INVESTIGATING DIGITAL DESIGN TUTORIAL VIDEOS ONLINE

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ABSTRACT

This thesis addresses the emergence of an online phenomenon and its relationship with digital design. This phenomenon involves geographically distributed individuals sharing information related to a craft or professional practice via video content, this phenomenon will be referred to in this thesis as the Online Video Tutorial Phenomenon or OVTP. OVTP has serious implications for the future of design education, digital design culture online and digital design processes. OVTP is an online phenomenon, affecting thousands of designers and hobbyists, who are using applications, recording them and then sharing online the digital processes they have recorded. These digital processes are then viewed by hundreds of thousands of other designers, who are also able to interact with and understand this content. All this information is now being produced at a rate that outpaces modern design universities, and the groups participating in the proliferation of this content are growing in number. This online phenomenon (OVTP) involves a mixture of professional designers, hobbyists and design students who are using, creating and sharing videos that involve digital design or computer-aided design procedures, techniques or processes. When presented online, these videos are commonly called tutorial videos online, and are seen by many members of the online design community as an educational resource.

The tutorial videos involve the recording of a digital design process, technique or procedure. Distributed publicly by a multitude of authors within networks and websites online. This study focuses on two specific websites (YouTube.com and Vimeo.com). This phenomenon (OVTP) is observable and completely open to the public, due to the nature of an open form of education; the online tutorial video content and the online user interaction around said content is assessable to anybody with an internet connection. Aspects of this phenomenon that are not observable without experimentation or study include how and why designers use and create the videos, what their intentions are, and what is the broader effect of the mass social proliferation of tutorial video content. As such, this thesis intends to review literature and conduct research related to the occurrence of *procedural* and *tutorial* videos within online communities, in an attempt to explore the role of tutorial videos as social practice in the contemporary online design environment.

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Declaration

This thesis contains no material that has been accepted for award of any other degree or diploma, except where reference is made in the text of the thesis. To the best of my knowledge, this thesis contains no material previously published or written by another person, except where due reference is made in the text of thesis, and where the work is based on joint research or publications. This thesis discloses the relative contributions of the respective workers or authors.

The thesis has been copy-edited and proof-read by Dr Jillian Graham (Articulate Writing Solutions), whose services are consistent with those outlined in Standards D and E of the Australian Standards for Editing Practice (ASEP).

Name: Adam Douglas Walker

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LIST OF ABBREVIATIONS

OVTP	Online video tutorial phenomenon
DDTV	Digital design tutorial videos
HCI	Human-Computer interaction
CSCW	Computer supported cooperative work
CSCWD	Computer supported cooperative work in design
CSCL	Computer supported collaborative learning
COP	Community of practice
VCOP	Virtual community of practice
CAD	Computer-aided design
GUI	Graphical user interface

CHAPTER 1

INTRODUCTION

Background

This thesis is about the emergence of an online phenomenon and the proliferation of digital video tutorials. In particular, it is concerned with how this online phenomenon affects design education and digital design culture through the proliferation of digital design tutorial videos (DDTVs) online. This phenomenon (OTVP) is broader than just design tutorial videos, it also involves other online tutorial videos from a range of crafts and professions that are being recording and shared openly online. OVTP also affects hundreds of thousands of people (Findings on page 111) who are using digital design software applications though the proliferation of DDTVs. The effects of DDTVs on design education and digital design culture will be studied in this thesis. Some other effects include the impact on the actual digital design processes used to create contemporary digital design. This online phenomenon is directly related to the emergence of online tutorial videos and the propagation of free information in video content online. It involves the uploading of video content to communicate a digital design process by a multitude of people from around the world. This information is shared openly with anybody with a broadband connection, and is ubiquitously accessed from all over the world.

It affects not just designers, but potentially millions of people who are using design applications and recording how they use them, before sharing these digital processes online. As far back as 2006, Oxman anticipated the emergence of the digital design phenomenon (Oxman, 2006), and saw digital design as a potential area for design research. Digital design phenomenons are specifically technological or online phenomenon related to the digitization of design. Digital design is defined as design that involves the use of computers or digital media; this is a broad and expanding area of design that includes, print, web, animation, video and multimedia design. This thesis takes Oxman‘s work as a starting point for investigating the digital phenomenon associated with digital video content for design. However, it should be noted that the researcher did not first become aware of DDTVs though

the work of (Oxman, 2006), but through personal experience and interaction with technological and online phenomena. While studying design and working as a designer, the researcher has personally used tutorial videos on purchased DVDs that would have been considered a precursor to this material. A continued interaction with digital design resources and associated design content has led the researcher to notice changes in the distribution and production of this content, and the emergence of DDTVs.

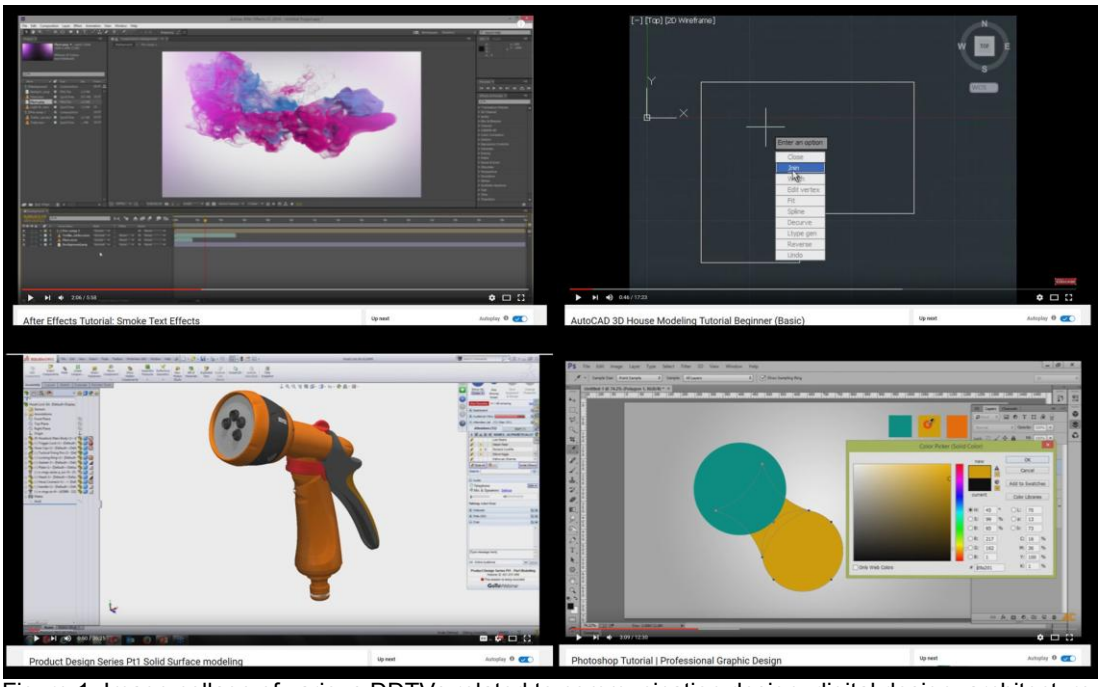

Figure 1: Image collage of various DDTVs related to communication design, digital design, architecture and product design; the image includes 4 different DDTVs collated.

The figure above (figure 1) gives examples of the visual appearance of DDTVs; because DDTVs are a recording of digital design practice their appearance will often represent the design object they are creating within a design software application. The spread of DDTVs means that students who are studying design in university intuitions now have access to step-by-step instructions anywhere and anytime. This influences their design practice, because their learning is no longer confined to the classroom, but is exposed to and influenced by the wider virtual design Communities of Practice that exist across the internet. Because of the digital nature to DDTVs, gathering information (and all coding and analysis) has to be done by digital means.

One of the questions investigated with the questionnaire is how the DDTV phenomenon may affect the actual digital design processes used by students to create contemporary digital design, and specifically explores the stage of the design process over which DDTVs are most influential.

Video tutorials that communicate a digital process are part of a rapidly expanding phenomenon emerging online via both social networking sites and video hosting websites (over 87 million views in the sampled videos in this thesis). The findings (Page 111) and analysis (Page 117) indicate there are millions of video tutorials currently on the web (Image on page 16, figure 2), with more being uploaded every day to be accessed and used by millions of viewers. This is displayed in the Figure 2. Despite the increase in video tutorials and viewers, little is known about why video tutorials are used as an educational resource or the ways in which the tutorial content is used. This thesis, therefore, investigates how DDTVs are currently used by design students as a resource in learning practice, while considering the effectiveness of DDTVs as a support resource for learning software programs.

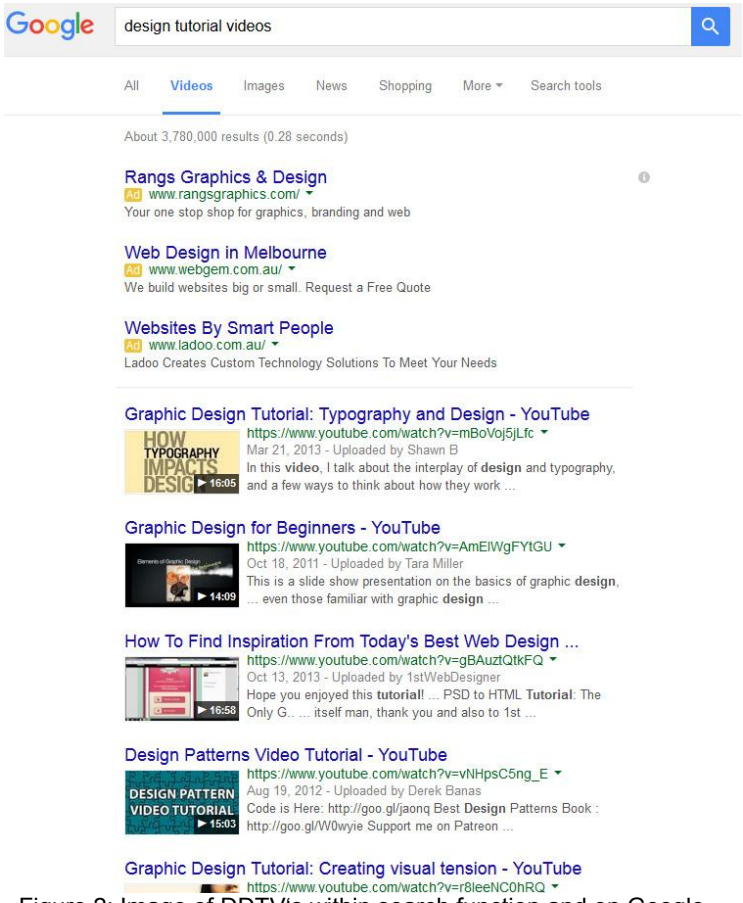

Figure 2: Image of DDTV's within search function and on Google.

This thesis is concerned with video tutorials that communicate a digital design process, and with the implications these video tutorials have for university learning. Specifically, tutorial viewers in tertiary institutions are educating themselves by using video tutorial content, both within and outside their university learning environments. This means that in the marketplace of ideas, university institutions are losing perceived authority as sources of educational content, as more and more students are watching user-generated content and becoming part of virtual (online) communities of practice that are external to their institutions.

This study includes a discussion of the application of video tutorial content in design and design education. This discussion raises questions concerning new experiences of learning, creating digital content with computers, and the progression and evolution of the practice of designing in digital applications and of digital design education. One further major effect of video tutorials generally concerns the globalisation of information and the ways in which these tutorials may, in the future, offer equality of access to information and to education, for example in rural indigenous communities in western nations and across the developing world.

To investigate the phenomenon of digital design tutorial videos (DDTVs), this thesis assessed the accession and use of online video tutorials by undergraduate design students at an Australian university. These DDTVs communicate and explain a process, theory or aspect of digital design culture. The research investigated three aspects of online DDTVs. The first concerns covered in the questionnaire involved what stage in the design process users made use of the tutorial video content. The second aspect covered in the questionnaire is the ways in which users followed the tutorial instructions, whether step by step or in other ways, and the learning they acquired from the procedures in the tutorial. This information was more qualitative in nature and was probed with open answer questions. The third aspect addresses if the users of DDTVs (in this instance students) then shared the video tutorial content with their digital peer groups and virtual Communities of Practice. This was intended to synch up with other research conducted related to the social network analysis, and content analysis of the amount of individuals who shared, liked, commented, and disliked DDTVs, showing some form of interaction.

The thesis presents new approaches for understanding the social phenomenon involved in the propagation of DDTVs in the online design community. These approaches are grounded in content-based social networking analysis (Velardi et al., 2008) and ethnographic content analysis (Altheide, 1996). The thesis Investigates students‘ attitudes towards DDTVs, their motivations for interacting with the content, and the processes they share when interacting with each other.

Creating DDTVs

In order to contextualise the topic and demonstrate how easy it is to create these products, this research also discusses how DDTVs are created. The ease of production goes some way towards explaining the explosion of DDTVs across the internet. Creating a DDTV involves the designer recording a computer screen while he or she operates a computer program, or uses video editing software to create a DDTV before sharing this content online. This introduction explains the methods or approaches and other processes involved in the design of digital content. The elements associated with digital design tutorial video content include the design applications that are recorded: e.g. Adobe Photoshop, Autodesk Maya; the digital design process; the digital design principles; the video content structure; and the capabilities of the video medium (form of media). These videos (DDTVs) involve unique recording only ever used in a tutorial context.

