts - actor Jeremy Irons, stepped onto the stage and international televisions screens with a ribbon pinned prominently onto his lapel. Thereafter thousands of red ribbons were handed out at the memorial Concert for Freddy Mercury, the lead singer for the rock group Queen who had died the previous year. Since then the Red Ribbon has become a symbol of awareness and support for those living with HIV and AIDS, a symbol of status, and symbol of activism.

The color red represents love and passion while it also represents blood and the anger about the lack of action. In Africa – more specifically Southern Africa it has also become a symbol of solidarity and hope that a cure will be found. The transformation of the AIDS ribbon in the US into a Zulu love letter in South Africa is a significant example of how effective visual

communications design can be when it is copyright free to be used by different communities to suit their own needs.

Siyazama

It soon became clear that the idea of product innovation and design for sustainable development would be wasted if the health concerns of the women involved on the project were not addressed. Hence, HIV/AIDS awareness became a central theme of the Siyazama ("We are Trying") project that evolved from the workshops. The oral culture of the Zulu craftswomen ensured that artefacts produced became talking points in the rural areas where the producers lived. In the process the hierarchical tension between art, design and craft in South Africa had to be re-evaluated and the lines between craft and visual communications design become blurred. This was a unique communication design project that offered unique opportunities for formal research at a time when staff were called upon to improve their qualifications in preparation for the institution's transformation into a University.

Most importantly, the project kept Textile and Graphic Design students who worked as interpreters, performers, photographers and designers engaged with the disease on an ongoing basis. This ensured that the issue of HIV/AIDS was incorporated within the curriculum in a way that it becomes a critical cross-field outcome of the Outcomes Based Education (OBE) philosophy that South African education had adopted after 1994. Students were given access to authoritative and reliable information at a time of mixed messages from government.



Ngema, F. "Year of the war" (2003)

loveLife

It was only towards the end of Mandela's tenure as Head of State (1994 – 1998) that a series of public health announcements called loveLife was developed. This campaign was initiated in 1997 by a consortium of non-Government Organisations (NGOs) concerned with adolescent reproductive health. It was conceived as a lifestyle brand for young South Africans promoting healthy living and positive sexuality. However, urban-focussed programmes such as loveLife meant that large numbers of people in the rural areas remained in ignorance and marginalised. South Africa is a complex country and the issues of multi-culturalism, multi-lingualism and the urban / rural divide were not always successfully navigated.



loveLife Billboard (c.2005)



Eastern Cape Billboard (c.2004)

It could also be argued that one of the main obstacles that loveLife failed to come to terms with was the complex terrain of sexual relations in South Africa within which "women must be respectful at all times and men don't have to listen to women" (Wells, 2009, pp. 104 - 105). This is particularly true in the rural areas that experience high levels of poverty and low levels of education that require a focus upon individual human rights.

Design, Health and Community

By the beginning of the new Millennium the HE Link had run its natural course and the department had been awarded National Research Foundation (NRF) funds to establish a Research Niche Area that focused upon "Appropriate Design Education for Sustainable Development" with an emphasis upon Design, Health and Community with Siyazama as the flagship. This Niche Area coincided with the establishment of a new Department of Graphic Design within the DUT

with an emphasis upon Bachelors of Technology (B.Tech) and Masters Degree as final qualifications.

In this manner HIV/AIDS research became fully integrated at both the undergraduate and postgraduate levels. B.Tech students working in teams linked up with the Department of Environmental Health to explore the design needs of local health clinics. Possibly one of the most profound studies was that undertaken by a B.Tech student - Samantha Robertson when she worked on developing "visual aids" for traditional healers for the US President's Emergency Plan for AIDS Relief (PEPFAR) at the University of Natal Nelson Mandela Medical School (2006).



Robertson, S. HIV virus (2007)



EAP workshop, Uganda (2007)

In 2003 the success of the Niche Area and the HE Link resulted in an invitation by the British Council to establish an England Africa Partnership (EAP) between the DUT, Makerere University in Uganda and Northumbria University in England. The main aim of the EAP was to explore the possibility of transferring the Siyazama model to another African country working with a number of groups of weavers.

The partnership with Uganda opened up a wealth of research opportunities as Uganda is often held up as a model for Africa in the fight against HIV/AIDS. In contrast to many African leaders who indulged in denial Uganda's President Museveni "launched an ambitious multisectoral – government, industry, religion, and civil society- effort aimed at combating the disease", insisting that fighting AIDS was a "patriotic duty". His government adopted a simple, understandable concept of "ABC," which called upon people, first, to *abstain* from non-marital sex. If they wouldn't abstain, they must be *faithful*, or adhere to what some leaders called "zero grazing." Finally, if they wouldn't be faithful, they must wear a *condom*" (Behrman, 2004. P. 113).



Nsanja, Y. "Care" (2009)



Nsanja, Y. "Taking Blood" (2009)

Conclusion

The EAP was a resounding success and culminated in an exhibition of selected work at the British Museum (2008). After years of international isolation the department now has Masters students such as Yusuf Nsanja who is involved in a study of "Illustration as Activism: the role of traditional Ugandan visual materials in community health care in Kampala and Wakiso Districts" (2009). In the undergraduate History and Theory of Graphic Design programmes students are called upon to research the increasingly complex communications environment within which HIV/AIDS awareness campaigns function. An interesting case study is the Nelson Mandela Foundation. Mandela, who, at first was reluctant to speak out about the disease became an international icon and subsequently has spearheaded the notion that HIV/AIDS is a human rights issue and has agreed to use his Robben Island prison number "46664" to raise funds and promote HIV/AIDS awareness on a range of products and services ranging from credit cards, mobile phone SIM cards to CDs and rock concerts.



Gap, London (2007)



46664 CD (2004)

Although the idea of linking human rights with health in the fight against HIV/AIDS was first propagated by Jonathan Mann at the World Health Organisation (WHO) in the 1980s (Behrman, 2004, p. 46). Tragically he died before he could see fashion campaigns such as (RED) linked to the notion of "fair-trade" in providing work producers while promoting HIV/AIDS awareness in high street stores such as The Gap. For complex reasons, which make interesting case studies, international brands such as Benetton and Levi's have also associated themselves with the disease and in the process the dissident voice has become mainstream.

Not even ACTUP could have anticipated the audacity of the world's most famous political prisoner launching a campaign to fight the disease with the support of a global brand such as Coca-Cola. In contrast to the professional apathy of the past it was a South African agency – Slick, that produced the "Hello" television commercial and "Mandela's Message in a Bottle" that contains a "note" that declares that "this is not a disease anymore, it's a human rights issue" (Mandela 2007). The complexities and contradictions abound but the struggle continues!

Dedication

This paper is dedicated to all the students and colleagues I have had the privilege of working with as a Head of Department at the M.L. Sultan Technikon and the Durban University of Technology. "A Healthy Balance" is our history.

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Cumulus 38° Conference theme: Shifts in art + design practice and technology

No More Design Experts? Meeting the Challenges of the Emerging Role of the Designer-Facilitator in Graphic Design

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Abstract

The reorganisation of societies around differentiation, diversification and distributed systems challenges graphic designers to better understand the contextual and human dimensions in design projects, the era of standardised communications having passed. Some design debate holds that audience participation in the design process better aligns designs with audience's needs and perspectives, challenging the graphic designer's established role as a creative and communication expert. Arguments for the ethical and pragmatic benefits of participatory design can seem compelling, but the task of including audience members in the design process is not straightforward. This paper responds to Jorge Frascara's argument that graphic design needs systematic case studies to build knowledge of practice. It reports on a project that used participatory design to research the use of information materials on asthma risk and management, focusing on the need for dedicated methods to help end-users contribute their creative ideas and problem-solving abilities to the design process.

Keywords

Participatory design, graphic design, design tools and methods, design facilitation

1. Introduction

The diversification and fragmentation of contemporary audiences represents a major challenge for graphic design, demanding greater specialization in designed communications. Jorge Frascara (2004) highlights the imperative of specialization in graphic design, describing graphic design as the creation of visual objects that aim to inform or influence a *specific* audience, or encourage it into action. Each year, a multitude of graphic designers around the world seek to engage their audience through the creation of designs that are 'understandable, usable, interesting and if possible pleasing' (Frascara, 2004, p. 54). Yet a section of the graphic design literature questions how designers arrive at the form and content of designed communications, challenging the appropriateness of the designer-driven message (See, for example, Forlizzi & Lebbon, 2002).

Some large design projects incorporate market or social science research into the target audience, but a majority of designers work without such knowledge. Since the late 1970s, the literatures of usercentred and participatory design have debated the relationship of the end-user to the design process. Both emphasise the humanity and diversity of end-users in the aim of developing more effective designs, seeing design as the creation of relationships with people, not the production of things. The inclusion of 'user designing' marks the critical distinction between user-centred and participatory design (Carroll, 2006, p. 3). However, although participatory design is widely discussed in the design literature, few published studies discuss its application to graphic design. Arguably, three main issues block its uptake here. Firstly, graphic design's close relationship with commercial activity emphasises business objectives over audience needs and preferences, the profit motive making it difficult to incorporate significant audience research into communication design projects. Secondly, where graphic designers assume the role of communication experts to claim an intuitive understanding of the communication task, audience input becomes irrelevant. Thirdly, where designers' innate creativity is seen to drive the design process audience input again becomes extraneous.

This paper reports on a study for the Asthma Foundation of Victoria, which investigated the nature and purpose of designed communications on asthma risk and management. The Foundation had a profusion of information materials, both print and digital, developed over an extended period with consequent poor relations between individual pieces and sets of information. Proposing a systematic communications strategy for the Foundation depended on understanding how diverse stakeholders used its information, providing a robust context to explore participatory design processes. Our paper focuses on the use of dedicated design tools for building the participative relationship, the merging of designers' skills and users' knowledge of the communication task being vital to unlocking the espoused benefits of participatory processes in more effective and democratic designs (Prahalad & Ramaswamy, 2004, Sanders, 1992). By presenting the study for the consideration of designers and design researchers, we hope to build knowledge in the application of participatory processes in graphic design, leading to greater interest and success in their use.

2. Method

The paper uses case study methodology, critically reflecting on a program of three participatory design workshops held for the Asthma Foundation in 2008. The workshops included 12 staff of the Foundation from the group responsible for public education and outreach, these individuals being key users of the Foundation's information on asthma risk and management while having close knowledge of the information needs of people with asthma and their carers. The design team comprised four communication design masters students from the Faculty of Design, Swinburne University of Technology, working under the guidance of an experienced design manager and studio art director. Three of the students had industry experience. We directed the project, framing the range of design activities undertaken. The study trialed nine participatory design activities, including information auditing, persona building, user scenarios and verbal-visual games. Our paper discusses the challenges and contradictions in the application of participative processes in graphic design, seeking to reveal Cumulus 09 Simone Taffe and Carolyn Barnes, No More Experts 2

causal relationships between the nature of design activities and the scope for designers and other project stakeholders to come together to draw on each other's knowledge.

3. Results

The participatory workshops produced valuable insight into how the staff of the Foundation use designed communications to deliver information on asthma risk and management to the public, providing a basis of knowledge for the revision of the Foundation's communications strategy and materials. This included the identification of key audience segments, detailed information on audience characteristics and behaviors, perceptions of the strengths and weaknesses of existing information materials and many creative ideas for new communications strategies. The workshops also highlighted the obstacles to building participative relationships in co-design. Three key findings about effective methods for participatory design emerged from the study: the advantage of tightly-scripted, small-group activities over loosely-framed, whole-group activities; the resistance to ranking and critical revision of design ideas; and the benefits of verbal-visual games in relationship building and knowledge transfer. Our study also showed that cycles of progress and regress distinguish participatory design, pitching activities between work and fun being important to sustaining the participation process until the way forward for design becomes clear. In the discussion section, we build on our findings and the arguments of others to address the challenges of participation and ways to resolve them.

3.1 Tightly scripted activities

Our study found that tightly-scripted, small-group activities were better at uncovering critical participant knowledge than the open-ended, whole group activities such as brainstorming and SWOT analysis commonly used among design peers. One activity involved an audit of the Foundation's information and promotion materials in which participants selected their favourite and least favourite items, pasting them onto A2 boards. Participants then added post-it notes to the items to comment on their strengths and weaknesses. In initial whole-group discussion in Workshop One, there was great reluctance to criticise the Foundation's information materials. However, when working in small, self-selected groups the participants became highly engaged in sifting through the different pieces of information to find and comment on especially liked or disliked items. Some participants voiced strong opinions during this activity, making comments loud enough for everyone in the room to hear, such as 'People really like this.' and 'It's a useful resource, but it's a matter of storage and remembering it's there.'

The information audit established a key issue for a new communications strategy for the Foundation, workers' comments and annotations identifying confusion over whether the Foundation's main role was raising money, raising the organisation's profile, raising public awareness of asthma or helping individuals and their carers manage asthma. The hands-on nature and intimate setting of the small-group activity seemingly made participants less self-conscious about expressing frank opinions. The information audit also highlighted the duplication of information and the negative effect of staff turnover and computer technology problems on the Foundation's provision of information to the public. The workers' guarded responses to the presentation of each negative finding of the information audit during the Workshop Two confirmed the importance, but also the sensitivity of these issues.

3.2. Positive feedback

Frascara (2004, p. 54) depicts graphic design as an opportunistic and synthetic activity; designers quickly frame and rank a variety of design propositions to identify the most promising directions, rapid conceptualisation and problem-solving a product of designers' role in developing a saleable culture in a commercial world, on time and on budget. Arguably, designers can rapidly propose and sift potential ideas because they do not have an emotional attachment to the context for design. The Asthma Foundation study revealed that the opposite is the case in participatory design. Workshop Two reviewed ideas from Workshop One, asking participants to rank issues from the information audit using a set of cards the designers had created. The participants' response to this activity was defensive, the cards being perceived as painting an inaccurate, negative picture of the Foundation's information materials even though they accurately reported staff members' comments. The designers and staff members resolved to change track and discuss the positive aspects of the information materials, which proved to be much more effective in filtering out weak ideas, suggesting that participants will arrive at good ideas in good time.

3.3. Verbal-Visual games

Our third finding was the value of verbal-visual activities in encouraging participation and overcoming barriers between designers and audience members. Ehn (1993) cites Ludwig Wittgenstein's idea of the imperfection of communication systems to challenge the idea that lay participants must fully articulate their needs and desires in the participation process. Ehn argues that design tools such as ideation exercises, visualisation methods and prototypes are all representations that enable participants in design to see new dimensions in existing circumstances and practices. For Sanders, the graphic designer's main challenge today is developing innovative tools to enable people to express 'those ideas and feelings that are often so difficult to express in words' (Sanders, 2002, p. 7).

As an icebreaker, we brought the staff of the Foundation and the designers into the one group, asking everyone to write a word related to the idea of information on a card. Each person then passed the card to the person on their right, whose task was to draw an image of the word. For example, in response to the word 'consistency', a second person drew three equal-sized squares. The card then passed to a third person, who we asked to guess the original word. In this activity, the need to draw was met with much joking and laughter. One reluctant drawer complained 'But I can't draw'; another commented 'I won a prize for drawing in primary school'. Some participants teased others that the quality of their drawings made guessing the original word impossible. The activity built familiarity between the designers and Foundation staff and made the serious work of the workshop seem less confronting. It also highlighted the challenge of conceptualisation through text and image, an undertaking intrinsic to graphic designers' work.

4. Discussion

When the aim of graphic design is to sell an idea, product or message, it makes sense to understand the audience, especially today. Drucker and McVarish (2009) argue that the end of the era of mass media and consumption and the development of new information and communication technologies have seen everyday people become active selectors of designed messages and, increasingly, cultural producers in their own right. They argue that such changes require graphic designers to better understand the 'conditions of use' for design, not just produce 'effective or aesthetic displays of useful information' (pp. 337-338). Traditionally, however, clients have engaged designers to provide professional services based on their creative expertise and technical knowledge (Reich, Konda, Levy, Monarch, & Subrahmanian, 1996, p. 179). Conversely, many graphic designers see themselves as frustrated artists whose individuality and inspiration is restricted by clients' lack of vision and budget. For Ilyin (1997), graphic designers' self-understanding as experts and artists encourages disdain for clients and audiences, whose needs and interests are disregarded in favour of play with the formal languages of graphic designers' creativity, but it is only in a handful of graphic design projects that audience research encumbers design activity.

Misunderstanding the relationship with the people they serve is an entrenched issue for many expert fields. Over two decades ago, Donald Schön (1983) highlighted the dilemma of society's lack of confidence in professionals despite their primary role in delivering expert knowledge and services to society. A broad literature argues that everyday people have much knowledge to contribute to the design process. Sui (2003, p. 64) highlights the issue of 'user-unfit designs', suggesting that future designers need to become less dominant in the design process so that audiences' requirements drive designed responses. Yet there are obstacles to building participative relationships in design. Initially in

our study, both the staff of the Foundation and the designers were ambivalent about each other's role and skills. The young designers expressed reservations about participatory processes, one commenting 'in the end it's our role to design the outcomes'. Some Foundation staff commented positively on the creativity and fresh insights of graphic designers they had worked with in developing information materials, but criticised the tendency of some designers to ignore crucial advice or aspects of a design brief to pursue an individual creative agenda. Staff gave examples of designers' creative latitude leading to seriously flawed results, such as a fridge magnet describing the key steps in asthma first aid having unreadable type.

Like many small organisations today, the Asthma Foundation provides a dynamic and testing work environment in which individuals and teams share common goals, perform mutually dependent tasks and are jointly responsible for communal outcomes (Kozlowski & Bell, 2003). When confronted with the diverse practical and organisational issues faced by the Foundation's staff in working with information, the designers reported feeling 'bogged down, lost and irrelevant'. These issues ranged from annoyances like the storage of brochures in the workers' lunchroom and unreliable computer systems to major conceptual challenges like understanding the Foundation's core business. Initially, the designers saw the complexity of issues as a major impediment to proposing a new information system for the Foundation, especially when the body of user research did not yet include the needs and perspectives of the Foundation's diverse public audience for information. On the other hand, the staff member's high level of design awareness surprised the young designers. In the information audit, they commented freely and authoritatively on poor choices of typeface, colour and imagery and provided vital information on the usefulness or redundancy of individual pieces of information, validating their presence in the design process.

Given such divided views, participatory design processes need to incorporate specific strategies to address the reluctance of lay participants and designers to collaborate through design. Theories of participatory design suggest that success in design depends on the quality of information gained from people about their needs and preferences, hence the requirement for innovative design tools and methods that allow lay people to directly contribute their knowledge and creative ideas to the design process in ways that are integral to design (Hanington, 2003, pp. 17-18). When this occurs, new ideas about how to approach a communication task can be major. In an activity aimed at dividing the audience for information on asthma risk and management into key segments, the Foundation staff showed the design team that the current divisions according to age, gender and asthma triggers were less important than framing information around people's emotional responses to asthma.

The 'Dear Designer Booklet' activity had staff cut images from magazines to represent a day in the life of a specific asthma sufferer they selected, using speech bubbles to describe a common situation in

which that person might find themselves in respect of their disease. The resultant A4 booklets represented an important design resource, each persona and scenario a distillation of the participants' great experience of working with people with asthma. These included the embarrassed teenager who no longer wants to discuss or properly manage their asthma, the frightened, elderly ex-smoker in a remote rural location experiencing breathlessness with only a telephone for contact with the outside world, and the three year old with asthma playing in a sandbox watched over by an anxious mother. The segmentation of asthma sufferers according to feelings of anxiety, distress, embarrassment, fear or shock could never have been discovered without the co-design process. It identified a potential new conceptual approach for the Foundation's communications strategy to be further investigated through participatory workshops with members of the Foundations' audience for information.

4.1. The designer as facilitator

Jorge Frascara (2004, p. 8) describes the future graphic designer as a guide, advisor or coordinator, who supports audiences and decision-makers to achieve what is required through their original analysis, creativity, realism and experience in working with people. This facilitation role shifts the emphasis in graphic design from visual matters to human factors. It also means sharing control of design with representative audience members, the new critical and creative task for graphic designers being the development of design tools that mediate between audience's contextual knowledge and their own visual expertise and production knowledge. Here, the design process becomes a forum for negotiating diverse design options, replacing the usual subject-object relationship of designing *for* an audience by the subject-subject relationship of designing *with* members of that audience (Spinuzzi, 2005). However, Carroll (1996, p. 288) warns that designers may not have the skills to be effective mediators. Certainly, clients, audience members and designers are separated by their differential facility with language, conceptualisation and visualisation. Typically, designers are reluctant to talk about things in words and audience members may feel they lack the skills to visualize their ideas.

Our study showed that dedicated strategies can disrupt the traditional roles and self-perception of the designer and dissolve the distance between expert and lay participants in the design process. Tightly-scripted activities allowed the workshops to keep moving forward until a level of trust and mutual respect developed between participants. Where the design team initially doubted the worth of the co-design process, by the third and final workshop they had became excited by the possibilities of the facilitation role and the scope to understand the real context for design. One designer admitted that without this engagement, any designs produced, no matter how aesthetically and conceptually innovative, would have been irrelevant. The complementary benefit of participatory design is that knowledge of design spreads throughout societies, demystifying the design process and gaining respect for the work of the designer (Frascara, 2004, p. 58).

In the Asthma Foundation study, the early use of verbal-visual games identified concepts and issues that resurfaced throughout the workshops and demonstrated the bridge-building potential of design tools when something substantive is created between end-users and designers (Kensing & Munk-Madsen, 1993, p. 79). Creativity theory also stresses the value of turning the mind to other things to allow new creative ideas to emerge, de Bono (1977, p. 11) highlighting how activities such as daydreaming, walking or driving allow the mind to freely wander. For de Bono, gaining insight is more effective where available information is creatively restructured through activities such as lateral thinking, it being difficult to transcend a typical way of seeing unless one can escape the restrictions of pattern thinking. In the Asthma Foundation study, the information audit exercise appeared to move participants beyond their usual, uncritical approach to the Foundation's information materials, releasing their opinions and triggering insight. The combination of designers and staff members working in small groups worked to unlock ideas by giving participants confidence to speak out (Perry-Smith & Shalley, 2003, p. 96).

5. Conclusions

Published studies (Dagron, 2001, Valente, 2002) show that designed communications are ineffective where audiences are not included. Certainly, in today's crowded communication sphere selling a message requires more than the combination of traditional graphic design and market research techniques. Audiences increasingly demand a stake in the creative process, challenging the idea that designer's creativity and intuition are enough to ensure the success of designed communications. Film producers whose aim is box office success rigorously test alternative film endings for audience response. Apple iPods offer people diverse colour and interface options and allow consumers to create personalised internal directories. Auto manufacturers are designing niche cars with their customers. These examples evidence the emerging role of the designer as mediator and facilitator. For Friedman (2003, p. 511), the designer's role is that of a 'synthesist' who understands and organises the range of talents needed to frame an effective design response. For Sui (2003), the goal for the designer is no longer the provision of fixed solutions, but rather facilitating a conversation with end-users in the aim of identifying the key parameters for design.

When future designers include representative audience members as key associates in the design team, the success of design may hinge on the development of effective participatory tools and methods. This paper argues that tightly-scripted activities with small groups distract participants, allowing integral ideas to surface, where in whole-group contexts participants may be reluctant to engage with design. Positive commentary is more effective than the established design technique of ranking and critical revision of design ideas, which creates resistance from lay participants who perceive it as critical of the ideas of others. Verbal-visual games create a relaxed atmosphere for sharing participant

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knowledge, breaking down perceived status barriers between designers and lay participants.

The insights gained from our study represent participatory processes as a promising addition to graphic design practice, though within limits. Any program of participatory design is distinguished by the people involved, the duration and order of activities and the nature of the underlying communication task, each of which may conflict with general principles. Even so, the shift to participatory practices is likely a force that graphic design cannot resist. If designers accept they are not the only experts in respect of the communication task, they may find that embracing a facilitation role introduces a new dimension of creativity into design, the development of effective and empathetic design tools empowering audience members to unleash their own creativity and problem solving capacity.

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Activating Space: piloting cross-disciplinary learning within a higher-education institution

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University College Falmouth (UCF) UK is a specialist Higher Education Institution (HEI) with 2800 students within the Schools of Art and Performance, Media and Design. The School of Design has been piloting projects which draw on the co-authors recent experience of implementing a collaborative learning experience that explores the distinctions between multidisciplinary, interdisciplinary and transdisciplinary learning. Recent British perspectives in education encourage curriculum links between research, practice and business that demonstrate the role of H.E. in fostering economic development. The student learning experience has been expanded by working in both collaborative design teams and alongside international business that culminates in a manufactured outcome.

This paper will discuss and analyse the role and forms of collaboration, captured by UCF's Learning and Teaching Department through video interviews, and its impact on the student learning experience. Ultimately this will enable the further development of inter and transdisciplinary learning and help to disseminate best practice.

1.0 Introduction

Within Higher Education there is a widely held belief that cross-disciplinary teaching and learning informs and enhances the student experience as discussed in Chandramohan and Fallows (2009). Its value is seen in its ability to address the issue of an isolated body of knowledge that traditionally belongs to one discipline (a knowledge domain that can be categorised as conventionally belonging to that discipline) and to potentially connect learning and thinking within education by widening the context within which learning can be understood and applied.

'Arguments for interdisciplinarity generally stem from debates surrounding disciplinarity.

Within arguments for interdisciplinarity, two main threads can be found. The first argues for interdisciplinarity normatively, positioning it either in terms of filling the gaps that disciplinarity leaves vacant or in terms of transcendence surpassing what disciplinarity can ever hope to achieve.' (Chettiparamb, 2007, p. 13)

Additionally the development of transferable skills are viewed in a positive manner in that they emulate 'real' world' working practices by transcending the methodologies of one academic discipline. The ability to work collaboratively as part of a team, to share ideas and working processes and understand and respond to different viewpoints and knowledge bases is valued within industry (Hogarth, Winterbotham, Hasluck, Carter, Daniel, Green and Morrison, 2007) and is central to cross-disciplinary learning

'The world of professional and work-based learning – the world that most of our students will inhabit for most of their working lives – is not constrained by the cultures and methodologies of disciplinary learning. This world requires capacity and understanding for working with many different sorts of knowledge in order to engage with complex emergent problems for which there may be a range of possible solutions.' (Jackson and Ward, 2004, p. 427)

Bearing in mind the perceived benefits of this mode of learning the decision to trial a crossdisciplinary project was undertaken. This decision was informed through feedback sessions involving both staff and students where an interest in cross-disciplinary opportunities was voiced. This project was initiated by Simon Thompson, principal lecturer in Contemporary Crafts and Jean Whitehead, senior lecturer in Spatial Design to trial, implement and assess the impact of cross-disciplinary working within a Higher Education Institution specialising in Art and Design.

2.0 Why a cross-disciplinary project?

The undergraduate students involved in this pilot were enrolled on a series of design courses - Spatial Design, 3D Design, Textile Design, Contemporary Craft and Garden Design. They were all housed within a newly built 'Design Centre' (DC) located on the campus of University College Falmouth (UCF). The Design Centre was originally conceived and built to promote a creative 'hub' for design. Its form of open interior levels and visual connection was chosen to encourage 'synergy' between the design courses and students and exploit the possibilities of cross-disciplinary practice. Collated data however revealed that the reality of the Design centre was different to its perception. Data was collected from three main sources firstly a Learning and Teaching fellowship's use of student focus groups to establish a post occupancy review of the Design Centre questioning how the student population used the space to enhance their learning environment, secondly a Post Graduate Certificate in Higher Education workshop for staff studying to become qualified teachers questioning the effectiveness of the Design Centre as a teaching space and finally student questionnaires, all revealed a common frustration over the lack of cross disciplinary opportunities within individual course curricula. The following quote taken from a student focus group is typical of the issues raised:

'The visual connection with everyone in the Design Centre is great, but you want this to be embedded more practically with your learning experience.' (Textile Design student focus group)

The student focus groups also highlighted a real interest in the development of transferable skills and being given the opportunity to cross the boundaries of their given subject of study and absorb some of the ideas and working processes employed by students on other design courses. Evidence of cross-disciplinary learning opportunities at an undergraduate level were minimal, the only exception being informal encounters where the students had taken the initiative:

'To me it feels like a society, you can see everyone, can talk to everyone in different sections, see what they are up to and get ideas from other people.' (3D Design student focus group)

Staff feedback echoed the students concerns:

'We don't have many cross collaborations in terms of working with other courses and that's a problem in terms of a budgeting issue and timetables and all the rest of it but surely [sic] enable students to do it in a managed situation.' (Post Graduate Certificate in Higher Education staff Workshop).

It was within this climate that the decision to formalise and trial a cross disciplinary project at undergraduate level was taken.

3.0 Initial Research

Initial research during 2008 revealed a series of terminologies and a wealth of published research on the subject of cross-disciplinarity which helped to identify potential modes of working and the learning experiences for the students involved in the piloted project. It soon became apparent that the term 'cross-discplinarity' is used as a generic or 'umbrella' term to indicate work involving more than one discipline (and is used as such within this paper), this remains one of the looser terminologies used when discussing collaboration. However there is a more useful reading of collaborative practices that includes the terms – 'multidisciplinary', 'interdisciplinary', and 'transdisciplinary' (Kaufman, Moss, and Osborn, discussing Meeth, 2003. p.6). These three headings start to suggest degrees of immersion in the collaborative experience.

Recent experiences in coordinating and implementing such a learning experience for undergraduate students exposed some interesting viewpoints, both positive and negative when it relates to the boundaries of a student's perceived discipline of study and its impact upon their learning environment. Evaluation has been gathered from video interviews, completed questionnaires and the actual outcomes of the student projects. This paper aims to clarify the authors' experience in an

undergraduate cross-disciplinary learning environment and distil what has been learnt concerning collaboration as a learning and teaching mechanism.

4.0 The 'Activating Space' project (piloting cross-disciplinary working)

The project was implemented in January 2009 in response to the three evaluations outlined in 2.0. It was developed as a live action research project (Kember, 2000) that would test research outcomes and inform the next stage of action research formed by a typical cycle of reflection, planning, acting, observing, reflecting and planning.

The participating students were organised into mixed teams, with each team representing the design courses located within the Design Centre. It was mandatory for all 140 second year students and the projects duration was for one week. Each team was supported by a 'base camp', an academic and technician to act as advisors and helpers rather than directors.

Each team was asked to produce a proposal for the refurbishment of the internal and external entrance spaces to the Design Centre. The decision to undertake a design-based project was largely driven by the recognition that a project that contained a problem-solving question would be common to a diverse range of design students, something that they often encountered within their course work. They were asked to critique and evaluate the quality of the existing spaces of the Design Centre, and question whether they responded to the needs of the academic population and reflected the creative industries housed within the Design Centre.

The title 'Activating Space' was chosen to suggest the need to set something in motion, to improve or enhance the spaces the academic population inhabited on a daily basis. Each team was asked to 'pitch' their ideas for the refurbishment of these spaces to a 'Dragons Den' style staff and business panel. As an added incentive the winning proposal was to be realised.

This project hoped to capitalise upon three potential levels of collaboration. Firstly collaboration between students from different disciplines offered the possibility for shared theories, different viewpoints and working processes. Secondly collaboration with a business partner, Pendennis Super Yachts based in Falmouth, Cornwall, UK who sponsored the project and brought a 'real world' authenticity. Finally, through exposure to and collaboration with staff who taught a different discipline, and brought an alternative body of knowledge and methodologies to the discussions usually experienced by the students.

5.0 Defining cross-disciplinary working practices: multidisciplinary, interdisciplinary and transdisciplinary

Any project developed within an academic framework has to question and attempt to understand the nature of collaboration and its impact upon the student learning experience. Creating a series of definitions for multidisciplinary, interdisciplinary and transdisciplinary learning and teaching is problematic as they are misinterpreted when they are all viewed as extending beyond their disciplinary boundaries. Starting from the premise that a subject specific knowledge is concerned with an understanding of a discipline and its associated body of knowledge (Ellis in Chandramohan and Fallows, 2009) the qualities of the three terminologies becomes easier to digest. Wall and Shankar (2008) identify the qualities of each in a useful manner discussing 'multidisciplinary' as the least sophisticated form of cross-disciplinary working in which team members remain true to the parameters of their discipline, working in isolation but in parallel with the other members of the team to address a problem or come to a consensus. 'Interdisciplinary' collaboration occupies the middle ground and benefits from increased levels of discussion, communication and the integration of each others ideas and findings. 'Transdisciplinary' collaboration is viewed as the most sophisticated with team members working in a manner that allows them to cross or transcend and blur conventional academic or professional disciplines in the development of a solution to a problem.

Kaufman, Moss and Osborn (2003) come to similar conclusions when defining these three terms.

Multidisciplinary learning is concerned with several disciplines all working on a common problem or issue. Each discipline contributes its subject specific knowledge or methodology whilst remaining true to the perceived parameters of their discipline. There is little integration of ideas from other disciplines. Although interdisciplinary learning starts with the discipline, unlike multidisciplinary learning it attempts to interrelate or integrate the different approaches of several disciplines. These connections help to forge a strong collaborative relationship. If interdisciplinary collaboration still starts with the discipline, transdisciplinary learning and collaboration begins with the problem. Through attempting to resolve or address the problem it utilises an understanding of any discipline that is necessary. It is concerned with holistically viewing the world from many multiple viewpoints.

At the same time, transdisciplinarity works to remove the notion that certain content matter is necessarily owned by any particular discipline, and we do not engage in transdisciplinary studies to meet outside requirements that identify exposure to specific content as the primary goal. Our goal is to find a problem or idea worth studying and bear the visions of multiple perspectives upon it in order to understand it more fully than if we observe it from a single vantage point. (Kaufman et al, 2003, p.158) Ellis (Chandramohan and Fallows, 2009) interprets the three terminologies in the following manner, multidisciplinary learning employs two or more disciplines juxtaposed to each other operating within the limits of their discipline. Interdisciplinary learning in contrast is '*integrationist and consultative*,' (Ellis in Chandramohan and Fallows, 2009, p.7) '*It is increasingly regarded as a learning mode involving the exploration of issues, problems, knowledge and understanding through the integration and synthesis of theoretical or methodological procedures or both which draw upon one discipline and/or challenge conventional disciplinary approaches*'. (Ellis in Chandramohan and Fallows, 2009, p.3). Whilst transdisciplinary approaches: '*evolve(s) its own synthetic, encompassing amalgams of other disciplines' theories and methods as it searches for unifying and comprehensive comprehensions of problems and issue.*' (Klein cited in Chandramohan and Fallows, 2009, p.14). From the definitions outlined it would seem there is a consensus of opinion regarding the definitions of these three terms.

5.1 Multidisciplinary outcomes

Multidisciplinary collaboration is seen as non-integrative, the disciplines work alongside and are juxtaposed against each other but their subject specific theories and processes remain unchanged by the collaborative experience (DeZure, 1999). Initial feedback from the trialled cross-disciplinary project highlighted some interesting parallels with these definitions:

Well we kind of worked out what everyone's good at doing, for example two girls doing textiles are concentrating on doing mood boards of samples of different fabrics that might work with the construction that we are making. Whereas myself and Becky, the other 3D designer, have been sort of coming up with furniture design ideas that could be working in with the project . . . and then the spatial designers have been making models and drawing things up on the computer of the finished idea. (Post project student interviews)

These students reinforce Wall and Shankar's (2008) notion of 'multidisciplinary' being the least sophisticated form of cross-disciplinary working. This project team comprising of 3D, Textile and Spatial students on one level remain true to the parameters of their discipline, working in isolation but in parallel with the other members of the team to address their common solution to the project.

5.2 Interdisciplinary outcomes

The perspectives of other disciplines will enhance and enrich the discipline being studied but always within the context of subject specific knowledge. Interdisciplinary collaboration in comparison theoretically involves individuals or teams that are transferring and integrating theories and methodologies from two or more disciplines. This form of collaboration is viewed as applying knowledge, principles and values to more than one academic discipline simultaneously:

... getting to meet people, get to know other disciplines, that was a really good experience. .. and you were made aware of how other courses are run quite differently and because they are run differently, for you get different mindsets and different ideas coming through that you wouldn't expect from ... and even having different tutorials from their staff from different disciplines was really interesting how you can approach it differently. (Post project student interviews)

It appears that these students have moved outside the perceived 'tribal' boundary, as outlined by Becher and Trowler (2001) of their discipline by embracing a more 'Interdisciplinary' approach. This has allowed them to cross an academic discipline in the development of a solution to their project proposal.

5.3 Transdiciplinary outcomes

Transdisciplinarity can be interpreted as a synthesis of two or more disciplines, that informs discussion and integrates both in the search for a solution that cannot be addressed through using a single disciplinary approach. Nicolescu (1996) extends this view and characterises transdisciplinarity concerns as a sharing of knowledge:

As the prefix 'trans' indicates, transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all discipline. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge.

(Nicolescu, 1996, p. 2)

This suggests that transdisciplinary working aims to move beyond the limits of any subject-specific discipline, instead it aims to take into account the many unique ways of seeing and interpreting the world that other disciplines can offer. It identifies and uses as appropriate whatever knowledge is necessary when attempting to come to a conclusion about a specific question or problem. For example there is evidence that a student from textile design is starting to think outside her own discipline by embracing the concerns of 3D and spatial design by considering the life span of their design proposal:

I have never thought about interaction within my own work like collaborative, working with other people, this has actually been for people and I think that's something I have never really thought about before and also thinking about social things . . . it has made me thing differently . . . because we've been looking at something that's quite interactive . . . it's

become less about aesthetics and more about something that's going to be used by someone, we've thought about life span. (Post project student interviews)

So there is strong evidence of multidisciplinary and interdisciplinary collaboration with some evidence that transdisciplinarity has been embraced within the single culture of design at an undergraduate level. However it is worth noting that the wining team, who were asked to progress their proposal have had enough time to begin to understand the professional world of design and have embraced marketing, engineering and sponsorship to resolve their design proposal more successfully. Evidence of transdisciplinarity needs to be more unequivocal than the co-authors have evidenced so far, but the project forms a basis for further research and development.

Following something through right from the very start to something possibly being fully built, that's a really good opportunity of working closely with Pendennis, local businesses. I think its been invaluable following it through and realising how many things you have to do, like hoops you have to jump through, it has been quite a long process but then it is just a really good learning curve to see what you have to do to follow something through. It's made me more aware of what is involved in taking something through from an idea to something that's completed, it teaches you that you need a lot more skills than just come up with an idea, you need to be able to go and meet a lot of people and have quite awkward conversations.

(Post project student interviews)

6.0 The project 'pros' and 'cons'

The UK's Higher Education Academy's Interdisciplinary Teaching and Learning Group has published on this topic and brings together both definitions and case studies of students experiences of interdisciplinary teaching and learning. Of interest are the commonly experienced 'pros' relating to the development of critical skills, of being able to move beyond a single subject knowledge through the ability to make connections and integrate knowledge from other disciplines and how this leads to increased employability. McEwan, Jennings, Duck, and Roberts, (2009) cite Dalrymple and Miller in support of this view:

Interdisciplinarity encourages 'multilogical' thinking – the ability to think accurately and fair-mindedly within opposing points of view and contradictory frames of reference. It is exactly these high level analytical skills that employers are often looking for rather than a discipline-specific expertise. (McEwen et al., 2009, p. 22)

This view was supported by student post project interviews:

The first positive thing about the project was definitely the interaction between different courses . . . getting to meet people, get to know other disciplines, that was a really good experience . . . and you were made aware of how other courses are run quite differently, and because they are run differently you get different mindsets and different ideas coming through that you wouldn't expect . . . and even having different tutorials from their staff from different disciplines was really interesting how you can approach it differently so that was really good . . . its obviously a positive to have a design realised we are all completely over the moon that its happening. (Post project student interviews)

And the 'cons' when implementing such an approach '... know [sic] there was a couple of students that maybe had negative responses to it and I don't know how you can make it good for every one ... its really difficult'. (Post project student interviews) 'The time scale is only a week so you don't have much time to learn new skills'. (Post project student interviews)

Although this is discussed from the point of view of interdisciplinarity it could equally apply to all forms of cross-discipline working. McEwen et al (2009) draws on Bradbeer to highlight the problem of overcoming different learning styles of both students and staff from different disciplines in successfully implementing an interdisciplinary approach: *Problems in working across disciplines, problems of working in different disciplines and problems in synthesising different disciplines.* (McEwen et al., 2009, p. 21)

These problems can be interpreted as discipline differences in terms of frames of reference, methodology and the use of a specific language. Becher and Trowler (2001) recognise that staff often defend as 'academic tribes' the status quo through both clustered departments, for example design, media or art, and more often, the individual disciplines that they occupy.

7.0 Conclusion

Through the planning and implementation of the project and the subsequent research the co-authors have gained an understanding of the nature of multidisciplinary, interdisciplinary and transdisciplinarity. The three approaches are all valuable in terms of synergy but they are hierarchical in terms of the breadth and depth of collaboration and thinking attained outside of a specific discipline.

As a pilot for an optional unit of study within a proposed new undergraduate framework for UCF the project, supported by Learning and Teaching resources, is seen as a pivotal step to embedding collaboration within the formal structure of the institution although questions remain of; what we are

aiming for and how we might define and assess learning outcomes. It is also important to inform the participants, students and staff, about the nature of multidisciplinary, interdisciplinary and transdisciplinarity as a mode of thinking, exploring and analysing. The project also exposed some reluctance to question the boundaries of a specific discipline and further work is needed to establish how this could be overcome.

In many ways this project has been a natural development within a School of Design with courses that share commonalities of culture and methodology. The real test, in the short and medium term, is to broaden the constituent to include the disciplines of art and performance and media and it will be interesting to establish whether a broader network of participants will enable a transdisciplinary experience. In the longer term there are opportunities to develop cross institution collaboration involving quite disparate disciplines which we can apply a developing theoretical base to.

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Design, Science and Engineering Collaboration for Developing New Materials and Technologies: a Case Study of Outdoor Café Furniture.

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Abstract:

Research and development of new materials and technologies has traditionally been dominated by scientific and engineering disciplines. However, methods are emerging that integrate design into the process to accelerate timeframes, lower risk and improve market uptake.

Within an Australian context, the Collaborative Research Centre for Wood Innovations integrated design with engineering and science in the initial stages of new materials development for Microwave Modified Timber.

This paper will explore how different modes of operation for industrial design were necessary to successfully engage in this cross disciplinary research environment. The research strategies developed, non-traditional activities employed and alternative application of industrial design processes will be discussed using a case study of outdoor café furniture.

The research shows new ways of working for industrial design were effective, allowing design to drive research and align material properties with real world product need. It also suggests the strategies are transferable to other kinds of new technology development.

Keywords:

New materials and technology development, collaboration, industrial design, design research methods, Microwave Modified Timber technology

1. Introduction

The following paper explores how contemporary new materials and technology development has shaped new ways of practice for industrial design. It is positioned in the context of an Australian research environment where design, science and engineering collaborate. This discussion is facilitated by PhD research for new Microwave Modified Timber (MMT) materials provided by the Cooperative Research Centre (CRC) for Wood Innovations.

Firstly background information will be presented on new materials and technologies development, considering general trends and methods for integrating design. An explanation of CRC Wood Innovations and MMT will also be offered before discussing specific details of the research pertinent to new ways of practice for industrial design. Strategies developed for integrating design within the

given context are detailed before introducing a case study of outdoor café furniture which provides a platform for exploring the roles of non-traditional design activities, alternative applications of industrial design processes and design thinking. The conclusion will then summarise the effectiveness of new industrial design practices within the given context, suggest that the strategies developed would be useful for other new materials or technologies development.

2. New materials and technology development and the integration of design

2.1 Trends in new materials development

Today the world is flooded with a vast choice of different materials with new options being developed everyday. In order to be successful on the market, it is becoming necessary to offer a *variety* of beneficial properties. This evolution is evident in elite new materials development. Polymer composite development has always been driven by aircraft needs for lighter, stronger and stiffer materials, however material performance is no longer the sole motivating factor. Affordability has now become important (Wessel, 2004). The development of composite materials based on natural, fibrous resources also demonstrates this trend. Maderon was created to use waste almond shells, so by origin, it's primary purpose is to offer a sustainable material choice. The successful uptake of Maderon was also a result of a range of other useful properties including low cost, ability to be injection moulded like plastic, ranging densities and the ability to be heatproof treated (Antonelli, 1995).

Knowing what materials and technologies exist and are best suited to product design applications can be difficult with the almost limitless options available. This issue is acknowledged by the rise of materials libraries around the globe in the last decade. Material libraries such as *Material ConneXion*, *Innovatheque* and *Materio* (Innovatheque, 2005; Material Connexion, 2005; Materio, c.2006), are organisations that exist purely to disseminate information about new material sand manufacturing technologies through physical, see Figure 1, and online collections. The growing need to link new materials or technologies with real products is also evident in materials that exist but have no application, such as Ligafill (Stattmann, 2003). This ceramic sheet material has an aerated core providing lightness in weight, heat resistance and excellent stiffness, but when published in *UltraLight, Superstrong: A New Generation of Design Materials*, it had no current applications (Stattmann, 2003).


Figure 1. Innovatheque materials library in Paris (C Thong, 2005)

2.2 Integration of design into processes for new materials and technology development

In the last decade there has been an emergence of methods for developing new materials and technologies that integrate design. While the origin of these methods is varied, they all use design with for the same purpose: to increase the probability of commercial success.

Philips developed a "Strategic Futures" methodology that generates product concepts in response to forecast socio-cultural trends and technologies. The idea behind this method is to appropriately focus product innovation and therefore sustain Philips competitive position in the market place. Another advantage of the method is helping to determine the validity in investing to develop the projected technologies (Phillips Design, 1998).

Research and development at Motorola have also use similar methods to Philips. The *New Life Forms* project proposes concepts for telecommunication devices based on predictions for future lifestyles and technologies. Motorola found this process to provide lower risk in developing products and technologies than through use of traditional product development (Susani, 2002).

For both Motorola and Philips, display of prototypes and consumer feedback were integral, multidisciplinary teams featured and traditional product development sequences were not adhered to (Phillips 1998, Susani 2002).

In the area of composite materials development, the Defence Advanced Research Projects Agency, a subsidiary of the US Department of Defence, has developed an Accelerated Insertion of Materials (AIM) methodology. The purpose of this method is to use resources more efficiently by using design to establish required material properties in the initial stages of materials development. Other important features of the method are the use of predictive modelling and simultaneous property development. This reduces risk, time and therefore cost (National Research Council U.S. 2004). AIM methodology

is particularly strong in reducing timeframes, producing up to 50% reduction in cycle time according to research partners GE (AIM methodology, 2005).

Accelerating materials development timeframes can also be achieved by linking new materials and product applications. Musso suggests that the strategic market positioning of new materials in product application can reduce commercialisation timeframes (Musso, 2004).

3. CRC for Wood Innovations and MMT technology

3.1 The collaborative research environment provided by CRC Wood Innovations

Cooperative Research Centre's are an Australian initiative where research partnerships between academia, industry and government are formed over 7-14 yr periods.

CRC Wood Innovations was formed to address an increasing trade deficit experienced by Australia's forestry and furniture industries. Based around the technology of MMT, the purpose of CRC Wood Innovations is to develop new and improved options in timber materials and manufacturing processes. The collaboration involves science, engineering and design research from a number of institutions and organisations around Australia. Some of the main partners include the University of Melbourne, Swinburne University, Commonwealth Scientific and Industrial Research Organisation, Queensland Department of Primary Industries, Western Australia Forest Products Commission, Carter Holt Harvey, Furniture Industry Association of Australia and Furntech.

3.2 MMT technology and derivative new materials

Microwaving timber alters the properties by creating a series of voids throughout the material. CRC Wood Innovation provides a technology that can control this process. By varying the intensity of the microwaves, the size of the voids can be controlled. Increasing the intensity creates relative increases in void size, which may vary up to approximately 5mm in size.



Figure 2. Cross sections of MMT samples showing barely visible and large voids

Properties of MMT include increased porosity, lightweight, reduced strength and possible acoustic and thermal characteristics. The increased porosity means that MMT can be turned into a composite material by filling the voids with another material. New materials development for MMT looked at impregnating resin to create a new material, see Figure 3, where the properties could be tailored according to resin type and timber species. Selection of timber species is particularly important as it's base structure is still inherent. This type of material was named Vintorg and is the material the PhD research is concerned with. Vintorg has a number of generic characteristics such as increased strength, density and dimensional stability. Many other properties could be tailored, including durability, appearance and surface hardness. With such variation in material properties possible, Vintorg development needed focus.



Figure 3. Vintorg sample showing dark flecks of resin that have filled voids

4. New ways of practice for industrial design

4.1 Strategies developed for integrating design, science and engineering research in CRC Wood Innovations

A *Pre-commercial Technology-Push Design Strategy* was developed in order to facilitate collaboration between science, engineering and design to develop new materials in CRC Wood Innovations. Taking into consideration approaches of existing methods, the framework for the strategy was formed in response to the current stage of progress in materials development for MMT (Anderson, et. al, 2004).

The Strategy has three stages. The first two are embedded in the initial stages of development, see Figure 4, and the third deals with product adoption and final stages of commercialisation. Due to the progress of Vintorg development, the PhD research did not have the opportunity to proceed to the third stage so it will not be discussed in this paper.

The first stage, *Contextual Parameters*, uses industrial design thinking to choose an appropriate case study that will give real world focus to the type of Vintorg to be developed. Case study selection is based on current material knowledge and the product/applications capability to generate knowledge of material characteristics for other types of Vintorg. Aligned with the product requirements of the case study, performance criteria for property development are specified as a goal for science and engineering research.

The second stage, *Iterative Research*, provides framework for collaborations between research conducted by design, science and engineering. Research in the different areas occurs simultaneously, informing and responding to one another in iterations. The different design activities that stem from and feed into design research can be seen in Figure 4.



Figure 4. Diagram explaining the first two stages of the Pre-Commercial Technology-Push Design Strategy

4.2 Outdoor café furniture case study

A case study to design outdoor café furniture was selected to develop a specific type of Vintorg, *Café Vintorg*. This was appropriate as outdoor café furniture would exploit many of the potential properties of this new material and push them to their limits because of the extreme conditions it must endure. This detail is important as *Café Vintorg* would therefore generate property knowledge for other types of Vintorg and determine types that are in fact appropriate.

The case study resulted in the design outcome of the *Matchstiks* chair, show in Figure 5. It addresses real product requirements of outdoor café furniture by featuring the ability to space save through stacking, portability through lightweight, durability, contemporary aesthetic, appropriate ergonomics, modularity and variation in finish. The validity of the design to successfully meet these needs was confirmed by feedback through display of aesthetic models at trade shows and virtual testing through Finite Element Analysis (FEA).

The *Matchstiks* design embodies the contributions of design research, as it is a culmination of the different modes of practice industrial design employed that will be discussed in the following sections.



Figure 5. Aesthetic prototype of the Matchstiks chair showing different options for the seat.

4.3 Alternative application of industrial design activities

The nature of design research in the Pre-Commercial Technology-Push Design Strategy itself shows an alternative application of industrial design activities as it is working towards developing new materials instead of new products. Through implementing the first stage of the design strategy, industrial design thinking is used to determine the parameters of the case study and drive research direction.

Industrial design processes were also used to determine different types of scientific and engineering experiments. Through concept generation, questions were raised about the possibility of various characteristics that would be of value to the case study product. For example, in the design of the *Matchstiks* chair, concept generation explored the possibility of coloured appearance as outdoor café furniture typically offers options in appearance through varying material and finish. Concept work also proposed what the coloured appearance of Vintorg may look like, see Figure 6. In response to this, scientific experiments were undertaken to investigate the effects of adding unnatural coloured pigments and dyes to the resin used in Vintorg production. Results of these experiments confirmed that a flecked appearance was created, see Figure 7, and therefore greater knowledge on appearance options achievable in Vintorg was generated.



Figure 6. Sketches proposing coloured Vintorg



Figure 7. Samples from coloured resin experiments showing a flecked appearance

Through concept generation, refinement and detail design, guidelines for how to design with Vintorg would also be generated. Through following these design activities for the *Matchstiks* chair, further understanding of joints that are appropriate in Vintorg were generated based on a strong understanding of material characteristics. Increased strength is achieved through a higher density at the material surface of Vintorg. As a result, to design with Vintorg you must to utilise standard section sizes and detail joints that do not interfere with surface properties. The open mortise and tenon joint with loose tenons, shown in Figure 8, are ideal as machining of the surface is uniform. This also shows another element of Vintorg development that design activities informed: standard sizes and cross section profiles that are be best suited to product application.



Figure 8. Sketch explaining open mortise and tenon joint that features uniform machining and pressed to size Vintorg sections.

Sequencing and timeframes of different industrial design activities also varied from those generally observed in product development processes. Time taken to progress from initial concept generation to detail design was much longer due to the lengthy periods required to properly carry out scientific experimentation and engineered testing for Vintorg. Integrating findings from science and engineering also meant that concept generation was often revisited or not progressed beyond according to property

testing. For example, concepts proposing a Vintorg sheet material in seating and table top surfaces were refined to the stage of mock-ups, but were abandoned after material experiments determined a sheet format for Vintorg as unviable, so concept generation continued.

4.4 Engaging in non-traditional industrial design activities

Design research in the PhD not only helped to define scientific experiments and engineer testing as discussed in the previous section, it also actively engaged in these processes. Industrial design research participated in a range of different activities contributing towards experiments and testing of Vintorg, including the design of experiments, conduction of experiments and assistance with Vintorg sample production. The participation in these science and engineering based practices gave a deeper understanding and insight of Vintorg characteristics, enriching design research's ability to respond to material findings. For example, participating in the experimentation for coloured Vintorg, see Figure 9, gave insight to the way resin impacts surface properties of the material. Without participation, this understanding would not have occurred. Without this understanding, propositions for appropriate jointing techniques for Vintorg, described in Figure 8, would not have been possible.



Figure 9. Experiments for coloured Vintorg in progress: treating samples with resins

5. Conclusion

Different modes of operation allowed for industrial design research to effectively contribute towards new MMT materials development. Alternative uses of industrial design processes allowed for design research to respond appropriately to material findings in science and engineering. It also allowed design to drive research directions that would ensure material properties remained focused on addressing real world product need. Participation in science and engineering based activities provided a deeper understanding of material knowledge. This enriched design activities, maximising their contribution to materials development. Developing a Pre-Commercial Technology-Push Design strategy was integral in keeping all the various research activities cohesive. The research suggests that this framework would be transferable to other new materials or technology development that have many variables and is in the initial stages of development.

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Dialogue between Research and Artistic Work in Writing a Children's Book

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Abstract

Artistic work and research can act in dialogue in many ways. This presentation concentrates on the dialogue between research and artistic process. It is a case study analysing the different roles of an artist-researcher in writing a children's book. My preliminary understanding is that, through closer examination, the artist-researcher will become more aware of her ontological and epistemological stances. First, I will briefly outline the background and progress of my project. Thereafter, I will study how research knowledge was used in artistic work. Finally, I will examine what kind of understanding this analysis gave me about the transformation process of the story. By using research material I have created a set of criteria to examine the "truthfulness" of the fictional world that I describe. Furthermore I will analyse the different meanings of the very core concept, the story itself, in different contexts. The relevant contexts are defined in the article as different transformational stages of the same story.

At the time of finishing my most recent children's book (Timonen, 2008) *Kummitukset kintereillä* ['Ghosts At Your Heels'] I realised that during the entire process there had been a dialogue between research and artistic work, and that to understand this fact might be of significance to my future work. I will next examine how research and artistic activity were integrated within this process and how I observed the phenomenon. At the end of this paper I will examine what the dialogue between research and artistic activity gave me as a researcher and author. The nature of this article can be defined as auto-ethnographic case research, in which the research results and methodology of folklore studies play an important role.

In art and design studies, practice-based research (Barrett & Bolt, 2006) (later practice-based research) has qualities that resemble ethnological or anthropological research. Ethnologists examine, interview, observe, and ask questions from their informants in order to understand their ways to structure the world and be part of it. Their research problems and methods evolve and become more accurate during the research process. (Blomberg, Giacomi, Mosher, & Swenton-Wall, 1993; Hammersley & Atkinson, 1995)

In this context practice-based research means that the artist-researcher may interview, observe, and ask questions of him or herself; analyse and arrange the world of conceptions, beliefs, and objectives related to his or her artistic production; and finally examine how these background commitments and goals are realised in artistic activity. In practice-based research the research problem, research data and methods are all generated in the course of the author's work. The researcher is an integral part of the research process and of the research problem itself (Hannula, Suoranta & Vaden, 2005). Following Maureen Thomas (2004,1) practice-based research here covers both practise-based research and practise-as-research. It has a hermeneutic research interest and could be referred to as auto-ethnographic research.

At best, the author-researcher is thus able to use her own work to see something that would otherwise remain unnoticed by the research community and to bring out some features, attitudes, expectations, and working methods of the culture of action. In the cases of both practice-based research and more traditional research, it is the research community that assesses – using normal scientific criteria – the research results and the applicability of the information (Hannula, Suoranta & Vaden, 2005). I expect to provide an example of the way in which practice-based case research can be used to convert the implicit knowledge of an individual actor into explicit, visible knowledge that can be assessed by the scientific and artistic communities (Anttila, 2005; Koski 2005).

Process Description

Traditional ghost stories reveal the worldview of the storytelling communities and their multilayered cultural heritage (Sarmela, 1994). Along with my folkloristic research I have written ghost stories for children using different media (Timonen, 1984, 2002). While writing the manuscripts for an animation series for the Finnish Broadcasting Company, I noticed that writing ghost stories in a safe, children's programme format was problematic in many ways. I downplayed the creepy themes and minimised the supernatural content of the stories. Perhaps my own disappointment was one of the reasons that I soon started to study the theme again.

At the very beginning of the process, research literature fulfilled a dual role. On the one hand, I gathered related information, and on the other, I searched for inspiring metaphors and themes among research and archive material. I outlined various plots and suitable action environments and designed characters for them. I decided upon the number of stories the book would have, how many would be funny and how many creepy. Thereafter, I assessed the thematic representation of the stories at the planning stage with respect to the archived material. I also assessed the world the stories would convey, that is, the shape that the internal world of the fiction would assume with its beliefs, worldviews, and everyday chores.

By the time of finishing the first drafts, I had made a number of changes to my original plan, though the concept by and large matched the initial idea. In the last phase I made endless improvements, compared different alternatives, and polished the style.

During the writing process I tried to keep in mind the media and target group. The target group required an awareness of sentence structure, story length, and the cultural environment of the receiver. In the end, however, I was so strongly inspired by the themes and the world I had created that I did not long for company other than my fictive characters – no imaginary reader was needed or, indeed, welcome.

There are some issues in the creative process that are quite analytical and systematic. However, my process was often chaotic and spasmodic. The organisation of the project was enhanced by the systematic work mode and by my familiarity with the background material. The level of chaos was probably increased by the mist that shrouds all creative activity. I typically cannot clearly articulate the actual objective of a project before the process has been completed. I used to define a project's goal or

goals that turn out as sub- or interim goals at the end. The actual objective hides behind the interim goals. Not until the work has been finished does it reveal itself. The naked simplicity of the revelation is often confusing.

The encounter of research and creative work

Research within the field of art and design is largely based on research focusing on art or design processes. The field of art and design is, however, characterised by the creation of something new. Therefore, a significant proportion of the research is aimed at design itself, to improve the means available in creative activity and production. In addition, research into art and design is characterised by research accomplished through artistic work. One of the important goals of this type of research is to generate concepts through which artists themselves can systematically process and analyse their processes and to make tacit and intuitive knowledge, skills, or methods visible. (Biggs, 2002, p.23; Cross, 2001, pp.54-55; Scrivener & Chapman, 2004, pp. 7-8 as cited in Mäkelä & Routarinne, 2006, pp.10-24)

There is great variation in the profoundness of different authors and artists in terms of the extent and detail of the studies they use in the construction of fictive worlds. This activity – the collection of the building blocks of fiction – is its own kind of research work as well.

In my artistic work research-based knowledge played a major role in a creative process. The research points here at the building blocks of the world of fiction, which in this case is an imitation of ancient rural Finland, the beliefs of which I try to give a living and accurate picture. The methods of folklore studies play a role in the process through which I gather material and themes from archives, as I have a background in folklore research. Thus, on the basis of research material, I have created a set of criteria to examine the "truthfulness" of the fictional world that I describe. As I have stated in my thesis (Timonen, 2004), the most important such criteria are the distinctive features of 1) time, 2) place, 3) society 4) worldview of folk beliefs and the logics of supra normal beings (Figure 1.).

- My stories based on belief legends are only rarely situated before the 18th century. Most of the archive material describes life as it was in rural areas of Finland during the 18th century and at the beginning of 19th century. In this context, however, it is worth mentioning that the beliefs themselves are, of course, of far older origins.
- 2. I situate my stories in the same geographical and cultural areas where the original

stories were told and registered. Hence my stories mostly take place in rural areas and they illuminate different aspects of rural culture with its associated local, temporal and social features.

- 3. Archive material reveals that folklore and stories differentiate between communities, according to, for instance, gender, profession and age (Virtanen & DuBois, 2000). For example, among hired men, stories about creepy and nasty hosts were popular. Similarly stories about lazy hired men were well known and of use among their hosts (Jauhiainen, 1999). The original context is worth being taken into account when creating stories on this basis.
- 4. I attempt to transfer the worldview of folk beliefs and the different logics of supra normal beings correctly regarding their main features. For example, in belief legends there are typical reasons and ways why and how the curtain between this world and that world rises. Furthermore different supra normal beings did not appear at the same time in the original belief stories. Each of them had a special role in relation to humans and the most important question upon meeting one was, why did they appear, what was the message being carried from the other world (Jauhiainen, 1999; Sarmela, 1994; Timonen, 2004). This is why ghosts, goblins and water spirits never appear in the same instances in my stories either (Figure 1).

Figure 1. Criteria for the truthfulness of a story based on archived belief stories - distinctive features



Figure 1. Criteria for the truthfulness of a story based on archived belief stories - distinctive features

From the point of view of reaching artistic goals, the quality and nature of sources used in the construction of fiction is of no relevance. We are dealing with the examination of artistic tools, methods, and processes, which is not a normative activity in the sense that it may provide instructions.

The source material in my work consists of stories and beliefs that have been collected from agrarian communities and analysed by researchers of folklore including Haavio (1942), Kuusi (1963), Siikala (1990), Virtanen & DuBois (2000). In terms of intellectual content, it is for this part a hierarchical bottom-up process comprising a huge amount of information of different types ranging from the straightforward one-liners of farmers to cool abstractions of semiotic theories and models.

Authors and artists regularly conduct background work when dealing with new projects. In my case, however, it would be wrong to delimit the meaning of research to artistic background work. Research has also functioned as an impulse for creativity by opening up the spectrum of beliefs behind ghost stories and their vast temporal dimension. With our cultural heritage we reveal material on beliefs that has accrued over thousands of years. In the same way as cosmologists can unveil the staggering temporal continuum of the universe, authors and artists can also uncover an age-old cultural heritage with their artefacts. In each case, the past turns into experiences and understanding in the present.

In practice-based research the common problem arrangement guides the progress of the research and artistic process. It follows that research and the creative process go hand in hand. Hand in hand does not, however, refer to simultaneity. As Inkeri Sava has commented, a person cannot watch a swimmer from the shore and simultaneously be that swimmer (Sava, 1998, p. 104). Research and artistic activity can be intertwined and feed each other throughout the process in many ways. Turkka Keinonen (2006, pp. 40-59) has modelled eight different ways in which artistic activity and research come together. Based on my thesis and the scriptwriting process outlined above, I am able to identify the following examples in Keinonen's model: research interprets art and art research; research is brought into the context of art and art into the context of research; and research and art contribute to each other in a process-like manner.

When dealing with folklore, the background is always occupied by the voices of people, the metaphors and worldviews of narrators, and the skills and intentions of recorders (Anttonen, 2005). Kerstin Summatavet (2005) has studied Estonian folk art in creating her jewellery art. She demonstrated that the women she interviewed had two ways of using traditional Estonian ornament models: one was to repeat them and the other to construct new patterns within the frame rules and variation conditions set by them (Summatavet, 2005, pp.152-154). Adding the concept of bricolage by Lévi-Strauss (1966) and DIY artists (Granö, Honkanen & Pirtola, 2000) to this information leads to an equation that I recognise as my own. Lévi-Strauss referred to those persons within a common cultural tradition who created new products from the materials of surrounding culture, whereas DIY artists could be understood as contemporary bricolages. I find myself in a domain (Figure 2.) where the different

representations of folk art and children's culture are combined with research into culture and creative work.

Figure 2. The background of the creation process of *Kummitukset kintereillä* [Ghosts At Your Heels] (Timonen, 2008)





The role of folklore as a bridge between past and present has been defined as "an antiquity, the related idea of the past as a lost community and folklore as its ruins" (Anttonen, 2005, 93). The different versions of the same story in the archives and their afterlife in the media leads to the question of how these appearances should be defined and what is their significance. After I had finalised my manuscript I began questioning the role the research had played during the fiction writing process. One important finding was that even the very core concept of the story was used in a variety of different meanings, related to each context. The key element was the transformation from one context to another. I sketched the transformations of a story as following: A story

- 1. as a part of communication in the everyday life of a past rural society,
- 2. as archive material, an item in the collections of a cultural organisation,
- 3. as a message being distributed through modern media book, TV, Internet etc.

These three manifestations describe the story as a part of communication between the members of the community, the archive being the bridge between different stages or forms of the culture. A story is understood as an independent object living its own life.

 as an object of research – for example semiotic, narrative, historic or even economic. Stories as objects of scientific research, analysed using methods accepted by the scientific community.

Stages 1 to 4 describe the story without any necessary connection to its author or creator. Research may – and often does – use the history or intentions of the writer, but by its very nature traditional research tends to assume an outside look, an "objective eye". Contrastingly, the following two stages have a direct connection to the intentions of the writer and his "inner look".

5. as a message that the writer wants to transmit, as imagined and aimed content. This is illuminated by the intention and wishes of the writer. These goals are, of course, restricted by both the resources and capabilities of the writer himself and by external factors such as the media, a publishing policy, etc. The meeting of the intentions of the writer and these external restricting factors brings us the story as

6. a part of the writer's strategy

In this case the story is analysed as an item or part of a larger plan, be it implicit or explicit. In order to be successful the writer must take into account the criteria of publishers, public taste etc., the conditions under which the story may be spread to the public. In my earlier studies (Timonen, 2004) I have, for instance, concentrated on the question of which kind of filters are used in creating new fiction for children on the basis of archive material – ideological, pedagogical, genre-related, economic, audience-related, publishing policy. Facing these challenges in a systematic way creates a strategy, which is necessary or at least useful to any artist in today's competitive environment.

Conclusion

I consider my work as part of a continuum in which generations use their cultural theme repository to construct new stories utilising the means provided by contemporary culture. People from different eras tell stories about the same topics, in this case the relationship between the living and the restless dead, using the means of narration available in their surrounding culture. As an author I construct a believable world within the frame of the internal rules of fiction. Gradually, the actors and environments of this world become familiar to readers, no matter how distant and illogical the actors of fiction are. Fiction opens the past and the future for us; it anchors us under the starry sky, together, with our fears and hopes.

This research provided me with material from which to construct fiction. It also increased my certainty regarding the fact that my interpretations of the past, of people's everyday life, beliefs, hopes and fears, were basically correct. This certainty was essential for the coexistence of my researcher-artist identity.