Online Communities of Practice

In this study that designers who are involved in the phenomenon of online video development are involved in a type of online community of practice (Wenger, 1998; Lave & Wenger, 1991; Wenger, White & Smith, 2009), and that watching tutorial video can be regarded as a form of legitimate peripheral participation (Lave & Wenger, 1991; Wenger, White & Smith, 2009).

A community of practice (CoP) is defined as a group of people who share a craft, and who could be situated together as a group (Lave & Wenger, 1991). However, what is occurring with DDTVs is more complex than a traditional CoP, and involves multiple overlapping online communities on different social media platforms sharing large quantities of information. (An example of a traditional CoP is one that involves communities emerging inside workplaces and design studios.) The first reason for

this is that there are multiple CoPs working together (Social network graph Page 139). The second is that there are potentially huge numbers involved — potentially tens of thousands (Findings Page 111). The third relates to the openness of the content, which allows DDTVS to be accessed and modified by an unlimited number of video makers and/or users (YouTube.com and Vimeo.com) Every single digital design process is open and available for anyone to look at, and then modify. This leads to a fourth difference between these virtual CoPs and traditional CoPs: the fact that anyone can join without being part of the design community (Behance.net and other online design communities) Lastly, digital design processes are becoming less routine as a result of social interaction, reproduction and modification. There are also differences in digital design processes shared online, with the result that there are rarely two processes that fulfil the same objective in exactly the same way.

There are, however, some specific, specialised online design CoPs. Some only create video or educational materials that relate to graphic design. Others, for example 3D CoPs, may only interact with a video editing community, or perhaps even with a more specific area of design, such as interaction design. Many areas of design interact with DDTV content, and this phenomenon encompasses multiple design applications and disciples. However, this thesis focuses on digital design and graphic design disciplines, because of the researcher‘s experience in these disciplines, as well as their potential to be shared and transformed online. (The lack of physical products means that transfer of visual information is simpler online and does not require a physical presence, and the content can also be downloaded, modified and remade by others who upload their own content.)

Design as Visual Knowledge

Experienced or knowledgeable designers can view the practice of other designers and interpret it through their existing expertise. This means that when design practice, such as the creation of a design artefact, is recorded, it is a visual activity that communicates a process. There are crafts or hobbies that we are motive to watch such as cooking and dancing that are also process based, and are using online video content to communicate these processes more effectively and make them more accessible to a wider audience. One of the reasons so many popular TV shows cater for cooking and dancing is because these are visual activities suited to the video medium. The difference and the advantage that digital design has over

other crafts such as dancing, cooking, or other hobbies that take advantage of online videos in communicating knowledge, is that every single aspect of the digital design is done on a computer. Nothing extra is required. The design is created, recorded, uploaded, and viewed on a computer, and if a DDTV is reproduced or used as an educational aid, then that production is also carried out on a computer. The entire digital design process is conducted on the same device, and this could be another factor influencing the spread of this type of content online.

A further advantage of design is that it is situated online and what is occurring can affect a large group of individuals is potentially impacting on a practice, from multiple different perspectives, and with multiple understandings about practical digital design knowledge. These videos can be accessed from anywhere; potential users can access them from a Smartphone while on the move, as most modern Smartphone‘s are equipped with an application that has access to YouTube directly, or in the workplace or classroom on a computer.

Video Content and Design Education

Video content has become exceptionally popular in recent years (182 million U.S. internet users watched online video content in 2011, Lella, 2012). More video content is now being uploaded on a daily basis than ever before, just as more news websites are including videos within their traditionally text-based stories. There is also an indication that people involved in online media are attempting to make the media content they create richer and more viable for online audiences. Video is being used much more, and is becoming a more attractive medium to people in society (Spielmann, 2008). Video content that explains processes online is also becoming more popular. Such content can be accessed by any device that can access online video. This phenomenon is only in its infancy, only coming to life on websites that have emerged online within the last nine years (Burgess & Green, 2009). In the last four or five years (—Ooyala Global Video Index Q3 2014”, 2017), tutorial videos have exploded online perhaps due to changes in the capacity of the internet for western audiences specifically, and advances made online, commonly referred to as Web 2.0.

Video content has already had an influence on education (Goldman, Pea, Barron & Derry, 2009; Heath, Hindmarsh & Luff, 2010). As more members of society become

accustomed to having their information represented in a particular way, having educational materials in a traditional text-based format may not engage participants in the same way. This contrasts with most educational resources. Traditionally, education resources are produced by the educational institution or organisation, or by specialists in the different education fields. The difference is that anyone who has knowledge about design practice can create DDTV content; they are most likely to be outside a design based organisation. The number of authors and users of DDTVs is therefore also substantively more than the numbers of students or teachers at university institutions that teach design. The large number (millions within the findings page 111) of users of DDTVs is an indication of the influence the content may have on the ways in which students learn design processes. This has the potential to add creativity to design by showing designers new ways of resolving design outcomes, and indicating a wide range of creative solutions and ways of using design processes to achieve certain aesthetic results.

Context

In the literature review (presented in the next chapter), a discussion of the literature on the major topic areas of this thesis is presented. The three main areas of focus regarding this online phenomenon include online communities, the online digital design video tutorials (DDTVs) these communities develop, and how these tutorials are used in the digital technological environment.

A brief overview of the development of online communities and the social networks through which they communicate is required to understand the potential impact this content could have online, and the context in which it resides. In this thesis, these online communities are understood as virtual communities of practice (Wenger, 1998; Lave & Wenger, 1991; Wenger, White & Smith, 2009), and those who use the video content can be regarded as engaged in legitimate peripheral participation (Lave & Wenger, 1991; Wenger, White & Smith, 2009). Areas associated with this online phenomenon will be addressed, including a discussion of the concepts associated with online social networks and different types, functionalities and categorisations of networks. This thesis also focuses on video, because this forms the basis of the resource that the communities studied in this thesis use to communicate. This involves a discussion of the history of video as a medium, and defining video as a medium itself. The discussion ranges from changes in the media

landscape from older forms of video to digital media, and the different ways video content was accessed previously, as distinct from today.

Video is composed of text, images and audio, and accordingly the differences between text, images and audio all when separate forms of media, change when they are combined. The use of text and images together in hypermedia is also discussed, because of its relevance to the topic with which this thesis is concerned. This leads into a discussion of video content and video editing, and more specifically to information on online video content. DDTVs are defined in the literature review thorough a discussion of their aesthetic appearance, their context, and the perceptions around their creation in online communities. Accordingly, context is a major part of the discussion regarding this online phenomenon. Context in this sense means the online environment, in which DDTVs exist, and the technological constraints and limitations in communication. Context can explain the technological limitations of a section of the online community, as this is the environment in which the communities and the content (DDTVs) exist.

Research Questions

This study is a mixed methods study involving both qualitative and quantitative data, and therefore required questions specific to these approaches. Thus qualitative and quantitative research questions were formulated. These research questions were designed to inquire into new experiences about learning and making digital content with design software.

The qualitative research questions are as follows (central and sub-question):

1. *How are DDTVs structured?*
2. *How do design students use DDTVs to learn digital design?*

The quantitative research question is as follows:

1. How much social interaction is involved in the use of DDTVs?

Terminology

The word ‚procedural‘, (used in this thesis as *Procedural and Tutorial Videos Online*) is defined as regarding a procedure, and is used in reference to what the videos in question contain: procedures involved in digital design production. The word

‗procedural' is also used in the term *procedural generation*, which refers to algorithmically-generated content, as opposed to manually-generated content, for example, computer-generated clouds, buildings or colours. It can be argued that aspects involved in digital design procedures are algorithmically generated; however, the amount that is algorithmically generated would differ from what is defined as procedural generation, as many manual procedures remain in digital design, for example sculpting, texturing or some specific animation. Some of this content could be classified as tutorial videos; however, they constitute only one of the many types of content this thesis is concerned with, and as such, different types of content will be referred to here as procedural or tutorial. Further clarification can be found in table 1 below.

Table 1: Procedual and Tutorial Terminology use.

Word	Usage
Procedural	Used regarding videos that involve the recording of a procedure involved in the production of a digital design object.
Tutorial	Used regarding videos that involve verbal instruction and the recording of a procedure involved in the production of a digital design object.

Significance to Knowledge

This thesis brings into focus some of the aspects involved in online interactions between users and designers who create and use tutorial video content that is oriented towards digital design. The research population is a diverse group, containing a mix of digital design students, digital design hobbyists/amateurs, digital design professionals, design teachers, and design teaching organisations. All, however, would be required to have produced, created, used or interacted with tutorial videos online, in order to be considered actively involved in the social phenomenon with which this thesis is concerned.

Examples of these interactions include sharing and commenting on a range of videos that mostly contain screen-recorded video explanations, tutorials, experiments and projects (with an explanation of process). This study also attempts to examine how and why design students use tutorial video content. When used to explain different approaches and processes involved in design, determining the value and benefit of tutorial video content is important to understand from a teaching perspective. This content (DDTVs) contains a direct recording of a digital design

process, and accordingly determining the values of the content could assist digital designers when using educational resources. So too is consideration of the continual social advancement of many different methodological design approaches and other digital processes used to create and design digital content. (E.g. can range from impressive computer graphics and particle displays to more efficient product design) DDTVs, as a type of video content, can also be considered a different type of educational resource (from text based resources available in magazines and instruction guides), as they are always accessible, and can be viewed from any device that has broadband internet access, at any point in time. Allowing individuals in geographically distributed communities to communicate and share information via video in way that is almost synchronous.

This type of content is also used by companies that produce educational videos on a professional basis, and sell their educational services to professional designers, students, universities and creative businesses. (Examples include companies such as Digital Tutors http://www.digitaltutors.com/11/customers.php & Lynda http://www.lynda.com/) Furthermore, if video content can be used to effectively educate digital designers in practical applications, then it stands to reason that it may also be effective in other creative design areas of education.

Research Gap

Research into communities that use video has so far only been limited to the websites like ‗YouTube', and amateur non-design-oriented participants who produce a range of content quite different in nature from that upon which this thesis focuses (VLOGs and Video compilations contrast with video recordings of software). Likewise, research into participatory culture and communities online has not yet been directed towards tutorial videos used by digital designers, or video websites that are oriented towards creative professions, such as ‗Vimeo'. This website should be of interest for its focus on design, art, film, and the educational video content presented on the platform, and engaged with socially by ‗Vimeo' users.

Thesis Structure

The first chapter has introduced the thesis research topic and contextualised the research in a short general overview of the topic area. The research methodology

was briefly discussed (under the title communities of practice), and will be discussed further, as will the research methods within the methods and methodology chapters.

- The next Chapter (2nd) continues with a literature review, in order to situate the study around similar research, and to provide the context of the study.
- The 3rd chapter contains the methodology, which reviews worldviews that could be used in the study, and which have been used in similar areas. The theoretical lens and main concepts with which the study is concerned are also featured in this chapter.
- The 4th Chapter is concerned with the methods to be used in this research, as well as the methods of analysis.
- The 5th Chapter covers the first method: a content analysis/social networking analysis. In the fifth chapter, the second method questionnaire is addressed.
- The 6th Chapter involves a discussion of the results from both methods, as well as the analysis.
- The 7th Chapter presents a conclusion, issues beyond the study‘s scope, and possibilities for future research.

CHAPTER 2
LITERATURE REVIEW: THEORETICAL CONTEXT

Introduction

This chapter describes the history of research and ideas surrounding content that is of a similar nature to DDTVs and the properties that make up video content. There will be a focus on the online community and its engagement with video content. I will examine the research surrounding online communities that engage with video tutorial content (DDTVs). As there are no existing studies about online tutorial videos, the research is situated around online videos and other material related to online social interaction. This review also takes into account the significance of this phenomenon for digital design and digital design processes. The phenomenon (OVTP) has not previously been precisely identified in research publications; however preliminary research (covered in the introduction, and shown in figure 2) has indicated that millions of people around the world are watching and interacting with tutorial videos, and some are creating them. This is an outcome of the rapid emergence of new communication technology such as YouTube, which was created in 2005. This literature review is intended to research beyond the design literature, and into other areas that contain research associated with this type of content and its mass proliferation online.

The literature in this review is concerned with content directly relating to design tutorial videos (DDTVs), which form the focus of this study. It will also be looking at theory and research related to this type of video content, and any associated research that involves video content online and social interaction with online design content. This review will focus on online communities (a group of people with common interests who use the internet to communicate), and will attempt to understand the differences between communities online who communicate socially with varying content and information. This can involve different mediums (media), video and text, and different communication methods, synchronous and asynchronous communication. The online digital design community identified in this thesis is an online interest-driven community, containing multiple online groups and

different online design communities within them (examples include: online 3D design community and online graphic design community). Their interaction with the content is based on their interest in it, either through production or their association with the related industry (responses to the survey in this thesis have indicated this). The communities do not constitute a single online community of practice, but represent a much broader community made up of many different organisations and online communities of practice interacting together with the same type of content (DDTVs). What they share is an interest in digital design practice.

The research areas covered in the literature review are associated with content related to DDTVs, or their involvement with similar elements. Such as the technological environment, or interaction with a technological device, and other research areas that also relate to online social interaction, or the practical aspects involved in the use of computer software. The research areas in this thesis (covered in figure 3) were somewhat constrained to the most relevant areas of research, and accordingly did not involve other broader areas of scientific research.