From the point of view of folklore studies, it is evident that fiction based on archive material differs in many ways from the source material, in this case the belief legends employed. Comparison of the original belief legends and my new arrangements gives us the following results:

- The original laconic, demonstrative style (Kuusi, 1963) has been changed into something more descriptive, something aesthetic with a flavour of humour. The fingerprint of the author is visible.
- 2. Short oral stories, consisting of one episode only (Jauhiainen, 1999), have generally been modified and widened. New stories contain several episodes belonging in the same cultural context.
- 3. The motives, feelings and moods are only seldom described as psychological processes in oral stories, rather the narration concentrates on action (Jauhiainen, 1999). My new arrangements open a window to these inner processes as well.
- 4. Belief legends were a part of oral tradition and are communicated between the members of the community (Sarmela, 1999; Virtanen & DuBois, 2000). My written versions are distributed via different media as books, audiobooks, on TV or via digital media.
- 5. Folk stories do not have a known author or writer (Virtanen & DuBois, 2000). My modern arrangements are copyright protected independent works and can be published and used only with the writer's consent.
- 6. Children were not the main audience of the original belief legends, which were aimed at adults (Jauhiainen, 1999). I have lifted the children from the margins and made them the main target group. Also, the main characters in my stories are often children.

The worldview of belief stories and that of today are similar in the way that they share the same eternal themes such as love, the wish to succeed, livelihood, conditions of life, family relationships, friendship, safety and man's place in the universe. Interestingly, what is different is man's relationship to nature, for example the role of hunting or forest, the dichotomy of man and nature in general. There is a big difference regarding the role of supra normal beings in life, the way poverty threatens people, how sickness is faced and understood – fate was not in the hands of humans as we seem to think it is today.

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Modelling Sustainable and Optimal Solutions for Building Services Integration in Early Architectural Design

Confronting the software and professional interoperability deficit

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Abstract: Decisions made in the earliest stage of architectural design have the greatest impact on the construction, lifecycle cost and environmental footprint of buildings. Yet the building services, one of the largest contributors to cost, complexity, and environmental impact, are rarely considered as an influence on the design at this crucial stage. In order for efficient and environmentally sensitive built environment outcomes to be achieved, a closer collaboration between architects and services engineers is required at the outset of projects. However, in practice, there are a variety of obstacles impeding this transition towards an integrated design approach. This paper firstly presents a critical review of the existing barriers to multidisciplinary design. It then examines current examples of best practice in the building industry to highlight the collaborative strategies being employed and their benefits to the design process. Finally, it discusses a case study project to identify directions for further research.

Keywords: building services, decisions, integration, multidisciplinary, design modelling

1. Introduction: Services Integration in Early Architectural Design

Given contemporary awareness of global environmental concerns, the imperative to reduce energy consumption and associated carbon emissions can no longer be ignored by stakeholders and practitioners in the Architecture, Engineering, and Construction (AEC) industry. The effects of global warming demand that increasing attention be given to the procurement of buildings that are more sustainable in both their construction and operation. Despite this, building services, one of the major components of energy usage and cost, are rarely considered as even constraints in the early stage of a design, let alone as potential driving factors for form and spatial configuration.

Presently, on a global scale, the buildings sector is responsible for 33% of all energy-related carbon dioxide emissions (Intergovernmental Panel on Climate Change, 2007). Furthermore, in Australia, 18% of the nation's emissions can be attributed to commercial buildings (Intergovernmental Panel on Climate Change, 2007), with the ongoing operation of heating, ventilation and air-conditioning

(HVAC) systems accounting for over 60% of the energy consumption responsible for these emissions (Department of Sustainability and Environment, 2006). However, it is atypical for the implications of either passive or active thermal comfort strategies to be explored in any detail in the early modelling of a building proposal, despite the possible environmental and financial benefits that stand to be gained from this approach (Drogemuller, Crawford, & Egan, 2004). In order for the form and geometry of buildings to be considered in response to performance-based considerations, such as energy efficiency and building services optimisation, multidisciplinary integration is required in the early stages of the design process when the proposal is still flexible and malleable (Tavares & Martins, 2007).

In this paper, the term *interoperability* refers both to the technical ability to exchange and use information across a system, as well as the capacity of professionals in diverse organisational structures to work together. This social capacity to *inter-operate* is vital in *performance-based design*, where the building form is not developed solely according to architectural considerations, but is instead generated in response to performance factors such as energy consumption and comfort control strategies, and requires simulation and analysis throughout the design process to be evaluated effectively (Kolarevic, 2003). The idea of performance-based design is considered distinct from the concept of *building information modelling (BIM)*, which has a more technological basis and is defined as the development of a digital representation of the physical and functional characteristics of a facility, serving as a shared knowledge resource for information that is more than simply data concerning geometry (Aranda-Mena, Crawford, Chevez, & Froese, 2009).

2. Barriers to Multidisciplinary Collaboration

The increasing complexity of sustainability and building performance issues requires multidimensional tradeoffs across a range of disciplinary objectives, rather than simply experiencebased guidance towards a solution (Clevenger, Haymaker, & Swamy, 2008). This necessitates a shift away from present information-oriented methods, toward process-oriented methods that encourage a dialogue between all parties involved, in order to formally and accurately capture design intent and information interdependencies for exploration and optimisation (Haymaker & Suter, 2006). Both architects and engineers must learn how to modify their tools and their skills to accommodate the significantly different types of knowledge and work processes being brought together (Frazer, Tang, & Gu, 2001). Only by engaging in this manner can an integrated, collaborative design process emerge that has the capacity to resolve performance and design constraints simultaneously, and subsequently catalyse innovative building solutions (Holzer, Tang, Xie, & Burry, 2005). However, there are a number of social and technical barriers inhibiting multidisciplinary design collaboration, most of which are focused around how and when information is shared between the different parties involved in the delivery of a project (Haymaker et al., 2006). To date, research has tended to focus primarily on finding solutions to only the technical problems, specifically, looking to improve issues of interoperability through the refinement of data exchange standards and customisation of application programming interfaces (Boddy, Rezgui, Cooper, & Wetherill, 2007). One of the fundamental downfalls of this approach, however, is that the design tools that have emerged from this direction of enquiry tend to favour documentation and management tasks that arise once the design of the building is already substantially underway (Lawson, 2005).

The subsequent result is that the current suite of computational tools available to designers are lacking in their ability to support decision-making and supplement tasks associated with resolving interdependencies between performance criteria and form in the early stages of projects (Schlueter & Thesseling, 2009). Performance-based simulation tools are largely discipline-specific and primarily used by engineers to substantiate a chosen proposal late in the design process, rather than to explore alternative solutions through analysis and evaluation early on (Flager, Welle, Bansal, Soremekun, & Haymaker, 2009). While there is the capacity to provide high resolution analytical data, the concurrent lack of ability to seamlessly integrate with software packages from other design domains means that computational advances are not being utilised to their full potential, and can actually inhibit the multi-objective exploration of possible solutions (Kolarevic, 2003).

The underlying problem that is evident is that the design software available exacerbates the lack of communication currently already existing in conventional practice. The tools that support high resolution design solutions have developed more rapidly than the framework of communication that is supposed to be sustaining them, and the result is a lack of cohesion between overarching project objectives and the computational methods for achieving them (Holzer, 2007). Paradoxically, collaborative design endeavours have been demonstrated to be more successful when integrated design infrastructures and communication networks are in place prior to the implementation of multidisciplinary technologies (Nikas, Poulymenakou, & Kriaris, 2007). It thus becomes crucial to acknowledge that design strategies must be established in response to knowledge and process interdependencies, and not dictated by the use of generic computational tools, so that information is placed in a context easily understood by the whole design team (Cheng, 2003). A refocussing of collaborative tactics is therefore called for that reflects support for process integration, as well as technological integration, in the early design stages, to ensure the integration, rather than dissemination, of knowledge (Augenbroe, de Wilde, Moon, & Malkawi, 2004).

3. Current Multidisciplinary Practice

Current practice is supporting a transition away from a linear work flow that promotes engineering as mere support for architectural design, toward a multidisciplinary approach where performance-based tools and processes provide the mediation between the participants and the design (Janssen, Frazer, & Tang, 2002). More consideration is being given to whole of building lifecycle considerations earlier on in the design process, which is necessitating the embrace of integrated design policies, technologies and processes (Succar, 2009). The two approaches that have gained acceptance in current research on these collaborative initiatives are the development of virtual design and analysis tools (Shelden, 2009), and the implementation of integrated communication and information management strategies (Haymaker et al., 2006). The first of these approaches relates to the idea of technical integration, while the second relates more to the concept of social integration.

One Island East is a seventy storey commercial office tower in Hong Kong that was procured through substantial implementation of virtual 3D building lifecycle tools (Figure 1). Gehry Technologies were consultants to the design and construction of the virtual model for this development, the complexity of which can be seen in Figure 2, which depicts the mechanical, electrical and plumbing services (Gehry Technologies, 2009). In this project, Building Information Modelling (BIM) facilitated a high degree of information integration and data exchange between members of the design and construction teams and the client, to improve the integration of building components (Boddy et al., 2007). The objective of this process was to minimise cost and construction time, which was achieved through the use of multidisciplinary integrated modelling tools that allowed for the optimisation of the sequencing of construction stages (Gehry Technologies, 2009).



Figure 1: One Island East, Hong Kong (Gehry Technologies, 2009).



Figure 2: Mechanical, electrical and plumbing model for One Island East (Gehry Technologies, 2009).

In this case the decision to implement a computational tool that integrated immensely complex and detailed building information compromised the ability of the design model to remain flexible to design modifications and alterations (Shelden, 2009). Collaborative design exploration and optimisation in the conceptual phase was restricted in favour of efficiency in the management of documentation and detailing tasks late in the design process. This clearly demonstrates the inability of existing collaborative technologies to support multidisciplinary design prior to the basic geometry of the building being established definitively (Holzer, 2007). In order to facilitate performance-based design explorations, more flexible frameworks that support the communication and management of multidisciplinary information and processes in the conceptual phase of the design are required (Haymaker & Suter, 2006).

Council House 2 (CH2) in Melbourne, the first six green star rated building in Australia implemented a collaborative design process that commenced with a two week multidisciplinary charrette for the development of the schematic proposal (Figure 3). The charrette process enabled 70% of the design and building systems to be resolved in the initial concept stages, an example of which can be seen in Figure 4. It also improved communication and understanding between the disciplines and professions involved in the project, as well as affecting a six month reduction in design and tender time from what was originally predicted (Hes, 2006b). Although this approach necessitated additional upfront investment, for the design and installation of all the environmental features in the building, it is predicted that this will have paid itself off in six years, through savings on energy and water consumption as well as over one million dollars a year in increased staff productivity (Hes, 2006a).



Figure 3: Council House 2, Melbourne (Fortmeyer, 2008).



Figure 4: Heating and cooling strategy for Council House 2 (City of Melbourne, 2006).

The success of the CH2 project can largely be attributed to the considerable attention given to thermal comfort schemes in the development of the conceptual design. Rather than acting as a restriction to the design or hindrance to the realisation of the project, the consideration of services in the conceptual design phase became a driving factor in the building's form, to maximise the quality of the interior environment while minimising energy usage and associated carbon emissions (Hes, 2006b). While these outcomes alone are quite an achievement, this process could be further augmented and strengthened through the development of low-resolution integrated modelling tools that permit the iterative testing of design solutions early on, rather than relying on precedence-based knowledge and methods from the consultant team (Nicholas & Burry, 2007).

The following case study from the Queensland Government Project Services demonstrates how similar strategies employing services integration in early architectural design are presently being investigated in Australian public practice. By exploring how the objectives of improving user comfort and minimising energy consumption can influence design, with an emphasis on developing *both* social and technological integration in parallel, this illustrates that more innovative and sustainable built environment solutions can be generated.

4. Case Study: JCC Project

The commission of the Joint Contact Centre (JCC), a 5100m² office located in Brisbane for nonemergency police calls and general government services, provided a unique challenge to the design team at Project Services. Not only did the program call for the accommodation of 375 employees and the operation of the premises 24 hours a day, but the client required a green-star outcome of six stars. Due to the green star rating scheme having a heavy emphasis on energy efficiency, the mechanical and electrical engineering teams were involved in the project from its outset, as part of an iterative design process that also involved architects and structural engineers.

Forty-five different services-design scenarios were modelled and analysed in the conceptual phase, examining variations to the basic form that included orientation, the presence of an atrium, the inclusion of cooling towers, alternative façade designs, alternative roof designs, the use of passive and active chilled beam cooling systems, and changes to the floor to ceiling height. Six of these different variations can be seen in Figure 5. Each of the iterations examined the impacts that these variations had on the somewhat conflicting performance criteria, exploring the tradeoffs required between spatial organisation, and HVAC, lighting and structural systems, to obtain an optimal design solution. For example, in order for the necessary lighting levels to be achieved during the day entirely through the use of natural light, to reduce energy usage, floor to ceiling height would have needed to be 4.5 metres. However, this would have increased the cooling load for the building, as well as placing an

increased burden on the structural system, which subsequently would have led to a significant increase in both operational energy usage and construction costs. Further investigation revealed that the placement of an atrium along the building's central axis provided for these lighting levels at only a 3.45 metre floor to ceiling height, with just a negligible increase in the cooling and structural loads.



Figure 5: A selection of the various design models explored: a) floor to ceiling height of 4.5 metres; b) floor to ceiling height of 3.5metres with central unenclosed atria; c) addition of cooling towers; d) enclosed central atria; e) roof pitch of 23° ; f) addition of window shading.

Once the form of the massing model had been established, more refined iterations were undertaken that looked at the performance constraints of chilled beam cooling systems. Variations considered were for minimum internal temperatures of 18°C and 16°C, and then again for 16°C with a 20% reduction in air speed. The criteria for evaluating the options weighed the quantitative result of total energy consumption against the qualitative measurement captured by the percentage predicted mean vote (PMV) of people considered comfortable. In this case the option that saved the most energy also provided the greatest comfort. It should be noted however that each of these predictions was based on empirical measurements and made certain accepted and standardised assumptions with regards to building usage, which can only ever be an abstraction and estimation of the actual situation. Regardless of these possible discrepancies however, the benefit gained from running a series of simulations arose from the ability to compare the performances of a number of design options.

The JCC building was a pilot project for Project Services that demonstrated an integrated BIM approach to modelling not achieved previously in the practice, combined with a collaborative multidisciplinary approach from the outset of the project. Not only were all disciplines working on the same central model for the design development and documentation of their individual contributions, but analysis software was specifically chosen for its ability to link to the 3D modelling program being

used, Autodesk's RevitTM, and therefore facilitate performance evaluations of the design as it progressed. In this case, the energy analysis software employed was IES's Virtual EnvironmentTM, which has an established link to RevitTM, and initially allowed for the architectural model to be transferred with minimal remodelling. It should be noted however that each option had to be modelled individually, as the software being used lacked both parametric capabilities and the capacity to transfer information bidirectionally. In addition to this, the simulation files took some time to set up, as the analysis software required a substantial amount of detailed information regarding building services. The responsibility for these early design investigations fell heavily on the engineers, as opposed to the architects, due to the expert nature of the analysis and interpretation required, making apparent that the tools being used did not adequately support conceptual exploration or multidisciplinary integration.

Despite these obstacles, this strategy proved quite effective in providing information to the designers regarding decisions to be made to improve the sustainability of the building early on. However, as the design began to progress and the solutions were refined, the model became more detailed, as can be seen in Figure 6, and this integration between disciplines became difficult to maintain. Part of the problem was caused by underlying software and hardware incompatibilities that materialised as time progressed. However, the deeper issue that emerged was a lack of interdisciplinary understanding about the process requirements of other design domains. Further to this, what became apparent was that the individual disciplines lacked awareness concerning BIM modelling inputs and outputs at the different stages of the design process, which also explained the minimal involvement of the architects in the initial design evaluations. Models were often overloaded with unnecessary data while simultaneously not containing sufficient information required for analysis when passed from one discipline to another. This was quite obvious when the engineers attempted to use the architectural models for analysis only to find that rooms had not been modelled as enclosed spaces and therefore could not be used to represent thermal zones. In the later stages of this project, the engineers had to remodel the building from scratch to perform the necessary analyses, due to a combination of inaccuracies in the architectural model as well as problems with the file translation between software packages.



Figure 6: Developed design model.

What becomes apparent from this case study is that there is a definite need for the different disciplines involved in the building design process to further improve their understanding of each other's information needs. The analysis itself is invaluable, but only if there is effective communication and adequate comprehension of the implications arising from specific design objectives. This must be achieved not only through clearer communication of design intent and improved knowledge integration, but also through more rigorous adherence to the modelling standards set by the practice, so that consistent representations are maintained throughout the design process to facilitate mapping between disciplinary models. Appropriate levels of abstraction must be negotiated to allow for a more efficient transfer of design and analysis data between the disciplines, rather than continuing to engage building information modelling with the aim of producing a perfect virtual copy of what is intended for construction (Mahdavi, 2004).

While BIM theory dates back several decades, it has only recently started to become prevalently accepted in practice, and as such, it is still falls short of supporting the early design process, in favour of assisting documentation (Holzer, 2007). As well as the obvious problem of software compatibility, the high resolution data structures lack the capacity to selectively filter or prioritise specific project information, creating conditions of over-constraint that often hinder the early iterative exploration of the most imperative design criteria (Burry & Burry, 2008). Lower resolution project representations, consisting of lighter data-sets, are required to support early stage design enquiries, when changes to the form of the design can vary dramatically and be quite sensitive in response to the performance variables being considered (Holzer, 2007). This will involve methods which support abstraction and prioritisation of project criteria in the early design stages, in order to test multidisciplinary optimisation strategies in a manner that promotes creativity and innovation (Mahdavi, 2004).

The issues of integration and interoperability exhibited in this case study, which persist throughout design practice as a whole, must be overcome to provide a means by which to explore the interrelated nature of performance-based criteria in creative and effective ways (Kolarevic, 2003). By managing the level of detail in building models, there is the potential to be able to explore a greatly increased number of design and analysis iterations in the conceptual stage of a project, through the semi-automation and management of the setup and execution of digital simulation tools (Flager et al., 2009). This transition to an integrated and iterative process would then lead to design solutions with improved performance outcomes, and result in a more sustainable built environment.

5. Conclusions

Appraisal of this case study serves to highlight the difficulties that arise from engagement in multidisciplinary collaboration and makes apparent the areas of the design process that require further

work to recognise the full potential of technological advances in the AEC industry. It is becoming increasingly obvious that present information-oriented methods are insufficient for collaborative design endeavours, and that what is needed instead are *process-oriented methods* that support *multidisciplinary design exploration*. If performance-based integration is to be achieved in the early stages of design exploration, then a collaborative strategy is required that focuses on *facilitating the communication and management of processes and knowledge, as well as data*.

If the next generation of tools for multidisciplinary design and optimisation could focus on supporting information interdependencies and design evaluation processes, we might then be able to engage in holistically integrated design practice. To traverse the disparity between collaborative technologies and collaborative processes, these tools will need to have the capacity to negotiate different levels of multidisciplinary information in a manner that is appropriate to the phase of design exploration. This is particularly relevant when considering the process of energy analysis involved with assessing the integration of services and architectural design, where the information is bidirectional between disciplines.

Only by reducing the complexity of these modelling and simulation tools will energy analysis design processes begin to present themselves as potential generators of innovative and sustainable building solutions, rather than act as deterrents to their own use (Ellis & Mathews, 2002). Additionally, given the inaccuracies inherent in these performance evaluation models, it is vital to recognise that overly complicated analyses quite often fail to produce precise performance data, due to small changes in the design having significant impacts on the energy usage (Clevenger & Haymaker, 2006). While they have their place, complex and overly comprehensive simulation tools are not always necessary as comparisons of alternative options can be substantially more valuable than the absolute results themselves (Ellis & Mathews, 2001). This is particularly the case in the conceptual design phase, when many aspects of the form and services are only preliminary, and likely to be modified or altered as the design progresses, especially if performance requirements are tested and fed-back into the design development loop.

The environmental and financial benefits of integrating services design in early architectural conceptual modelling cannot be ignored despite the technical challenges that present themselves. At a time when global ecological and economic issues have intersected in ways that hitherto have not caused such concern, we can react positively by increasing our attention to the procurement of buildings that are more sustainable in terms of their construction and operation. It naturally follows that for building services, as one of the major components of energy usage and cost, to begin to have greater prominence as core driver in the design process, a greatly improved software interoperability

will need to be complemented by improved communication strategies between collaborating disciplines.

6. Acknowledgements

The research reported here has been part funded by the Australian Research Council. We acknowledge their support and that of the Queensland Government Project Services in Brisbane for the opportunities that they provide by extending their workplace to foster this research.

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ELIZABETH (DORI) TUNSTALL: DESIGN BETWEEN, ACROSS AND BEYOND DISCIPLINES

Cross-cultural design, design for development, social design, and design and politics are areas into which design is expanding its reach. Anthropological and design thinking are converging as design expands its intentional impact on the world. Buckminster Fuller once said that the best way to predict the future is to design it. Tunstall believes that anthropology provides the social and cultural understanding to ensure that designing the future has more positive outcomes than negative ones for the people affected.

Tunstall will present an engaging insight into how design and anthropology operates between, across and beyond disciplines in order to create a unity of knowledge about the present world. At Cumulus she will work with contemporary circus arts group, A4 Circus Ensemble, to perform the trans-disciplinary benefits of design and anthropology's interactions.

Enabling Design for Sustainable Futures:

Design-led research and research-led design. Viveka Turnbull Hocking Australian National University Fenner School of Environment and Society

Abstract

In addressing the theme of design as a catalyst for social change I will specifically look at the role of design-led research. The contemporary issue of sustainability, however ambiguous, is highlighting the need for social change; in particular the need for researching possible futures and inspiring the implementation of effective change. Focusing on research may not seem to be a direct application of social change. However in enabling social research projects across the disciplines to utilise a design-led methodology, I propose, could increase the creative capacity of our society to envisage and implement a sustainable change for the better. This paper explores what such a design-led methodology could look like, how it should work and why it ought to be of significant value. As an example of how this methodology can be operationalised I will outline my community based project in Tumut which engaged participants in a process of designing sustainable wellbeing for their communities' future. The purpose of this study was to construct a methodology that acts as both design-led research and research-led design to give an approach to researching possible sustainable futures.

Keywords: Sustainability, Research, Design-led Methodology

1. Introduction

This paper looks at the outcome of my PhD thesis study to construct a design-led methodology for researching sustainable social change. This methodology is the outcome of a study which concentrated on design as a process rather than focusing on the ability of design to produce cultural artefacts. The design practice is not 'in itself already a kind of design research' (Findelli, Brouillet, Martin, Molneau, & Tarrago, 2008, p. 73), though it forms the basis from which a design-led methodology can be constructed. That is to say design can be remoulded into a kind of research for addressing particular sets of questions in a particular way. Design questions are characterised by questions about the future, but not what *will* be as in forecasting used in the science or social science disciplines, instead
questions about what we might want, such as what could/should/ought¹ to be (Cross, 2001) – that is questions about change. In addressing these questions design generates 'knowledge for acting' rather than 'knowledge of what is' (Glanville, 2006, p. 66). Hence this design-led methodology could help to reposition design in social research as a methodological approach to facilitate social change.

This study focuses on sustainability as the key concept of positive social change to be addressed by the design-led methodology. Sustainable design theorists such as Ezio Manzini have been working for over a decade on the notion of sustainability as positive social change by reassessing our concept of wellbeing. Manzini makes a strong claim that environmental issues cannot be addressed without consideration of the social systems of everyday life (Manzini, 1992). This suggests a sustainable resolution cannot be obtained without positive social change. Such ideas have culminated in the recent conference *Changing the Change* (Cipolla & Peruccio, 2008) which focused on furthering design's role in positive social change towards sustainability. Delegates discussed not only the contribution the design field can make through formulating more 'eco-friendly' products but more importantly the contribution of design research to exploring questions about what kind of sustainable change we want for our future. This study explores the construction of a design-led methodology developed to address such questions.

This approach is based on the notion of design as research (Glanville, 1999) also known as 'research through design' (Archer, 1995; Frayling, 1993), 'practice-based' or 'project-based' research (as outlined in Findelli, 1999, p. 2). Where other design researchers have examined a design approach to research for the field of design (Like in Bowen, 2009 thesis on a critical design methodology; or the cultural probes method of Gaver, Dunne, & Pacenti, 1999) this project aims to construct a design-led methodology of use to both design research and social research more generally, for investigating sustainable social change. Here I will discuss the design outcome of this project; what this design-led methodology looks like, how it works and why it might be of significant value.

2. What this Design Approach to Research could Look Like

This methodology is designed to produce 'fictional possibilities' (Wood, 2008). The study sets out an approach to researching questions like what kind of sustainable change a community might want and there by construct results in the form of design outcomes of possible futures. The approach is embedded in the epistemology of constructionism. Hence focuses on the meaning we as a society derive from our world in order to construct new meaning, fictional possibilities, and thereby make

¹ 'The natural sciences are concerned with how things are...design on the other hand is concerned with how things ought to be.' (as cited in Cross, 2001, p. 51; from Simon, 1969).

changes in that world². The methodology is contained by the theoretical perspective of post-industrial design (see Moles, 1988), particularly the systems approach to design for sustainable change³ as formalised in the Munich Design Charter (Doordan, 1991) and explored through the *Changing the Change* conference (Cipolla & Peruccio, 2008). This theoretical perspective comes from sustainable design theory, predominantly although not exclusively from European theorists who set up a systems approach to design in order to generate sustainable change (see Doordan, 1991). Such theorists have explored designs role as; creating a habitable world (see Manzini, 1992; Papanek, 1971), increasing wellbeing (see Manzini & Jégou, 2003), considering the interconnecting systems of artefacts, people and environment⁴ (see Baudrillard, 1968/1996; Doordan, 1991; Manzini, 1992; Manzini & Jégou, 2003; Pantzar, 1997; Papanek, 1971) producing enabling solutions (Manzini, 2003) through a process of co-creation (Maase & Dorst, 2006). From this perspective I have derived the core concept for the methodology: enabling design from within the system of the everyday (see Fig.1).



Figure 1: The Concept: Enabling Design from within the System of the Everyday. In this image the matrix depicts the system of the everyday and the central object in the process of construction depicts design from within that system.

This concept suggests the design of sustainable change needs to come from within the system of everyday life not from outside the system as dictated by an isolated expert – that is we all need to be

² The idea of research as both reflecting and constructing reality is also explored by Law (2004).

³ In my paper 'An Ecology for Design' I explore, in more detail, the systems approach to design for sustainable change as growing out of the notion of the 'ecology of the artificial' (Hocking, 2009b).

⁴ This systems approach first appears in the design literature as the 'ecology of the artificial' (see Manzini, 1992). I have explored in more detail the use of 'ecology of the artificial' and the systems approach to design in my paper 'An Ecology for Design: From the Natural, Through the Artificial, To the Un-Natural' (Hocking, 2009b).

part of answering the question of what kind of future we want. Developed from this concept the methodology proposes an approach to research able to work from within complex systems of the everyday to facilitate change. Design is enabled within this system by placing the researcher in the role of facilitator of the design process whereby participants, as representatives of the system, are engaged in that process. The methodology produces a design outcome able to act as a vital link in the social activity of constructing and reconstructing our culture of living. Hence this design-led methodology is formulated in such a way as to reposition design, in the form of design-led research, as a catalyst for social change, in the context of social research on sustainability.

The design-led methodology enables design from within the system of the everyday by adopting a structure based on the design process (Fig.2), as a series of six steps:



Figure 2: The Design Process. A six step process adapted from the process of design taught at the College of Fine Art^5 .

These steps in the design process are translated into six phases in the research project. The 'brief' phase sets out an investigation into the research question being asked, the system of the everyday being investigated and any specifications required for the project or the outcome. The 'background research' phase stipulates investigations into all things related to the brief, encouraging both relevant and irrelevant explorations to establish a wide scope of possibilities for the project. In the 'concept' phase these possibilities are distilled into a core concept for the research project. The 'concept development' phase acts to translate the concept into a plethora of different ideas. Then in the 'design outcome' phase these ideas are transformed into a series of outlines for possible futures, from which the most appropriate can be chosen. In the 'presentation' phase this chosen outcome is clearly communicated; what it looks like, why it is of value and how to put it into practice in the system of the everyday it has been designed for. Each phase acts to generate the next phase until an outcome is reached.

This design-led research structure has been constructed in such a way as to utilise the nature and characteristics of design practice⁶ in research form. Design has the ability to work within the

⁵ These steps in the design process are based on the philosophy of design taught at the College of Fine Arts (CoFA) in Sydney during my undergraduate time there. I have modified these steps in two minor ways. Firstly instead of the heading 'research' I have called it 'background research' to avoid the misinterpretation that research stops after the second phase. Secondly, I have added the heading 'Design Outcome' which was always an integral part of the design process but never specifically named, causing it to float somewhere between concept development and presentation, so it made sense to formally add it in. Otherwise the steps are the same as those we were taught at CoFA. I have not made a survey of which other institutions teach this process but it seems to be acknowledged among my fellow design colleges as a fair description although over simplification of the design process.

⁶ In my paper 'Design with a Thousand Faces' I have explored in more detail the nature and characteristics of design practice and it's significant value to social research such as sustainability(Hocking, 2009a).

messiness of a complex system without having to 'clean up' first and in so doing generate an outcome that fits into the social activity of reconstructing our culture of living. By implementing a design process the methodology can monopolise on these abilities of design in four key ways. Firstly this design process is described by Cross (1990) as using abductive reasoning, also referred to as productive or appositional reasoning (p.131-132). Abductive reasoning describes the 'logic of discovery' for creating new hypotheses (Peirce, 1958 as cited in Honderich, 1995, p. 1) in this case for formulating future possibilities. Secondly this abductive process is conducted in a playful manner or as Cross (1999) describes 'exploratory' (p.28). These playful phases do not try to pre-empt the outcome, instead each phase focuses on generating the next phase. Thirdly this playful generation creates a dynamic quality to the phases which means they can incorporate unforseen, serendipitous circumstances, which Cross (1999) calls 'opportunistic' (p.29). Finally the dynamic nature of the process is able to work within uncertainty, giving the process a quality Cross (1999) calls 'ambiguous' (p.30). This ambiguous quality also requires a suspension of disbelief as the existence of an outcome is not known till the end, this is what Cross (1999) calls 'risky'(p.30). Design's ability to work within complex systems also comes from what Findeli (1994) calls 'intuition' a skill derived from aesthetics (p.63). All these qualities work together to give the design-led methodology an ability to work within messy systems to generate outcomes for social change. Many of these design qualities and abilities are shared with other disciplines and individuals (Cross, 1990, p. 132), however, designerly practices are neither easy nor straightforward so there is a need to build creative capacity in order to operationalise the methodology.

3. How this Design-Led Methodology should Work

This research process is operationalised through engaging participants in the design-led process. This means inserting participatory methods into the phase structure and building participants creative capacity to enable design. Hence choosing an appropriate method requires selecting ones which fit into the design-led structure and help build participants creative capacity. Design researchers such as Bowen (2008) suggest one of the greatest obstacles for participants, not trained in creative practices, is the ability to imagine something new and different to what already exists. Hence, the methodology applies methods that utilise disordering techniques. These kinds of methods disorient participants in such a way as to help them make a break with what already exists, enabling them to imagine change. Gaver's 'cultural probes' are examples of a method which uses disorder in this way (see Gaver, et al., 1999). These kinds of disordering participatory methods are particularly important for the initial phases of the project whilst working towards the generation of a concept. The next concept development phase requires methods which allow participants to play with the concept which has been generated by the previous phases. Methods like the game format used by the research project

Underdogs & Superheroes (see Mazé & Jacobs, 2003) are useful in engaging participants in game play to explore and develop the concept. The design outcome phase requires methods that consolidate the previous phase into a set of design ideas for future possibilities. The scenario building method used in the *Sustainable Everyday Scenarios of Urban Life* project (see Manzini & Jégou, 2003) is an example of methods useful for producing a set of future possibilities. I used these set of methods in my 'Project Tumut' fieldwork for this study, in the rural NSW town of Tumut⁷. I went to Tumut several times over the course of a year to engage community members in this design-led process. The three methods above where fitted into the design-led structure to form a research project on 'what kind of sustainable wellbeing does the community want for Tumut's future?' (Fig.3).



Figure 3: Research Design for Project Tumut. Participatory methods where inserted into the design process to engage the community of Tumut in the process of designing future possibilities of sustainable wellbeing in Tumut.

This project is used here as an example of choosing and implementing methods. However within my PhD study 'Project Tumut' was part of the process of designing the methodology; to play with initial ideas, further developing the studies concept and reflecting on what happened. In 'Project Tumut'⁸ I used the basic outline depicted in fig.3 and implemented the first four phases with participants from

⁷ Tumut is a country town in New South Wales. It is predominately known as a forestry town however the Tumut Shire is also known for its orchards 'Batlow Apples', other Agriculture, Snowy Hydro and the shire borders the north west side of Kosciusko National Park.

⁸ Preliminary findings from this work where also presented at the Change the Change Conference (Hocking, 2008a) and the Undisciplined Conference (Hocking, 2008b).

Tumut. The following explanation of the phases gives a brief outline of how I used the methods and how each phase worked within the overall structure.

Phase 1: This phase created a creative questionnaire to slot between the 'brief' and 'background research' steps. I created a pack (Fig.4) based on cultural probes to establish what kinds of creative activities people preferred interacting with and which sustainability issues where most important to the community.



Figure 4: Creative questionnaire pack for phase 1 of 'Project Tumut'.

This was a very tentative phase to find out a little more about Tumut, the results of which helped design the Phase 2 packs.

Phase 2: This phase slots between the 'background research' and 'concept' steps. I further developed the packs from phase 1 to include more cultural probe activities in order to explore ideas of sustainable wellbeing in Tumut (Fig. 5).



Figure 5: Tumut Project Packs, including culture probe activities for phase 5 of 'Project Tumut'.

The results of this phase generated the concept: to diversify cohesively. This result helped to design the next phase.

Phase 3: This phase used the game format method to slot between the 'concept' and 'concept development' steps. I included two parts to this phase in order to experiment with both a three dimensional interactive object (Fig. 6) as well as a game based on card and board games (Fig. 7).



Figure 6: Larry the Story Tree Creature: Participants were asked to think up a story about everyday life in Tumut and write a one sentence outline of the story on a leaf shaped piece of paper. The paper was then clipped to Larry's braches acting to foliate him with stories of Tumut.



Figure 7: The Storyscape game. A board and card game in one designed to engage participants in the concept of diversifying cohesively using sustainable principles from Manzini & Jégou work (2003, p. 56)

The results from this phase developed the concept into stories about the need for a diversity of culturally based activities to engage different age groups and to be organised by members of the community.

Phase 4: This phase used the scenario building method to slot between the 'concept development' and 'design outcome' steps. These scenarios where based on the idea of facilitating public creativity in such a way as to motivate community members to develop social activities for the Tumut community. From this I compiled three visualisations; (a) Guidebook, (b) Co-Creation Projects, and (c) Time Bank. I created four posters (see Fig. 8) and a take-home information booklet to give to participants. Participants were encouraged to give their feedback on the three scenarios by talking with a research representative or filling out a question sheet.



Figure 8: Future Visions for Tumut. From top left clockwise: Information poster about the project, Guidebook scenario poster, Co-Creation Projects scenario poster, Time Bank scenario poster.

The scenarios visualised received positive reactions. A couple of participants requested that some booklets be sent into members of the Tumut Shire Council who then contacted me interested in finding out more. After talking with two council members it became clear that, even though this project was only conducted in an experimental way on a very small scale, it had got to the core of an important issue for Tumut. This meeting highlighted a real need for the community to be enabled to develop their own socially oriented projects. The results of 'Project Tumut' where able to initiate some suggestions on motivating the community to develop activities, so I hope the project gave the community ideas for their future or at least initiated a conversation which can continue within the community. However the meeting also highlighted that there is still a long way to go before design is more widely accepted as having a significant, legitimate and valid role to offer as a catalyst for social change. A wider acceptance of this design-led research methodology can only be gained through continuing this discourse within the research community and the application of the design-led methodology in research practice until the possibilities described in this paper have been established.

4. Why this Research Methodology ought to be of Value

The value of this design-led methodology lies primarily in repositioning design in social research as an approach to researching sustainable change. This role is of significance to design research, social research and sustainable social change. For design research this methodology works towards giving the discipline legitimacy in the wider research community. Sharing this design-led methodology with other social disciplines can offer social research a different approach which is able to address the need for 'messy methods' (Law & Urry, 2004, p. 390). For sustainable social change this design-led approach offers an adductive process of discovering new propositions for society.

For design research this methodology offers a designerly approach aimed not at the production of artefacts (as do many other design approaches to research) but at addressing research questions about sustainable change. This methodology adds to the 'research through design' (see Archer, 1995, p. 11; Findelli, 1999, p. 2; Findelli, et al., 2008, p. 71; Frayling, 1993, p. 5) approach which is gaining momentum in the design research field (see for example Findelli, et al., 2008). This kind of methodology gives design researchers more of an opportunity to approach research in a designerly way by asking questions about 'what next' instead of focusing on questions 'about' or 'for' design (see Archer, 1995, pp. 11-12; Findelli, et al., 2008, p. 70). This methodology is articulated in such a way as to enable the design approach to be shared with other social research disciplines. For the design field, the act of sharing the approach helps to legitimate design research in the wider research community. Sharing this approach is of value both to the design field and other social researchers.

For other social researchers this is a fresh approach to research, able to address issues of importance to sustainability studies – like innovations for sustainable social change. This design-led methodology responds to existing social science discourse calling for innovative methods. Within social research the need for more diverse, imaginative methods, has been voiced from various sectors, such as John Law who in his book *After Method* initiates a discussion on the need 'to unmake many of [social science's] methodological habits' (p.7) in order to be able to rethink methods: 'The task is to imagine methods

when they no longer seek the definite, the repeatable, the more or less stable. When they no longer assume that this is what they are after' (Law, 2004, p. 6). The design-led method presented in this paper engages with Law's aim 'to begin to imagine what research methods might be if they were adapted to a world that included and knew itself as tide, flux, and general unpredictability' (Law, 2004, p. 7). I propose this design-led methodology has the potential to offer social research one way of addressing Law's aim.

The methodology also gives different approach to sustainability research able to work within the complex messiness of social systems to discover propositions for sustainable change. For society, a design approach could deliver innovative propositions for sustainable futures. Implementing such a methodology shares an approach which is at once, design-led research and research-led design, able to increase the creative capacity of our society to envisage and implement sustainable change for the better. Hopefully sharing this design approach will widen the acceptance of design research such that one day we will see design researchers called upon to develop interdisciplinary research teams to work on sustainable change.

5. Conclusion

There is still more work to be done on developing this design-led methodology including: conducting a comparative analysis with other research methodologies; establishing more ways of implementing methods into the methodology; to continue the conversation of a design approach to research with other social researchers; and to establish the methodology's ability to facilitate sustainable change. By focusing on the construction of a design-led approach to social research this paper has aimed at adding to the conversation about repositioning design in society as a catalyst for social change.

In order to research innovations for sustainable social change this design-led methodology is constructed to enable design from within the system of the everyday. This concept is achieved through placing the designer in the role of facilitator and the participant as representative of their system of the everyday. The process of design is enabled through setting up a series of phases which follow the steps of the design process. This process is operationalised with the insertion of participatory methods into the design phases. These methods need to be chosen and developed in such a way as to fit into the particular design phase, build the creative capacity for participants specific to that phase and there by engage them in design.

This design-led methodology offers an approach to sustainability research which utilises the qualities of design to develop innovative propositions for sustainable change. Design's abductive reasoning sets up a research approach for discovery. This playful, dynamic process enables the design-led approach to work within the messiness of the everyday without having to 'clean up' first. This methodology has

the potential to be of value to design, social and sustainability research. For design research this methodology gives a designerly approach of 'research through design'. For social research the methodology offers an approach to 'messy methods'. For sustainability research the methodology provides an approach to discovering change. The further development of this design-led methodology is working towards repositioning design within social research as a catalyst for social change.

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Transformative Textiles

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Abstract

Innovation in material fibres and textile technologies is both informing and transforming approaches to textile design education, research and practice. New textiles challenge us to new ways of thinking about the connectivity of surface and form; the structural and ornamental; the responsive and intuitive. This is allowing for textile designers to engage in current design debates like never before.

This paper will discuss the opportunities for 'wicked solutions' to emerge as demonstrated in a range of transdisciplinary projects between textile design, architecture and industrial design at RMIT University.

Keywords: Textile Design, transdisciplinary

Introduction

Innovations occurring with fibre-based materials and textile technologies are an important focus for designers today. Technological breakthroughs are transforming textile fibres and textile techniques traditionally associated with hand crafts such as weave, knit, crochet and embroidery. This is allowing designers to look towards textiles for the opportunity to creatively explore the relationship surface, structure and form. By using new textile materials, can a form be simultaneously structural and ornamental, as well as about surface and volume?

Understanding these textile materials and how they can contribute to the connection of the surface and the form presents unique opportunities but also significantly increases the complexity of the design process. "Advanced tools and materials are making the designer's task ever more complex. As a consequence, we are starting to see some changes in design practice" (Braddock Clarke & O'Mahony, 2005, p.136). How designers engage with these complexities can perhaps be found by examining the notion of 'wicked' problems. As these types of problems are trans-disciplinary in nature, interdisciplinary approaches are needed. Therefore meaningful links must be made between not only the parallel worlds of design; of fashion design, industrial design, architecture and textile design, but also between design and science. As these breakthroughs are textile based, textile designers are in a unique position to assist in instigating these exchanges.

How such interactions can occur, is demonstrated through two studio projects *Soft Machina* and *Fibre_Space* run in 2008 at RMIT University. These projects show the potential for using collaboration as a springboard to elicit a deeper understanding of complex design problems that ultimately reflect real world scenarios. In doing so this paper highlights the opportunities educators, design practitioners and researchers have in meeting these challenges.

New textiles

Textiles can be described as "surfaces and volumes made out of yarns, fibres or filaments" (Tellier-Loumagne, 2005 needs p.18). Today textiles and fabrics take on a range of properties, specifications and performance characteristics that are challenging what a textile is and can do. Textile techniques, once associated with being hand crafted are becoming transformed into high-tech automated processes using sophisticated and complex technology and machinery. For textile designers this presents exciting opportunities to assist in developing new applications and products.

Fundamental to material innovations are the advances in fibres. The engineering of fibres has accelerated over the past decade. The twentieth century saw the transformation of fibres from natural fibres (such as cotton and wool) to the early synthetics (nylon and polyester), to blending of fibres, development of advanced next generation fibres such as glass, arimids (Kevlar) and carbon. Combined with this is the emergence of hybrid fibres, textile composites and textile membranes resulting in high strength, low weight materials that potentially perform better than conventional materials (Horrocks & Anand 2000, p.24-39). For example, the use of carbon composites can produce a material that combines qualities of strength, odour absorption, fatigue resistance, vibration absorption and electrical conductivity" (Braddock Clarke & O'Mahony, 2005 p.62). Its applications, once exclusive to the aerospace field, include sports equipment and furniture, and are being considered for architecture, such as the thought provoking project 'the Carbon Tower' by Testa and Weiser (Garcia, 2006) (Hodge, 2006). This conceptual project draws on techniques traditionally associated with fashion; the tower is literally woven on site. So the form-work is no longer just the support for the structure, but is actually creating the structure. It is because of the unique qualities that carbon fibre offers, that projects of this nature can be considered.

In addition, there is a renewed interest in natural and recycled fibres, to pursue more sustainable product outcomes and consider how material selection impacts on the products' longevity and potential retirement options. There is an array of newer natural fibres to choose from with good environmental credentials. Bamboo is one such fibre due to its' rapid growth, renewability, and ability to adapt and grow in to a variety of climates. But from bamboo to bamboo fibre, it must undergo significant processes. At present there are two methods of converting bamboo to fibre, one costs less

but uses chemicals, and the other is converted through mechanical means but is more costly (Delano, as cited in Hoffman, 2007 p.166).

Underlying all of this is the need for designers to better understand, beyond a superficial level, the potential opportunities and consequences of these materials. The success of a project relies upon a combination of factors: an aesthetic sympathy with the design intention, and the practical ability to select the appropriate means and methods by which to develop and execute the desired outcome. New advances in textile materials demand a more expansive knowledge base that blends the scientific and engineering know-how, with a poetic and aesthetic sensibility. How these materials can be used for new applications and new forms ultimately demands an interdisciplinary approach. It also raises questions as to whether a designer's knowledge base is adequate, and challenges educators to consider how to teach design within this context.

Textile design education has traditionally relied on a process of 'learning by doing'. Students learn their craft by engaging with materials by hand. Emphasis has been on the design of artefact, be that a commercially marketed end-use product or a 'craft object'. The translation of the design *croquis* (a textile design term to describe a design that implies a repeat but is not to final production specification) to automated machinery and manufacturing processes was something the designer learnt on the job, relying on the knowledge of the technician. There were clear disciplinary boundaries.

The Textile Designer

Textile designers have long occupied the somewhat ill defined space between 'design' and 'craft' due to the nature and scale of the materials with which they work. The predominant concept of craft in the modern era evolved from the 19th century attempt to reclassify the liberal arts by writers and theorists including Pugin, Jones, Ruskin and Morris (Shiner, as cited in Alfoldy, 2007 p. 33-35). A discourse was developed around notions of 'good' design, honesty in execution and practice, and retaining the intrinsic integrity of materials. The debate continued well into the 20th century, with the further separation of the decorative from the functional, as espoused in the theories of the Bauhaus followers. This sense of 'hierarchy anxiety' remains evident in the continuing ideological distinctions being made between design-based and craft-based disciplines, the continued emphasis on separating the genius creative designer (artist), and the practical executor (craftsman) of the artefact. However, in our contemporary understanding, such stratification is becoming meaningless, as designers are required to approach problems beyond the traditional boundaries of their discipline area.

"Much of the future progress for textiles will depend on techniques, knowledge and methods well beyond the traditional craft origin and scope of textile design and construction." (Gale & Kaur, 2002 p.172). Designers must understand the consequences of the choices that they lock into at the design stage for their product (Lewis, 2001 p.13). The textile designer's knowledge must encompass structural and performance issues, which include such things as manufacturing and retirement options, along with the aesthetic and decorative aspects of their product.

These are varied and complex skill requirements. The gap between design and science, and craft and technology needs to be considered and narrowed, but not to the detriment of creativity and speculation. It is these unpredictable moments that are vital to the design process and are the key drivers of innovation.

Collaboration and wicked problems

"Wicked problems" was a term, coined and explored by Rittel & Webber (1973). As social planners, set within a period of social upheaval, they posited that traditional scientific models for problem solving were no longer sufficient to describe and manage the multi-faceted challenges that were confronting them. These methods were appropriate for "tame" problems rather than "wicked" problems.

Wicked problems are complex in nature and can have multiple, and often conflicting, issues situated within and around them. Discovering where "in the complex causal networks the trouble lies", "identifying the actions that might effectively narrow the gap between what is and what ought to be" are some of the issues considered to be part of wicked problem definition. (Rittel & Webber, 1973, p.159). Indeed design challenges are often wicked in nature.

Richard Buchanan (Buchanan, 1992), in "Wicked Problems In Design Thinking", suggests that the designer's role is often to work with 'indeterminate' problems, ones that have no obvious linear or 'determinate' conditions (p.16-17). He sets this argument in the context of a changed world of design thinking. From the 19th century onwards, "refined methods and new subjects" (Buchanan, 1992, p.5) became stratified into the distinct art & science disciplines that we now know today. He argues that this has led to specialisations that have resulted in an increase in knowledge but also a "fragmentation" and "loss of connection between design disciplines" (Buchanan, 1992, p.6). The notion of interactivity and collaboration is central to the idea of managing wicked problems. Re-connecting different design disciplines is essential to achieve this end.

Textile innovation requires diverse skills, team work and a non linear design approach. If a fabric is the form, and the form the fabric, where does one role end and the other begin? "From the traditional to the intangible, from the technical to the tectonic, the exchanges taking place between materials and design are forging a uniquely multi-disciplinary arena" (Beylerian, Dent & Quin, 2007, p.46). When textile innovations are considered in the context of wicked problems the need to collaborate is even

greater. Collaboration among design disciplines, as well as between science and design is vital to reflect the real world situations.

Transcending disciplinary boundaries

Textile design students at RMIT specialise in either print, knit or weave. Upon graduation, they have the knowledge to develop fabrics for practical and decorative purposes. They have an understanding of the textile industry, design history and related technology, combined with practical computer skills and the ability to research markets and interpret trend predictions. As a collective, textile designers are well equipped to deal with issues related to 'design' within the textile industry. The textile industry is more than just design; it incorporates the sciences, sustainability, engineering, technology and marketing. Graduates are not isolated in industry and therefore need to be prepared for a collaborative work place.

According to Gale and Kaur (2002) "Multidisciplinary, teamwork and interdisciplinary knowledge are key requirements in the task of creating new textile products and related markets" (p.177).

Recently RMIT architecture and textile design have worked together to solve problems in a multidisciplinary fashion. "Multi-disciplinary can be described as a team of people, each with their distinct disciplines working together on a research or applied project or a course of study requiring mastery of more than one discipline" (Erlhoff & Marshall, 2007, p.135).

Engaging with related disciplines makes the design process transparent, allowing individuals to approach design problems from alternate viewpoints (Shapiro & Dempsey, 2008, p. 158; Haynes, 2002, p. 143).

Interdisciplinary can be defined as "inquiries, which critically draw upon two or more disciplines and which lead to an integration of disciplinary insights" (Haynes, 2002, p.17). The ultimate goal is for students to consider issues or topics in a range of ways (Haynes, 2002). To ensure they are capable of doing this, educators need to move outside of the textile design domain and involve people who view the world differently. Gale and Kaur (2002), suggest, "science is an important creative resource in the development of textiles" (p.172). Textile technology and textile design constantly intersect, the demand for new innovative materials and textile related products is driven by the quest for an improved quality of life (Gale & Kaur, 2002). The inclusion of science students in multi-disciplinary work requires serious planning and scrutiny on behalf of the project planning team. (Haynes, 2002). In order to provide the opportunity for the integration of multidisciplinary insights perhaps it isn't necessary to actively involve science students, but to consult scientists with the expertise and knowledge to pose and answer questions. Design students by their very nature are creative and

curious. Inviting a scientist to take part in a multi design disciplinary project would provide some facts and help to identify the possibilities amongst the 'science fiction'. The working methods employed by scientists to solve problems are not dissimilar to those used by designers. Highlighting the similarities could help to alleviate any sense of anxiety about crossing the line into textile technology (Crabbe, 2008, p. 12 -13).

Wicked problems require transdisciplinary approaches. Individuals cannot solve wicked problems, nor can teams of people within one discipline, or related disciplines (Erlhoff and Marshall, 2007). The inclusion of 'outsiders' in undergraduate textile design education is necessary to explore answers in a transdisciplinary manner. Erlhoff & Marshall (2007) reinforce this idea, stating that "collaborative teams ... with a range of expertise" (p. 447) are essential when dealing with wicked problems. Wicked problems require trans-disciplinary approaches.

Case study - Industrial design / Textile design

In November of 2007 GM Holden approached RMIT program directors from textile design and industrial design as they felt there was a need for design students to have a better understanding of related disciplines before entering the workforce. A project was created to encourage students to consider the relationship between surface (typically a concern for textile designers) and form (the domain of the industrial designer) whilst considering the issues believed to be of key importance in the year 2026. Students worked together in small groups to forecast, problem solve, learn from one another, share skills and ideas.

The project was conceptual in nature; each discipline had its own assessable outcomes. From a learning and teaching perspective the objectives were for students to learn from one another, to share their skills and consider different approaches to solving design problems. The project was the first of its kind for the majority of teaching staff and participating students.

The project ran over a period of 7 weeks. Textile design and industrial design students met each Monday for 5 hours. The lecturing staff consisted of contract and sessional staff drawn from the textile and industrial design disciplines. During classes industry professionals were invited to share their experience and expertise. Discussion and debate was encouraged which often lead to further questions rather than answers.

Collaboration between textile design and industrial design students highlighted the similarities and differences in their design processes. The nature of the textile industry requires designers to generate concepts quickly, particularly when developing ideas for fashion and trend related markets. When textile design students were ready to move into the 'making' stage, industrial design students were still

in the 'research' phase. It was interesting to note how adaptable textile design students were when asked to consider textiles and form.

The freedom of the project was welcomed by some students, but overwhelming for others. Students were taken out of their comfort zone in order to make new discoveries. Thompson Klein (1990) describes the transdisciplinary approach as "breaking through disciplinary barriers and disobeying the rules of disciplinary etiquette" (p.66). The experience for students was often messy and confusing but ultimately produced some exciting design solutions welcomed by industry partners.

A new understanding of interdisciplinary teaching and learning has grown out of this project and assisted in planning for 2009. For example, staff reflected on the lack of expertise in the area of textile technology. Students were actively researching new materials and technology, but were unclear if their ideas were viable. To provide real answers to student questions, staff invited textile experts to field questions and give students an indication of where their ideas sat in the realm of science and technology. Ongoing responsiveness to questions that arise from the interdisciplinary process means that improvements to the teaching and learning process will ensure students have a greater understanding of their own design process, of each others' and of those external to design. And by consequence, interdisciplinary thinking can become a part of their skill set when approaching design challenges. "Interdisciplinary collaboration is a twenty-first century inevitability" (Weld & Trainer, 2007, p.157).

Case study 2: Textile design and Architecture: Fibre_Space

The multi disciplinary project 'Fibre Space' involved undergraduate textile design and architecture students along with PhD candidates of aerospace engineering to work in small mixed discipline teams. The brief asked each discipline to look to the other and share their skill base and unique expertise in developing an architectural concept. In doing so students had to consider the innovations occurring with textile fibres and technology and in particular the potential of textile composites. This collaboration offered unique opportunities, as textile designers deal mostly with 'surface' and architects with 'form'; so each offered the other a very different perspective. Combined with this was the significant difference in scale at which both disciplines operate.

Each discipline area had its own project brief and assessment criteria. Specifically textile designers had to create fabrics suitable for the architects to develop into a form. Architects and textile designers had to work closely together to consider the relationship of new textile based materials to form. PhD aerospace engineering students acted as consultants, providing technical assistance on the feasibility of the ideas being developed and give input as to how to address the structural issues associated with these new materials. In addition a number of 'outsiders' - industry experts - were brought in to

provide specific knowledge of textile composites, new materials and resins, as well as manufacturing processes.

The initial pressure was on textile design students to disseminate the textile techniques, materials and technologies. The architecture students then had to take this information on board to consider the form, and provide feedback to the textile design students. Together students explored how hand crafted methods might be transformed through high-tech machinery. Concepts such as textile composites, membranes, skins or tensile structures were investigated for clues on how they could develop their concepts further.

In particular the relationship between surface, structure and form needed to be considered. Integral to this was the consideration of how the fabrics created by the textile design student could be scaled up for a building. Repetition alone, through the development of a repeat system and arrangements of motifs, stitches or structures was not the sole solution.

Textile design students had to consider their designs for structural possibilities as well as the ornamental. In a very real sense the pattern needed to create density and form. For the print based specialist students this was particularly challenging. They needed to consider how a hierarchy of structure could be created through pattern.

The project value for design students lay in the discovery of the commonalities in their design processes, as well as in sharing their own specific discipline knowledge. As they began to realise their ideas, the PhD students and industry experts were able to give feedback as to the viability of their concepts and to keep the project 'real'. The aim for students was to gain an understanding of general concepts, as well as have an opportunity to show their design ideas and ask questions that would assist in informing their designs.

In this context, answers to one problem often lead to more questions and potentially a high degree of uncertainty, which meant students needed to be flexible and open-minded. It also highlighted that the foundation of disciplinary specific knowledge needed be established before entering such a collaborative project. Those involved needed to have a deep knowledge of their discipline and have confidence in their skills and knowledge base to collaborate with people outside their discipline.

The exchange of ideas within the studio reflects the value of the creative process and the value of 'play' in the design process. But the studio also highlighted that for play to be meaningful it must be grounded in real world parameters. In this instance it was the need to understand the materials and of manufacturing processes, but also the need to look beyond what already exists. As Buchanan (1992)

states, the constant challenge for design disciplines is to 'conceive and plan what does not yet exist' (p.18).

The challenge is to provide an environment that allows for the technical knowledge and creative play to work in support of each other and to enrich the collaborative experience. To facilitate this there needs to be greater flexibility, to build in the time to play to allow for the unplanned discovery, and also to place this within a strong support framework to encourage the exchange of ideas. This was achieved by bringing in experts and consultants to assist by contributing ideas at key milestones within the project's development, without stifling the creative process.

Conclusion

Designers are required to work beyond the traditional boundaries of their discipline area, to collaborate with other practitioners in order to provide myriad solutions to complex problems.

Advances in textile materials and technology are making it possible for designers to use textile techniques, and concepts, once more closely associated with fashion, and to begin to apply them to new applications. For designers, textiles are offering enormous potential. As textiles handle and behave in very different ways, a knowledge base is required to understand their potential uses. This opens up new opportunities for textile designers, to explore the relationship of surface, structure and form through collaborations with other key players in the design, technology and science fields. These elements need to be considered not as separate entities, but as one. Because of the complexities of this relationship and the new materials, a multidisciplinary approach is vital from the beginning of the design process. Embracing a wicked solution ideology leads to this collaboration and interaction through which new innovative design solutions may emerge.

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HELEN VERRAN: DIFFERENT LOGICS OF SEEING AND THINKING. WHAT'S DESIGN AND DESIGN EDUCATION GOT TO DO WITH IT?

A controversial and perhaps odd claim: design is taking over the social work that, through much of the 20th century, was done by epistemology. This claim is part of an argument that design and design education need to consider their role in an emergent, contemporary metaphysical project, recognising that disparate knowledge traditions embed alternative logics — differing ways of thinking about and working with our worlds. Taking this claim seriously implies that knowledge traditions can be connected and separated in better and worse ways, and that we need to learn to explicitly engage what we might call a politics of ontological design.

These philosophical claims will be developed by telling stories of working with Yoruba teachers in Nigeria in the 1980s. It was in this work that Verran stumbled across and learned how to understand the claim that logics of knowledge traditions differ. This led Verran to suggest that numbers themselves are in some sense collectively designed. Verran will build on these stories by discussing some of the difficulties of designing databases that can work with, and not against, the logical structures of a particular Australian Aboriginal knowledge tradition.

Design as a catalyst for social change in a community under stress

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Abstract

The paper addresses the conference theme of repositioning art and design's role in society as a catalyst for social change. It is concerned with the development of a social design model in the Western Cape, South Africa, which incorporates lived experience for social benefit. The concept of design for development -a model of design which promotes social responsibility, sustainability and participation in community-oriented projects- was used to explore these attributes in an existing post-graduate research project, by illustrating how theoretical approaches can be applied to real world communities. Some design for development objectives which were achieved with the Fibre-Arts Design Project (FADP) case study -conceptualized and implemented by a Master in Design candidate whom I supervised- are discussed here.

Abbreviations and Acronyms

CCSL	Creative Communities for Sustainable Lifestyles
CPUT	Cape Peninsula University of Technology
FADP	Fibre-Arts Design Project
GAPA	Grandmothers Against Poverty and Aids

1. Introduction

4

In this paper I present what I have learnt from a design student's research project in my quest to find out how design can function as a change agent in communities under stress, to evoke positive social change. It is important in the South African context to extend the work of design to function as social and economic enabler in vulnerable and marginalised communities. In particular, design used in a social context to contribute to a community's well-being has gained ground in the current design discourse and Margolin (2005) proposes that the "market model" in design must be balanced with the "social model" for the satisfaction of human needs. What this means is that the profit motive which drives the development, creation and sales of designer products has to be aligned with the Fibre-Arts Design Project (FADP) case study, conceptualized and implemented by a Masters in Design candidate whom I supervised, which is described in the paper.

1.1 Background and literature survey

The concept of design for development is not new, but finding new ways of applying it successfully in marginalised communities remains a challenge. This is particularly the case in the Western Cape, with high numbers of unemployed people living in informal settlements, surviving on pensions and other state grants. This paper discusses how a design for development model, the Fibre-Arts Design Project (FADP), was implemented in one such marginalised community in Khayelitsha, a sprawling township settlement about 20 kilometres from Cape Town. The FADP model conforms to the social design model (Margolin & Margolin, 2005) which encourages design for development and promotes social responsibility, sustainability and participation in community projects. Social design is responsible and ethical, compared to the traditional market-driven model which favours the design and production of disposable products for consumption based on maximising profit. Margolin (2005, p. 1) argues that the social model is gaining ground in the design community: "The social agenda of design has become increasingly more acknowledged by the global design and design research community" and Manzini et al (2008, p. 268) link social design with the sustainability discourse in the Creative Communities for Sustainable Lifestyles (CCSL) project.

The social model and the market model have to complement each other in an effort to satisfy human needs in a responsible way (Margolin and Margolin, 2002, p. 25), and ultimately to a preferred focus in design which is asset-based (Allen, 2007). Allen, in his community development model, argues for a shift in emphasis from a traditional needs-based perspective, to an asset-based perspective where social value is the most important resource in a community. Asset-based community development therefore has as its goal the building of communities where the change agent is relationships, versus needs-based community development which has as its goal institutional change with power as the change agent. The asset-based conversation is about gifts and dreams, while the needs-based conversation is about problems and concerns. The view of the individual in the latter is that of a consumer or client, whereas in the former it is that of a producer or owner. Assets are "based on community 'treasures', while needs are based on community problems" (Allen, 2007, p. 21) [See Appendix 1 for Allen's model].

The Fashion and Surface Design post-graduate programmes have been following the design for development and social design models increasingly, in an effort to grow community engagement as a post-graduate research focus area in that discipline at the Cape Peninsula University of Technology (CPUT). Seen in this light, the aim of the FADP was to empower older people through the implementation of a creative skills development and incomegeneration programme, with the underpinning objective of helping to build communities. Older people in the South African cultural context have traditionally been acknowledged as community builders and cultural stewards. With an increase in demands associated with urbanisation, poverty and the HIV/Aids illness, the elderly have become disconnected from these important functions in some instances. A collaboration between the Grandmothers Against Poverty and Aids (GAPA) focus group of nine women, and a Master in Design student whom I supervised, who conceptualised and implemented the project, resulted in the above aim and objective being achieved in part.

1.2 Creative practice as a way to evoke positive social change

Ageing has been acknowledged as one of the greatest achievements of the 20th century as well as a triumph of human development (World Health Organisation, 1993, p. 1; Kalasa, 2001, p. 13 & HelpAge International, 2006, p 2). It is estimated that by 2050 three-quarters of the world's ageing population will be living in developing countries (Beales & Gorman, 2003, p. 4). Africa will contribute to the highest elderly population growth rate in the world (Kinsella, 1997, p 1; Kalasa, 2001, p. 4 & Noumbissi, 2004, p. 1–2), while South Africa will have *the* highest proportion of elderly in Africa.

Against the background of these current ageing trends, the FADP was designed as an intervention with the potential to highlight some of the sociological problems that older people in communities under stress (as represented by the GAPA focus group) have to contend with, while acknowledging their creative capacity. Problems include unemployment, retrenchment, early retirement, crime and the HIV/Aids illness. The theoretical models which informed the FADP were Design for Development models, namely the Creative Industries, Design for the World and Architecture for Humanity projects (Margolin, 2002, Scholtus, 2005; Architecture for Humanity, 2006, p. 11, 13, 16, 22, 24, 30, 31 & 72; Matheson, 2006, p. 55, 57 & 63 and Manzini, 2008, p. 2-3). The FADP drew on attributes from each of these design initiatives, such as creating sustainable and socially conscious design relief, as well as offering unique and marketable products, based on fair trade principles, which could ultimately lead to job and wealth creation. Initiatives which provide examples of creative practice for social change include some of the Creative Communities for Sustainable Lifestyles (CCSL) cases in South Africa and internationally. Amongst them are the "Greater Midrand Organic Agricultural Co-operative" and the "Shova Lula Cycle Co-operative" near Johannesburg. The cycle co-operative re-conditions second-hand bicycles donated by "Re-cycle" in the UK as an ecologically sound means of cheap

transport and it functions as a poverty alleviation and wealth creation initiative too (CCSL, 2009). The CCSL cases "reinforce latent resources present in a given place, and through the creation of new links, generates social value" (CCSL, 2009, p. 1). Some of these considerations were included in the FADP objectives of examining the social and economic problems of the elderly (as represented by the focus group) from a creative perspective and how, through a practical intervention, these problems can be addressed (Stipp, 2009). The FADP therefore aimed to raise awareness not only of the problems facing older people, but also of their creative capacity through the design, crafting and marketing of a range of women's accessories, the 'TOGETHER' collection.

2. Research Methods

The question addressed in this paper is how design can function as a catalyst or change agent in a specific community under stress, to evoke positive social change. Post-graduate students in design at CPUT are strongly encouraged to focus on community development as a research area. This particular Master student chose to work with older people and consequently a focus group was selected consisting of nine isiXhosa GAPA participants. These participants were selected because they expressed a need for skills training to supplement their state pension, and wanted to participate in a programme that might strengthen the group, which is in line with the objective of helping to build communities, as discussed in the Allen (2007) model.

A variety of qualitative research methods were used in the FADP study. The fieldwork research methods included observation and journaling by the student, semi-structured individual interviews and workshop sessions with the participants to gather rich, descriptive and in-depth data and responses directly from them in their social setting and over a sustained period of time (Neuman, Miller & Brewer cited in Stipp, 2009). These methods yielded valuable data that was used to interpret the experiences, and personal thoughts and feelings of the elderly. These data collection methods were "important measures of their everyday life experiences and helped to ascertain how social phenomena affect them economically and emotionally" (Stipp, 2009, p. 26).

In addition to informal conversations and bi-weekly supervisory meetings during the project, I conducted an in-depth interview with the student after completion of the FADP to record her personal perceptions and thoughts about the design intervention.

Three different skills-training workshop sessions were structured so that each individual session took place once a week, from ten o'clock in the morning for five hours. The workshop sessions were conducted on site at the Multipurpose Centre in Khayelitsha, a venue which is available to the community for training and other purposes. A participatory approach was

used in the skills-training workshop sessions; all involved gave input in the planning, existing skills were identified and the participants requested training in certain skills and techniques. The student in turn indicated which area she lacked skills in, and in this way the participants and student researcher shared knowledge reciprocally. The GAPA participants requested instruction in a new fibre-art technique -felting- and complex knitting stitches so as to improve and update their existing knitting skills. Participants were encouraged to share their own creative ideas during the workshop sessions. This they did by sharing their crocheting expertise, and later on in the process by assisting with the product development and fabrication of the range of accessories. This example of the reciprocal exchange of knowledge between the student and the focus group participants continued throughout the project. Integrating felting-, knitting- and creative workshops into the design of the FADP model, proved to be beneficial to the participants in acquiring new knowledge and skills, which they demonstrated deftly in the subsequent development and fabrication of the accessory range (Stipp, 2009). The results are discussed in the next section, and images of one of the accessories are included.

3. Discussion of results

The research findings based on the interviews, show that older people who reside in low socioeconomic areas in the Western Cape, such as the Khayelitsha township in the case of the GAPA focus group, are the ones who are most negatively affected by life events such as early retirement, retrenchment and the HIV/Aids epidemic. Three GAPA participants tried to re-enter the formal workplace after retrenchment without success. They had feelings of being discriminated against on the grounds of their age and not being skilled enough, Mama 9 explaining that: "... [I] am physically strong and experienced, but was denied the opportunity to work, because of my age and because I was considered outdated and insignificant" (Stipp, p. 65, 2009). These participants are not only faced with financial hardship (often with scant or no pension provision) but at times also with crime and community sanction if their HIV status (or that of their children) is positive and known. Five women indicated that they suffered from emotional strain and trauma because of HIV/Aids epidemic and that they were stigmatised (initially) after their/children's status became known. They had to take over the responsibility of caring for ill children as well as looking after orphaned grandchildren Stipp, 2009) This specific focus group therefore seemed to benefit significantly more economically and socially from the FADP than the Haven Homes focus group (not discussed in the paper), which was established at an old-age home in a middle class area. None of the participants in the latter focus group was HIV positive, they lived in a secure environment and did not have the added financial responsibility of looking after others. Therefore the old-age pension grant, common to both sites, was of more benefit to participants in the Haven Homes focus group.