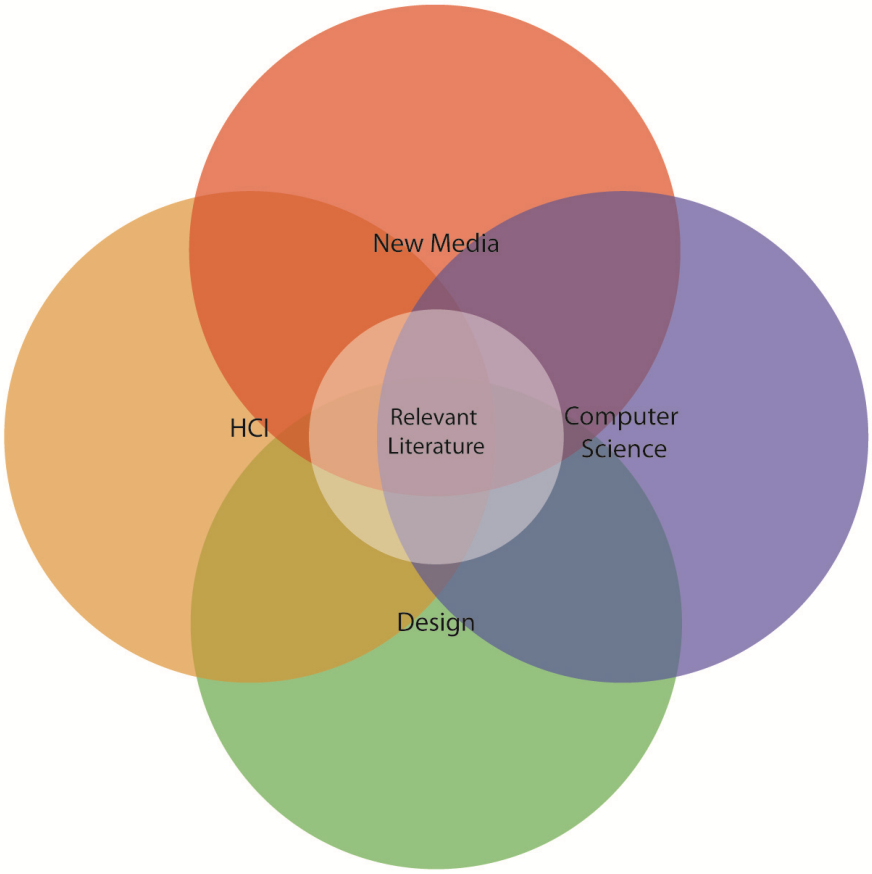

Figure 3: A diagram indicating the relevant research areas for this study.

The relevant literature involved in this thesis includes new media, computer science, and human computer interaction and design research. All of these areas overlap in various ways; however, in this thesis all of the above mentioned research overlaps in their relevance to DDTVs and the associated online phenomenon (OVTP). When studying aspects related to the propagation of information via video online, all of the different research areas above (figure 3) are deemed to make valuable contributions in this area and accordingly to this literature review.

New media is defined as the availability of digital content and mass communication using digital means. New media in this thesis involved in the study of new formations of media content and its changing distribution, engagement and proliferation in the 21st century. This area is also concerned with the effects of this online media and online video content, and accordingly this content (tutorial videos) could be classified as a type of new media. The area of human computer interaction also contains relevant literature because it is concerned with how humans interact with the subject matter in this thesis. Millions of people are interacting on their computers with the DDTVs studied in this thesis, after searcher for or stumbling upon the video instruction. Their intention to interact with the content and the desirability of accessing the content is indicated in responses to the questionnaire involving university students, and in the content analysis of the online comment responses made with regard to DDTVs, which are covered later in the thesis.

Computer science is important because it is involved in the operation systems and design applications necessary for production, and the principles they run on. Digital design is also closely associated with this type of content, as this is the foundation of this research and provides a literal demonstration of digital design practice. The processes within these videos are design processes as well, taught and used by designers in universities, studios, workplaces and design groups around the world. _Digital Tutors' (www.digitaltutors.com) and _Lynda'(www.lynda.com) currently market themselves to universities for design-based training, and this commonly involves content that consists of what could be considered by some as _high quality' video tutorials. These are very similar to the DDTVs studied in this thesis, the main distinction being that the videos studied here occur within a different online platform and are completely free of charge.

Also related to this thesis is design education, and while the literature review may draw from research from a range of different areas, this is the main area that this thesis is concerned with; it is at the centre of the thesis. The most significant aspect of this digital phenomenon is its likely effect on design education and design culture online. All areas researched in this literature review are also connected to digital design education. They interact with it on some scale, and/or they are all involved in what is currently occurring in digital design culture online. It is assumed in this thesis that most students, and most people who are engaged in learning digital design, are quite possibly engaged with educational resources related to design, such as tutorial videos or DDTVs. These assumptions are made based on past experience as a digital designer, and after correspondence with various digital designers currently working in the industry. Designers and students are engaging with this content, and it is very likely that this engagement and interaction is shaping their development as designers to some degree, though the extent of their interaction is not explored in this thesis. As students become working professionals, it is assumed that they will continue to interact with this content, and with other designers who also interact with it. This has been discussed in correspondence with digital designers currently working in the industry, but is not explored in this thesis. Since the main concern of the online phenomenon is gaining digital skills, this phenomenon could affect the futures of many designers and impact on hundreds of thousands of design students.

People are putting this video content (DDTVs) online free of charge, without any motivation from corporations or educational intuitions, apart from sharing knowledge. There is also a much larger user base that is seeking out this content for a multitude of reasons, some to learn design or for solving a problem with a digital design process. This type of content can be seen by some designers as an educational resource that can be used in case an unexpected technical problem occurs, such as a lack of knowledge by staff, and when staff in industry are required to learn something new at an agency. In these cases, tutorials may be provided to aid them, and will form an essential part of their ongoing new learning to maintain and improve their industrial skill set. Tutorials are being used in some instances to help cement the foundations of knowledge about how to design practically in digital applications. The content is also being created by universities and used for educating design students at universities all around the world. This is certainly evident at Swinburne University in resources related to various digital design

classes. These tutorials used by universities are not normally situated online, unless located on a website associated with the university, or perhaps another organisation that creates tutorials for profit such as Adobe.com, Digital Tutor and Lynda.

Video the Medium

Video is a technology that electronically records, captures, processes and stores a sequence of images and sounds which make up audio-visual video signals. It is a medium that consists of various signals kept in motion. Video differentiates audio and video signals, and video recording can electronically apply processes, modifying visual attributes like ‗light' and other audio attributes separately (Spielmann, 2008).

Before the emergence of DDTVs video recording was analogue; however, in recent years it is usual to record video directly to a digital format. When video is recorded, an electronic signal is captured containing visual information that can be transmitted or ‗written out' in a line (referred to as a *scan line*) from left to right or top to bottom. The information is systemised and coded into an electronic video signal, ending up as either interlaced video or progressive video. This content becomes digital during conversion, and this digital aspect classifies it a new media object: ―All new media objects, whether created from scratch on computers or converted from analog media sources, are composed of digital code; they are numerical representations" (Manovich, 2001, p. 27). This is also the case for video that is represented digitally. Accordingly, video has a vast array of transformable properties that can be simulated and manipulated under the control of applications that process video.

The transformable properties of video that are apparent due to the principle of *automation* (the use of automated functions to modify media)(Manovich, 2001, p. 32) must also account for the online social interactions and engagement around videos that attempt to improve automated software processes, or for the presentation of educational videos through the use of automated software processes.

Spielmann (2008, p. 5) states that,

> In determining the characteristics of technical transformation imagery, the position of video is central: on the one hand, the electronic medium rests on analog recording technology, yet it establishes, on the other, the essential features common to electronic and digital media in processuality and transformability through flexible forms of audiovisuality.

The term ‚processuality' refers to the processible dynamics, like movement and time involved in animation and video. This processuality may be related either to the mental processes involved in designing videos or the mechanical processes that are applied to video content. Consequently, transformable imagery or adaptive video could be defined as video that makes transformable visual changes through the use of various automated and other digital processes. These automated software processes are at work in the production and design of most digital content, and the digital videos with which this thesis is concerned.

Biemann (2003) states that, "Today's digital video production is to be seen in the context of hypertext and the internet." In all cases tutorial videos are digital, but not all digital video is online. Online video requires an electronic device to access it, and are commonly accessed on a computer or Smartphone. The content in question is online and as such is accessible via a web browser, or Smartphone app and on occasion is embeddable in networks and WebPages other than the original website on which the video content is hosted.

Videos are essentially composed of multiple stills together to form moving images, as are other mediums similar to video, for example the medium of film. Carroll (1996, p. 52), indicates that the "Formal features of film — such as line, shape, space, motion, and temporal and narrative structures — are things that film shares with many other arts", video being one of them. That is if a distinction is made between film and video as separate media, as Spielmann does in 'Video: The reflexive medium' (2008). Regardless of differences between media, both have the moving image. When it comes to the moving image, Carroll (1996, p. 52) asserts that "the observation that art-forms involve multiple media, which, in turn, may be frequently mixed, is incontrovertible". This assertion is evident when viewing tutorial

video content (DDTVs), as ‗Art' and ‗Design' share many similarities when constructing media.

Carroll (1996, Chapter 4) states that in order for content to be categorised as a moving image, it must meet necessary conditions, such as a detached display or screen, or belong to a class of things from which the impression of movement is possible. Included in this is the assertion that the performance in video is an interpretation, where the motion picture is generated by engaging a template mechanically, and is two-dimensional (Carroll, 1996, p. 70). Following these conditions, videos can be classified as moving images.

Like many other forms of moving images, video involves editing: ―Editing is a communication practice based on cutting which prompts the spectator to infer the significance of a shot chain in terms of the best available account of the shot chain" (Carroll, 1996, p. 418). Consequently, editing is considered an important and defining factor involved in digital video content.

Editing plays a major role in digital video, as the amount of control possible in computer software is ever increasing. With editing, ―The grounds of inference are numerous and varied, including several types of narrative considerations, as well as sensuous and thematic comparisons and contrasts, and linguistic and conceptual evocations" (Carroll, 1996, p. 418). This can also be the case for some tutorial videos. While some may contain no editing at all, some DDTVs may use the ability of modern-day special effects to present visual effects, and this occurrence should also be taken into account when considering editing. Editing in the case of DDTVs can to help form the composition of the video, as DDTVs are composed of the recording of a computer screen and these recordings can be edited together to form a larger video in some instances. Other instances editing may be minimal and may only include branding information at the start and end of the DDTV.

Audio-visual Aesthetics and Perceptions

DDTVs are a type of content that is noticeably similar to the type of lessons taught in practical design classrooms or studio classes. Typically, practical lessons involve the process and aspects in digital design being taught, with the teacher's screen and associated computer program displayed to the entire class by a projector. What

is different with tutorial and procedural videos is that the activity or specific aspects involved in digital design can be replayed at will. This is an important distinction, because going back and replaying activities or processes involved in the video could indicate a user‘s motivation towards understanding and learning the processes. Video tutorials are also referred to by some design teachers as resources that are commonly produced and made available by teachers to students in design universities. The video content essentially shares the same space as other educational resources in design. This is similar in other disciplines, such as mathematics in the case of Inglis et al. (2011), who explored the differences in educational resources, specifically the use of live face-to-face lectures, online recorded lectures, and a mathematics learning support centre. These educational resources are noticeably different in aesthetics from tutorial and procedural design videos, but similar in their proliferation, indicating that exploring the differences may throw light on why content is propagated within the design community online. In a surprising conclusion, Inglis et al. (2011) assert that students appear only to make what was perceived as above average use of either one learning resource or none (Inglis et al., 2011). Inglis et al. (2011) also assert that the study strategies adopted by students are related to their discipline of study. This indicates that because of differences in disciplines, there is the possibility for differences in the use by designers of tutorial and procedural videos as educational resources.

Preceding Audio and Visual Media

Older media forms like television and film are considered the precursor to video, but the precursor to tutorial videos (a form of hypermedia that involves video representation) can be wider ranging, as the pages in which tutorial videos are viewed also include text and static images. Bolter & Grusin (2000), state, —We call the representation of one medium in another *remediation*, and we will argue that remediation is a defining characteristic of the new digital media”. In this instance, the representation of the video medium is always present and necessary. There is also the possibility that it is, in a way, competing against other elements active on the page. Webpages comprised of video content are seen by some (Bolter & Grusin, 2000, p. 45) at first glance to be —an esoteric practice” that is so widespread that we can identify a spectrum of different ways in which digital media remediate their predecessors, a spectrum depending on the degree of perceived competition or rivalry between the new media and the old”. For this reason, the co-existence and

rivalry between old and new media should be accounted for in tutorial video content and its surrounding visual environment.

It has been argued that —Video contains preceding media forms as languages in its electronic vocabulary" (Spielmann, 2008, p. 22). These preceding forms would be television and film, the other audio-visual mediums. The links that video has to film and television, when involved in the production of video content, are not physical but theoretical, in the sense that film techniques have been adapted and automated by the computer or the user: —If we place new media within a longer historical perspective, we will see that many of the principles above are not unique to new media, but can be found in older media technologies as well" (Manovich, 2001, p.50). This is the basis of remediation in the video medium, containing a combination of early mediums, not unlike the precursor to video television.