Another finding which resulted from the FADP was that an intervention of this nature can be implemented successfully in a vulnerable community if a co-operative and participatory methodology is followed. As discussed in methods (see previous section), this resulted in a number of outcomes which were agreed upon mutually, and planned together. It was also agreed upon that the workshop materials will be supplied by the student, as well as refreshments and meals, and that no money will change hands but rather a bartering arrangement will be followed- training will be provided in lieu of payment. At the same time the understanding was that the FADP could be postponed if other (paying) commissions were secured. This understanding proved to be problematic for the student halfway during the project, in that a big commission was taken on by the GAPA participants which set back the original time frame by close on two months.

Taking ownership of the project was an important consideration from the outset however, and contributed to the fact that the GAPA participants reported that they were all, in some way or another, impacted upon by their participation in the project. They reported that the newly acquired knitting techniques were integrated with their existing knitting skills and as a result could be used in future production of their own merchandise such as scarves and handbags. One participant stated that: "I knew how to knit long ago, but just basic knitting (stitches). I have now learned advanced knitting skills and will 'flourish as an excellent knitter' " (Mama 7 cited in Stipp, 2009, p. 79). This strong endorsement of the skills training aspect of the project should be seen in the context of Mama 7 making a living through craft and handwork activities. Any competitive advantage or skill gained, translates into improved living conditions since the old-age pension grant provides for the most basic living costs only at R700 (in 2005 when the project started) to the current R1010 per month ("About social grants," 2009). In addition, as mentioned before, GAPA participants often support extended families affected by the HIV/Aids epidemic, and frequently as the only breadwinner.

Some GAPA participants reported a renewed sense of engagement, intellectual development and identity after the skills-training workshops. One participant felt empowered to the degree that she started to communicate more with other people and her peers, one participant became very interested in fibre-arts once again, while three participants felt happier and more confident with themselves and their craft abilities. Mama 1 articulated these sentiments: "I feel empowered and confident to the extent that I can sell my [handcrafted] products around all the [surrounding Khayelitsha] neighbourhoods and even go to Cape Town to sell to the white people [tourists] and other cultural groups" (Mama 1 cited in Stipp, 2009, p. 81). This equally strong endorsement of the training and developmental aspects of the project can be understood in the context of the participants' improved

sense of self-worth in the following ways: a sense of engagement with the immediate peer group and other people in the area, intellectual development during the creative workshops and product development phases and identity consolidation as skilled craftspeople and women with a purpose in the community. Some of the participants were able to supplement their state grants with income generated from additional projects, such as the crafting of teddy bears for a national hotel group, in which they used their newly acquired and improved fibre-art skills. In this way the GAPA participants transferred the skills and knowledge from the FADP to other commissions they secured. One participant expressed the desire to transfer her new knowledge not only to other commissions, but also further a field to the community at other GAPA sites by: "...go[ing] back to the Transkei, with the new techniques that I have learnt for myself, and teach the new techniques to the members of the GAPA group there" (Mama 1 cited in Stipp, 2009, p. 82).

Learning about colour, colour combinations, conceptualisation and knowledge regarding the procedures and techniques involved in the manufacturing of the 'Together' product range, also listed among the benefits that the elderly gained from participation in the FADP. Mama 4 stated that the FADP "has encouraged her to dream again" (Mama 4 cited in Stipp, 2009, p.81). Table 1 shows the improvement in the participants' existing skills, and the acquisition of new skills, techniques and knowledge.

	GAPA		
	BEFORE FADP	AFTER FADP	
Craft	Knitting, Crocheting, Sewing and	Felting (wet and resist)	
	Bead Work	Shown in felted bucket bag Fig 1	
Knitting Stitches	Plain and Purl	Elongated, Loop, Running Stitch,	
		Patterning, Shadow Patterning, Shadow Knitting & Odd-yarn Knitting	
Crochet Stitches	Slip Stitch, Double Crochet, Extended Double Crochet, Treble, Half Treble,	Shown in handle of bucket bag Fig 1 No new stitches learnt by GAPA	
	Double Treble, Working in Rounds and Lace Work	only by student	
Skills Brought to	Crocheting	Knitting (Elongated, Loop, Running,	
the FADP	Time management	Openwork patterning and Shadow	
(existing and new)		Knitting), Felting	
		Improved time management	
		Improved communication skills	
		Improved product and design	
		development skills	

Table 1 Accumulation of skills and knowledge before and after the FADP intervention



Figure 1 Three views of the Graphic Kalahari bucket bag. Stipp, 2008.

Table 2 shows how their emotional well-being improved. A renewed sense of engagement, intellectual development and identity amongst the GAPA participants resulted from participation in the FADP.

	GAPA		
	BEFORE FADP	AFTER FADP	
Product and time	Some confidence in	Improved confidence in	
management	creating product and	creating product and	
	managing time	managing time, resulting	
		in timely completion	
		of teddy bear order	
Identity and personal	Some identity, purpose	Improved identity,	
well-being	in life and feeling	pupose in life and	
	socially useful	feeling socially useful	
		through acquistion of	
		new skills and knowledge	
Preservation of craft	No passing on of skills,	Pass on their skills,	
skills, knowledge and	knowledge and wisdom	knowledge and wisdom	
wisdom	to their children and	to their children and	
	grandchildren	grandchildren because of	
		an acknowledgement and	
		development of existing	
		skills and resources	

Table 2 Improved personal well-being before and after the FADP intervention

Helping to revive hands-on creativity in this group by practising and restoring the sometimes neglected traditional craft skills such as specific knitting and crochet techniques, also resulted in their application to make products for the "Together" collection. The achievement of the collection is made visible in the lives of the FADP participants on many levels, including the donation of a copy of the Master's thesis as documentation and reference (Stipp, 2009). The student's exhibition showcasing

the 'Together' range of accessories opened on the 11 August 2009 for public viewing, with all the participants attending.

3.1 Guidelines for extending the FADP

After completion of the FADP a framework and guidelines were established by the student and the participants. This was done to help extend this developmental model as a creative intervention to similar sites, where needed. Implementing another FADP amongst other elderly groups is possible since it is context specific and can be adapted and altered to meet the needs and circumstances of those groups, using a facilitator/s. The fact that all potential groups and contexts are different, should be noted and the following guidelines are not meant to be prescriptive.

- A FADP can be facilitated by a designer/product developer (or previous participants with additional training) who are social design practitioners working with the elderly and/ or other marginalised community groups.
- A FADP implemented in a low-income socio-economic area with elderly participants who are retired (existing groups' participants were between the ages of 50 and 80), seems most beneficial to the participants.
- Provision needs to be made for bartering and remuneration arrangements.
- Participants who are physically active, able-bodied and competent to do complex and sometimes labour-intensive work, have an advantage.
- Participants who are craft producers of some form (such as beading, quilting and leather work) and are familiar with time management and planning, have a desire to learn and obtain new skills and knowledge, have an advantage.
- New participants need to be introduced to a FADP and receive training on a continual basis, so as to ensure that the project is never without craft producers.
- The skills-training workshop sessions and fabrication of product ranges need to be conducted in the participants' own environment and surroundings in a venue which is located centrally, so that the participants may easily reach the central workplace on foot or by taxi.
- The FADP venue needs to be equipped with electricity and running water.
- Provision must be made for an adequate amount of tables and comfortable seating for the participants during the workshop- and manufacturing sessions of the FADP.
- Donated equipment and materials required for the workshop sessions and fabrication of the product range are an advantage.

- Content and scheduling for workshop sessions must be structured in such a manner so as to expose the participants to a new craft skill/s, improve and update their existing skills, and allow for creative interaction between the FADP designer/product developer, participants and setting.
- Continued interaction, sustained fund-raising and promotional activities are necessary to consolidate and grow a FADP.

4. Repositioning art and design's role in society: a catalyst for social change

The implementation of the FADP illustrates the importance of extending the curriculum to nontraditional sites of learning, to link curriculum content with the real world which points to a new understanding of the role and implications of curriculum in educational settings and to life beyond the campus (Ensor, 2004; Diamond, 1998; Applebee, 1996 & Jansen, 1990). It became clear from the FADP implementation that in encouraging students to engage with real-life situations in the community context, important contributions can be made towards sustainable design solutions for social benefit. Financial sustainability questions regarding the project are currently addressed by the Fashion and Surface Design department and the student who are engaged in active fundraising efforts, with the FADP being short listed for the Impumelelo Innovations Award Trust, a grant initiative which awards sustainability and poverty reduction projects in the community and recognises public and social entrepreneurs who "are the backbone of exemplary programmes" (Impumelelo Innovations Award, 2009).

Design as a catalyst or tool for social change is illustrated by the perceptions of the GAPA participants and the student, who indicated that they were all in some way or another positively influenced by their participation in the project. The student explained that she had started the project with preconceived ideas, which were soon changed. She had assumed, for instance, that the group of middle-income old age home participants that she worked with previously (the Haven Homes focus group not discussed in this paper who were seemingly better resourced) would be the more productive and creative crafters, showing initiative. Her perceptions were changed once she started interacting with the GAPA group, in that she discovered that the active and latent (human) resources within that community were considerable. This brings us back to similar CCSL (2009) South African case studies (mentioned in Section 1.2) which has as an aim to "reinforce latent resources present in a given place, and through the creation of new links, generates social value". Social value was generated in this project through adding new knowledge and skills to all the participants' existing resources, knowledge and skills which have the potential to be transferred to other similar sites. Participation during the project, another assumption which was turned on its head since she assumed that the age and ethnic difference may hamper progress. However, because operational aspects and personal concerns were addressed before each workshop session started, a collaborative atmosphere was created which was built upon as the project continued (Stipp, 2009 Interview).

On a personal level the student indicated that she had to learn to be flexible with regards to her expectations of the pace at which production happened and the timing of general project management, since scheduled workshop times were invariably changed by the participants if paying commissions were secured (as discussed before). The student had to learn patience with regard to language and other cultural differences (Stipp, 2009 Interview). An interpreter worked with her initially, but the relationship with the group consolidated to such an extent that they were able to communicate successfully in a variety of ways, for instance visually -through drawing and theme storyboards- and physically -through body language and practical examples and creative samples- samples which the group developed using their own initiative. These samples were in turn frequently used as components for the accessory range. Some of the grandmothers who were able to speak limited English also eventually helped with interpretation. The student indicated that from a cultural difference perspective, a much deeper understanding of the isiXhosa culture was formed during the intensive contact hours necessary for the workshops, with particular reference to issues of respect, communication and finding common ground (Stipp, 2009 Interview). Sometimes common ground was found in small and unexpected ways; sharing a meal or a cup of tea, celebrating together when new stitches or techniques were mastered, or just enjoying quiet moments of crafting. These experiences resonate with Ehn's (2008) views, who argues that design, when practiced as 'situated doing and undergoing' facilitates an experience and expression which belong to the collective dimension of design work. Ehn also states that design can be used in groups to deepen social interaction such as sharing meaning, sharing objects, and engaging with artifacts in a place (Ehn, 2008). The collective dimension of design work, it seems, therefore also forges common ground and may be a valuable tool for social change.

The generation of social value as a result of acknowledging and working with embodied knowledge and lived experience as ongoing sites of knowledge construction, often occurs in community with others. Wenger describes this as "a community of practice" (Wenger, 1998, p. 45 cited in Smith, 2003), which in this instance involved the extended community of grandmothers, their families, the student, her family and the support system, myself, other supervisors and lecturers in the department, other designers, the faculty and so on. The successful implementation of this design for development model illustrates that the social and economic problems of the elderly can be addressed and improved to a degree through a well-considered and practical intervention. Investing time, energy and finance in such an intervention while simultaneously and actively promoting strategies of knowledge and skills
creation as the preferred path to help maintain the well-being of older people, accomplished this. The FADP is therefore a good example of Margolin's (2005) argument that design has the capacity to change existing situations into preferred ones.

5. Conclusion and recommendations

Repositioning the role of art and design in society to function as a catalyst for social change is not only possible, but desirable. In addition, when lived experience in the form of latent and active resources in a community are used to involve communities in creative ways to take charge of their lives and environments, they are encouraged to exercise agency and strengthen their voice, one of the important tenets of the Creative Communities for Sustainable Lifestyles (CCSL, 2009), a design for development model. This model was drawn upon to inform the Fibre-Arts Design Project implemented in Khayelitsha with a group of nine grandmothers and a Master student, who managed to change the participants' prospects while improving their well-being during the project.

Interventions such as the FADP proved to be a valuable data-gathering tool, establishing not only the level of craft skills in existence, but also what other lived experience assets are in existence in a given community, and the level of inclination to develop these assets. Allen's (2007, p.21) Asset-Based Community Development Model emphasizes a shift from a predominantly needs-based perspective to an asset-based perspective, where social value is seen as the most important resource in a community. Allen refers to certain community assets as 'treasures' such as artists... clubs, cultural groups... senior citizens, youth and so on. Therefore the view of the individual as [product design] producer and owner, may truly be empowering to older people as they are acknowledged as community assets and treasures.

Future design interventions may be documented on video as a way of storing and disseminating this communal knowledge which may develop during a FADP or similar design project. Potential to establish a GAPA database that can be plugged into industry/business in a similar way to how many sheltered workshops operate, is another possibility to ensure future sustainable growth of such a project. Ultimately, in striving to balance the profit motif which drives the development, creation and sales of designer products with the social responsibility motif, the lived experience of all the participants in this design intervention were drawn upon to contribute to social change and adding value in a community under stress.

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Appendix 1

Allen's traditional needs-based versus alternative asset-based community development model

Traditional Model: Needs-Based Community Development Based on ...+ Needs Goal --+ Institutional Change Conversation --+ Problems and Concerns Change Agent ---+ Power View of Individual ---+ Consumer, Client Needs are based on community problems:

Broken Families, Child Abuse; Crime, Gangs, Housing Shortage, Illiteracy, Lead Poisoning, School Dropouts. Truancy, Unemployment, Welfa'e, etc. Schools, Senior Citizens, Youth, etc.

TRANSITIONS IN DESIGN EDUCATION: A COMPARATIVE STUDY OF AUSTRALIAN & JAPANESE 'INTERACTION DESIGN EDUCATION'

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Abstract

With ever increasing pressure from technological and social transitions to teach competence in Interaction Design, new teaching methods and syllabus need to be explored. This study presents an approach to develop cultural characteristic focused syllabus in Interaction Design. This study hypothesizes that an internationalized cross-cultural society will be the next frame-shift of the social structure. Working with this hypothesis, this study applies comparative study methods in exploring an Australian and Japanese Interaction Design education practice. In addition, an analysis of theory and practice in relation to the current development of interaction design education is demonstrated. Most importantly, this study takes into account the cultural contexts which affect interaction design characteristics in these two countries. Based on the findings, an enhanced cultural context design model in Interaction Design is proposed, which intends to reflect the progressive transitions in Interaction Design Education across these two countries.

Keywords

Interaction Design, Design Education, Cultural Context, Cross-Cultural Study, Comparative Study

1. Introduction

Interaction design has been considered as a major design methodology in the Human-Computer Interaction field, which has been constantly contributing to bridging individual user experiences within various social & cultural contexts by utilizing the latest information technologies. With the revolutionary development of information and communication technology, such as the advent of Web 2.0 technology and the progressive implementation of RFID & mobile technologies, in addition to the focus of user interface and interaction usability, the focus of interaction design also embeds various contextual interrelationships (Beyer & Holtzblatt, 1998, p.3). From the early 1990s, the design field has been paying increasing attention to social contextual analyses, so that interaction between people and systems, systems and systems, and systems and society have become a more regular feature (Dourish, 2001). As a consequence, the main challenge of interaction design is shifting from achieving

usability, efficiency, attractiveness, and playfulness for individual user's interaction (Norman, 2004, p.26) to individual (personal) system interaction with relevant systems. From the user perspective, this shifting companied by technology development together support new communication platforms provide enormous increase of social and cultural interaction possibilities, the various social contexts are playing a more significant role in people's social lives which is been recognized with more cultural characteristics even before (Huang & Deng, 2008). The major design issue is shifting from one-to-one interaction, to the interaction between the user and the contextualized cultural ambient and social environment. Following this shifting, interaction design education should also focus on providing students with a foundation theory and related design process to understand user's action as inevitable cultural conduct.

Since social context is one of the most important issues of modern interaction design theory, it's crucial to understand the culture that sustains a whole society (Huang & Deng, 2008). Especially in Asian countries, people's social behaviors and activities, cultural standards and recognitions, the overall social interactions and cultural traditions always significantly influence people's decision-making. And the cultural differences oriented decision-making became to the ambitious target of globalization for many commercial software and online applications (Marcus, 1993; Marcus & Gould, 2000). Cultural preferences have become one of the most significant subjects and focuses of fulfilling users' cultural and social needs (Bourges-Waldegg & Scrivener, 1998; Strøm, 2006). Based on such a cultural stand, in this paper, terms like cultural contexts have been used as an analyzing tool to thread the structural and contextual influences back from the user's original living environment. There is a rapidly increasing trend to modulate user's interaction patterns from a cultural perspective, especially when we try to deal with sensors, physical computing, tangible interfaces and intelligent ambient environments.

Hofstede (1980) defines culture as "the collective programming of the mind which distinguishes the members of one group or category of people from another." A culture can be distinguished as a set of shared characteristics within a group of people, and these characteristics include thoughts, values, and behaviors (Choi, Lee, Kim, & Jeon, 2005; Huang & Deng, 2008). For the purpose of human–computer interaction, Honold (2000) also defines culture based on concepts provided by Ratner (Ratner, 1997), Shore (Shore, 1996), and others. He advocated that culture does not determine the individual's behavior, however the modularity of thinking, perceptions, and actions are significantly affected by it. This notion of cultural impact provides a need for modularity within the recent interaction design methodology, it has been used to explain people's unconscious actions, language, and even thinking, which derives from their cultural background, knowledge and beliefs (Kövecses, 2006, p. 69). For instance, the design of mobile phones needs to incorporate a wide range of cultural factors concerning

users, organizations, practices and environments in order to most effectively perform its intended role throughout the use process (Jung & Chipchase, 2008). Similar cultural localization needs can be easily seen from the internationally popular interactive home game device, Nintendo Wii, e.g. the study by Yashiro successfully described cultural elements, which have significantly influenced Wii game design for different markets. (O'Hagan, 2009; Yahiro, 2005). This trend demonstrates how cultural impacts influence interaction design in real industry, while at the same time showing how a successful interaction design always induces users to reorganize and recombine their interactions, in order to '... improve the relevance of their actions in and sense making of a particular situation' (Ringberg & Reihlen, 2008, p. 923).

This paper proceeds in three parts. First, it introduces the background and a cultural-focused characteristic of a collaborative curriculum development project which involves one Australian and one Japanese university. Then, it presents a case study of new interaction design syllabus development with the intention of revealing the cultural perceptions that have been neglected in most current interaction design curriculums globally. In addition, an enhanced cultural model is proposed.

2. Comparative Research of Two Interaction Design Programs

Thus, this research proposes an approach to accelerate the Interaction Design transitions by taking into account the cultural impact of Interaction Design Education. To do this, it is necessary to comparatively study two education programs from a cultural perspective across two different countries and cultural circles. This project builds on a case study undertaken at an Australian University in Melbourne Australia and a Japanese University in Tokyo Japan, and the discussion focuses on identifying the impact on the pedagogical development based on qualitative comparison research method.

Above all, due to the extensive definition of Interaction Design which across various disciplines; in this study, the disciplinary stand of Interaction Design has been defined across Industrial Design and Media Design domains. The first focus is the course structure and teaching contents. Our main motivation in this study is to help our graduates to achieve higher competiveness in interaction design industry. To do so, gaining an understanding of what interaction designers need to be effective practitioners in various industries is vital, which is strongly oriented by local culture. From the industry perspective, the most needed interaction designers are the designers can design interactive products and systems to answer specific market users. Those user's customs, styles, behaviors, and perceptions are all strongly influenced by their cultural context. The main goal of this project is to achieve a cultural oriented syllabus by comparatively research the pedagogical arrangement within Australian and Japanese counterparts. This research started from the social and cultural contexts of interaction design, where various industries are shifting to a new paradigm based on cultural change and developing technologies. This shift requires new design methodology for future design practice, which requires rethinking of interaction design in tertiary education. To inspect whether the course

syllabus and teaching contents of interaction design provided by these two participated universities truly match industrial requirements, expectations and cultural contexts, it is necessary to examine the whole course contexts, students' knowledge background and syllabus. In the next section, one unit has been chosen from each university by participated lecturers; through the comparison research we intend to figure out a way to integrate cultural context focused framework for interaction design education.

2.1. Positioning Participating Programmes

The pedagogical approach has been employed in the teaching of both 'Interaction Design' at the participating Japanese university and 'Contextual Design' at the participating Australian University. As the final research target, to achieve a cultural-context centric interaction design syllabus, we arrange a course called 'interaction design' in the Japanese University which takes interaction design theory as main, contextual design theory as supplementary; as the contrast, we arrange two courses called 'Design in Context' and 'Professional Context' takes contextual design theory as main, interaction design theory as supplementary (Table1). We comparatively observe the differences of teaching contents and students' outcome in every stage; intend to find out the ideal structure of this syllabus.

This project has explored teaching methodologies within Interaction Design and Contextual Design programs across both under-graduate and post-graduate levels; and intends to articulate a comprehensive framework for interaction design education.

In the Japanese university, two undergraduate second year classes from Industrial Design have been involved in this project; while in the Australian university, one master's course work class and one honours (fourth year) class from Multimedia Design have been involved. Each class contains around 25 students. The undergraduate degree in Japan is a four year course, and the master's degree in Australia takes 1.5 years.

	Japanese University	Australian University	
Program name	Interaction Design	Design in Context	
		Profession Context Design	
Program level	Bachelor students (2 nd year)	Master's course-work	
		students	
		Honours students (4 th year)	
Student	2 classes (25 students each)	2 classes (25 students each)	
numbers			

Table1. Positioning Participating Programmes

Discipline	Industrial Design			Multimedia Design		
Main theory	Interaction theory	Design	related	Contextual theory	Design	related
Supplementary theory	Contextual theory	Design	related	Interaction theory	Design	related

2.2. Probing Related Background Knowledge

There are obvious differences between the participating courses from both universities. In developing collaborative curriculum, it is crucial to build up understanding of the background knowledge of participating students. The Interaction Design course in the Japanese university has been expanded into two semesters: titled 'Interaction Design 1 & 2'. There is no unit titled Interaction Design in the Australian university's existing curriculum. So we re-formed an existing unit called 'Design in Context', with respect for the original teaching objectives, while adjusting the curriculum to be appropriate to our study needs and synchronized in terms of key lecture topics and technology support.

In the Japanese university, the 'Interaction Design 1' unit aims at teaching basic Interaction Design concepts to students, such as "affordance" and "interface" (Figure 1). This is followed by learning the processes of field observation and design concept creation. Students observe and understand the concept of "affordance" from the environment containing the user, the space, the facility, the product, and so on, within the university. By exploring and assigning specific meanings to the design objects within cultural contexts, students design object (product) oriented concepts first, followed by designing interface oriented concepts. There are also some presentations by students to help them to proceed through their subject and keep them on track. For example, they take pictures of objects then analyse them from an 'affordance' perspective. They also talk with each other about the meanings of their presentation to inspire their image making.



Figure 1. Frame of 'Interaction Design 1' in participating Japanese university

For the Australian university, the situation is more complicated than our Japanese counterpart, as we have to separately analyse the pedagogical arrangement for the undergraduate (honours) students and the postgraduate group. In the undergraduate (honours) curriculum, we focus on the students who

come from the same university, and are all studying on the local campus. The Interaction Design related Major units have been titled: 'Interactive Design for Web Technology', and 'Interactive Design for Games and Web Applications'. Interaction Design related theories can also possibly be taught in some design studio units, such as: 'Individual Research Project', 'Group Research Project', 'Design Studio', etc. However, after observation of the above units, there was no obvious evidence to demonstrate that adequate Interaction Design related theories have been previously taught to students. The 'Web Technology' related design theories are fairly limited in terms of supporting further Interaction Design study.

In the postgraduate (masters) curriculum, students may enrol in either Semester 1 or 2. Students' knowledge background may be from any design discipline. If students take this unit in the third semester of their master's course, they will have Interaction Design related basic knowledge from the core unit 'User-Centred Design Research/ Studio', and may also have supportive knowledge from an elective unit called 'Information Design'. However, if students take this unit in their first semester, we have to assume that they don't have any Interaction Design related background knowledge.

Based on the above probe, from the perspective of related background knowledge, we can summarise that the participating Japanese students have basic knowledge to support their Interaction Design study, but the Australian students do not.

3. Syllabus

To implement the course delivery method which focuses on the cultural context issues, there are obvious necessities to rebuild the course plan. In this case, especially in integrating a cultural-focused collaborative teaching method, and utilizing an online learning environment, we had to adjust our in class teaching methodology.

In rearranging the course syllabus, we started by clarifying the final teaching outcomes in detail. What do we want our students to learn as they interact with the course material? How can the syllabus provide more space in the student's mind to develop new ideas with cultural characteristic, and develop relevant critical-thinking and research skills? The syllabus needs to be re-formed with a culturally sensitive structure to encourage students to develop new concepts, exercise and present more cultural-critical-thinking skills, and develop research skills in more cultural depth. During the whole developing process, it is also crucial to keep in mind that the focus of this course is Interaction Design. One of the most important objectives is supporting the 'interactivity' of the students' learning process, communication, and outcomes.

The cultural characteristic can be seen from this 'interactivity'. For instance, reviewing the students' learning process through their final design outcomes, it is very interesting to identify the cultural differences between Japan and Australia, from the initial stage of 'theme setting'. For example, Figure 3 is an Australian student's online interactive 3D prototype, which is named an 'Interactive Pasta

Cooking Assistant System'. This theme fully reflects the localized cultural-characteristics of a Melbourne user's needs.



Figure 3: The sample screenshot of an Australian student's online interactive 3D prototype for the topic 'Interactive Cooking Assistant System'

As a comparison, Figure 4 presents a Japanese student's concept, allocating his design outcome as a 'Business Cards Exchanging System'. This theme also fully reflects the localized cultural-characteristics of a Tokyo businessman's needs.



Figure 4: The sample screenshot of a Japanese student's concept of a 'Business Cards Exchanging System'

The course objectives can be set broadly, the students can develop their research directions based on their own interests. In this course, the major objectives will focus on the following aspects:

- Cultural theories: the contextual design methodology and process are crucial for students' interaction design practice.
- Creativity based on contextual redesigning: encourage students to open their minds and create concepts which are related to cultural contexts analysis, and present an interaction focused systems or services design as the final design outcomes.

- Cultural research strategies: explore relationships between behavior and culture. The field research- observation studies have been designed as part of the syllabus in order to explore features of the different culture needs, understand relevant contexts, and most important how user carry out their lives and achieve cultural needs within the current environment. The Ethnographic Archive has been introduced in both courses as the main research strategy of observation, students tasks are to gather user related living materials known as the Human Relations Area Files (HRAF) (Berry, Poortinga, Segall, & Dasen, 2002, p.236).
- Cultural interactivity concepts expression skills: provide opportunity for students to learn the most practical and advanced methods of idea expression for this interactivity focused unit. In the Australian university side, an Interactive 3D technology called 'Viewpoint' has been introduced in this syllabus, to express various contexts three-dimensionally and interactively.
- As the final design outcome, Cultural-Contexts-Aware focused design method has been introduced. Students need to design interactions which communicate cultural awareness and atmospheric aspects within a specific cultural environment (Dourish, 2001).

The shared key word for both sides of the teaching objectives is 'context'. Students study how to grasp technology, culture and social contexts through the observation of user's local daily lives, express the contexts into a Contextual Diagram, then based on this diagram to form mental model of an interactive system, at last carry out Interaction Design Outcomes (Figure 2).



Figure2. Syllabus of Collaborative Interaction Design Unit

4. Discussion

The primary purpose of this paper is to draw attention to future Interaction Design education development based on comparatively probing the potentially relevant existing curriculum in both participating universities. Our observations, claims and analysis are based on limited student studies, limited information resources and a tight schedule. To draw a more complete and rigorous paradigm, more participating classes and observations are needed. From the hypothesis that an internationalized cross-cultural society will be the next frame-shift of the social structure, we argue that it is possible to

come up with an understanding of integrating a cultural and social context framework in Interaction Design education.

Based on the experience of this comparative study, it is worthwhile addressing some common difficulties we have experienced. In terms of helping students to achieve cultural contextual sensitive Interaction Design outcomes, we believe there are some parts of the existing syllabus in both universities that need to be significantly improved. Here, instead of suggesting changing each unit of the existing curriculums, which will potentially cause 'meaningless arguments', we have summarised the following principles, which we hope can help future curriculum development.

- Firstly, to help students achieve a successful cross-cultural Interaction Design outcome, at least one collaborative unit across two different countries are needed. As a cross-cultural information resource for students on both sides, the student project review process has been considered as the most efficient information exchange opportunity for students.
- 2. Secondly, besides knowledge of their specific design discipline, it is also necessary for students to have some prerequisites knowledge of relevant Interaction Design theory, such as 'User-Centred Design', 'Affordance', 'Information Design', 'System Design', etc. Furthermore, cultural-understanding focused knowledge such as social patterns, interaction modularity, social cross-cultural psychology etc. are also should be prerequisites knowledge.
- 3. Finally, contextual design needs to be oriented by user's lifestyle, behaviour, and cultural activities. Students need to build up analytical thinking to interaction design in group. Perhaps the most effective way to implement the filed observation is to establish a collaborative relationship with somebody who comes from another culture. It is also important to take the filed observations and comparatively and critically analyse the cultural materials by these cross-cultural group. Furthermore, to consolidate this fieldwork, it's also important to achieve platform for information sharing, especially for trans-national circumstances.

5. Conclusions

Based on the findings, a design model in Interaction Design, enhancing cultural contexts, is proposed, which intends to reflect the progressive transitions in Design Education across these two countries. This cross-cultural focused interaction design program provides an opportunity to integrate emerging technology with cutting edge design education practice. In the mean time, it is also important to investigate and assess the feasibility and suitability of the existing curriculum.

While further work is required to refine the achieved pedagogical arrangement, we believe the current model provides a platform to promote greater cognitive participation and knowledge transference among the participant students. We hope that engaging in a dialogue around this approach, and reviewing other cross-cultural comparative research, will provide key solutions for future alteration in Interaction Design education, especially to transnational Interaction Design curricula development.

Acknowledgements

The comparative study of Australian and Japanese information design education is supported by the Australia-Japan Foundation of the Department of Foreign Affairs and Trade.



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Engaging a Design Community Online

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Abstract

The Powerhouse Museum (PhM) is one of Australia's largest museums with a collection of 400,000 objects relating to design, science and technology. PhM is a leading exponent in the design and implementation of social media tools through which to engage online communities. For example, the objective of its Design Hub portal was to create an online resource that would become the first stop for design-related information and resources for students and practitioners in the state of New South Wales. Focusing on the Design Hub portal, this paper presents a case study on designing for online user motivation to ensure that social media tools and networks engage the target community. Research tools – based on human-computer interaction knowledge – include expert interface analysis and web analytics. Findings from this case study underline the importance of making an online community of contributors visible to each other and to the wider audience.

Keywords

social media; online communities; motivation; human-computer interaction.

1 Introduction

The Powerhouse Museum (PhM) is one of Australia's largest museums with a collection of 400,000 objects relating to design, science and technology. In 2004, PhM updated its website after a two-year user survey. From 1,048 questionnaire responses, 75% visited the PhM site primarily to plan a physical visit to the museum (Miller, Dawson, & Perkins, 2003). From these results, PhM specified that its site redesign should focus on serving the information needs of new and repeat visitors to the physical site in central Sydney. As a result, PhM began implementation of a collections gateway in 2004 through which both national and international design collections could be accessed. The objective of the 'Design Hub' (D*Hub) project was to create a Museum resource that would become the first stop for design-related information and resources for students and practitioners in the state of New South Wales (the Powerhouse being a state-funded museum). The first collection to go online would be the Powerhouse Museum's own; other design museum collections would be added postlaunch, using standard document description protocols to aggregate collection search results from multiple institutions (Chan, 2006a). Traditional museum collections are not for lending; whereas lending library collections are designed to be borrowed and used by participants to inform their own work. Therefore – through the D*Hub project – PhM was attempting to move the museum some way towards the lending library's mission.

1.1 Research design

This research is structured according to Yin's five components of case study research design (2003, p.21):

- a) Study questions.
- b) Study proposition.
- c) Unit of analysis.
- d) Linking data to propositions
- e) Criteria for interpreting findings.

1.2 Study questions

In addition to the D*Hub project, the PhM web development team has designed and implemented a number of innovative social media projects designed to make the Museum's content and collections more engaging to online visitors. Therefore PhM constitutes a rich site of investigation for work on design, social media and museums. In order to adhere to the first of Yin's five components of case study design, this case originated with the initial study questions *how and why does the D*Hub project engage a design community through social media tools?*

1.3 Study proposition

Study propositions are those factors associated with the site of investigation that direct "attention to something that should be examined within the scope of study" (Yin, 2003). In this instance, the study proposition was derived from some of the design challenges faced by the PhM web development team during its implementation of the D*Hub project. For example, the team's initial response to the D*Hub brief was to insert a magazine-style interface between the collections aggregate and the user, in order to repurpose existing collections content for the requirements of the target user group. Such a magazine interface is hardly a new idea; D*Hub's informants include the international design 'e-zine' 'Design Boom' as well as the Australian arts portal 'artsConnect'. D*Hub is differentiated from these examples through its direct link to the Powerhouse Museum's object and image content management system (CMS). But despite this link, many of the object records in the CMS do not have any kind of commentary attached, either curator- or user-generated.

Therefore a distinguishing feature of D*Hub would be the addition of editorial, featured articles, and events listings through which to provide a different kind of interface to encourage users to browse and borrow PhM content to inform their own study and/or practice. In so doing, the ambition of the D*Hub portal was to motivate the New South Wales design community sufficiently so that a critical mass of users would generate content for the site. The lead developer described one scenario in which the motivation for user contribution would be the opportunity to build "social capital":

"So you're a design student, how are you going to impress your future employers? You're going to do that by having had 50 posts up on D*Hub... You might know a lot about skateboard art. You might go to all of the skateboard art shows; you know who's hot, whatever. OK, put that knowledge up on our site rather than just putting it up on your own site because our site brings you social capital that putting it on your own site doesn't" (Chan, 2006b, unpaged).

This kind of top-down assumption about user motivation by the lead designer has a basis neither in research nor anecdote. Therefore the informal study proposition that underpinned this case study was that *top-down, features-oriented interface design does not account adequately for soft factors such as user motivation*. This study proposition informed the definition of the case study's unit of analysis.

1.4 Unit of analysis

Yin stresses that a clear definition of the 'case' itself is essential to the success of a case study; in other words, the researcher must specify the unit of analysis (2003, p.22). This unit emerged from further investigation into the Design Hub portal. By the time it was launched in August 2006, D*Hub had consumed approximately 2,000 hours of in-house development by the PhM web team, spread over eleven months (although much of the PhM's implementation is modular, so that code and systems which are created for one project can be reused by others). The enduring challenge for D*Hub and other PhM social media initiatives is how to generate and maintain sufficient user motivation to ensure their ongoing success over the long term (Chan, 2006b). Hence *user motivation* with respect to social media emerged from the exploration of the site as the primary unit of analysis of the case study.

Like many of their physical equivalents, online communities can struggle to attract and retain members who actively contribute on a regular basis. A study by Lancaster University of the popular peer-to-peer (P2P) music sharing service Gnutella conducted a one-week monitoring session of P2P traffic. It found that 85% of peers share no music files on the service; 86% share 10 files or fewer. Wikipedia reports that as of June 2005, 1.81 million computers were connected to the Gnutella P2P network; if this figure is even remotely accurate then it appears that – although Gnutella has achieved a critical mass of peer-contributed content – it is the number of *free riders* (those who download music files while not contributing any to the network) that is more notable. The Lancaster report is quite articulate on this matter, suggesting that users of P2P networks like Gnutella

"face a social dilemma. They must decide whether to contribute to the common good by sharing files or maximize their personal experience by free riding... Individuals gain no personal benefits from uploading files (in fact, it's inconvenient), so it's 'rational' for users to free ride. However, significant numbers of free riders degrade the entire system's utility" (Hughes, Coulson, & Walkerdine, 2005). If uploading a music file to a P2P music share is considered detrimental to an individual community member's quality of experience, then the expectation that the D*Hub community would upload news or even write original content may seem rather ambitious.

1.5 Previous work on user motivation for social media

To some extent, the design rationale behind D*Hub borrows from the model of user-generated knowledge that drives the success of wiki-based sources such as Wikipedia. Work by Hoisl et al. (2007) examines how social reward mechanisms can motivate users into making more contributions to a wiki community. Discounting the use of financial rewards as an option, Hoisl et al. worked with the same MediaWiki software used by Wikipedia to develop a user motivation system through a calculation based on three reward mechanisms:

- 1. *Amount of references;* including size of a reference; number of links pointing to it; and number of links pointing to the specific article.
- 2. Rating of articles; an open rating system whereby users can vote for or against an article.
- 3. *Most viewed articles;* a simple user visitation count.

The proportion of users who actually generate content for Wikipedia is small; therefore a substantial critical mass of users is required to support a self-sustaining community of actual content generators. Hoisl et al.'s rewarding system seeks to "create qualitative high results which are necessary to generate non-monetary incentives for users" (Hoisl, Aigner, & Miksch, 2007). In effect, their prototype reward system gives gold stars to reliable, regular and significant contributors to a wiki, in a similar fashion to how the eBay system generates gold stars for reliable buyers and sellers. The authors acknowledge that their reward mechanism will be insufficient "to motivate enough people to form an active community to participate in every wiki. Users must have an intrinsic motivation to contribute" (Hoisl et al., 2007).

Agreeing that "Under-contribution is a problem for many online communities", Beenan et al. (2004, p.212) conducted field experiments which applied social psychology theories to the redesign of an online movie review and recommendation community of 80,000 members, of which 7,000 were active in the six-month period prior to the research. 830 members were sent motivating emails, in response to which 397 (47.8%) members logged in and rated at least one movie. Descriptive analysis including all participants revealed a movie review rate of 19.26 movies during the week (mean), a significant increase on the previous number of 5.4 movie reviews per week in the 6 months before the invitation. The researchers expanded upon *social loafing* theory to propose that users would be more motivated to contribute to an online community if they were reminded of both the uniqueness of their contributions and the benefits that followed from this contribution. Social loafing suggests that "People exert less effort on a collective task than they do on a comparable individual task." In the case of the movie review community, the researchers sought to motivate individuals to review or recommend rarely-

rated movies in the database by making them aware of the uniqueness and value of their contribution to the community – with some success (Beenen et al., 2004).

A proven tactic to increase user participation is to automate the dissemination of an individual contribution throughout the community. This can encourage active participation, since the user has proof that his/her contribution does connect with a peer network. This tactic was employed to great effect by Mark Zuckerberg, who founded Facebook whilst still a Harvard student. Initially the social network was open only to students, who posted news and updates to their personal profile page. Zuckerberg felt that the problem with the user experience was that it took too long for a Facebook user to browse the pages of their friends. In response, Zuckerberg developed "News Feed", an automated function that sends changes in a user's profile page to his/her friends' list. Hence users no longer had to browse through their friends' pages; they were now automatically informed of every change that each friend makes. On its initial release, the News Feed function caused some panic in Facebook users, who suddenly found that every personal profile update they made was being broadcast to every member of their friends' list. However, this panic was replaced by widespread acceptance of the automated information dissemination feature. Shortly after the introduction of News Feed, Zuckerberg allowed non-students to use Facebook; the network now boasts approximately 100 million users (Thompson, 2008).

2 Method

2.1 Analysing user motivation

The review of previous work illustrates three key design elements aimed at increasing user motivation to participate via social media tools:

- a) Visibly reward user-generated content (Hoisl et al. 2007).
- b) Make contributors aware of the uniqueness and value of their contribution to the community (Beenan et al. 2004).
- c) Automate dissemination of individual contributions throughout the community (Zuckerberg, in Thompson 2008).

I conducted an expert examination of the D*Hub interface on 03 November 2008 to verify whether it incorporated any of these design elements, or other user motivation devices. This examination was based upon my own professional background and training in web and interface design. The examination was constructed using elements adapted from Powell's robust website evaluation tool (2002) which I have used successfully in professional practice. These elements included:

- *Explicit functionality:* high-level descriptive and navigational features.
- Content volatility: how recent (and copious) is content news, articles etc.?

- Information reliability: is content reliable and authoritative?
- *Community/contributor visibility:* in terms of design for user motivation, are user contributions attributed and visible to the wider community?
- Aggregation: is third-party content aggregated effectively within the portal?

The expert examination of design-for-motivation devices incorporated within the D*Hub showed that:

- With reference to Hoisl et al. (2007), there is no visible reward for contributors. The entire D*Hub community appears largely anonymous.
- With reference to Beenan et al. (2004), there is no attempt to make contributors aware of the uniqueness and value of their contribution. Conversely, there is unwarranted repetition of featured content; and a lack of content circulation.
- With reference to Zuckerberg's work with Facebook (Thompson 2008), there is no automated dissemination of individual contributions beyond RSS notification.

D*Hub has yet to attain a critical mass of user-generated content after two years of operation, despite sporadic promotions such as competitions.

2.2 Linking data to propositions

An analysis of PhM site usage statistics from the period 21 July to 17 August 2008 was conducted using the Google Analytics tool. Comparative data were generated from the D*Hub portal; the main Powerhouse domain of www.powerhousemuseum.com; and the Sydney Observatory blog. The Observatory is part of the Powerhouse Museum and it hosts a simple blog site which supports a community of amateur astronomers. This blog is maintained by one person (the Senior Curator of Astronomy) and was implemented using the free Wordpress blog application. Therefore the Observatory blog is a much smaller social media project than D*Hub in terms of scope and budget.

Table 1 below shows that the D*Hub portal experienced the highest *bounce rate*, indicating that 74% of visits resulted in the user leaving the site at the first page. "Bounce rate" refers to percentage of single-page visits or visits in which the user left the site from the entrance page. This rate could be explained by a number of reasons, including:

- The user found the information s/he was looking for on that page.
- The user did not find D*Hub to be an appropriate destination and left straight away.

	PhM main site	D*Hub	Observatory
Visits	270,250	70,029	18,417
Page views	634,460	126,785	51,295
Pages per visit	2.35	1.81	2.79
Bounce rate %	67	74	53
Avg time on site (m:s)	1.38	1.01	2.1
New visits %	84	89	83
Visitors	243,439	65,587	16,155

Table 1: usage comparison of PhM main domain, D*Hub portal, and Observatory blog, 21 Jul to 17 Aug 2008.

Google Analytics does not measure the reason for this high bounce rate; but it does reveal that users did not browse the D*Hub site. The high bounce rate corresponded to the low average number of pages viewed per visit to D*Hub (1.81); as well as the low average time spent on the site (1 minute).

In contrast, the Sydney Observatory blog had a much lower number of visits (18,417) than the PhM domain and the D*Hub portal. But these visits seem to last longer than those to D*Hub:

- The bounce rate is low (53%), indicating that approximately half the users visited more than their landing page on the blog.
- This is correlated by the highest number of pages per visit in the comparison (2.79) and the longest average time spent on the site: 2 minutes, twice as long as D*Hub.

3 Discussion: criteria for interpreting findings

This case study originated with the study questions *how and why does the D*Hub project engage a design community through social media tools?* The answer to *why* was to create an online Museum resource that would become the first stop for design-related information and resources for students and practitioners in the state of New South Wales. The answer to *how* was by implementing a magazine-style interface that would encourage the target community to contribute engaging content to the D*Hub portal.

User motivation was identified as the primary unit of analysis of the case study and an examination of the Design Hub portal found that very few explicit user motivation design elements were apparent at the interface. A review of theory above suggested that "Users must have an intrinsic motivation to

contribute" (Hoisl et al., 2007). However, little intrinsic motivation is stimulated at the D*Hub interface.

A web analytics snapshot showed that in comparison to the main PhM domain and the D*Hub portal, the Sydney Observatory blog experienced a low number of visits; a low bounce rate; and a high number of pages viewed per visit. D*Hub experienced a high bounce rate and a low number of pages viewed per visit. After two years of operation, D*Hub is still progressing towards a critical mass of user-generated content, aided by intermittent promotions such as competitions. Based on these findings, this case study indicates that user motivation should be regarded as an important factor in the design of future online community projects which require a critical mass of contributors in order to remain sustainable.

4 Conclusion

The performance of the D*Hub portal should not be measured solely on whether it has achieved a critical mass of contributors. On the contrary, the project should be judged as a successful milestone in PhM's ongoing roll-out of social media tools. The D*Hub project was conceived in 2003-4 and its ambition to allow users to contribute comments and editorial demonstrates the adoption and implementation of a Web 2.0 philosophy well before most other major museums around the world. Furthermore, the D*Hub experience demonstrates the importance of a *visible* community of contributors to the success of an engagement using social media. In order to achieve this visibility, PhM is now using third-party social media tools such as Facebook to achieve its strategy of online engagement. The D*Hub project may be somewhat reminiscent of the 1980s office IT revolution, during which organisations committed considerable expense to developing database solutions inhouse; only to find within the space of a few years that similar solutions could be purchased off-the-shelf. The fact that a comparable revolution is occurring even more rapidly in the social media field demonstrates the challenge of both practice and research in this area.

Acknowledgements

This research was facilitated through the generous assistance of Mr Sebastian Chan, Head of Digital Services and Research at the Powerhouse Museum, as part of the Australian Research Council Linkage Project 'Reconceptualising Heritage Collections' LP0561202 (2006-2008).

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Interdisciplinarity and Design Education

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The concept of interdisciplinarity in art and design education is difficult to define. Hodge (1998) has described knowledge situated between or beyond disciplinary boundaries as *monstrous knowledge* - unexplored terrain that leaves discipline specialists feeling less confident in their ability to educate others. At the same time crossing disciplinary boundaries is considered an essential part of the discursive nature of inquiry in art and design. Educational programmes have steadily shifted in focus toward a more cross-disciplinary approach to knowledge, with schools of art and design constructing interdisciplinary projects, modules, courses and degrees.

A variety of approaches to interdisciplinary art and design education exist. In this paper I explore an understanding of the idea of interdisiplinarity as applied to design education based on W.J.T Mitchell's concept of *forms of interdisipline*. What is noteworthy about this conceptualisation is that it starts with the idea that interdisciplinary work is a result of challenges to the continuity of a set of established practices i.e. interdisciplinary activity starts from within a discipline, and not between or beyond existing disciplines.

Reflecting on my own teaching experiences I present a number of positive outcomes that conceptualizing interdisciplinarity in this way may offer to a pedagogical response that aims to embrace the dynamic changes and expansions in our field of study. The current moment of disruption in the field of design is used to illustrate a specific instance where the concept of forms of interdiscipline may serve as a useful way to conceptualise the notion of interdisciplinarity in art and design education.

Key words: Interdisciplinarity, Art and design education

Introduction

"Factors that have led to a renewed interest in interdisciplinary education include: globalization, postmodernism, and various educational initiatives" (Ulbricht, 1998, p. 13). As art and design education has become more post-modern it has become more interdisciplinary. The decontextualisation of knowledge, where knowledge is not thought of as divided into a series of discrete domains but is instead considered as an integrated system (Freedman, 2003) has also contributed to an increased interdisciplinary perspective in education. Teaching and learning in art and design is characterized by a range of perspectives on the question of what skills and knowledge artists and designers need. Furthermore, approaches to interdisciplinary study in this subject are varied in their structure and organization.

Scott (1979) is concerned with both personal and institutionally based dilemmas of interdisciplinarity in higher education and notes the first problems of being interdisciplinary as: 1. "Everyone (nearly) already believes in interdisciplinary education" (p. 310), and 2. "Everyone (nearly) believes in specialisation" (p. 310). In terms of the first issue Scott breaks this down to reveal that: "What everyone believes in usually turns out to be rather indiscriminate mixtures of offerings by currently recognized disciplines determined more by tradition and convenience than by any other rationale" (p. 308). Interdisciplinarity is also, as Scott reports, "plagued with misunderstandings about terminology" (p. 307). The concept of interdisciplinarity and related controversies over its meaning as well as the variation in how it has been applied in an educational context offers ground for interesting discussion. New insights emerge when different models and methods of interdisciplinary education are shared and debated. This paper intends to offer some ideas on this topic as related to teaching and learning in art and design. I present what I consider to be a useful way to conceptualise interdisciplinarity based on W.J.T Mitchell's concept forms of interdisipline and apply this to framing interdisciplinary study. Reflecting on my own experience teaching graphic design as part of a fully interdisciplinary art and design course I focus on the current moment of shifts in thinking and practice in this field as a specific point of reference for the discussion.

1. Forms of interdiscipline

In his article *Interdisciplinarity and Visual Culture* published the December 1995 issue of *Art Bulletin*, W.J.T Mitchell introduces the concept of *forms of interdiscipline* as a response to the uncomfortable fit of the term interdisciplinary in relation to his own work in the field of Visual Culture. Mitchell suggests that calling the practices of Visual Culture (which he describes as work at the disciplinary fringes of art history, media studies, literary studies, and cultural studies) interdisciplinary "does not in itself tell us what is crucial about them" (p. 540). Mitchell describes his feelings toward to his work being labeled interdisciplinary as "a kind of escalating shame at the increasing number of disciplines in which I find myself certifiably incompetent" (p. 541). Similar concerns are expressed by Hodge (1995) in his description of knowledge situated between or beyond disciplinary boundaries as *monstrous knowledge* – unexplored terrain that leaves discipline specialists feeling less confident in their ability to educate others.

In response to this problem Mitchell introduces the concept of *the interdiscipline* as a more comfortable fit. "My real interest has not been in interdisciplinarity so much as in forms of 'interdiscipline', of turbulence or incoherence at the inner and outer boundaries of disciplines. If a discipline is a way of insuring the continuity of a set of collective practices (technical, social, professional, etc.), 'interdiscipline' is a moment of breakage or rupture, when the continuity is broken and the practice comes into question" (Mitchell, 1995, p. 541). In this sense interdisciplinary

investigation is conceptualized as work that relies on underlying knowledge, practices and perspectives of individual disciplines. It is this idea that I use firstly to reflect on contemporary shifts in the area of design practice and secondly to argue for its productive use an interdisciplinary approach to art and design education.

2. Forms of interdiscipline & contemporary design

The idea of the interdiscipline as proposed by Mitchell can serve as a useful reference point for reflecting on the contemporary moment of question and self-critique that is happening in the filed of design. Over the past decade design has been experiencing a moment of turbulence. This phenomenon is not new. Design has experienced moments of rupture before. Arts and Crafts, De Stijl, Constructivism, and the Bauhaus all represent points of overlap, confusion and challenge to the values, functions and purposes of forms of art and design. More recently, the introduction of digital technologies has represented a revolution across most facets of contemporary life and has challenged the traditional division of disciplines within art and design that were based on differences in media and process.

The most recent instalment of self-criticism within the field is occurring in a variety of ways including: design work exhibited in galleries alongside art or in dedicated design galleries; the conceptual and/or expressive value of design being emphasized above other concerns; collaborative art-design works by artists/designers; designers producing unique one-off items; artists expanding their practices by creating functional works that draw on the visual languages and materials of design; artists engaging in commercial forms and contexts usually associated with design. Claims are being made that the impact of current forms of conjuncture and overlap between art and design represents an important moment in time for the field. "Contemporary culture is witnessing one of the most significant shifts of recent times. The old dividing lines between artists and designers appear to be dissolving into one another. Indeed, the breath and range of investigation and inspiration they share is possibly the widest to date" (Greff, 2007, p. 1).

Design writer Nick Currie (2008) talks of a current generation of young designers that seem to share in the spirit of Conceptual Art. He writes:

"Once upon a time it was easy to distinguish design from art: designers had briefs from clients, practical problems to solve; artists found their own problems. But something has been happening to design – something as significant, in its way, as what happened to painting when photography came along. It's been getting more conceptual, more playful, more self-directed, less tied to clients, less servile, less practical. Design is, you might say, having its Marcel Duchamp moment" (p. 1).

Design writer Chris Rust (2007) also notes the overlaps between artists and designers in relation to the current evolution of Critical Design practices commenting that "recently, some designers have developed practices that have a relation to the role adopted by artists. The idea of 'critical design' has emerged, informed indirectly by critical social theory in the sense that it is important to engage with the ways in which the world may change, rather than purely observing the world as it is" (p. 72).

Current inquiry and modes of research by designers using the labels Critical, Conceptual, Speculative and Experimental are presenting challenges to previously fixed conventions within design practice and culture. These approaches can often be connected through an increased sense of critique and selfawareness by designers. They share common underlying concerns including: an increased interest in the messages created; an increased responsibility for the broader ramifications of the work; a use of the mechanisms of the commercial design world to ask questions about the discipline itself; questions of the functionality and purpose of design; new intrigues between the fields of art and design; and a blurring of the distinctions between art and design. The work produced by these designer-artists often sits outside of directly commercial contexts and is often able to disturb or surprise our conception of what design is, or what it might be capable of doing. Currie (2005) reflects on the conceptual and immaterial qualities of current designers work saying that "Rather than products, these people are designing situations, intervening in existing arrangements, framing everyday activities in ways that make us think of them, unexpectedly, as 'design'. And although they're often satirical in tone, these designers share a concern with ethics and responsibility; one of the reasons the design they make is so often immaterial is their sense that the last thing the world needs is more objects, more consumer goods" (p. 1).

Evidence of art-design overlaps in recent times is now well documented through exhibitions like the Walker Art Center's *Strangely Familiar: Design and Everyday Life* (2003); the Museum of Modern Art's *Safe: Design Takes on Risk* (2005); The Smart Museum of Art, University of Chicago's *Beyond Green: Toward a Sustainable Art*, (2006/7); *Designing Critical Design*, Z33, Hasselt, (2007); and *On Purpose: Design Concepts*, Arnolfini, Bristol, 2008.

The current moment of self-critique, question and challenge within design briefly mapped out here seems to fit easily within Mitchell's description of the interdiscipline as a moment of breakage when continuity within a practice is disrupted and that practice comes into question (Mitchell, 1995). Conceptualising interdisciplinarity in design in this way may be a productive start toward formulating a pedagogical response to the challenges of creating a learning environment that is informed by current critical debate and one that offers an interdisciplinary approach to research and practice.

3. Art and design pedagogy & forms of interdiscipline

Researchers in art and design education have reminded us that how we define or think about the subject and the particular views we may have of its purposes, values and outcomes fundamentally determines how teaching and learning is structured and delivered (Allison, 1982, Corner, 2005). Similarly, our conception of interdisciplinarity as applied to our subject will affect our approach to teaching and learning in an interdisciplinary way.

3.1 Conceptualising Interdisciplinarity

Disciplines serve multiple functions. They give us a way to organize subjects of learning (the term 'discipline' has an educational connotation), ways to frame domains of knowledge, and they create regions of comparability. By differentiating one area from another disciplines produce expertise. Disciplines are defined on several levels. They have their own discourses, epistemologies, methods, concepts, linguistic conventions, social contexts and histories.

There appears to be plenty of evidence within the literature attempting to define interdisciplinarity to suggest that it starts with bringing together component disciplines. The concept of interdisciplinarity seems to be reliant on the concept of disciplinarity whether in the realm of interdisciplinary knowledge, research, theory or education. As Robert Scott (1979) says in Kockelmans edited volume *Interdisciplinarity and Higher Education*, "interdisciplinarity presupposes disciplinarity, and if one truly wants new lamps that person should want to retain the old" (p. 326). In their account of the promotion of interdisciplinary research work Lowe and Phillipson (2006) note "interdisciplinarity presumes and builds upon the existence of disciplines" (p.166). Responding to the question 'what is interdisciplinarity is best seen as bringing together distinctive components of two or more disciplines" (p. 203). The idea of interdisciplinarity, as applied to education, seems to be generally accepted as the merging of components of several different disciplines into a single programme of study. In the subject area of art and design this would mean we could understand an interdisciplinary approach as a programme that aims to merge aspects of the component disciplines painting, sculpture, photography, printmaking, graphic design, product design, and so on.

The 2008 Subject Benchmark Statements for Art and Design include introductory statements that make clear the importance of acknowledging the existence of the individual disciplines within the subject whenever reference to interdisciplinarity is made. For example:

"Defining Principles...Art and design is the term widely used to embrace a complex, diverse and evolving constituency of disciplines which share important conceptual characteristics but which are differentiated in significant respects. While it is the very nature of this difference which contributes to its richness as an area of study and practice, the different disciplines share numerous defining qualities. Yet, through modern media and the rapid technological development, the boundaries between the disciplines continue to become more diffuse" (Art and Design Subject Benchmark Statements, 2008, p. 6).

Julia Marshall (2005) makes a case for *Substantive Curriculum Integration* that connects art, learning and creativity. Marshall explains that functions of curriculum integration include "highlighting interior structures of and connections within disciplines" (p. 232); exploring the structural aspects in a discipline and foregrounding the similarities between and among disciplines. It is clear in this work that an interdisciplinary curriculum aims for its effect by going deep into the specifics of individual disciplines to discover conceptual connections as well as to highlight distinctive elements. Here again, disciplinary foundations and distinctions are central to the work of integration.

Our conception of the disciplines can vary. Since our conception of interdisciplinarity will depend on our ideas about its basic component (the disciplines) it should prove useful to consider how we are conceptualising this foundational element. Squires (1992) outlines a very useful *multi-dimensional model of disciplines* in an attempt to address what he describes as some of the shortcomings of a standard model of disciplines. Squires' critique says that a standard model "tends to ignore the fact that disciplines are defined and delimited in terms of not one but several attributes, and that the relative emphasis on those attributes may vary from one discipline to another" (p. 202).

The multi-dimensional model suggested by Squires contains three dimensions: *object, stance* and *mode* (1992, p. 202). Object is described as "what the discipline is about – the content, topics or problems which are addressed" (p. 202). A disciplines' stance toward that object, in terms of a concern with knowing, doing or being, explains the second dimension (stance) and is described as manifesting itself in "the methodologies, techniques and procedures which are used" (p. 202). The third dimension, mode, is "the extent to which they are operating in a normal, reflexive, or philosophical mode" (p. 202). This is described as manifest in "the extent to which the discipline treats its own nature as the subject of reflexive analysis" (p. 202). This model may help in clarifying what one might mean by interdisciplinarity in that it distinguishes several dimensions along which disciplines may come into contact giving us a way to think about *what* and *how* aspects of component disciplines merge in a particular interdisciplinary context.

The underlying premise of Squires' model is that "disciplines can be viewed as multi-dimensional spaces which define, protect and enlarge themselves along any of those dimensions, and in so doing come into conflict or co-operation with other disciplines, these other disciplines are often adjacent, in the sense that they have a common boundary in terms of object, stance or mode" (p. 202).

With reference to the earlier described current moment of self-critique in the discipline of design it can be observed how the disciplines of art and design have come into closer conversation. Design has enlarged itself along the object dimension by becoming less practical and more conceptual with a corresponding shift in the content, topics and problems it engages with. This also includes a shift from primarily industry driven practices to more self-directed type projects bringing it closer in proximity to art. It has enlarged itself along the stance dimension through engaging with methodologies, techniques and procedures more commonly attributed to the practice of art than design. A good example here is the work of self titled Critical Designers Anthony Dunne and Fiona Raby who are "showing how designers can use fine-art means – provoking, making ambiguous, making strange- to question how we cohabit with electronic technology and to probe its aesthetic potential" (Crampton-Smith, 2006, p. 11). The increasing practice of designers showing their work in a gallery context, more common to art than to design, is another example of a shift along the stance dimension.

The 2008 Subject Benchmark statement for art and design distinguishes the practice of art from design in part by defining the nature of art as "a creative endeavour that constantly speculates upon and challenges its own nature and purpose" (Art and Design Subject Benchmark Statements, 2008, p. 6). A shift in Squires' dimension of mode can be claimed here in the sense that through the contemporary practices of Critical, Conceptual and Experimental practice design is entering into a more philosophical, speculative and reflexive analysis of its itself. This brings it closer to one of the distinguishing characteristics of art. Good examples here are designers like Marti Guixé, Jop van Bennekom, Anthony Dunne and Fiona Raby who use the mechanisms of commercial design contexts in a critical and reflexive way to self-critique the discipline of design.

Also central to Squires model is the idea that by expanding out along one of these dimensions disciplines come into conflict or co-operation with other disciplines (Squires, 1992). This seems to fit comfortably with Mitchell's concept of forms of interdiscipline. Interdisciplinary activity is conceptualised for both in a similar way. For Mitchell it is a result of a shifting at the inner or outer boundaries of a discipline and for Squires it is an enlarging along one or more of the dimensions of a discipline. Of note is that both scenarios are grounded in the idea that interdisciplinarity is not a distinct phenomena in itself; it relies on the existence of established disciplinary practices, concepts, and structures for its work.

This idea sits in contrast to some long-standing, more standard images of interdisciplinary that claim interdisciplinary work should aim to be a self-contained starting point for the construction of new knowledge, free from disciplinary constraints or boundaries. Rodgers, Booth and Eveline (2003) lay out some related 'stereotypes of interdisciplinarity' in their work *The Politics of Disciplinary*

Advantage the first of which is that "interdisciplinarity must develop its own disciplinary foundations if it is to flourish. Without a stable core, it will be unable to coordinate various research programs, remaining essentially fragmented" (p. 5). Squires (1992) in his discussion of interdisciplinarity in higher education also makes note that previous analyses of the topic interdisciplinarity have resulted in a "curiously decontextualised view of interdisciplinarity, as something that had its own essence, rather than as something relative to, and located within, existing epistemological and institutional structures" (1992, p. 201). I would argue that when we conceptualise interdisciplinarity as forms of interdiscipline and turn our attention to engaging with breaks in continuity to established disciplinary practices, concepts, and structures we enter into a more productive endeavour that offers several advantages for interdisciplinary models of teaching and learning.

3.2 Using the concept of 'forms of interdiscipline' for pedagogical purposes

The concept forms of interdiscipline harmonises well with the idea that disciplines are important to interdisciplinary work and also represents a useful strategy for teaching and learning in an interdisciplinary way. It's particular strength lies with the idea that forms of interdiscipline describe a moment of turbulence or incoherence at the inner and outer boundaries of disciplines rather than referring to a space between or beyond disciplines where many feel less confident to operate.

In pedagogical terms I would suggest that introducing the concept of forms of interdiscipline as a way to approach interdisciplinary education in art and design has several advantages. Firstly, it does not imply a complete merging of categories or suggest the existence of an entirely separate entity thus avoiding some of the problematics associated with Hodge's idea of monstrous knowledge and other stereotypical conceptualizations of interdisciplinarity. Instead, the idea of the interdiscipline is based on a break or rupture of the continuity *within* a discipline. It starts with the idea that a discipline can be defined as a way of insuring the continuity of a set of collective practices - technical, social, professional (Mitchell, 1995) and moves to introduce the idea of interdisciplinarity as representing a challenge to established discipline norms. Overlaps and moments of contact are contextualised in relation to distinct features of a discipline providing an essential grounding for asking critical questions about a practice. By way of example here we could consider the comments of design writer Dmitri Siegel (2003) in a review of Émigré No. 64, Rant where he writes: "The defining characteristic of graphic design is that it inhabits a sliver of land suspended between commerce and culture...what remains distinct about graphic design is the unique context of its practice. The next phase of innovation and debate will be toward renovating this context – expanding our sliver of activity and influence" (p. 2). This example shows how a challenge can be raised from within the discipline as a form of interdiscipline where a practice asks fundamental questions of itself that challenge existing continuity.

Secondly, the idea of the interdiscipline can help educators with an approach to learning that emphasises the importance of the contingency of disciplinary knowledge and its continued capacity for revision. Art and design learning emphasizes an approach to knowledge that challenges existing understandings and seeks out alternative perspectives, reflecting the fundamental nature of knowledge as contingent. Introducing forms of interdiscipline to students through an engagement with current critical debate and practice within a discipline emphasizes that knowledge and understanding are always subject to revision.

Forms of interdiscipline have at their base a question or a challenge to ways of doing things. So too, an important feature of education in art and design is to encourage students to have an interrogative disposition to received ideas. Danvers (2003) points out that "compared to many other subjects the constant process of critical interrogation, revision and even redefinition within art and design leads to an inherent instability that is seen as positive, dynamic and productive" (p. 54). One way of translating this interrogative stance into the teaching and learning context is to facilitate a constant engagement with forms of interdiscipline which can be described as the terrain where the problematics of a discipline are discovered, its terms are called into question, and its boundaries with other disciplines are tested (Mitchell, 1995).

Thirdly, Mitchell's concept of interdiscipline is concerned with the sort of questioning of continuities of practice that digs deep. He describes the moment of interdisciplinarity that has always interested him as "the moment of chaos or wonder when a discipline, a way of doing things, compulsively performs a revelation of its own inadequacy... I think of this as the *anarchist moment*" (1995, p. 541). Mitchell also refers to this as the sort of interdisciplinarity where a practice looks at itself from the inside out. He notes the work of critics such as Jacques Lacan as being examples of this level of investigation. "Others (Jacques Lacan would be a good example) penetrate so deeply into the practice of their discipline that they seem to cause an implosion of its boundaries that sends shock waves into other disciplines..." (p. 541). This kind of fundamental questioning and engagement in challenge and debate of disciplinary structures seems exactly the sort of critical encounter that the developing research-led teaching and learning culture in art and design seeks to engage in.

Conclusion

Utilising Mitchell's concept of forms of interdiscipline offers educators a way to conceptualise interdisciplinary teaching and learning that promotes a questioning of existing knowledge, practices, beliefs and assumptions associated with disciplinary categories. Under this model the idea of interdisciplinarity resides in moments of turbulence within a discipline, moments when disciplinary structures, methods, and conventions are disrupted, when the continuity of a practice comes into question and new insights emerge. The motivation for interdisciplinary work in an educational context

must of course come from learners and their personal interest in the opportunities that forms of interdiscipline can offer.

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Key words

Landscape Architecture, Interdisciplinary practice, Site analysis, Landscape painting.

Abstract.

One of the great opportunities that increased access to technologies and information has brought, is interdisciplinary practice between the fine arts and industrial design. As a student, these two pathways had at first appeared separate, and requiring different skills and temperament to study and practice. But on further enquiry into the subject of Landscape Architecture, which is considered an industrial design discipline, I discovered a past and present rich with unbounded trans-disciplinary and interdisciplinary practioners, where fine art methodologies have helped find identity and belonging in landscape, and have been used to influence and inform design.

I am not a Landscape Architect or a Cartographer, but an artist and designer whose work has always been concerned with the landscape and the stories that live within it. Where and how fine art methodologies and normative Landscape Architectural site analysis practice can collaborate has always interested me, and I have based my Masters of Landscape Architecture project on how fine art practice could contribute to Landscape Architectural site analysis, and through this project demonstrate possibilities in interdisciplinary practice. The relationships between fine art practice and the articulation of "*sense of place*" has always been evident in map making, and it is in this cross-over that I hope to find a usefulness to Landscape architecture within my work. In this paper I describe my methods and findings from this project so far.

Methodology.