Williams (1974 p. 36) states that, —Many people have said that television is essentially a combination and development of earlier forms: the newspaper, the public meeting, the educational class, the theatre, the cinema, the sports stadium, the advertising columns and billboards". But it is how these earlier forms combine themselves that makes television the unique medium that it is. Accordingly, if video is a medium and a form of digital media, it should in its own right have a combination and development of earlier forms, just like television, and as a result, differ from television. This is because —What is new about digital media lies in their particular strategies for remediating television, film, photography, and painting" (Bolter & Grusin, 2000, p.50).

Video as a medium can involve combining, developing and re-purposing aspects of both the film medium and television medium. McLuhan (1964) classifies mediums as 'hot' or 'cold', based on the amount of participation and sensory focus: —A hot medium is one that extends one single sense in 'high definition.' High definition is the state of being well filled with data" (McLuhan, 1964, p. 22). Likewise, a 'cold' medium is one that is 'low definition', the state of being given less information and having to 'fill more in' yourself.

With regard to participation, a 'cold' medium gives less information, and offers more information based on the amount of participation. —Hot media are, therefore, low in

participation, and cool media are high in participation or completion by the audience" (McLuhan, 1964 p. 23). Television is described by McLuhan (1964) as a cold medium, which when heated up is less effective. However, film and movies are 'hot'. This indicates there is a cooling and heating process involved in the video medium, and that some tutorial videos could be 'hot', while the text and other participation surrounding the tutorial videos are 'cold'.

This could offer an explanation as to why text-based communication is prevalent online, as "Any hot medium allows for less participation than a cool one, as a lecture makes for less participation than a seminar, and a book for less than dialogue" (McLuhan, 1964, p .23). This leads to the speculation that video's own combination of hot and cold could prove effective within the cold participatory environment of the web. Video now exists within an environment that was not seen by McLuhan, and as a result these videos are viewed in ways not previously found. Berger's (1972) work addresses ways of seeing in changing contexts. This is important to video, as its precursor, film — a medium that required audiences to sit in the context of a dark room — and television — a medium that brought the video into the context of the audience's home — were each time subtly altering interaction in the viewing contexts. Online video, on the other hand, can be embedded in many websites and watched on numerous devices. Online video can now be brought into any environment that contains an electronic device that can access it, which in a sense makes it ubiquitous.

The combination and development of older media forms is essentially the re-purposing of an older media into a new media. "Repurposing as remediation is both what is 'unique to digital worlds' and what denies the possibility of that uniqueness" (Bolter &Grusin, 2000, p. 50). The possibility of uniqueness is denied due to the fact that the new media is a combination of older media; it is not unique, but just different, in that it is a new composition. When online video is active on a webpage, it involves not only a number of older media forms within itself, but older media and interactivity. This could be described as *online video*, and fundamentally it is video on a webpage, involving multiple other elements such as text, image, and hyperlinks, all active and together on the one page. "The insistence that everything that technology can present must be presented at one time, is the logic of hypermediacy" (Bolter & Grusin, 2000, p. 269). According to this understanding,

videos contained on websites can be seen as a form of hypermedia. However, what technology can present is entirely based on what the user accessing the content is using in terms of device and connection speed.

Accordingly, changes in the technology may allow for different combinations and numbers of older media forms. —What is new about new media is therefore also old and familiar: that they promise the new by remediating what has gone before" (Bolter & Grusin, 2000, p. 270). How ‗new media', and online video specifically remediates what has come before is also what is essentially new about new media.

—The finding that there is strong interest in the video medium, just as always in the area of the application of new, primarily interactive and net-based media, as well as in the international art scene, will be taken as a point of departure for the argument that video, like every other medium, transits various stages of evolution, articulation and establishing its specificity as a medium in the course of its technological, cultural, and institutional development" (Spielmann, 2008, p.13). However, what pre-dates new media and video content is an industry that, since the rise of the internet, has become somewhat diminished. These are Industries that publish knowledge, specifically encyclopaedias, self-help books and guidebooks ‗for dummies'. These manuals were widely published and popular during the 1980's and 1990's. However, in a similar way as the decline in print media and newspapers, they have since lost popularity, mainly due to the rise of information on the internet (with websites like wikipedia.com and google.com). Books designed ‗for dummies' or ‗how to' guide manuals were a part of the print industry in the 1980's and 1990's. These were the predecessors to DDTVs, as they offered advice for beginners on how to use popular design software, and this involved examples that followed a similar protocol as DDTVs.

Video and its Technological Environment

As Spielmann (2008, p. 20) notes, —The position of video as a medium should be described so that noticeable changes in video's structure and form highlight, on the one hand, the relations of film and video and, on the other, the links of video to computers."

Computers play a significant role in both the distribution and production of video content online; almost every task in the creation of this content involves the use of a computer. In addition, computers are being used to create and view large amounts of video content, and this use is increasing. Statistics from The Nielsen Company (January 2011 online video usage, 2011) show a 45% increase in online video usage.

Indeed, interest in online video is on the rise within western countries and abroad —a report from the Pew Research Center's Internet & American Life Project finds that online video is growing. 78% of online adults watch or download videos online" (Purcell, 2013), with popular ‗viral videos', ‗memes', and ‗internetpersonalities' generating millions of views every day. Video is a flexible medium, and one that Spielmann (2008) argues is reflexive. Tutorial videos, while active within a technological environment, and sometimes even completely produced and recorded on a computer, do not constitute an evolution of video, but simply video content in the new media environment.

—Thepopular understanding of new media identifies it with the use of a computer for distribution and exhibition rather than production" (Manovich, 2001, p.19). As a result, tutorial videos, and the range of content itself, can be classified as a form of new media content. This is because video content, which is produced on a computer, published on the internet, and then accessed by another person on a computer, is a form of new media, present and active in a new media environment known as the internet.

However, there is no reason to privilege the computer as a machine —forthe exhibition and distribution of media" over the computer as —atool for media production or as a media storage device. All have the same potential to change existing cultural languages" (Manovich, 2001, p. 19). It can be assumed that the act of designing video content with a computer can be considered as important as its exhibition and distribution via the internet. In terms of changing existing cultural languages, the computer can be used to produce video content that is designed to educate users on the functions in computer applications or techniques partly automated by the computer. This reflexive form of online video seems to have come about to suit the need of the users, this need being to see the most direct

presentation of these automated processes. This can come in the form of a screen-recorded video demonstrating the specific automated processes (step-by-step visual guide), with an audio explanation used to describe more specific aspects of the process. Additional images may also be composited into the presentation to aid in the explanation.

According to Manovich (2001, p. 14), —Professional designers are typically the ones who really push forward the language of new media by being engaged in systematic experimentation and also by creating new standards and conventions". Therefore it is no wonder that designers have been the main players engaged in the creation of video tutorials and other types of tutorial videos for other designers who use design applications. These video tutorials have come to take their place as an educational convention, one supported by major companies like ‗Pixar', who outsource ‗Digital Tutors' in educating and advancing their staffs' knowledge of applications that are involved in the production of video content.

Applications that edit video and produce content to be composited into video, (and also use video as a communication tool) have significantly increased in their ability. —With these new applications, the desire for immediacy is apparent in claims that digital images are more exciting, lively, and realistic than mere text on a computer screen and that a videoconference will lead to more effective communication than a telephone call" (Bolter & Grusin, 2000, p. 23). This immediacy seems apparent in some tutorial videos and perhaps in the educational tutorials that are professionally produced, which often contain diagrams and visual explanations that could make them seem more visually exciting than written explanation.

As previously mentioned, tutorial videos are digital, and the medium may be recorded in analogue, but for its online publication it is converted into a digital format, if not already recorded in that format. —The numerical coding of media and the modular structure of a media object allow for the automation of many operations involved in media creation, manipulation, and access" (Manovich, 2001, p. 32). This automation of process has transformed compositing, motion graphics and special effects to the extent that it has changed ‗video' to become a medium with an ever-expanding array of possibilities that make the creation of video content more effective and transformable for designers. Digital applications' own effectiveness in

creating quantities of content is evident in the vast amount of existing content that is reused in different instances using different automated techniques. The original content can be removed, adapted, changed and reproduced to the extent that it is now, in a sense, ‗new', no longer resembling the original content.

This process of re-use is occurring within the context of new media, and appropriately, "the emergence of new media coincides with this second stage of a media society, now concerned as much with accessing and reusing existing media objects as with creating new ones" (Manovich, 2001, pp. 35-36). The re-use of video, effects, scripts, motion-tracking data and other existing media objects has come to play a large role in the design of new media, specifically motion graphics, which is a visually adaptive and transformable field.

The re-use of material is contributing to the transformation of almost every aspect of video content. "This weighting of transformative and similar components in video depends finally on how far the related devices and technologies possess a programming function" (Spielmann, 2008, p. 10). Digital animation is one example. At first it seems there is no re-use (and no applicable programming function), and that the animations are commonly generated with a series of ‗key frames' that map out a movement. This is no longer the case in some applications, where a routine animation is generated, for example a ‗walk cycle' (a continuous animated walk, exactly the same at the start and end of a walking movement, so that the walk continues seamlessly when replayed). This existing animation is used by the computer, and then automated and adjusted based on attributes and algorithms that the designer chooses to implement. Other animations (jumping, lifting, and so on) can be downloaded from the internet and re-used, with various attributes adjusted.

This re-use of a material can be described as a result of the variability principle, and the modularity of existing video (or other applicable content). As Manovich (2001) explains, "Variability would also not be possible without modularity. Stored digitally, rather than in a fixed medium, media elements maintain their separate identities and can be assembled into numerous sequences under program control" (Manovich, 2001, p. 36). The computer's impact on the creation of tutorial video content, as methodological changes occur in the design of various elements involved in video

content creation, also presents the possibility for video to produce new adaptive aesthetic visualisations.

> —Variability and automation, these general principles of new media, also apply to images. For example, a designer using a computer program can automatically generate infinite versions of the same image, which can vary in size resolution, colors, composition, and so on" (Manovich, 2001, p. 291).

These same examples can be applied to video, as applications involved in the production of video content advance to the point that tasks are more automated, and the ability to alter video has increased. This could ultimately lead to making video content more frequent and varied online.

Automation alone has the potential to create new visual possibilities for video content. The modularity of the media elements involved allows for these media elements to become automated and manipulated. These new media principles (automation and modularity [Manovich, 2001]) create a conjecture around continual expansion of visual possibilities for digital image:

> As the possibilities of what can be displayed of the visual in videographic signal processes multiply, the location of video can finally be defined like this: video is the predestined medium of figuration, in which elements of analog and digitally coded pictoriality can be made visible in an ambivalent relationship (Spielmann, 2008, p. 10).

Regardless of how increasingly automated, varied, and adaptable video content appears to be as a result of computers, ‗the screen' (the physical object in which these videos are viewed) and the subsequent environment the media are accessed from (the graphical user interface) are important factors in understanding any online phenomenon involving video adaptation and transformation:

> It is by looking at a screen — a flat, rectangular surface positioned at some distance from the eyes — that the user experiences the illusion of navigating through virtual spaces, of being physically present somewhere else or of being hailed by the computer itself (Manovich, 2001, p. 96).

Everyday, millions of people look into screens for work or pleasure and experience an illusion of navigating through a computer or the World Wide Web. The screen as

we know it has gone through a great transformational change over the years. As Friedberg (2006, p. 193) argues, —In the short span of the last two decades, the introduction of computer-generated images and digital display technologies has radically transformed the space of the screen". Digital imaging technology, and arguably digital design, has proliferated the appearance of online videos in the screens of many computers, changing how humans use screens in the present day.

Indeed, there have been many screens throughout human history. Manovich (2001, p95.) describes three types: *Classical, Dynamic,* and *Real-time*. However, due to the nature of the internet, a combination of two types of screens could be active at any one time through interactivity. Examples of this occurred at a recent ‗TEDxSydney' event. If a user were to go and watch the ‗TEDx' trailer on their website, this would be an example of the use of a dynamic screen that is displaying a moving image from the past. However, if a user were to go and watch the ‗TEDx' live stream on ‗YouTube', this would be an example of a real-time screen that is displaying a moving image from the present (Manovich, 2001). This is due to the interactivity of a computer screen, and unlike a classical screen (a static, permanent image), it has the possibility to change at any point in time at the user's whim.

> —Dynamic, real-time, and interactive, a screen is still a screen. Regardless of the possibilities of Interactivity, simulation, telepresence and other attributes that can be found in contemporary screens, as was the case a century ago, we are still looking at a flat, rectangular surface, existing in the space of our body and acting as a window into another space" (Manovich, 2001, p. 115).

Accordingly, previous analysis of the nature of a screen (all types/styles, predecessors) is relativity applicable because of preceding patterns of screen use.

The Internet and Video Distribution Websites

This thesis investigates the emergence of online design tutorial videos. Design tutorial videos involve the recording of a computer screen while the user operates a computer program, or the use of video-editing software to create a video that explains a process, theory, or aspect involved in design, before sharing this content online. The uploading of video content to communicate a digital design process could be considered a digital phenomenon emerging online through the use of both social networking sites and video-hosting websites. The videos studied are

specifically used to explain methodological approaches and other processes involved in the design of digital content. The elements that are associated with this type of video content include the design applications that are recorded; for example, Adobe Photoshop, Autodesk Maya, the digital design process, the digital design principles, the video content structure and the medium‘s capabilities. These videos involve unique recording and editing processes, allowing the videos to be viewed as adaptive or reflexive video content (Spielmann, 2008).