One of my first observations of making the transition from fine art practitioner to Landscape Architecture student was that I would have to understand normative site analysis practice, and place my work in context with it. What I had to do was establish at what level my site analysis artwork was to operate within the managing and developing of public open space, and what aspect of site analysis if any is not currently being utilised.

I started by selecting a site that I had known as a child, Centennial Park on Auckland's North Shore. I decided on this after reading about the American artist Robert Smithson, who returned to his childhood neighbourhood to produce an artwork that described his voyage within a re-visited landscape through an exhibited installation artwork. I was interested in how this artist used his powers of memory and observation to produce powerful visual narratives of a site that outwardly was so banal. In this work I saw the potential artists have in ascribing spiritual and cultural values to landscapes that are not mapped by local authorities, and usually are only revealed through the work of poets. There are projects such as the Common Ground movement in the UK, and the Bright Sparks funding scheme also from the UK that explore the relationship of artist and industrial environmental design. The former is engaged in preserving local distinctiveness and empowerment in the face of insensitive development. This is done through advocacy and the publication of guidelines and strategies that are designed to promote sense of place. One of the methods employed is to use local artists to conduct mappings of their towns and villages, thus giving a counter view to the authorities town planning data collection that is often done without the benefit of intimate local knowledge and experience, as (Wood, 2006, p.8) observes; "Beyond their formal continuities, maps and paintings are both communicative, that is constructs intended to affect behaviour".

This process enables artists and crafts people to talk to Town Planning and Landscape Architectural practice through a complimentary creative process, this has been a distinguishing methodology for the Common Ground projects, for the reason (Kanarinka, 2006, p. 24) suggests; "*It is possible to think of a map not as a representation of reality but as a tool to produce reality.*"

The Bright Sparks funding scheme offers a different approach, it explores public space potential through creatively led research that is achieved through partnerships between artists and public realm professionals. This scheme was set up by Haring Woods Associates, and Landscape+Arts Network as (Woods, 2009, p. 26) describes; "*The scheme champions the role of the artist in the development of the public realm, and the their intuitive response to spaces, places people and wildlife.*"

These two differing ways of achieving similar goals offered me two methodologies from which to use as a model, I had to try the Common Ground approach first as no such scheme as Bright Sparks was available to me, unless I created one myself, not easy. The first problem that I encountered in targeting methodology was the issue of approach, was I to adopt normative landscape architectural practices and adapt my methods to these, try to create a hybrid approach with my methodology, or to use my existing fine art practices with a landscape architectural intent only? After my second workshop, when I had presented explorations all of these options through producing artwork based on locations within my site, it became clear that only through the use of my own fine art methodology could I produce work that could offer Landscape Architecture something that was not already available through existing practiced site analysis techniques, or too heavily coded. The aspect of site analysis I identified through research that is currently under explored was narrative, and as (Potteiger, 1998, p. ix) observes; "...narrative offers ways of knowing and shaping landscapes not typically acknowledged in conventional documentation, mapping, surveys, or even the formal concerns of design." What was also evident from my second workshop was that in order for a meaningful interdisciplinary project that used fine art methodology to solve an industrial design problem, in this case landscape site analysis, was that the artist should not abandon the poetic in order to come closer to the scientific, it is the dreaming and the poetic qualities of the artwork that the scientific data collection requires, the Ying requires the Yang to be complete. The necessity for the partnership arrangement in the success of the Bright Sparks Program was evident to me now, and I decided that I needed to find a partnership that could work in a similar way, and the model of the Bright Sparks Program was what was needed to for me as an artist to have currency in Landscape Architectural site analysis.

A partnership.

Having identified an unusual planting of Pohutukawa trees in the park, I completed three artworks of this landscape feature. From these artworks I discovered that the site contained significant historical importance, and this importance even though known by some local residents was not known to the North Shore City Council, under whose authority the park resides. From this artwork I discovered the following story of the sites construction;

In 1939 the local residents under the umbrella of the Campbell's Bay Beautification Society undertook to contribute to the national celebrations of the 1940 Centenary. They planned to do this in the form of a grand avenue in a similar style as Twin Oak Drive in Cornwall Park but they decided to use Pohutukawa.

The avenue was bulldozed to approximately 20 meters wide and 480 meters long, from one road-end of "Takapuna Reserve" (Beach Rd,) to another (Rae Rd.). For the Centenary the park was re-named "Centennial Park" and the grand avenue planting was started.

But in September 1939 the war had arrived, and the decision was made in 1940 when citizens were being mobilized to go overseas to fight to continue the plantings began in 1939, but each man leaving from the district would now have a tree planted for them in the avenue with their name written on a small plaque that was placed under their tree. And from that time on this avenue was known by locals either as "*Centennial Avenue*", "*Memorial Avenue*" or "*the soldiers trees*".

This impressive landscape feature had now become a hybrid memorial, one designed to celebrate the inception of nationhood signed at Waitangi in 1840, and to celebrate the courage of the men who had volunteered to fight for that nation. The hopeful possibility of partnership and nationhood that the cartoon from the Herald of 1940 endeavoured to create had been captured in this double row planting of Pohutukawa.

But by the beginning of the 1960's the origins of the memorial had been lost to all but a hand full of locals who had an interest in the park's history or witnessed the original construction.

The artwork made from researching images from various time frames from the life of the avenue of trees, and the findings of the site made through this process was presented to the council. The result from this presentation was that the Council changed the draft management plan of the park to recognise the avenue of trees known alternately as Memorial Avenue or Avenue of Remembrance to locals, as a listed historical site. In recognition of this work, the Council agreed to a partnership arrangement with me in the form of 120 hours of expert advice from the specialist council staff, as I required it. I now had something resembling the Bright Sparks model to work with.

A working model.

The methodology was now in place to conduct a meaningful project in using my fine art practices along side a council Landscape Architect. I could now enter the realm of public space Landscape Architecture and site analysis without running the risk of dilettantism, or merely producing paintings and drawings in the landscape tradition and hoping they could be useful in some way, as I did not have a single environmental issue or village community behind me as is the case with Common Ground projects. This partnership with the council professionals could now hopefully ensure my work contributed towards solving the problem of how this historic site that research through drawing and painting had revealed, sits in context with it's surroundings, how it is, and was used, and what spiritual and emotional

meanings are imbedded within the place, and what possibilities for design are contained within it.

As (Girot, 1999, p. 95) states; "The central question today is whether we are capable of returning to a site-induced vision." and the key word for me in that quote is "site- induced", and that is where my work could be of value, to explore the genius loci and to work complimentary to the council planners, managers and landscape architect. And in order to help me to identify what method I could use for a categorising of the elements within a landscape I turned to (Relph, 1976, p.5) "identity of place is comprised of three interrelated components, each irreducible to the other – physical features or appearance, observable activities and functions, and meaning or symbols." A decision was made to use this proposition to structure my enquiry. The city council's sole landscape architect is responsible for all design development within the city parks, and her role is almost completely management of contracted landscape professionals. Budgetary constraints limited the depth of site analysis work undertaken by council and the contracted architects and designers. The council structures for funding are such that the arts and open public space are managed separately, coming together occasionally for a sculpture, a bridge or placed landscape features that are commissioned for a negotiated space. The use of fine art practice to research and articulate a sense of place for a public open space, by anyone other than a landscape architect is not currently considered by the council, and as the contracted architects are under budgetary pressure for design solutions this is not required of them beyond the rendering of site lines and vistas, even though many have been trained in fine art practices, but what is required for true understanding of *place* is what Colin McCahon is quoted as saying in (Park, 2006, p. 57) "...his landscapes weren't landscapes". And Park puts this quote into context for us; "But an interpreting a place through symbol and imagination, they heighten our own perceptions in ways that are rarely permitted by ordinary process of seeing."

What the political and financial decision makers at the council require from funding, is material outcomes that can be witnessed by the ratepayers, and where a fine art practitioner can deliver an artefact there is an advantage in seeking funding for projects. And this is where possibilities for collaboration with various managers within the council arise, with the artist as facilitator between planning, parks and arts to produce artefacts that map through symbol and imagination important public space, identifying uniqueness and providing a resource for discovering "*sense of place*".

(Girot, 1999, p. 95) comments again on the need for a deeper connection to *place* in site analysis; "*How far from reality can the landscape design tools that we work with be? The gradual withdrawal from landscape as a place to landscape as a piece of paper or a computer screen must be questioned.*"

The council officers suggested an application for funding from the Community Board Fund to put together a comprehensive historical site analysis of the avenue, which was done, and am at the time of writing still waiting for results of the application. But a successful application would enable through the funding, for a Bright Sparks model to be used in New Zealand.

At this point the project was faced with a situation that it had to wait for the site analysis project partnership that would allow me to use the Bright Sparks model in researching the historic avenue landscape. The council were keen to recognise its importance but had trouble funding a project that had an indeterminate goal with anything other than staff time. So another site was selected from the park; Wattle Grove, so as to keep up my investigations into media and composition and not lose any momentum in my work. What was discovered was that this site was the source of a dispute over the merits of Wattle and Pine in the park involving local interest groups. I decided to undertake a study of this place.

In selecting this site there would be no working with my expert partners at the council, but a solo effort. And so subsequently, the work would only attempt to perfect a methodology in painting and drawing that could allow a cohesive representation of the three components identified by Relph, that my previous work did in-cohesively.

One of the outcomes of my second workshop was the realization that an extended description of the artworks is un-necessary and perhaps counter productive, and that the poetry of the site contained within the work should speak for its self, and the true value in the works are the personal interpretations of the site made possible, and that answering questions about the work is a better way to utilize the artworks. So I set out to construct the artworks as devices or machines that could be used to provoke dialogue and thought and to extract the stories of the landscape.

If the artwork can take on mechanical characteristics without losing it's spiritual and perceptive creative origins, it might enable the art-machine to become a more effective instrument within the discipline of Landscape Architectural site analysis, one that could be more complimentary to scientific data collection, again referring to the Ying and Yang as a way of describing the relationship of geotechnical data collection and art.

An Environment Court Case.

In the absence of an expert partnership, I needed to find an example of where perception and the use of imagination to unlock aesthetics could have made a difference to an industrial landscape development. And I have here an example of where the collaborative work of artist and industry in conducting site analysis might have assisted in preventing an Environment Court case.

This Environment Court decision went in favour of the Respondent, the NSCC, who opposed the coastal development plans of the Appellant.

In the case of Bayswater Marina Holdings v. North Shore City Council, Environment Judge J.A. Smith (Smith, 2009, p. 29) when delivering the decision began by saying; "*At the heart of the difference of opinion on natural character was the perceived naturalness of the reclamation*." This issue was at the heart of the dispute, and it is my contention that an artist could have been in a position to express variations of "naturalness" in this case, and could have provided the valuable site analysis dealing with this problem of perception.

The Judge (Smith, 2009, p. 30-31) also commented; "*How we assess and address landscape issues depends on how landscape is defined*." And more pointedly on this subject went on to say; "*Neither is it simply a total of bio-physical elements, patterns and processes occurring over time, even though these are regarded as formative factors*."

Is it this kind of case that possibly can answer the question of why fine art practice should be used to assist in solving industrial landscape design problems?

I believe what this Environment Court document represents, is an acknowledgement that the qualities of a landscape, are not able to be defined simply by a scientific collection of data, or by a photographically representational rendering of a site. Possibly what is asked for is a site analysis that is able to express values and perceptions through an exploration of a site's meaning, and to assist in defining the cultural basis to the definition of landscape.

Findings.

A question my research has encountered is can site analysis be conducted as public artwork? A sculpture or an elegant bridge is seen to enhance the environment of the urban landscape and is funded accordingly, This work hopes to demonstrate the value of publically commissioned and owned artwork that goes beyond the pictorial and can be used as a resource for referencing place, and a catalyst for discussion on what exists in experience within a landscape. The work would act as a map that is complimentary to the official cartography.

The possible problems that I have identified in using artworks in a site analysis project such as the court case mentioned are: Firstly, the very nature of the work tends to aestheticise the complex landscape into an artefact, and the issue of depiction and objectivity towards ugliness is raised. Secondly the artworks are setting up design cues, and how this integrates into the Architecture and Landscape Architecture design processes would need planning.

My conclusion so far is that the positioning and relevance of using fine art practice in conducting site analysis for Landscape Architecture relies on the structure put in place for analysis and development, macro or micro, a district, neighbourhood or a specific site of importance. The artwork, even though intended only for site analysis requires a standard of presentation that enables it to have authority, and should also be available in a format that enables it to be distributed to all interested parties in a clear and accessible manner. One way of making fine art practice more useful to industrial applications like Landscape Architecture would be to ensure a wide variety of rendering media and methods of composition were used when producing artwork, and multiple pieces of artwork for a site are produced, this would maximise the machine-like qualities that artwork can bring to analytical discourse, and bring a less pre-determinate site analysis to the design process.

As (Joliet, 2001, p. 40) states; "Landscape incontestably involves aesthetics; we could even go so far as to say, aesthetic motivation, as regards the land." I believe it is in this aesthetic motivation that the place for fine art in Landscape Architectural site analysis resides. Fine art's capacity for aesthetic discovery becomes a vital tool for ensuring the best interests of the environment and society in the early stages of town planning and open space development. But I also believe that currently the Bright Sparks model for funding and artist/public space professional partnerships is the optimum methodology for an artist practitioner like myself, to maximise the interdisciplinary process and to contribute useful knowledge through site analysis. I also propose that a working partnership between open space design management and fine artists in exploring "sense of place", is vital to preserve identity and uniqueness in communities.

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An Interpretation Design Pattern Language:

A propositional conceptual tool for interdisciplinary team members working on interpretation design projects.

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Abstract

Ideas and information about natural and cultural heritage are communicated through the designed interface of interpretation. Interpretation design has emerged as a new field of design as graphic designers work on complex, large-scale projects that communicate about natural and cultural heritage sites and objects. Research into designer's contribution to interpretation projects indicates the need for a better dialogue between designers and other team professionals. This paper introduces a 'pattern language' methodology, which proposes a shared language for use by interdisciplinary teams working on interpretation. Interviews with designers and a synthesis of research findings from the fields of interpretation, education, visitor studies and psychology inform the construction of the pattern language. Articulating shared concepts from these disciplines as a common pattern language aims to strengthen the professional practice nexus between the fields of design and interpretation.

Keywords: communication design, graphic design, interpretation, natural heritage, pattern language, interpretation design

1.0 Introduction

Interpretation design has emerged as a new field of design, as graphic designers work on complex, largescale projects that communicate about significant natural and cultural heritage sites and objects. Designers and other professionals collaborate on multi-disciplinary interpretation projects teams which may include writers, scientists, historians, anthropologists, builders, artists, architects, rangers, researchers and bureaucrats. This paper draws on research that examines how the dialogue between these disparate professions can be better facilitated. As yet there is no integrative framework facilitating the fields of design, visitor studies and interpretation to work together. While reviews of visitor behaviour in museums and heritage places have been conducted (Patterson and Bitgood, 1990) no attempts have been made to integrate design and the related fields of visitor studies and interpretation (Moscardo, 1996; Ettema, 1997, p197). This research introduces a conceptual tool developed from architect Christopher Alexander's 'pattern language' approach (Alexander et al., 1977) for use with team based interpretation projects.

1.1 Interpretation Design

The term *interpretation*, in museum, heritage and tourism contexts, is used in relation to the presentation of an object or place to an audience. Since the early 1980s, communication designers have been contributing to an emerging, yet relatively unexamined field of design, *interpretation design*. The emergence of interpretation design over the last decades of the twentieth century, as a hybrid of spoken and visual traditions of communication, positions interpretation design as a new field sitting at the intersection two professions; interpretation and design. Where interpretation originates from a background of spoken language, through narrative and storytelling, design comes from a background of visual language, communicated via graphics, images and text. This communication is multi-faceted, uses a range of communication platforms, is site-specific and presents objects and places of natural and cultural significance to mobile audiences in highly public and visited places. Interpretation design projects are typically concentrated in settings such as visitor centres, national parks, botanic gardens, historic sites, and museums. These projects have posed designers with new challenges beyond those of traditional graphic design projects. Interpretation design projects typify the practice of contemporary designers who work across media and disciplines, engaging with the content, issues and ideas at the core of the communication.

Taken as a whole, the design profession in the latter part of the 20th Century has transformed, redefining itself from a position of 'occupying a well-defined, limited role in a production sequence, to a more comprehensive, richer and more challenging professional engagement' (Friedman, 2000, p15). Design activity now operates within the knowledge or creative economy with an emphasis on research, strategy and systems, rather than objects. This type of professional practice is more collaborative and team-based than ever before, with designers working in complex situations determined by linked networks of multiple stakeholders. Design is no longer seen as a value-added extra, but is now recognised as a complete process, incorporating problem identification and solution strategies, project management, and production. As an emergent field, interpretation design has attributes that clearly characterise it as a form of contemporary design practice. Diverse media platforms communicate complex messages that educate, raise awareness and provide experiences for visitors. These experiences are human-centred and fit into a larger system of knowledge relating to natural and cultural heritage. Typical projects are large-scale, complex and interdisciplinary, drawing on the expertise of a diverse range of specialists working in clusters and teams, as it is impossible for any one person to possess the breadth of expertise necessary. Friedman describes a successful contemporary designer as 'a leader who organises teams when one range of talents is not enough' (Friedman, 2008, p11).

2.0 Methodology

An outcome of this research is a conceptual tool developed as a practical aid, which draws on a wider base of knowledge beyond design and is for use in team-based collaborations. The conceptual tool is based on architect Christopher Alexander's pattern language (Alexander et al., 1977) and aims to bring together diverse of bodies professional knowledge. Alexander's pattern language was initially developed in the 1970s as a critique of modernism. Practically, the tool aims to develop a shared language which has a relational and multi-pathed approach to the type of problems encountered in interpretation design. I am proposing that a pattern language approach is suited to a more postmodern form of practice such as interpretation design, requiring a relational, recombinant approach and is complex and multi-voiced rather

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than universal and linear. This propositional tool aims to further orient interpretation designers towards future ways of working.

2.1 Grounded Theory

The research methodology used in this work is aligned with the process of Grounded Theory, a methodology that has evolved over four decades since its inception by American sociologists Barney Glaser and Anselm Strauss in 1967. Grounded Theory originated from American sociology in the 1960s as a reaction to extreme, abstract empiricism. In contrast to abstract theory, Grounded Theory, as the name implies, is 'grounded in data which have been systematically obtained by social research' (Abercrombie et al., 2006, p174). In using this approach, cycles of research occur, new questions emerge and further research is conducted. This research is grounded in the practice of leading designers, seeking to generate some broad explanatory principles that help toward the practice of interpretation design.

Where the methodology is most closely aligned with Grounded Theory is in the *process* and the sequencing of the investigation through a series of iterative cycles through which theory was generated. Where the methodology differs from Grounded Theory is in the grouping and coding of the data. This research does not adhere to the same coding process of grounded theory, instead a range of diverse data, was analysed and sorted through searching for common patterns of problems, issues and themes. As much of design research and design practice focuses on a 'problem finding' and then a problem solving approach, a pattern finding methodology emerged as an appropriate and suitable method to group and sort data. Thus pattern finding, grouping and sorting, intrinsic stages of the investigation, are embedded in the larger cycles and loops of investigation. This investigation follows a non-linear path, the stages of which are illustrated in the diagram below.

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Figure 1: Overview of research methodology process

A conceptual thematic framework emerged from literature reviews, interviewing designers, analysing artefacts and sites, identifying patterns and problems and investigating how designers collaborate. From this program of research, a theoretical position emerged and a conceptual tool for use in interpretation design was developed as a practical outcome of the research. The tool, an interpretation design pattern

language was based on findings from two research methods, a survey of designers and a synthesis of multi-disciplinary research.

2.1 Pattern Language

Architect and mathematician, Christopher Alexander and his colleagues developed a conceptual tool called a 'pattern language' in the 1970s in response to his growing disenchantment with the formal methods used in architecture and urban design. Alexander and his colleagues in the seminal book A Pattern Language (Alexander et al., 1977) propose the pattern language methodology to be used in architecture, building and urban design. A significant motivation in Alexander's philosophy, expressed throughout his work, is to capture what Alexander refers to a 'quality without a name', which was present in buildings that fulfilled the needs of their occupants but was difficult to define, formalise or prescribe. Their aim was to encapsulate certain commonly occurring problems observed cross-culturally in the planning and building of houses, communities, and regions. In response 'patterns' were developed as approaches to fulfil the real needs of people who lived and worked in buildings. Alexander's patterns rather than being fixed prescriptive solutions were generalisations that could be adapted and extended for locally appropriate settings. Despite criticism of Alexander's work, particularly from within the field of architecture (Protzen, 1980; Dovey, 1990) the pattern language approach has been widely adopted by many other disciplines including the field of software development (Griffiths, 2004; Lea, 2003), industrial design (Junestrand et al., 2001), education (Jessop, 2004), organisational management (Salingaros, 2004) and landscape architecture (Kaplan et al., 1998). As well as a conceptual tool that can be applied to many contexts, the pattern language approach is particularly well suited to interdisciplinary projects where a diverse range of professionals need to share concepts, constructs and ideas while working towards common project goals. Erickson (2000) argues that Alexander's methodology is well suited for any project where multi-disciplinary teams need a *lingua franca*, or shared language, to be able to communicate with each other. The research in this paper uses multidisciplinary interpretation design projects as the professional domain to develop a pattern language to encourage and facilitate dialogue

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between team members from overlapping disciplines. While this research spanned a number of stages outlined in Figure 1 the pattern language was developed from (a) data gathered from interviewing designers and (b) from a synthesis of research findings in related disciplines.

3.0 Results and Discussion

3.1 Interpretation designers survey

Eight Australian interpretation designers were interviewed representing a broad cross section of projects including those projects for national parks, local councils, interpretive trails, zoos, forestry, private forest industry, sporting organisations, conservation organisations, indigenous heritage and historic sites. The designers represented have worked on projects in Australia spanning 1991 to the present. Many of these projects cover major visitor centres for heritage management clients including national parks. Survey responses were collected, grouped and coded according to the particular issues they raised, the question to which they were responding and the identity of the designer. Several patterns emerged that related to common issues and themes for these designers. The responses were grouped around these issues:

- Complexity and the interdisciplinary nature of interpretation projects.
- Experience of collaboration.
- Challenging aspects of interpretation projects.
- Skills needed for interpretation projects.
- Design management and project management.
- Ideological commitment.

The majority of designers agreed that interpretation projects differed significantly from more traditional graphic design projects, with designers identifying interpretation projects as being more complex technically, spatially and from a project management perspective. Designer's comments also revealed the interdisciplinary nature of interpretation projects, with this approach having the potential to enlarge and extend the designer's repertoire. One designer responded:

Also in some cases there is the creative melding of other professions; architects, interior designers, writers and artists into the process that can stimulate and offer another way of viewing which takes it beyond the normal scope of work this designer does in the every day (Designer 1).

The increased inter-disciplinarity of interpretation projects led to observations about collaboration. The designers interviewed in this study all recognised the importance of good collaboration in interpretation projects. The strengths of working collaboratively were described as stimulating, creative, and 'achieving an integrated dynamic'. Responses also acknowledged the difficulties of collaboration, including working with inexperienced team members, lack of co-ordination between team members, dominating egos, and personality problems. The designer's responses indicated that successful collaboration was not a given, it requires skill, patience, good communication and time management.

3.2 Collaboration

The designers interviewed all recognised the importance of good collaboration in interpretation projects and acknowledged the increased need for collaboration and team work. The positive aspects of working collaboratively were described as stimulating, creative, and 'achieving an integrated dynamic'. The comments of the following designers sum up the strengths of working collaboratively and highlight the increasingly blurred boundaries between disciplines:

Coming up with the initial concepts as a member of a team has been a great experience of my professional life; I guess if you have the right people together it is a very creative milieu. With the people I was involved with, we didn't stick rigidly to our areas of expertise, and felt able to contribute ideas across the board. It worked very well (Designer 2).

Evidence both from the literature and from designers found that that the fields of interpretation and design lack dialogue and an integrative framework that brings the fields together (Moscardo, 1996; Ettema, 1997, p197). This issue is not limited only to interpretation design. Good collaboration is a critical issue facing designers and others attempting to solve pressing problems. The current literature on collaboration can be summarised with the following observations. Firstly, there is an emphasis that collaboration is critically dependent on communication and finding ways for stakeholders to negotiate shared meanings and understandings (Cross & Clayburn Cross, 1995; Sonnewald, 1996; Chiu, 2000). Secondly in the absence of well developed models, the literature is forward-looking, predictive, and searching for new models and ways of working (Conklin et al., 2007;Thackera, 2006, 2007). Thirdly, the literature offers useful conceptual constructs already in existence that can be adapted to encourage new ways of working in interpretation design (Nigten 2007; van Dijk 2007).

3.4 Interdisciplinary research findings

A second strategy leading to the development of the pattern language came from conducting a literature search which yielded a large body of relevant professional and academic knowledge under-utilised in interpretation design. Research findings from the fields of education, psychology, tourism studies, museum studies and visitor studies as well as literature about the professional practice of interpretation were examined to establish common problems and patterns in interpretation settings. Findings were synthesised and built on an existing review of literature by Paterson and Bitgood (1998) also extending a framework developed by Moscardo (1999). While this research comes from diverse discipline perspectives it was evident that certain grouping and patterns were emerging. The patterns form a cluster particularly suited for interpretation design problems, but the same patterns may also be relevant or apply to other communication design problems and other design disciplines. The patterns are human-centred in that they are predicated on participation and it is anticipated that they will be added to and adapted. The first group of patterns (1–7) are led by the research findings from the disciplines visitor studies, museum studies, psychology and education.

- 1. Control Visitors need to be given control over their experience.
- 2. Comfort Visitors need to feel safe in an environmentally comfortable setting.
- 3. Personal connection Communication needs to connect with visitor's personal experience.
- 4. Challenge/curiosity Communication should challenge, intrigue and encourage questions from visitors.
- 5. Participation/interaction Interactive and participatory experiences and exhibits, lead to high levels of visitor attention and recall.
- 6. Variety/multi-sensory Communication using multi-sensory attributes has more impact.
- 7. Flow Interpretive settings can be personally enriching, rewarding and restorative enabling people to have 'flow' experiences. (Csikszentmihalyi,1990)

A second set of patterns (8-10) assist designers and teams to find a common language and sense of place

for the local project site. These patterns relate to place-based interpretation

8. Reading Place – Creating a inventory of the visual and sensory elements of place records a non-verbal language of place

9. Lexicon for Place – A lexicon of place acknowledges the different ways people view the same location 10. Visual metaphors – visual metaphors of place can assist a team communicate about place.

This group use designer-led approaches to the site itself and are to be used to enable team members to respond to place and establish a communicative vocabulary of both text and image. These patterns assist in generating a visual language for the project, a common language between interpreters and designers using a human-centred approach. Primarily, the patterns focus on the visible dimensions that visual communicators or communication designers work with; however, as designers are engaged in designing wholistic experiences, the patterns may also include non-visual aspects such as sound, taste, touch and smell.

3.5 Pattern language development

The interpretation design pattern language was developed in 3 stages:

- 1. Summary of findings.
- 2. Problem identification.
- 3. Design responses to the problem.

Firstly, findings from the literature review and designer's responses were summarised to identify ten patterns. To illustrate the pattern development process, the stages of development of the first pattern CONTROL are outlined in detail below. This table details the process of creating the patterns.

Stage 1 – Problem identification

The first stage of the pattern is to identify and name the problem. The findings from literature search were grouped according to commonly occurring themes and patterns.

Pattern: 1 Control	Authors/ Study
Research findings and conclusion	
• Visitors should be given control over their experience.	Moscardo 1996
• Successful museum learning requires visitor's sense of self-determination and control.	Perry (1992)
• Interactive exhibits which give visitors some control over their experiences, result in higher levels of visitor attention	Bitgood and Patterson (1988)

Next, the pattern is phrased as a problem. In this case *Control* when phrased as a problem becomes *Lack of control*. When visitors encounter a lack of control in visitor and tourist settings, researchers have documented negative experiences including a passive distancing from the meaning of exhibits (Tyler, 1995) insecurity (Kaplan et al., 1998) incompetence (Olds 1990), mindlessness (Moscardo, 1996), anxiety (Olds, 1990; Pearce, 1998; Pearce & Black, 1984) fatigue (Gilman, 1916; Robinson, 1928) and a general sense of being overwhelmed by the amount of information to process.

Following Alexander's system this can now be named as the problem statement.

Problem: *People can feel overwhelmed by and distanced from information in museum and interpretive settings.* Stage 2 – Design strategies

Within the interpretation design pattern language framework, design strategies that deal with the problem *Lack of control*, include *Visual hierarchy and Layering*. Following Alexander's model, these are not fail safe, prescriptive solutions; but can be read as generalised strategies that can be customized for specific local projects and settings.

Design Strategy - Visual hierarchies

Hierarchies are a design strategy used to deliver information in a gradual manner. This principle is utilised in many design systems found within interpretation design. Using systems of hierarchies to regulate the pace of information helps to reduce the effect of overwhelming visitors with information. Designers develop systems of visual hierarchies to prioritise certain information, and to give order to the remaining detail. For example, hierarchies regulate the layout of type and image on a page, the composition of a sign or poster, the navigational space on a website or computer interactive as well the physical layout of an architectural space. One interpretation designer explained a strategy used in his practice to give a hierarchy to information. Devising three levels of information according to the amounts they believed people could comprehend. In interpretation settings, they coined the terms:

- *Headline* for a short grab of text to emphasis basic themes and encourage a return visit.
- *Bus stop* for the amount of text one would absorb on a bus shelter panel, while waiting for a bus and includes easy to read brief explanations so the sense of the message is gained readily.
- *Novel* the amount of text people would read if they were really interested in the topic and wanted to study it in more depth.

These levels of text have a corresponding visual form, which is easy to envisage in printed format (as a headline, bus stop or novel), but they could also translate into web form as a browser link (headline), one to two screens full of text (bus stop) or a .pdf article (novel). The same strategy can be 'designed into' a 3D space, where the visitor is gradually revealed more detailed information as they interact with an exhibit.

Design Strategy – Layering

Layering, revealing and staggering are further ways to create visual hierarchies, whereby the physical structure of the communication is revealed in a gradual manner. The visitor may be required to interact with a three-dimensional structure to reveal all the segments of a story or layers of meaning; or information could be made available through audio visual information delivered at different points. The strategies of *Visual Hierarchies* and *Layering* are not limited just to this pattern and *control* is one pattern belonging to a larger framework. Similar to Alexander's methodology, each pattern can be cross-

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referenced with other patterns to form 'a language' to address a particular design problem. Other patterns related to giving audiences control are:

- 3. Personal Connection
- 4. Participation/interaction
- 6. Variety/multi-sensory

The scope of this paper only allows detailed discussion of one of the set of patterns that together form a language as a group. Following Alexander's layout each pattern is laid out with an interpretation design example to illustrate and follow up references (Figure 2.).



Figure 2. Layout of Pattern 1 Control

4.0 Conclusion

In the spirit of Alexander's original pattern language set, these patterns have been written for use by all participants in the design process—for designers, interpreters other team members, collaborators and stakeholders, not necessarily at an 'expert' design level, but devised in such a way that makes the language open and accessible. At the risk of simplifying complex concepts there are references included in each pattern for further investigation.

Articulating shared concepts from the fields of interpretation and design as a common pattern language aims to strengthen the professional practice nexus between the fields of design and interpretation. The patterns and strategies here are not new or ground breaking. What is new is the synthesis of design and interpretation wisdom into a practical form. The patterns described developed from this research are a starting point, with more patterns to be added over time with use on particular projects. At present the pattern language remains a conceptual tool, however the next stage of applying the tool to an interpretation project will test its relevance and potential to strengthen collaboration and communication among interpretation project teams.

The Interpretation Design Pattern language is designer-led, initiated by a desire for better collaboration between designers and other professions. The patterns are grounded in a search for recurring themes in literature and research as well as listening to professional commentary from designers. The pattern language does not provide ready made solutions or answers, but rather offers insights from an extended range of disciplines that may trigger strategies in interpretation. It is motivated by exploring the territory beyond and between the different professions, less interested in differences, yet still being respectful of other disciplines. The intention is that in harnessing a richer resource of experience, knowledge and professional wisdom from disciplines other than the fields of design and interpretation individually, interpretation design will continue to strengthen as a field, be agile and adaptive to change, future-focused and evolve as a significant contributor to the discourse about Australia's natural and cultural heritage.

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Acknowledgements

I would like to acknowledge the designers who generously shared their professional experiences in participating in this research.

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Unravelling the Affective Appearance of Products

An Interactive Instrument for Application in the Packaging Industry

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Abstract

A growing body of empirical research is available to aid design decision-making. Much of it comes from other disciplines, making it difficult to assemble and codify in an accessible form. One such area concerns people's emotional-aesthetic reactions to product appearance, where disciplines allied to Psychology and Neuroscience have made considerable headway. Various models now exist that describe the processes underlying product evaluation and identify key facets of these processes. The project to be described incorporates this information into a software instrument for use within the packaging design industry. It is interactive, multi-layered, and incorporates 'real life' scenarios to illustrate its application to different consumer markets and for different packaging products. Scenarios are used to illustrate its application in different consumer markets and for different packaging products. A feature of the instrument is its layered construction whereby the designer can dig deeper into each facet and draw upon the actual empirical research that underpins it. It can therefore be used at different levels of sophistication; its underlying goal being to unpack the complexity of this area and to make it accessible to the design team.

Keywords: multi-disciplinary knowledge, user research, instrument for design practice, packaging design

Background

In theory, design decision-making is now facilitated by a growing body of empirical research. In practice, however, much of this research comes from other disciplines and can be extremely difficult for designers to use in real world practice. The reason is simply that these disciplines rely upon different research methods, often quantitative, and express their results in a language that is unfamiliar within the design community. This creates a barrier to accessibility. Added to this is their adoption of diverse discipline-specific theoretical models which militate against comprehension. Key disciplines are sub-fields of Psychology, Sociology, Marketing, and Human Computer Interaction (HCI), each with its own methods, models, and terminology. Inevitably, much of the research does not focus directly upon designed products, but rather contributes to our understanding of human perception, cognition, and affect applied to designed products are an extremely broad area. This paper and the instruments it describes focuses on perhaps the most difficult to conceptualize, namely, people's emotional-aesthetic

reactions to product appearance. Within this domain, disciplines allied to Psychology and Neuroscience have made considerable headway.

Emotion-aesthetics as a growing research area

Over the past two decades findings in Neuroscience have shown that emotion plays a much larger part in human information processing than previously thought (LeDoux, 1996). The cognitive science perspective of "the brain as a computer" saw cognitive processing as more important than emotion: research has now shown that emotion plays a vital role in human decision-making (Demasio, 1994). In fact, without emotion, decision-making cannot operate. While the cognitive and affective (or emotional) aspects of brain function were in the past treated as entirely separate, it is now established that we need both to function in the world. The cognitive and affective aspects of brain processing are often discussed as separate. In reality, the two are inseparable, though for conceptual convenience they have been partitioned. In dealing with designed products and their packaging, we acknowledge this partition, though we seek to integrate where possible.

The study of emotion in relation to designed products has become a growing research area. Notions of Product Pleasure (Jordan, 2000), Emotional Design (Norman, 2004), Product Emotions (Desmet, 2002), and Kansei Engineering (Nagamachi, 1996) epitomize this new direction. Closely related to emotion is the research area of aesthetics. While traditionally the domain of philosophy, it has been subject to empirical investigation for over a century within the field of experimental psychology. The term aesthetics derives from the ancient Greeks and is defined as 'knowledge that came from the senses'. However, by the 18th century, Baumgarten notably used the term to mean taste or beauty (Rée, 1999). This notion of aesthetics as beauty was first taken up by philosophy and art. Empirical research later investigated why certain paintings, films and, recently, products were considered beautiful or appealing to the viewer (Berlyne, 1974; Crozier, 1994; Fechner, 1876). The focus of this research has even extended to the aesthetic appeal of digital artefacts, such as websites (Lindgaard & Whitfield, 2004; Tractinsky, 1997). Central to these investigations was the question "Does a universal aesthetic exist?" as professed by the Modernists and typified by the Bauhaus (Itten, 1997) or is "beauty in the eye of the beholder?" Crozier (1994) states that aesthetic appeal is not inherent in the object, but rather is a property of the object-individual interaction, and one subject to context and change. Hekkert (2007) argues that the term aesthetic is often confused with the notion of beauty. Concurring with the original Greek meaning of the term, Hekkert posits that aesthetic encompasses all sensorial experience one would have with a design artefact including not only sight, but also the other senses as well. Rather than sensorial, the general public may think of aesthetics as the "styling" of an artefact (Smith & Whitfield, 2005). Within this paper the notion of aesthetics is confined to sensorial experience.

Designing a knowledge instrument for packaging design

The successful application of consumer research is vital to the design development process. This is evident in packaging design where consumer research increasingly quantifies how design contributes to the bottom line (Young, 2002). Package appearance has been shown to significantly impact upon consumer choice (Garber, 1995). However, how consumer research is designed, conducted and interpreted can be problematic for designers. A better understanding of the research relevant to understanding consumer response should assist in creating better design outcomes. The project presented here applies this knowledge to the needs of the packaging design industry.

Packaging design development teams are often multidisciplinary being comprised of engineering, finance, and marketing, as well as design. The lack of a shared understanding of the area of how consumer research should be applied in the design is most obvious in practice where these various stakeholders' perspectives, knowledge and agendas must be negotiated to ensure success in the design development process (Reinmoeller, 2002; Young, 2006). That said, the lack of a shared understanding and terminology can also benefit sectors of a company or an industry, as it can retain ownership via incoherence and the mystery of techniques that require, for example, statistical knowledge. In this way research knowledge becomes proprietary rather than shared. This competitive, proprietary climate makes the sharing of such knowledge extremely difficult, and underscores the need for an open source knowledge instrument that would be available to all design practitioners. The research described here was designed to address this by developing a knowledge instrument suitable for design practice.

In constructing such an instrument, various models pertaining to consumer responses to product appearance were examined (Bloch, 1995; Creusen & Schoormans, 2005; Crilly, Moultrie, & Clarkson, 2004; Desmet, 2002; Desmet & Hekkert, 2007; Garber, 1995). Bloch's "Model of Consumer Responses to Product Form" covers the consumer's psychological response to the product which in turn leads to a behavioural response. Desmet expands on this psychological approach by focusing on the affective or emotional side of a consumer's response with his "Model of Product Emotions". Crilly proposes a conceptual framework to bring together disparate areas in consumer response to product appearance, drawing on Bloch, Desmet and others. Desmet and Hekkert propose a framework for "Product Experience", while Creusen and Schoormans propose key facets with their "Different Roles of Product Appearance in Consumer Choice".

While these represent significant advances in this field, they nonetheless are disparate in their methods, theoretical orientations, and even in the terminology that they employ. Quite simply, there remains a lack of clarity, and no one common terminology or accepted overall framework exists. Furthermore, the focus has been on products generally, as distinct from packaging. The project described here, and its

resulting instrument, take packaging as the focus, and clarity as the guiding principle. The instrument seeks to assemble a wide range of knowledge and present it in a multi-layered and interactive form allowing the designer to access information about the various facets of this area.

The Unpack Instrument

The *unpack* knowledge instrument was developed to assist packaging designers to better understanding how consumers respond to their designs. It contains five sections covering The Project, The Knowledge, The Framework, The Scenarios, and The Feedback. *Figure 1* features the interface of the instrument.





As the instrument was intended for practical use in a design setting, the context of this application needed to be explored. The audience for the instrument was the experienced designer who would be familiar with the use of research within the design process. While many design companies may work with packaging design, the specific focus was upon companies that use research in their design process.





The Knowledge

This section details the literature from which the knowledge was derived and employed in the instrument as visualised in *Figure 2*. The two broader areas represented below by the two largest circles are design practice and design research. The smaller circles represent the more specific areas of the literature. From Design Research, the disciplines of Social Science, Business and Engineering were reviewed, while Design Practice literature draws upon packaging industry research, case studies and the use of market research within packaging design.



The Framework

The framework is separated into layers of information (*Figure 3*). This allows the user to explore various categories of knowledge at different levels of detail. At the most detailed level the user can access the key research material if they wish to delve further. The

visualization of the framework is based on a tree map with the size of the circles indicating a hierarchy of information. The three largest circles represent the key facets of consumer response including Cognitive and Affective that result in a Behavioural response. The next largest circles display the next level of information and so on. For example, Cognitive is further broken down into Aesthetic, Semantic and Symbolic aspects (Crilly et al., 2004). While Affective encompasses a number of concepts from Kansei (Nagamachi, 1996), Emotional Design (Norman, 2004), Product Emotion (Desmet, 2002) and the notion of Product Pleasure (Jordan, 2000). Behaviour is more literal and results from the consumer reacting with an Avoid or Approach response. The third level of information, the smallest circle, adds to the complexity, further detailing various contributions from the literature.



Figure 4

Figure 4 demonstrates how the user can access by clicking on various facets of the framework within the instrument interface to further explore the theoretical concepts. The window in the lower left corner of the interface provides access to more detailed research. The instrument also seeks to make clear the often overlap between categories of knowledge, and differentiates the information and terminology derived from the academic and the commercial spheres.

Scenarios

Unpacking the framework was a challenge, and it was clear that the theoretical concepts behind the framework would be difficult to grasp without examples of a real world application. With this intention, scenarios were constructed that represented the knowledge in a way that would be familiar to designers. These scenarios feature a series of characters reacting to packaging designs and their giving their subsequent responses. See *Figure 5* for an example of the characters and packages. The four characters were developed to represent various demographics within a consumer market, both male and female of different age and background. Each of the characters have chosen a packaged product, in this case bottled water, and they respond to the package. This response is then analysed or unpacked so the user of the instrument can view the framework applied to a real world packaging situation.





Feedback

Future work for this project includes testing in a number of environments. Investigating how designers respond to the instrument is the next phase of the research. This will involve its use in the packaging design industry to evaluate its impact on the design process.

Conclusion

This paper presents a knowledge instrument that can be used in the packaging design industry to better understand how consumers interact with package designs. The *unpack* instrument makes the complex knowledge in this area available to assist in design decisions. The structure of the instrument enables the user to delve deeper into a facet of the knowledge as required. To illustrate the application of the instrument, scenarios are presented that use real world design examples. The next stage of the project involves evaluating its use within the packaging design industry.

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Lowering horizons: Australian art and education in the global south

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"Transcending disciplinary boundaries, creating new practices, processes and knowledge' *Cumulus 38° South: Hemispheric shifts across learning teaching and research.* RMIT University, Melbourne, November 12-14 2009.

Abstract

As inhabitants of the global south, Australian art/education communities steadfastly continue adhering to paradigms emanating from the global north. While this tendency has long characterised aspirations of Australian art institutions, it is becoming increasingly evident in the corporatising bureaucracies of art Academe which require compliance with Euro-American models, not only in administrative systems, but in learning and teaching, as well as research measurement. While "Asian' art has at last appeared on Australian cultural radar, serious attention is yet to be paid to the potential of shared experience with, and difference from, our neighbours in the southern hemisphere in terms of Indigenous and colonial histories, cultures, pedagogies and political systems. Given the propensity for lateral thinking and inter-disciplinarity in the "creative arts sector', the situation is perplexing. This paper posits historical discomfort with "our' Antipodean place as a major factor in the disregard for potentially transformative south-south axes of alignment.

Keywords: south; southern hemisphere; cloud; art education; research

Introduction

We should, at all times, consider the weather and the title of the conference, *Cumulus 38° South: Hemispheric shifts across learning, teaching and research* is redolent with meteorological and geographical allusion. Accompanied by fluffy white and azure skies, the conference's poster design features a *contraposto* of two semi-circles or hemispheres, no longer forming a circle but opened out and realigned along a new curve of possibility. This exploded global ,geography' invites us to reflect upon the physicality of environment and place in our prognostications about art and design education and to reconsider the hierarchies of hemisphere.

The particularity of the conference's Melbourne meeting-place, situated along the 38th parallel in the southern hemisphere, assumes geographical significance. In introducing the topic, *Lowering horizons:*
Australian art and education in the global south, I wish to take up this idea of place as a significant factor in art and design education and research and to interrogate the invisible ,*a*tmospheric' conditions affecting this place. Therefore it is important to state first and foremost that this place and others throughout Australia belong to the Indigenous people of this country. Although this may seem obvious, I will suggest that the historically unresolved nature of ownership of this place situates our cultural endeavour under a cloud. This looming ,*s*hadow', or ghostly pall, bearing down upon Australian settler history has profoundly affected our past sense of identity and self-esteem and continues to occlude a self-image located in, but not quite of, the southern hemisphere. Encumbered with repressed anxiety and haunted by guilt, much Australian enterprise fits awkwardly with its physical location, habitually seeking northern hemisphere (,,western') validation. This sense of unease has long precluded more horizontally oriented cultural imaginings.

At this juncture, we may ask: what does it mean to conduct a visual practice at 38° south in 2009? Drawing upon the rhetoric of clouds and the double meaning of ,,lowering', the following discussion seeks to frame questions about how and why, as predominantly non-Indigenous artists, designers, students and educators, we continue to align our aspirations primarily towards horizons of the global north, even after two hundred and twenty one years of settlement down here in the global south. It will suggest that in order to raise our aspirations and self-esteem we might consider a lowering of horizons.

Under a cloud

At the outset it should be noted that the term *,lowering* ' carries a double meaning; firstly, as an intransitive verb (pronounced lō'ər), it describes the direction of movement downwards from above - from north to south - and secondly, as an adjective its precise meteorological/aeronautical meaning draws upon different pronunciation, rhyming with *,s*ouring' (lou'ər iŋ) (lowering, 2009). This refers to a sullen, threatening or ominous cloud formation, as in, for example, *,the lower* of thunderheads'. Under certain meteorological conditions both meanings of this word combine when a *lowering* cloud formation or bank is formed by the downward movement, the *lowering*, of clouds along the horizon. Unlike the verticality of *Cumulus Congestus* (University of Utah, 2005), for example, a *lowering* cloud base is characterised by a great deal of instability. In aeronautical terminology this signals "increased turbulence" and accelerating "stress levels" (Everett, 2006) and thus provides an appropriate metaphor for the *,c*louding' of our colonial past.



Fig. 1. A lowering sky. Gordon Smith. *Import: Rain coming in from the west.* 2004. *look ANDsee: A pictorial journal of life in rural Australia.* (Creative Commons) <u>http://las.newengland.net.au/2004/09/09/219/</u>

Fig. 2. *Crying sky(line) of Melbourne: HD*. Artie Ng. 2008. www.flickr.com/photos/artiephotography/

Hovering over the sunny image of settler Australia, albeit visually imperceptible, is a different kind of cloud from the fluffy cumuliform variety. What is ,painted out', if you will, of the vast blue skies of iconic Heidelberg paintings and tourist brochures is not only the presence of Indigenous people; it is this presence of highly unstable ,*a*tmospherics' – socially, politically, culturally and spiritually– that we share. Pictorially, a layer of lowering cloud might more accurately represent the tentative relations existing between settler culture and the place we inhabit. This cloud bank obscures the ,*t*ruth that lurks beneath the self-congratulatory rhetoric of the [Australian] frontier epic' and inhibits ,*a* productive rereading of the nation's foundational cultural myths (Greer (2004), in Huggan, pp. 53-4).

Schech and Haggis (2000, p. 232) note that "...twinning of the always having arrived with the wilful forgetting of the nature of that arrival - of colonial conquest and racism..." creates tension, displacement and a sense of un-belonging. Such avoidance builds collective psychic anxiety, shame and guilt even though this occluded history may remain below the horizon of consciousness. Resulting displacement in terms of location and cultural identity, combined with denial, equates with an existence that is neither here nor there. In terms of belonging, Wang Gungwu (1972, pp. 339-340) puts it more bluntly: "...to most Asians, Australia is part of the progressive modern West, possibly located in the wrong place". Koorie writer and lecturer, Tony Birch (2004, p. 2) calls for an intertwined

understanding of racially separated Australian histories, explaining, "[s]ettler history and culture embody indigenous narrative". We are, according to New Zealand writer, Ian Wedde (2004, p. 2), "yet to experience a "willingness to confront and accept cultural difference within shared historical contexts.

Across the Tasman Aotearoa, the Land of the Long White Cloud' has, with Australia, "fac[ed] mutual problems as the only European nations in a predominantly non-European area" (Keith, 1966, n.p.). This similar but different Antipodean experience of repressed settler history (Salmond, 1987, p. 299) has been interpreted as spectral, perpetually ,haunting' the present and rendering home unhomely. "...[G]hosts are a general sign of the repressed refusing to stay dead", explains Damian Skinner (2007) who identifies "the particular pressures of culture in Aotearoa [as] the contested history of cross-cultural transactions between Mäori and Päkehä." Although "...the cultural gap existing between New Zealand and Australia is far greater than between both countries and Europe" (Keith, n.p), both settler cultures experience discomfiting metaphorical layers', variously interpreted as clouds or wraiths. Deceptively clothed in insubstantial matter, these historical memories of place continue to float above and seep through contemporary life. In this way, "nation, place and physical proxemics constituted a significant role in the construction of identities, real or imagined, for Indigenous and non-Indigenous individuals and cultures in Australia, New Zealand and their region(s)" (Zeplin, 2005). As Maori art lecturer and theorist, Peter Brunt (2004, p. 5) suggests, we are thus rendered "unsettled settlers", a situation determined as much by a moral as a geographical compass. In his essay, "Bell's Theorem: ABORIGINAL ART - It's a white thing!", Indigenous Australian artist, Richard Bell (2002) more bluntly addresses each (white) reader as "an uninvited guest behaving like a "Star Boarder".

North and south: Bisecting the known world

To speak of the specificities of place, hemispheres, latitudes, bounded geographical entities - and even history – may go against the grain of much postructuralist discourse concerned with globalisation, boundary dissolve, rhizomatics, diasporic communities and the flattened cultural landscapes of anywhere (Tyler, 1991, p. 12; McLean, 1997, p. 2,). Moreover, it may seem naïve, even quaint, to attempt situating a global south, to re-invoke binaries of the metropole and its peripheralised "others". After all, it was over thirty years ago that Terry Smith (1974) grappled with the complexities surrounding what he termed "the Provincialism Problem" besetting this country's response to international art world structures. It is also half a century since A. A. Phillips (1958, p. 89) coined the term "Australian Cultural Cringe" in 1950, lamenting how "the centrifugal pull of the great cultural metropolises works against us". Nevertheless, by 1992 James Blaut's theory of ,,diffusionism' (1992, pp. 289-299) was further penetrating this "Problem", presenting this kind of enduring Euramercan hegemony in terms of "cultural racism", an embedded condition subtly operating through the

mechanisms of colonialism; this included postcolonial academia. In this way "Europe" (read Euramerica/,,the west') remains central and superior in terms of "progressiveness" and "rationality" while "non-Europe" as " recipient" culture/s - lags behind, perpetually positioned in peripheral discourse with that "centre".

Blaut contested that, in effect this, invisible and complex apparatus substitutes

the cultural category "European" for the racial category "white." We no longer have a superior race; we have, instead, a superior culture. It is "European culture", or "Western culture," "the West"... What counts is culture, not color ...[R]acist practice persists under the guidance of a theory which actually denies the relevance of race. The differences between humans which justify discriminatory treatment are differences in acquired characteristics: in culture (Blaut, 1992, np).

This colonial miasma has long clouded national confidence and endeavour *in* art, art education and wider culture. For example, in praising Australian painters who "revealed Australia to the Australians" in 1930, Hancock (in ,, 1983, p. 15) warned: "...their nationalist outlook on art is healthy, so long as it does not perpetuate itself". More recently, David Malouf (1998 in Nevin, 2004) reminds us that, unlike a European elsewhere, "life here was somehow thin and insubstantial" – not unlike, I would suggest, the quality of cloud.

Smith's later study, "Between regionality and regionalism" (2000) described how "patterns of provincialism" characterised much Australian artistic production and reception whereby an "attitude of subservience to an externally imposed hierarchy of cultural values" (p. 4) took precedence over the local product. This entrapped local artists in "a game that they must always lose...[t]o turn one's back was to step into invisibility; to make a virtue of one's peripherality was to settle for the second rate" (Smith, 2000, p. 3). Thus "the provincial artist cannot choose not to be provincial" (Smith, 1974, p. 46) and with an ingrained belief in inferiority, serious artists were obliged to temporarily live overseas – usually England and commonly called "Home'- before they could gain acceptance at home (Alomes, 1999). Until the 1950s when U.S. influence began to infiltrate studio teaching, art schools generally followed the English South Kensington System, instituted in 1853 (Weston, 1991).

Over the next fifty years the cringe abated reluctantly. Interestingly, "The Provincialism Problem" was written a decade or so after Australian accents were officially sanctioned in theatres, film and on radio (as late as the 1960s) (O'Regan, 1987; O'Brien, 2003), and three decades before Australian teenagers were, "like totally' mimicking Californian accents. As late as 1983 Terry Smith decried the Euramerican syllabi of art history throughout the country, notwithstanding publication of Bernard

Smith's landmark studies, *European Vision and the South Pacific* and *Australian painting 1788-1960*, in 1960 and 1962 respectively; the latter author's introduction proclaimed:

Australian art is a European art flourishing in the South-East Asian world...For the Australian artists there are two traditions of special importance, the European tradition itself and the local Australian tradition which is itself a variant of the European tradition (Smith, 1962, in Smith, 1983, p. 15).

"Most strikingly absent from Australian art history writing", noted Terry Smith (1983, p. 17),

is a consciousness of the continuing contribution of aboriginal [sic] and minority group artists...The whole question of the relationships between black and white Australian artists needs to be explored.

He continued:

...European, not Australian, art has been the main interest of historians working here, and...only quite recently have undergraduates had the opportunity to take courses in Australian art. Most courses centre on Europe, including England and sometimes the United States, with very few looking at Asian art and none at Aboriginal art... (Smith, 1983, pp. 11-12).



Fig. 3 "The hemispheres'. From: Mason, C. *Elementary geography*. Book I: The Ambleside Series Geography Books. (New Edition. Revised 1925). London: Kegan Paul, Trench, Trubner & Co., Ltd., p. 17.

So in 2009 what changes are revealed when we push aside this lowering curtain of cloud? Initially, we find a few rays of hazy sunlight but no artistic or intellectual blaze akin to Nietzsche's "fine southern brightness of heaven" (in Murray, 2009). After twenty six years Australian artists and designers are now firmly on the national educational radar and there is widespread appreciation of Indigenous art which unexpectedly rocketed skywards from the late 1980s. Indigenous author, Jackie Huggins (n.d.), notes:

It looks like the international world awaits more of our works too. Aha! The cultural cringe is being tested. As we know, Aboriginal art finds more appreciation in Europe and the US than in our own country; literature looks like following that example.

Twenty years on, however, there is only one compulsory Indigenous art school course of which I am aware; this is at the University of South Australia's South Australian School of Art. Euroamerican art models continue to thrive. This is in stark contrast to bi-cultural New Zealand where The Maori Language Act 1987 legitimated *te reo maori* as an official language and was enshrined through the Education Act 1989. *The Arts in the New Zealand Curriculum* includes compulsory Maori studies in years 1-8 (New Zealand Ministry of Education, 2009) while Maori and Pacific studies have proliferated in art schools and universities throughout the country (New Zealand Ministry of Education, 2005).

Notwithstanding this gloomy local outlook, the crafts sector, which is not the subject of this discussion, has always been regionally engaged (Bennett, 1991, n.p.), while important visual art exchanges in the region took place during the 1970s and 1980s. *Mildura Sculpture Triennials* were hugely important events for art education, introducing site-specific and non-object practices across Australia and New Zealand, as were *ANZARTs (Australia and New Zealand Artists Exchange)* and Perth-based *ARXs (Artists' Regional Exchange)* with South East Asian and New Zealand artists (Zeplin, 2005a). Despite government enthusiasm for the Asia-Pacific region during the 1980s and 1990s, the Asialink exchange program was not founded until 1991(*Asialink*, 2009), Queensland Art Gallery's *Asia-Pacific Triennial of Contemporary Art (APT)* was only inaugurated in 1993, an ongoing enterprise that, disappointingly, has not been emulated by other state galleries. These events set the groundwork for a recent ,*s*kyward' explosion of contemporary Chinese art across global biennale circuits; this notwithstanding, the Australian art world and art educational gaze remains largely influenced by Euramerican practices.

Overwhelmingly, most of the artistic, theoretical and pedagogical benchmarks we automatically measure ourselves by still emanate from northerly climes. The *Venice Biennale* and not the *Biennal di Sao Paulo* remains our art world "Mecca'. It's not well known that the 1973 *Biennale of Sydney* was specifically created to showcase the Asia-Pacific, and after its first two regional iterations, this mission was only taken up again this century, albeit as a small section of an international program. Similarly, from the 1960s the Australian National Gallery planned extensive Australian and southern hemisphere collections but shifted direction by the mid 1970s (Whitlam, 1995, p. 566).

This degree of yearning for northern validation may result from Australia's smaller critical mass of intellectual and artistic activity but this factor does not fully explain why so little interest has been

generated in ideas and events from other ,southerly' cultures, especially in trans-Tasman/, Indian Ocean and Asia-Pacific - or more correctly, Asian *and* Pacific - regions. Language differences, of course, account for a large part of apparent indifference but this has not inhibited two decades of unprecedented enthusiasm for continental French theory (Murray, 1992).

Australians may be among the most travelled of populations and hundreds of different languages may be spoken within this country but the majority of the population and government departments, unlike their New Zealand counterparts, are monolingual. In art education Euroamerican theories and practices prevail despite an intensely multicultural society. Even postcolonial studies in Australia inevitably reference metropolitan-based theorists writing about the Indian sub-continent, Africa, black Britain and the Middle East rather than, or in addition to, Southeast Asia, the Pacific or Latin America.

It seems ironic that so little artistic and/or intellectual capital is known, cited or celebrated from our surrounding geographical region - and throughout the southern hemisphere – amidst a proliferation of recent theoretical discourses - in and beyond art and design schools - devoted to difference, diversity and horizontality: postcoloniality, rhizomatics, marginality, and relational aesthetics. (Murray, 1992; Leong, 1996; Crouch, 2002; Pennings, 2005). Some questions arise: What, for example, do we know or teach about contemporary art – or indigeneity - in Chile, or modernism in Brazil, design in South Africa, theorists (other than Gayatri Spivak) in India or contemporary philosophers in Australia? And what of contemporary visual culture in the Pacific, comprising one third of the earth's surface, and a large percentage of whose populations live in Australia and New Zealand? Papua New Guinea and East Timor, New Caledonia and New Zealand lie in close proximity but how much awareness is there of their complex histories and societies, or New Zealand's art, fashion and film industries - beyond the late, great Colin McCahon and eight Oscars awarded for Peter Jackson's *Lord of the Rings*? How many courses exist in Australian universities on New Zealand and/or Pacific societies, let alone the Indigenous and non-Indigenous visual culture of these countries?

I have suggested that this dysfunctional – and mutually ignorant - relationship between Australia and New Zealand has resulted from what we may term the ,,lowering factor'. Both displaced ,,European' countries have a historically derived inferiority complex determining these relations which *Meanjin* editor, Judith Brett (1985, p. 28) explained thus: "... [S]mall countries try to maintain ,,an illusion of completeness. Blotting out the recognition that their societies lack the differentiation, complexities and competencies vital to the functioning of major powers...".

The spectre of the geographical south has recently been raised by Raewyn Connell in *Southern Theory* (2007), a sustained enquiry into the disturbing preponderance of Euroamerican paradigms in the field of social theory. Many of these "totalising metanarratives of the North" (Jolly, 2008, n.p.) presume a

kind of "universality" in spite of the asymmetry existing in population and wealth between the two ,spheres'. Even with only passing reference to visual culture, this is a significant study which identifies the locus of power/knowledge within the exclusionary practices of northern metropoles, where the south is positioned as subject, mined for raw data (Connell, 2007). As Jolly (2008, n.p.) reminds us: "Those in the South are authors of theory and not just objects of study, and the ground of their knowing, their location, matters". In critiquing this form of intellectual colonialism, Connell notes: "Whenever we see the words ,building block' in a treatise of social theory, we should be asking who used to occupy the land" (Connell, p. 47).

Pacific and feminist scholar, Margaret Jolly (2008, n.p.) has expressed well-founded reservations about such generalised concepts as "east' "west', "north' and "south' as well as "developed'/, undeveloped', deriving as they do from "western' cartographical categories. In a globalised world these terms may indeed be considered inadequate if used to "naturalise" and "dehistoricise difference" according to the points of the compass and thus "betray a deep imperial history". Nevertheless, we can begin to reconsider these "directional' ideas in different and creative ways beyond crude binary oppositions. It would seem premature, however, to entirely disregard the cardinal points since globalisation has not yet visibly diminished northern/Euramerican dominance; global air traffic is premised upon these so-called "imperial' markers, and until further notice, the compass –invented in China –still points north.

Fig. 4. "The points of the compass'. From: Mason, C. *Elementary geography*. Book I: The Ambleside Series Geography Books. (New Edition. Revised 1925). London: Kegan Paul, Trench, Trubner & Co., Ltd. p. 39.



(En)compassing the south

A number of Australian theorists have contemplated ,the south', antipodality and regionality. These include Terry Smith (1974, 2000) Ross Gibson (1992), Kevin Murray (2006, 2007, 2007a, 2009), Nikos Papastergiadis (2003), Tara Brabazon (2000), Mein Smith, Hempenstall & Goldfinch (2009), and McKenzie Wark (1997, p. 56), who explains: "Where postcolonialism seems to have a passion for diagnosing the symptoms of empire within the colony, antipodality is about what else gets produced besides repression and guilt". While offering creative challenges to ,cringe' culture and opening up approaches to southern studies in art ad design institutions, further research is needed on shifting definitions of ,antipodality', ,regionality', ,Asia-Pacific', ,Australasia' and the arbitrary and racially-defined divisions of Polynesia, Melanesia and Micronesia (Jolly, 2008, n.p.).

Kevin Murray (2006, 2007, 2007a, 2009) has wrestled with these problematic issues, particularly how south relates to the arts and culture and these deliberations extend beyond geographical tropes. He mines the term's historical origins so that Mexico and the Mediterranean become as ,southern' as cultures situated below the Equatorial zone and he challenges the normalisation of north and south as hierarchical and moral constructs which govern the up and down "habitus of the body" (Jolly, 2008, n.p.). In Judaeo-Christian philosophy north (the mind) is up, and up is good, or at least, better than south, which is down (the body's nether regions). In this context heaven aspires upwards (north) with hell providing a southerly counterbalance. With terms like "heading south', therefore, only holding negative, sometimes demonised, connotations, how is it possible to renegotiate such ingrained ideas and recast verticality? How does one begin to turn these philosophical "truisms' upside down? One answer might lie in widening, rather than inverting, the scope of our current art and design syllabi.

In the early 1990s when ,imported' postmodern theory raged throughout Australia, Murray embraced the "French' phenomenon and related its reception to Anglo-Australian traditions. Later, as Director of Craft Victoria his grounding in the local and his embrace of craft and regional connections resulted in a grand plan; the South Project, an extraordinary Melbourne-based organisation which has, since 2004 focused attention on and promoted exchange between cultures of the south, be they geographical or conceptual, bringing artists, makers, curators and writers into new, creative and continuing relationships, and creating new bodies of knowledge and resources. Gatherings in Melbourne, Wellington, Santiago and, from 2007 under Magdalena Moreno's directorship, Soweto/Johannesburg and Melbourne - with Yogyakarta and Noumea on future horizons - have brought forth rich, lateral understandings of global and conceptual south(s). Different colonial and Indigenous histories and economic experience are entangled with diverse intellectual, artistic and physical landscapes and, of course, wildly variable weather conditions. Certainly, the inaugural Melbourne Gathering at 38° south latitude was a memorable event which, for Wedde (2004, p. 1), was much more than a "knee-jerk resentment of generalised, north-oriented world orders...such as the bogey of American capital/cultural expansionism". Southern ideas of ubuntu (South Africa) and the Indigenous notion of *tandurrum* (shared humanity) might not "cut the intellectual mustard" in western arts academia (Birch, 2006, p. 104) but they palpably "charged the first 2004 South Gathering in Melbourne with a powerful chemistry" (Murray 2007, n.p.).

Despite such notions being "most likely received with quaint regard (at best) in a global environment dominated by neo-cons, mass deception and moral isolationism" (Birch, 2006, p. 104), we might re-think these values in relation to the kind of art and design education we currently provide, especially with regard to alternative exhibiting structures, as well as more collaborative and cross-disciplinary ways of working - that may include primary and secondary art sectors. The *South Project's* immediate

pedagogical implications, however, lie in its successful *relational* development of horizontal southsouth – and south-south-north/south-north-south – networks of Indigenous and non-Indigenous artists, writers and craftspeople across southerly latitudes. These links are established and ready to be activated and extended in terms of residencies, lectures and publications, while analysis of South and similar informal models in the academic curriculum could provide a useful discussion platform towards expanded pedagogies and sharper awareness of critical regionalism.

These ,southern' values are not unrelated to the day-to-day administrative systems that increasingly dictate our schools' character and fate. Managerialist structures of infinite complexity, compliance and de-humanisation - brought to us via corporate ideologies spawned by the Harvard MBA – seem at odds with the (increasingly mythological) Australian respect for the ,fair go' and contempt for overregulation, over-work and puffed-up pretension. Similarly, creative arts research that deviates from northern hemisphere validation won't cut the mustard with current ERA criteria; ranked journal criteria virtually bypasses the southern hemisphere (Haddow and Genoni, 2009). This kind of corporate ideology can play a vital, if unwelcome, role in tertiary education as it often *determines* curricula. Art and design are increasingly becoming instrumentalised under the tiresome rhetoric of , creative industries' (Grierson, 2005); (Conomos, 2009) and electives examining southern issues are disappearing over the horizon, even though student comments on courses like Asia Pacific Arts, for example, have included: "...it has been fascinating. But more importantly, my perspective has shifted and I have woken up to an enormous world of art and culture that I have been missing" (Asia-Pacific Arts, 2009). As Beilharz (1997) suggests: "...the antipodes is not a place so much as it is a relation, one not of our own choosing but one which also enables us." Indigenous culture have had this knowledge for aeons but it seems the "corporates' are yet to discover this.



Fig. 5. "The surface of the earth'. From: Mason, C. *Elementary geography*. Book I: The Ambleside Series Geography Books. (New Edition. Revised 1925). London: Kegan Paul, Trench, Trubner & Co., Ltd. p. 49.

Conclusion

Lateral transactions within Australia's southerly Indigenous and non-Indigenous ,neighbourhood' have long been discouraged in favour of Euramerican legitimation. This cringe tendency is aptly symbolised by the flightless birds unique to our hemisphere which cannot connect with each other. It also recalls the lowering cloud of colonialism frowning darkly upon settler identity as displaced - and displacing - inhabitants of the south. As educators, artists and designers we need to acknowledge this looming mass above ,,our' place ,,under the sun' so as to challenge the rainbow-hued rhetoric that continues to construct myths of the ,,sunny south'. From there, we can more confidently consider creative multi-directional engagements across and around the global sphere as well as at ,,home'.

In this endeavour, Grierson (2006, p. 8) affirms "the potential of the arts for establishing a mode of regional thinking" and considers the *South Project* a useful model for social engagement. This lies in its proven capacity to "provoke and actualise the political dimensions of sustainable action" (p. 11). While this unique interdisciplinary program represents an important contribution to global culture, it is only one example; there are many others to be discovered and researched when we cease to look *solely* beyond our own horizons. Paradoxically, we will be able to participate more fully in a truly global society by lowering those horizons. This was recognised in 1984 by playwright, David Williamson (in Nevin, 2004) when he warned Australian audiences: "If we don't write our own stories our children will grow up thinking that real life happened elsewhere in accents other than our own".

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