It was only with the arrival of YouTube in 2005 that it became possible to freely store, access and distribute video content online as an open and interminable resource. This online storage and independent production of videos contrasts with most educational resources. The number of authors and users is also dramatically more than the number of students or teachers at design universities (Findings page 111, indicating the online audience is in the millions). This has the potential to add creativity to design education. It is a resource that is being created by what has been described as a community of practice, a collection of people who share a craft and interests that could be virtually situated together as a group. But what is occurring here involves more than a collection of people who share a craft and interest, as they are many intersecting and overlapping interests and crafts where communities from different areas collate (social network analysis page 133). The processes are becoming less routine as a result of social interaction, and there are differences in digital design processes shared online. Rarely are there two processes that may fulfil the same objective in exactly the same way. There may be some communities focussed only on their own content. For example, there may be some communities that are graphic design focused, and that are only creating video or educational materials that relate to graphic design. But there are also different communities of practice working together online. For example, a 3D community members may interact with a video-editing community members, or perhaps even with a more specific area of design, such as interaction design.

The areas of design that interact with online video tutorial content encompass all design applications and disciplines. This thesis will focus on digital design and graphic design disciplines. The tutorial videos are being shared online, and these educational resources are being uploaded online free of charge in a video format that is considered a type of multimedia. When in video form, this content can record

and show things that are not as easily shown or described in text, as these videos involve using an application to record the screen, while the user engages in digital design processes.

There are crafts or hobbies (such as cooking and dancing) that appear to be as popular as DDTVs, and where online video content can be used to communicate complex processes more effectively than in earlier forms of media such as print. This content is also now more accessible. TV shows have existed that cater to cooking and dancing, because they are both visual ‗how to' activities. Design is also a visual activity, and it could be argued that it is even more diverse and complex. The major advantage of this content is that what is being produced by a large group of individuals is impacting on a practice from multiple and different perspectives and understandings relating to practical knowledge.

The advantage that digital design has over other crafts (like dancing or cooking), or hobbies that take advantage of the online video to communicate knowledge, is that everything is done on a computer. The design is conducted, recorded, uploaded, and viewed on a computer, and if it is reproduced or used as an educational aid, then that production is also conducted on a computer. That it is conducted on the same device is one of the main factors in the spread of this type of content online. This phenomenon has the potential to affect the content and delivery of design education and design culture online into the 21st century.

It is possible to access these videos from anywhere — from a phone while on the move, or in the workplace or classroom on a computer. This type of content can be accessed by any device that can access online video content. This phenomenon is only in its infancy, and has only come to life on new websites that have emerged online within the last nine years. Tutorial videos have exploded online in the last four or five years, perhaps due to changes in the capacity of the internet since the advent of Web 2.0. Video content has become ever more popular in recent years. More video content is being uploaded currently on a daily basis than ever before, and more news websites are now including videos along with their traditionally text-based stories.

There is also an indication that people involved in online media are attempting to make the media content they create richer and more meaningful to online audiences. Video is being used a lot more, and is becoming a more attractive medium to people. This has already had an impact on information delivery in the provision of education. As more members of society become accustomed to having their information presented in a particular way, educational materials delivered in other formats (traditionally print) may not engage participants in the same way.

In exploring these videos, there are rarely any harsh critiques or criticisms found online of any of the practices represented through the tutorial video content. The videos analysed in this study could have had problems with sound, editing or the actual explanation of the process. Nevertheless, the overall response to the videos was not particularly negative. The number of people viewing these videos individually is not many (sometimes only a few hundred or a thousand), but overall this study contains millions of unique viewers, and hundreds of thousands of different individuals interacting with each other and the video content via text. The principal elements associated with this type of content are the digital design applications. These are what are recorded and represented with video content, which comes down to what application is recorded, and what its limitations are.

The design process is another element. The process is what is literally recorded; it is the vital information that is required if the viewer wishes to recreate what has been represented in the video. Another element is the aesthetics associated with the video, the appearance or quality, tone of voice, and editing capabilities. This aspect affects the user‘s perception of tutorial videos. The principles of a computer and a binary device are very similar to those that govern what can and cannot be achieved in digital design. The principles affect what you can and cannot do on a computer, and they affect your ability to record the screen, recording and saving information while working in another application simultaneously, something that has recently become more achievable by a greater percentage of the population.

Video itself, and the way it functions as a form of media, and now as a form of digital media, is represented by multiple different file formats, and is viewable online on many websites. Video is the most important element associated with this study. It is a media that is progressive and changing as new technology effects and editing

techniques emerge. Video can now be uploaded and edited easily by most people with access to a computer, once it is in a digital format. If it is not in a digital format (analogue), then the video must be converted before it can be edited and uploaded using digital software. However, all the videos in this study are already in a digital format, and are represented online openly within websites where the content is completely free of charge. They are represented with either HTML5 or a flash player online, which is a type of video content that is accessible to most mobile devices and computer operating systems. The video content is not just uploaded on websites; it is tweeted, posted about, and appears in forums, educational briefs, message boards, on-line newspapers and sites, and mailing lists. Such content has and is being shared and embedded in multiple webpages by different users.

The approach in this study also takes into account many factors surrounding *online communities* and *new media* content, including the fact that most designers involved in this phenomenon are involved in a type of online *Community of Practice* (Wenger, 1998), and that watching tutorial video content could be regarded as a form of *legitimate peripheral participation* (Lave & Wenger, 1991; Wenger, White & Smith, 2009). With the intention of providing a thorough investigation, this thesis presents new approaches pertaining to an understanding of the social phenomenon involved in the propagation of tutorial and procedural videos in the design community online. These approaches stem from content-based social networking analysis (Velardi et al., 2008) and ethnographic content analysis (Altheide, 1996). This thesis is presented with the intention of investigating the attitudes that motivate an interest in tutorial and procedural videos, and account for the content‘s proliferation online. The investigation includes a relevant discussion of the application of tutorial content in design and design education. The questions identified in this thesis are situated in new experiences about learning and making digital content with computers. The thesis aims to add to the discussion about the progression and evolution of the practice of designing in digital applications, and of digital design education.

Online Video Content in Design Video Tutorials

One of the most important elements associated with this type of video content is the structure and ability of the video medium to record and process audio-visual material electronically. The binary nature of digital video (Spielmann, 2008), when recorded or imported to a computer, has to be considered in terms of what this

means for the *modularity* (Manovich, 2001, p. 30) and *automation* (Manovich, 2001, p. 32) of video content. Online tutorial videos may be perceived as making visual transformations through the use of various automated digital processes incorporated in the recording or editing of video. This can also help to position tutorial videos as a form of new media, one that does not operate in the same way as traditional video content, since the target of the recording is a computer screen.

Video contains crucial visual components, making visual aesthetics another important factor in tutorial video. This involves breaking down the dichotomy between words and images in video content without disregarding the audio component, often a disembodied voice as ‚voice over' directing the viewer how to proceed with various design processes. Another component in video includes the desire for immediacy through visual or audio representation, and any perceived aesthetic value towards adaptive or transformable editing techniques in the video content.

Tutorial videos are essentially video content that exists on the internet within the context of a computer, which is a binary device that operates through a screen, using an operating system and a graphic user interface. As such, the ‚principles' of new media (Manovich, 2001) can be applied to the creation/production of digital content, and of the video content with which this study is concerned. The screen, the device in which the content is viewed, should also be studied with regard to the effects when looking into and interacting with it while viewing tutorial and procedural videos. Another element associated with contemporary online video content in general is the media conventions of older media forms that involve video (such as television and film), which are considered a precursor to contemporary video (Bolter & Grusin, 2000). The origin of videos is film and TV, and this origin is an influence that should be taken into account. So too should the rivalry between old and new media in *hypermedia* (Bolter & Grusin, 2000) if this is evident in the presentation of online video content. Hypermedia is understood by some (Bolter & Grusin, 2000) to be simply the remediation of older media within a webpage. However, the content in question offers a unique twist, as it is often a recording of a computer application, and is aesthetically different from most forms of video.

Something that should also be taken into account is the distribution of, and access to, tutorial video content over the internet. This should occur whether this is through databases and networks of connected websites, or through online interactions between users, communities, and organisations. This is because of its role in the use of DDTVs, and its perceived differences compared to previous forms of information distribution. The variety of methods used to access web videos could be seen as one of the ways in which the global online environment differs from traditional media (broadcasting) access and distribution. What global networks and the variety of online information offer contemporary internet users should also be considered an important factor in the access of tutorial videos. It is important, as well, to review the technical elements, former conventions, and online environment involved in the use of technology, or the practice of creating a tutorial video on a computer and distributing it via the internet. Participation with online videos also creates new social formations, making it necessary to understand the nature of the communities involved once the video is distributed or published. Participation in online networks becomes social, as many of the websites that involve the publishing of video content also involve social networking, text-based communication and avatars.

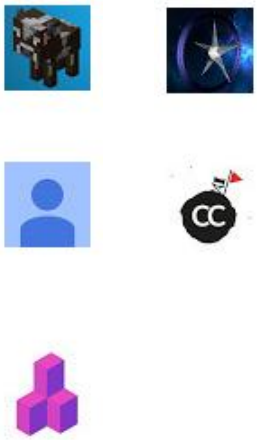

Figure 4: Image showing Avatar on popular social networking site; includes the site involved in this study: Youtube.com

Social Interaction Online

The method of access attempted by the user, as well as the methods of distribution attempted by the creator of the tutorial video content, should be decoded with regard to how they could affect representations of this content. The notion of *telepresence* is one that can be considered. A geographically distributed audience

viewing representations that are themselves geographically distributed is a phenomenon that may occur. —With the rise of the Web, telepresence, which until recently was restricted to a few specialized industrial and military applications, has become a more familiar experience" (Manovich, 2001, p. 164). But telepresence is not actually a practice involved in all tutorial video; telepresence refers to technologies used to give a person the appearance, or feeling, of being in a different place.

Viewing tutorial videos has become a familiar experience for many people around the world, one that does not only allow the audience to view and explore a range of similar content (through the use of algorithms), but also to leave text-based responses in most instances. Manovich (2001, p. 162) writes: —Such new twentieth-century cultural forms as radio and, later, television emerge at the intersections of these two trajectories. In this meeting, the technologies of real-time communication became subordinated to the technologies of representation." However, when viewing online video, the video is presumed to be the dominant representation, not the text-based description, or the text-based communication that is actively sharing the same visual space.

This is not to say that communication cannot have a role in the representations that are present when viewing online videos. When a user becomes actively engaged in a discussion or argument surrounding the video content, that activity could be regarded as an influential representation if it is visible to other users.

> —But in fact, the ability to 'teleport' instantly from one server to another, to be able to explore a multitude of documents located on computers around the world, all from one location, is much more important than being able to perform physical actions in one remote location" (Manovich, 2001, p. 165).

This concept of being able to access a multitude of documents (in this instance web video) is historically of great importance.

The ability of the user to act must not be discounted, as a user can at any time pause and rewind most online videos in order to go back and listen again to details for improved or further comprehension. When it comes to video sharing, such action becomes more social, as users can 'favourite' and 'like' a video, and accordingly

have those seen amongst their friends online through algorithms and user ‗profiles'. ―Telepresence can be thought of as one example of representational technologies used to enable action, that is, to allow the viewer to manipulate reality through representations" (Manovich, 2001, p. 165). A user can act to manipulate the online world through the creation of representations such as playlists, groups, categories and tags that are attached to the tutorial video content as it is viewed, or as a means of access to the video itself.

According to Manovich (2001), the ‗World Wide Web' resembles an incredibly large database. However other definitions differ slightly, the Cambridge definition (Cambridge, 2016. 4 may 2017) states that the ‗World Wide Web' is a system of connect documents on the internet, including pictures, video, sound and information, making the ‗World Wide Web' more like a visual database with popular algorithms allowing you to search though the incredibly large amount of information. A database is what participants are involved with in their use of tutorial video when exploring and viewing video content to a certain extent. According to previous principles of new media, how they are navigated and structured can vary greatly. ―After the novel, and subsequently cinema, privileged narrative as the key form of cultural expression of the modern age, the computer age introduces its correlate — the database" (Manovich, 2001, p. 128). Many websites make up a ‗database' of online video content. This is in a sense a technological environment in which users create their own content and upload it to an appropriate platform, which could also be referred to as the creation of ‗user-generated content'.

When websites are accessed, various elements are drawn from various databases and areas based on who the user is and where they live. (The level of detail involved in this depends on the specific website.) This is achieved through the use of algorithms that target the user. Accordingly, ―The elements that make the page the user encounters are not stored in one place and may never show their face again. Even when the page is recalled from an archive, much of it will have changed" (Fagerjord, 2003, Chapter 11, p. 321). However, the content that is indexed and found by a search engine should remain the same and as relevant as the last time it was viewed, because this content (which is text based) is required to be on the page to be found by a search engine.

Databases and the internet at large previously contained only text and downloadable files, but "In the late 1990s, major news sites on the World Wide Web started to incorporate streaming audio and video alongside text and pictures. The result has been a new news medium to which tens (if not hundreds) of millions of people turn every day" (Fagerjord, 2003, Chapter 11, p. 293). The situation is arguably similar for digital designers who have turned to video alongside text and pictures when accessing design-related content online. In the process of accessing this content, users may interact with each other socially. This social interaction can be varied, operating on different types of technological platforms such as social networks, forms and content-sharing websites.

Certain authors (Blanchard & Markus, 2007; Wenger, White & Smith, 2009) believe that particular variables and social processes involved in online communities are in some ways dictated by the technological features or tools evident in the online environment. Blanchard & Markus (2007) state that there are two largely disjointed bodies of scholarship when it comes to online communities: "communities" literature and "environments" literature. They define "communities" literature as work that is concerned with social processes, and "environments" literature as work that is concerned with the technical environments in which these social processes exist. However, they maintain that the current "communities" literature does not discuss aspects of technology adequately, and that researchers should pay more attention to the technological issues in order to improve theory development and enhance knowledge.

Blanchard & Markus (2007) make reference to Herring (2004), Kiesler, Siegel & Mcgyure (1984) and to Short, Williams & Christie (1976) to identify a growing body of empirical evidence suggesting that communication via media has an effect on human communication. Using a rudimentary analytic framework that links social processes and technical features, Blanchard & Markus (2007) conducted a review of 20 recent studies in the area of technology and communication. They concluded that human communication behaviour online is influenced by differences in the technological environment. They state that predictable variations in human communication behaviour can be attributed to a human adaptation to the technical design features or tools within online environments, and that within the 20 studies,

there are 13 separate instances where technical characteristics have produced variations that seem to involve human adaptation.

Conducting an exploratory investigation into the behaviour in four communities similar in audience and interests, but vastly different in technical features, Blanchard & Markus (2007) aimed to determine whether technological features may promote or hinder the formation of online communities, noting that it was important to have an array of different technical features to compare between communities. In the process of determining and examining these features, each feature was observed for frequency and use. These features were also categorised into three areas: identity cues; status and control tools; and attention, availability and response indications. They concluded that technological features were plausibly related to how participants identified themselves and communicated with each other, and that the behavioural differences exhibited were consistent with the differences in technological features.

However, these communities were not examined from conception, and accordingly the behaviour cannot be completely verified as a gradual adaptation to the technology or social norms around its use. This may be due to the possibility that the websites had undergone a massive structural change. The number of sites viewed was only four — a limited number. It is possible that there are more websites and communities online with similar audiences, interests and technical features, which could offer a comparison. These sites might also contain vastly different technical features or tools, and operate in different countries than those communities studied by Blanchard & Markus (2007).

With reference to Preece & Maloney-Krichmar (2003), Blanchard & Markus, (2007) state that online environments are understood in terms of distinct ‗types', and that reasonable technical design differences exist within each. In addition to this, there are noticeable differences between online environments, such as Blanchard, Ducheneaut & Bellotti (2003) and Hewitt (2001). Furthermore, communities may consist of several different ‗types' of technology. As noted by Blanchard & Markus (2007), the same community can operate over email, newsgroup, and blog in combination or by themselves; therefore the possibility exists that members could be contacting each other within the community by other unobservable means.

Alternatively, Wenger et al. (2009, p. 60) map technological tools or features across a diagram, displaying asynchronous and synchronous technological environments horizontally, and the concepts *participation* (Wenger, 1999, p. 55*)* and *reification* (Wenger, 1999, p. 57) vertically. Participation is defined as, taking part in something with another, to share an activity, enterprise, or process. Reification is defined as, the perceived meaning that forms an idea, object or activity, and our perception or the representation of meaning not a concrete material object. These two concepts are involved in the learning theory of communities of practice (Wenger, 1999). The edges of the diagram represent individual activities, while the centre shows group activities.

Below is a diagram adapted from Wenger et al.‘s (2009 p. 60) diagram of the asynchronous and synchronous technological and community of practice concepts participation and reification. The adapted parts include the addition of ‗online video‘ as a technical feature, and all the technological features present in the environment‘s procedural and tutorial videos are highlighted.

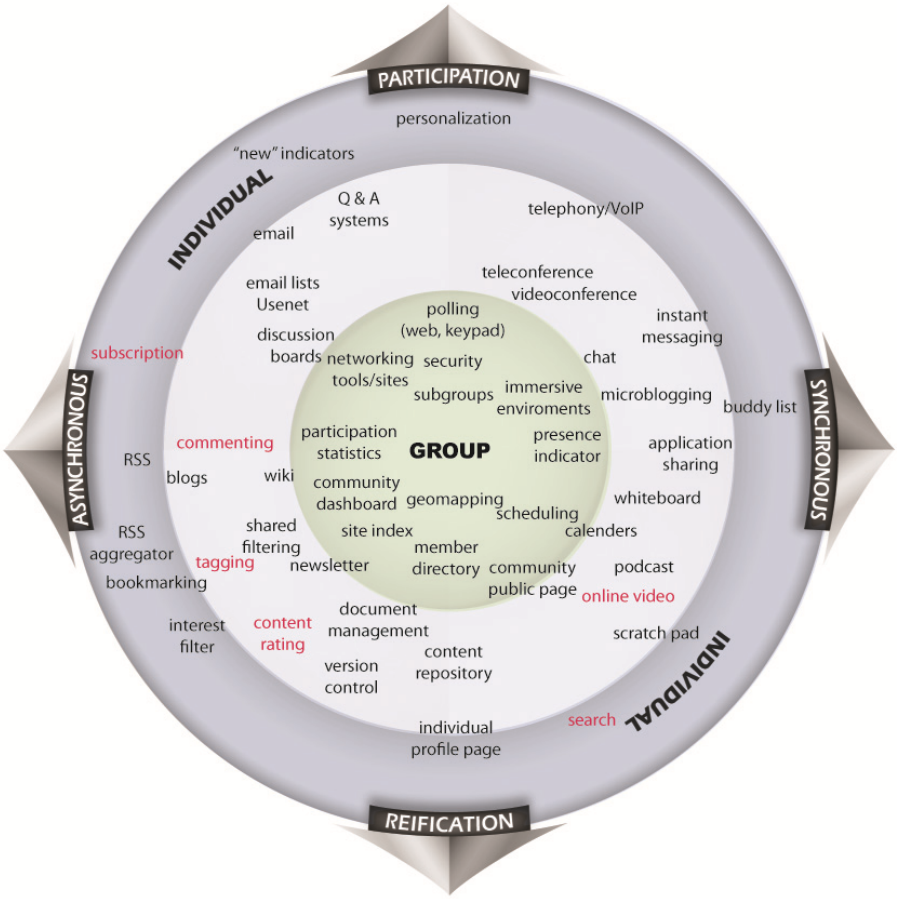

Figure 5: An image representing technological features, adapted from Wenger, White & Smith (2009).

The studies cited in the paper by Blanchard & Markus (2007) are mostly concerned with psychological research regarding social processes within online environments, and computer science and information systems studies into online environments. Although Blanchard & Markus (2007) regard social learning theory (the view that people can learn by observing others) as important, they only briefly mention social learning, which is a process that could be active within the knowledge-sharing process they observed. Likewise they did not pay much attention to the process of creating an online identity and adjusting to the communities' norms.

However, other research has been conducted by Blanchard, (2007) that does relate to social learning and adjusting to and feeling a sense of a virtual community, and forming an online identity. The relationship between forming an identify, adjusting to the communities norms. In this research Blanchard (2007, p.4) states that, "Indeed, as members more closely adhere to the norms of the community, their bond to the community increases. Thus, development and adherence to norms closely precede SOC [sense of community] in FtF [face to face] communities. We suggest that they will similarly lead to SOVC [sense of virtual community] in virtual communities." (Blanchard, 2007, p.4) This indicates that an individual's ability to adjust to the norms of the community, which in this instance could include technical language related to design software, there connection with that community increases for both design communities at universities and online.

Social learning often can involve informal learning and learning outside of what can be considered a typical academic environment. This is also the case when learning digital design processes and techniques online with DDTVs, as it occurs outside of an academic environment in many instances. Siemens (2005, p.1) states that "Informal learning is a significant aspect of our learning experience. Formal education no longer comprises the majority of our learning. Learning now occurs in a variety of ways — through communities of practice, personal networks, and through completion of work-related tasks." This is thought to be the case for DDTVs, accessed though technological networks where virtual communities of practice are able to interact online. However, social learning and informal learning can often involve a cycle, and in some instances this could be triggered by a 'work-related task' or a design project or problem. The occurrence of the project or task may

require the learner (designer or design student) to search and interact with a virtual community of practice for advice or guidance regarding a process or activity. This process or activity would be perceived as a solution of the project or task by and learner and would be used to potential generate a new digital design practice for said designer. Engeström (2011) views learning as a cycle that involves the consolidation and generalization of new practices. This often involves informal learning like the kinds of activities and practices that are uploaded and discussed on virtual communities for digital design.

Blanchard & Markus (2007) note that many of the studies reviewed relied on common ground theory with reference to Clank (1996), or on the diminished or reduced social cues theory with reference to Kiesler, et al. (1984). However, Blanchard and Markus (2007, p. 4) state that —No single theory or framework that we are aware of accommodates both the range of social and psychological processes observed in virtual communities and the range of technological aspects of online community environments". This statement suggests that further theoretical development is required with regard to online community environments. As indicated in the study by Blanchard & Markus (2007), their framework would involve the concepts of social processes and technological features. Incorporating both the —environment" and —communities" literature together, they suggest that environmental or ecological psychology approaches would be suited to explore this. Siemens (2005), presents „connectivism' as a theory for the detail age in an attempt to resolve this while discussing three broad learning theories „Behaviorism', „cognitivism', „constructivism'. This is presented in resolve to digitisation of information and an increasingly connected online world. The spread of information online over the World Wide Web (internet accessed though a web browser) is becoming a vast dissemination of knowledge by a large range of different groups, from different disciplines, sharing information and practice openly online. —Communities of practice reply on situated theories of knowledge, i.e., the idea that knowledge is a property enacted by groups of people over time in shared practices, rather than the idea that knowledge is a cognitive residue in the head of an individual learner." (Hoadley, 2012, p.298) The concept of situated knowledge and social learning mixes well with the way knowledge is spread online, and the creation of platforms to share information, video content and practices with a larger audience. This information is accessed in a ubiquitous fashion, available on any

computer, tablet or modern Smartphone. This allows social learning to occur in settings that formal education may not occur, however this is not uncommon with research related to virtual communities of practice, as researchers interested in virtual communities —focus not upon formal educational settings but on the ways in which learning is part of all social practice and not confined to formal settings. (Lea & Nicoll, 2002, p.10)

However, a framework that involves social learning theory — specifically the communities of practice (Wenger, 1999) theory — as well as a concept of technological features, could take more variables into account. Social learning is considered by Blanchard & Markus (2007), but only mentioned as a variable once. There is little reference to the concept of communities of practice (Lave & Wenger, 1991), despite its relevance in social learning online. Blanchard & Markus (2007) regard the concept of technological features as more effective in analysing the environmental context, because of its ability to take into account the environmental factors. Nevertheless, Blanchard & Markus (2007) note some behavioural adaptation in communities to features present in the technology they use. This presents the possibility that other communities operating with different technologies, such as online video, may also be adapting their behaviours based on the technological features present in those technological environments.

Lange (2011) states that certain binaries have dominated scholarly approaches towards digital video and online video. Lange investigates two separate binaries, one dealing with videos made by professionals versus amateurs, and the other using images for memory preservation, versus sharing experiences and negotiating identities. In a case study, Lange (2011) draws on a two-year ethnographic project that contained more than 150 interviews, analysis of hundreds of videos, and the examination of posted text comments. This project, entitled „The ethnographic YouTube project‘, was informed by a larger diversified study called „Digital Media: An Ethnographic Investigation of Innovative Knowledge Cultures‘ (Ito et al., 2010).

In this case study, Lange (2011) advocates a model that acknowledges fluidity between amateurs and professionals, and that young amateurs can train to become professionals. Lange (2011) states that scholarship regarding the „professional versus amateur‘ binary assumes that professional videos are better in quality than

amateur videos. In referencing the work of Sherman (2008), Lange maintains that the latter asserts that ‗user-created' or ‗amateur' videos lack an aesthetic ‗defined as an internal logic or set of rules for making art'.

Lange (2011) responds to this with an ethnographic analysis of a group of video makers, analysing two videos for the combination of aesthetic choices and possible nostalgia. In addition, Lange (2011) interviews the group that produced the videos, and analyses other users' comments associated with them. In this analysis, Lange (2011) observes a style of film-making or design that involved a conscious reflection on their individual and collective pasts, with a ritualistic footage-watching process involving footage of their own childhoods. They admitted that their production combined a mix of professional and amateur video design. In conclusion, Lange (2011) criticises the assertion that amateur videos lack certain aesthetics, suggesting that aesthetic judgments are determined by certain cultural groups or individuals. Lange notes that identity negotiations about technical competence are undertaken by the group studied through a process of combining the aesthetics of video-making standards and specialised or local aesthetics, which are artistically valuable in their own right (Lange 2011).

However, in this case study, only two videos and one group were analysed. There are other similar groups that could be studied, and their use of video production methods and the resulting aesthetics may differ from this one. It was also noted that the use of nostalgia was present in the videos studied, which are prevalent on YouTube. Furthermore, from whence originated what Lange (2011) referred to as the ‗normative video making standards' and ‗local sets of knowledge' that produced specialised and nostalgic aesthetics? The education or social learning that may be involved in designing videos of this nature needs to be explored in more detail. Lange (2011) investigates the nature of online amateur video and the aesthetics of online video content, but ignores the question of the use of video content for more communicational purposes.

As Blanchard & Markus (2007) assert, human communication online is influenced by differences in technological environment. Taking this into consideration, we could make the assumption that a technological difference that allows for communication with video could lead to behaviours different or adaptive from those existing with the

current text-based online communication seen in web forms. Adami (2009) explores a technical communication feature implemented on the YouTube website in 2006: the ‗video response'. This feature or tool involves communication ‗threads' started by a single video and built upon by responses. This is similar to the structure of some web forums that are composed of ‗topics' or ‗threads', but in this case the responses are via video as opposed to text. It is suggested that most of the ‗video responses' that occur are in response to a video that requests them, and that theoretically (with reference to Benevenuto et al., 2008), the study of video responses have so far only been analysed quantitatively (Adami 2009). Video responses are, however, not as common in tutorial videos, and may on occasion be used to promote work, as well as not being used as frequently as other video producers (for example, Vlogs).

Adami's (2009) study consists of a social semiotic multimedia analysis of the initial video, and looks at how the responses related to the initial video, and how the video summary transformed the responses in terms of meaning. The analysis is driven by a heuristic assumption that focuses on exploring the notion of ‗interest', which is driven by the prompt in the initial video, and is given as a response (Adami 2009).

This ‗interest-driven prompt-response', being the ‗videothread' in question, and its video response and video summary components, comprised a total of 837 total responses. There were 792 responses to the initial video, and various other ‗sub responses' and responses to the follow-up, ‗video summary'. Out of the total responses, nine were duplicated, one was removed, 14 were private, 37 were not related to the initial videos topic, and 38 videos provided a ‗fake' or ‗joke' response (Adami 2009).

Adami (2009) observed that many users exploited the ambiguity of the initial videos topic, providing a multitude of different types of responses. Most video responses stayed in line with the topic; however, on finer analysis, Adami (2009) found that each video was composed of unique sound, editing, effects, and aesthetic components. Adami (2009) went on to suggest that the video summary makes new meaning out of the prompts given by the responses, and that many videos do more than respond to the prompt in the initial video, differentiating themselves from each other.

Adami (2009) concludes that the primary interaction occurs between each respondent and the initial video producer. While other interactions are also occurring between respondents in response to the initial video, they are all explicitly referring to each other. Stating that the analysis has shown early stages of video interaction work through the participants‘ interest-driven exploitation of the prompts offered by the initial video (Adami 2009), this could be interpreted as an adaptive behaviour occurring in response to either the video response technology or the initial video specifically. Nevertheless, it was concluded that the social structure generated by this was regarded as —a system of attuned-and-differentiated responses stemming from a given prompt or theme” (Adami 2009 p. 394).

However, keeping in mind that Adami (2009) asserts that most of the popular video interactions ask for responses, it could be assumed that most ‗video response threads‘ are similar in structural nature. A larger study into a range of video response topics would be required to ascertain this. Furthermore, how often sign-making patterns occur within videos and video responses must be ascertained before the notion of an interest-driven prompt response could be deemed appropriate for more videos. Despite this, what is significant about Adami‘s study (2009) is that, for the first time, it explores the role of communication between users with video content. This type of video communication is different from others, as each video is uploaded publicly and can be re-watched by others. This means that each aspect of the communication is shared publicly by audio-visual means.

Blanchard & Markus (2007), Adami (2009) and Lange (2011) all indicate that the technical environments and technical tools available shape the ability and ways a community communicates online. This suggests that if different mediums (in this instance, video) and technologies are used in combination in future environments, then ultimately the possibility for new forms of online communication and engagement between online communities exists.

Nevertheless, research in the area of online communities that practise and generate video content is an emerging area. Mizuko Ito et al. (2010) engaged in what was essentially an exploratory ethnographic inquiry. This was undertaken in an attempt to identify landmarks and boundaries that define the area of youth interest-driven practice in new media.

The studies outlined by Mizuko Ito et al. (2010) are relevant to the proposed research area, as they are concerned with creative production and communities that engage with video content online. Two of the most relevant studies, *Broadcast Yourself: Self-Production through Online video-sharing on YouTube* by Sonja Baumer, and *Thanks for Watching: A Study of video-sharing practices on YouTube* by Patricia G. Lange were classified as networked sites; however, to an extent, they were interest-driven.

Ito et al. (2010) note that interest-driven participation happens in more distributed networks that contain specialised knowledge. These networks would be similar to those that contain tutorial video content, the main difference being that the interest would be digital design oriented. Individuals deemed media creators would often reach out to online networks to customise learning practices; Mizuko Ito et al. (2010) stated that they did this, while downplaying formal education. These media creators were also observed experimenting with genres that make use of editing capabilities in digital media. Mizuko Ito et al. (2010) indicate that online communities are often organised by a different means than the model put forth by a standardised curriculum.

In conclusion, Mizuko Ito et al. (2010) assert that participation in networked websites like YouTube suggests that education is the responsibility of a more distributed network of people and institutions. A study within the contemporary design community that explores networked participation between professional designers and design students could indicate something similar.

Online Communities

Some online interactions between users and producers who create digital content using shared accessible resources could be viewed as social learning through communities engaging online. This occurrence within the online design community involves the production and distribution of online videos, and could be regarded as a practice involved in what Wenger et al. describe as a *community of practice* (Wenger, 1999). This virtual online design community includes designers who share a *joint enterprise* (the creation and distribution of videos that benefit other members of the design community) (Wenger, 1999, p. 77). Thus they are *mutually engaged* (Wenger, 1999, p. 73) in instructive and constructive communication online.

Once thousands of different designers have uploaded millions of different video tutorials, this global distribution of tutorial videos becomes a *shared repertoire* (Wenger, 1999, p. 82) of videos when distributed and shared through networks, forums, and other websites online. This indicates that design communities of practice exist online, and furthermore that they are producing a shared repertoire available to the broader design community. The practice of designing digital content is also central to this study, as the videos involved are typically described as design tutorials, and represent a recording of a CAD application in which the author often explains and visually records a design process.

However, it is undetermined if the virtual community formation results in the creation of a shared repertoire or if the availability of the shared repertoire allows the virtual community to form for DDTVs. Communities however may become attached to the shared resources and the practices and activities within them, if they find them to be of assistance when learning design, or in the practice as a designer. ~~–~~The routines and practices that this CofP converges on might primarily be positive and constructive. You can imagine that such a CofP would be sustained over time because this mutual engagement is so useful to the members‘ emotional and practical needs.” (Meyerhoff, 2013, p.2) Digital designers involved in an online community may respond positively to DDTVs because of their suitability for helping designers with the practical needs in learning digital design processes and practices.

The ability of designers to now join virtual communities of practice and mutual engage in learning digital design practice could be very helpful to designers who want to continually learn and improve their design practices, and design students who are learning digital design. ~~–~~VLCs [Virtual Learn Communities] can be used to augment and enhance the reach and impact of any type of learning community previously discussed in this volume (that is, curriculum based, classroom based, residential based, or student based).” (Blanchard & Cook, 2012, p. 89) this could certainly be the case for design students, who are sampled in this thesis. To a certain extent, there may be multiple different communities of practice interacting with the same shared resources online. Originating from different universities or different groups that are studding digital design in a curriculum based environment.

It may well be the case that digital design virtual community on YouTube are forming with some influence from communities of practice within other environments realted to learning digital design. Waldron (2012, p.94) states that, —Although YouTube is itself an example of a global community of participatory culture, digital videos from the site also serve important participatory functions in online music communities like the Banjo Hangout.", this is also the case for online design communities. Students studying design, and designer who are engaged in learning digital design online, are joining communities, and groups online though forums where they are able to embed video content (place it within the forum) from video hosting platforms.

Websites like YouTube (www.youtube.com) and Vimeo (www.vimeo.com) should be seen as platforms that contain members of online communities and a range of related and interconnected content, while acting as media companies distributing various types of online videos. Despite this, YouTube, and to some extent Vimeo, contain significant amounts of online video content, but are not websites that produce video. ―YouTube is a platform for, and an aggregator of, content, but it is not a content producer itself" (Burgess & Green, 2009, p. 4). These websites act as a platform for online video sharing and circulation. This platform works with a business model that generates money, mostly from advertising.

> ―YouTube is not actually in the video business — its business, rather, is the provision of a convenient and usable platform for online video sharing: users (some of them premium content partners) supply the content, which in turn brings new participants and new audiences" (Burgess & Green, 2009, p. 4).

YouTube and Vimeo are platforms, and have multiple technical roles. As Burgess & Green (2009) note, ―[they have] multiple roles as a high-volume website, a broadcast platform, a media archive, and a social network" (Burgess & Green, 2009, p. 5). Vimeo and many other video-sharing websites have emerged following the instigation of YouTube, and are observed sharing a noticeable similarity to YouTube in their ability to make videos embeddable in other WebPages. However, Vimeo, like many other different online video platforms, differs in its business model. Vimeo is aimed at ‗creatives' (art, design, film audiences), supports HD in full resolution, and

comprises free and paid accounts. ‗Vimeo Plus' is aimed at designers/filmmakers, and the ‗Vimeo PRO' account is aimed at creative businesses. However, like YouTube, Vimeo contains a mix of ‗professional' and ‗amateur' user-generated content.

To an extent, tutorial videos could be deemed user-generated content, as the content is usually created by designers and watched by designers. When writing about user-generated content, Burgess & Green (2009) make reference to participatory culture. A participatory culture is one where consumers actively participate in the creation and circulation of new video content (Jenkins, 2006):

> —Participatory culture is a term that is often used to talk about the apparent link between more accessible digital technologies, user-created content, and some kind of shift in the power relations between media industries and their consumers" (Burgess & Green, 2009, p. 10).

Participatory activity and a participatory culture are assumed to be at work within websites like YouTube and Vimeo, where it is also supposed that members of communities are at work influencing each other. This aspect of digital culture is of great significance for digital design culture, as well as for the study of this phenomenon, as participatory culture could be a motivating factor for the proliferation of this content online.

Platforms such as YouTube that come with a media archive, broadcast platform and social network all wrapped into one are an example of new media and the remediation of older media. To some, —Youtube represents not so much the collision as the co-evolution and uneasy co-existence of ‗old' and ‗new' media industries, forms, and practices" (Burgess & Green, 2009, p. 14). Tutorial video content is active on Youtube, as well as on other similar websites like Vimeo, and could be seen as an aspect involved in the collision of ‗old' and ‗new' media. However, as Burgess & Green (2009) state, it is more of a co-existence between ‗old' and ‗new' within hypermedia.

Tutorial videos or DDTVs are a form of audio-visual new media affected by many different elements. The extent of the influence of preceding medias on video's own audio-visual appearance is worth acknowledging and should be noted, as should

the ability of computer-aided design software to edit and design video with increasing complexity and possibility. But arguably, the online environment in which video is presented, and the community that surrounds the generation, review, critique, and creation of tutorial video content, are of equal importance in the facilitation and spread of the content.

Conclusion

This literature review has introduced the most significant and relevant literature available and known to the researcher. Different areas of research have been addressed in separate sections of this chapter. The reasons for these sectional divisions are as follows: ‗Video the Medium' is included because of what video as a medium adds to the representation of information, the context it gives and the linear pattern it displays of activity over time. ‗Audio-visual Aesthetics and Perceptions' is present due to the unique aesthetic values added with audio-visual media. The aesthetic combination of moving image and sound should at least be noted for its relevance. ‗Preceding Audio and Visual Media', is covered because of the effects of preceding media in terms of influence on similar or remediated media, and its influence due to similarities in displaying information. ‗Video and its Technological Environment' is dealt with because of the effect the environment has on the media and content within it, the users interacting with it, and the predetermined potential within the system. The section ‗Video Distribution Websites' is included because of these websites' role in the propagation of information online, and the differences when compared to other mediums in the way information is ubiquitously shared. ‗Design Video Tutorials' are covered because they constitute the content central to this thesis, and form the tutorial or procedural content of the online phenomenon being studied. The ‗Social Interaction Online' section is here because it is what is different about this content (DDTVs) compared with others not online. This content is open for social interaction and public criticism online, among other things, unlike other tutorial videos and DVD's that are sold and produced by various companies. ‗Online Communities' are also addressed because of the ways in which communities form and share information around content online. In this thesis, the ways in which they as a community employ videos as a resource is considered a positive aspect of their use.

The research cited in this literature review tends to be indirectly rather than directly related to this study, as no studies on this type of content (DDTVs) or the associated community have been conducted before. The material included here is thus related to this study because of the medium involved (Video), or often because of the technological environment being studied (in this case, the internet). In most instances the research is related because it involves studying something similar, or a group of people who are interacting in a way that is perceived as similar (online communication). Much of the research cited in this review focuses on the medium or the media involved. This is partly due to the fact that this project involves research into the emergence of a type of new media that has not been studied before. It was deemed important to contextualise this study by presenting research about preceding forms of media, and how they relate to the changes being seen in new media and in new information-sharing practices.

CHAPTER 3
METHODOLOGY

In the literature review section, I framed DDTVs around research conducted in related areas. Some of this research makes reference to communities of practice and the concept of situated learning. In addition, the concept of communities of practice has also been used when describing educational interactions between groups of designers in the real world, and interactions between individuals involved in interest-based online activities. As such, through the lens of communities of practice, it is argued that video content can be used by virtual communities of practice. In this chapter I explore the relevant worldviews, the chosen theoretical lens, and the concepts involved in the selected theory and methods, in order to provide an explanation of the methodology of this study.

Worldview

This structure of this study stems from the adaptation by Creswell & Plano Clark, (2011, pp.39) of Crotty's four elements (1998, pp.4). This is done because it is believed that the broader philosophical assumptions act as worldviews, and will ultimately inform impact and shape the theory, methodology and methods involved in the study. Methodology is a —a particular social scientific discourse (a way of acting, thinking, and speaking) that occupies a middle ground between discussions of method (procedures, techniques) and discussions of issues in the philosophy of social science" (Schwandt, 2007, p.193). This philosophy, or philosophical assumptions, exist as worldviews and inform theories that shape how we formulate research and seek information. They are also important to recognise as they are deeply rooted in training and reinforced in the scholarly community (Creswell, 2012b).

For that reason, the chosen worldview is considered first, followed by the theoretical lens, the methodological approach, and finally, in the following chapter, the methods. All are outlined in sequence as indicated in the pyramid diagram below, which is an adaptation of Creswell & Plano Clark's adapted diagram of Crotty's four elements. The diagram indicates how the philosophical assumptions involved in the

study impact on it, and how the methodology and method chapters are structured to follow (from the top down).

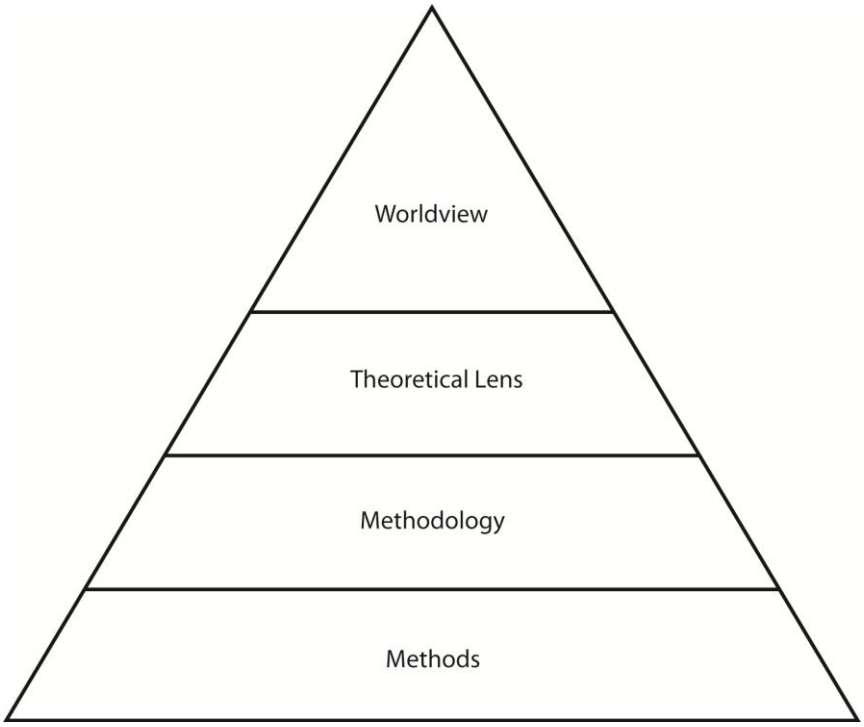

Figure 6: Pyramid diagram adapted from Creswell & Plano Clarks (2011) adapted diagram of Crotty's four elements. (1998)

Creswell (2012a, p.537) states that ―Worldviews are the broad philosophical assumptions researchers use when they conduct studies". Indeed the chosen worldview in a study may inform the use of a theoretical lens and methodology involved in the study, with the broad philosophical assumptions it brings with it. These broad assumptions, such as the epistemology, ontology and axiology, are regarded as important elements involved in different worldviews. Worldviews can be differentiated by these different philosophical assumptions, and by other elements such as rhetoric and the accommodation and commensurability (accommodating multiple types of inquiry [Guba & Lincoln 2005]) of each worldview.

The exploration of relevant worldviews is justified because of the relevance of studies and concepts in associated research, concepts such as social constructivism, postmodernism and social constructionism, which share similarities.

The following table compares the fundamental differences between two worldviews — postmodernism and constructivism. These worldviews have been identified as relevant because of their prior use in similar research (Lave & Wenger, 1991), and

because of the nature of this study. It must be noted that this table is an adapted version of both the Creswell and Plano Clark (2011, p. 42) and the Lincoln, Lynham and Guba (2011, p.102) tables, compiling both tables. The latter is an update of a previous table comparing worldviews presented in Guba and Lincoln (2005, p.194), in which the descriptions regarding postmodernism are taken from Heron & Reason (1997). The following table contains areas of philosophical study related to the potential epistemological position taken in this thesis, social constructivism and postmodernism.

Table 2: A summary of the relevant characteristics for possible worldviews in this study.

	Postmodern (Participatory)	**Constructivism** (Interpretivist)
Ontology (What is the nature of reality? (Creswell & Plano Clark, 2011, p. 42)) —The study of reality, of being, of the real nature of whatever is, of first principles." (Schwandt, 2007, p. 190)	Political reality (Creswell & Plano Clark, 2011, p. 42) —Participative reality: subjective-objective reality, co-created by mind and the surrounding cosmos" (Guba & Lincoln, 2005 p.195).	Multiple realities (Creswell & Plano Clark, 2011, p. 42) —Relativism: local and specific co-constructed realities" (Guba & Lincoln, 2005 p.195). —We construct knowledge through our lived experiences and through our interactions with other members of society. As such, as researchers, we must participate in the research process with our subjects to ensure we are producing knowledge that is reflective of their reality" (Lincoln, Lynham & Guba 2011, p. 103).
Epistemology (What is the relationship between the researcher and what is being researched? (Creswell & Plano Clark, 2011, p. 42) —The study of the nature of knowledge and justification" (Schwandt, 2007, p. 87).	Collaboration (Creswell & Plano Clark, 2011, p. 42) —Critical subjectivity in participatory transactions with cosmos; extended epistemology of experiential, propositional, and practical knowing; co-created findings" (Guba & Lincoln, 2005 p.195).	Closeness (Creswell & Plano Clark, 2011, p. 42) —Transactional/subjectivist; co-created findings" (Guba & Lincoln, 2005 p.195). —We are shaped by our lived experiences, and these will always come out in the knowledge we generate as researchers and in the data generated by our subjects" (Lincoln, Lynham & Guba 2011, p. 104).
Axiology (What is the role of values? (Creswell & Plano Clark, 2011, p. 42)	Negotiated (Creswell & Plano Clark, 2011, p. 42) —Practical knowing about how to flourish with a balance of autonomy, cooperation, and hierarchy in a culture is an end in itself, is intrinsically valuable" (Guba & Lincoln, 2005 p.198). —What is the purpose for which we	Biased (Creswell & Plano Clark, 2011, p. 42) —Propositional, transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable" (Guba & Lincoln, 2005 p.198). —Emancipatory, but longer term, more reflective versus critical theory's

	create reality? To change the world or participation implies engagement, which implies responsibility" (Lincoln, Lynham & Guba 2011, p. 112).	desire for immediate results. _Intellectual digestion'" (Lincoln, Lynham & Guba 2011, p. 112).
Methodology (What is the process of research? (Creswell & Plano Clark, 2011, p. 42) —A Theory of how inquiry should proceed" (Schwandt, 2007, p. 193).	Participatory (Creswell & Plano Clark, 2011, pp. 42) —Political participation in collaborative action inquiry, primacy of the practical; use of language grounded in shared experiential context" (Guba & Lincoln, 2005 p.195). —Experiential knowing is through face-to-face learning, learning new knowledge through the application of the knowledge" (Lincoln, Lynham & Guba 2011, p. 105).	Inductive (Creswell & Plano Clark, 2011, p. 42) —Hermeneutical/dialectical" (Guba & Lincoln, 2005 pp.195) —Hermeneutic Cycle: Actions lead to collection of data, which leads to interpretation of data which spurs action based on data (Class notes, 2008)" (Lincoln, Lynham & Guba 2011, p. 105).
Rhetoric (What is the language of research? (Creswell & Plano Clark, 2011, p. 42) —Rhetoric is the art or technique of persuasion, especially through language" (Schwandt, 2007, p. 267).	Advocacy and change (Creswell & Plano Clark, 2011, p. 42) —'Passionate participant' as facilitator of multivoice reconstruction" (Guba & Lincoln, 2005).	Informal style (Creswell & Plano Clark, 2011, p. 42) —'Passionate participant' as facilitator of multivoice reconstruction" (Guba & Lincoln, 2005 p.194). —This means that while critical theorists attempt to get involved in their research to change the power structure, researchers in this paradigm attempt to gain increased knowledge regarding their study and subjects by interpreting how the subjects perceive and interact within a social context" (Lincoln, Lynham & Guba 2011, p. 110).
Accommodation and Commensurability (Can the paradigm accommodate other types of inquiry? (Guba & Lincoln 2005)	—Researchers must understand the social context and the culture in which the data are produced to accurately reflect what the data actually mean to the study" (Lincoln, Lynham & Guba 2011 p. 113).	—Incommensurable with positivistic forms; some commensurability with constructivist, criticalist, and participatory approaches, especially as they merge in liberationist approaches outside the west" (Guba & Lincoln, 2005 p.198).

This table represents the fundamental differences between these two worldviews, but these are not the only differences. There are similar aspects in both worldviews which can philosophically accommodate each other. The table above displayed the similarities and differences between both relevant worldviews, by comparing them in terms of positions towards different areas of philosophical study. However, there are more differences and a more in-depth discussion of both worldviews (constructivism and postmodernism) is required to ascertain whether one theory is more suitable than the other, or if they are both equally applicable.

Constructivism and postmodernism have similarities; however, there are slight semantic differences with regard to the ontology and epistemology, and more

prominent differences with regard to the methodology: "The constructivist paradigm assumes a relativist ontology (there are multiple realities), a subjectivist epistemology (knower and respondent co-create understandings), and a naturalistic (in the natural world) set of methodological procedures" (Denzin & Lincoln, 2011, p.13).

This discussion starts with constructivism, described by Crotty (1998, p.42) as the view that "all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context". These statements, that all knowledge and all meaningful reality are constructed, could be used to describe constructivism in a broader sense, as not all constructivists hold the view that all meaningful reality is constructed. Constructivism makes the epistemological claim that knowing is not passive but active, in that the mind essentially does 'something' with information:

> "In this sense, constructivism means that human beings do not find or discover knowledge so much as construct or make it. We invent concepts, models, and schemes to make sense of experience, and we continually test and modify these constructions in the light of new experience" (Schwandt, 2007, p.38).

Experience in this case is human activity, including social activity and academic activity. Constructivism is, however, more complex than this, and is believed to be composed of more than one specific line of thought. Schwandt asserts that there are two strands of constructivism, *radical* (2007, p.38) and *social* (2007, p.38), and within social constructivism both weak and strong positions exist. Radical constructivism is more associated with the idea that human knowledge cannot coexist with a faithful representation of an external non-phenomenal reality. Schwandt (2007, p.38) asserts that in radical constructivism, "knowledge is redefined procedurally — as an unending series of processes of inner construction". This differs from social constructivism, a strand of constructivism that is more concerned with the social activity involved in the construction of ideas, objects and theories. According to Creswell,

> "In social constructivism, individuals seek understanding of the world in which they live and work. They develop subjective meanings of their experiences-meanings directed towards certain objects or things. These

> meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrow the meanings into a few categories or ideas" (Creswell, 2012b, p.24).

Social constructivism is also referred to as interpretivism in qualitative research, because a researcher is also an individual who seeks an understanding of the world in which they live and work, and they too develop subjective meanings towards objects, things, ideas and theories. This means that the researcher has their own background of experience and activity that shapes the interpretation of the study. After stating that they place themselves in the constructivist camp, Lincoln, Lynham and Guba, (2011, p.116) add:

> —We believe that a goodly portion of social phenomena consists of the meaning-making activities of groups and individuals around those phenomena. The meaning-making activities themselves are of central interest to social constructionists and constructivists simply because it is the meaning-making, sense-making, attributional activities that shape action (or inaction)."

The differences between social and radical constructivism are indicated in the different beliefs around meaning-making activities. Social constructivists can be identified by their focus on social activity involving groups and social phenomena, while radical constructivists focus on meaning-making activities as a series of unending processes of construction.

Despite the differences between radical and social constructivism, they both still hold the position that theories and concepts do not map or form a representation of reality that is exactly accurate. As mentioned before, there are both weak and strong forms of social constructivism. The weak strand would not maintain that every object, idea, and aspect of the world is a social construct. The strong strand, however, would hold the position that every object, idea and aspect of the world could indeed be a social construct. Hacking (1999, p. 7) states, —There are many grades of commitment. Later on I distinguish six of them. You can get some idea of the gradations by thinking about feminist uses of construction ideas". The variations of constructivist belief between weak and strong, is often represented within the epistemological disagreements of various philosophies that interact with constructivist ideas.

The second relevant worldview covered in Table 1 is postmodernism. Postmodernism shares some similarities with social constructivism in its philosophy and approach to the understanding of construction or creation of knowledge and reality, in that they both allude to the concept that they are co-created and co-constructed. However, Schwandt (2007, p.235) takes the view that "Broadly conceived, postmodernism is an attitude toward the social world at the present stage of its historical development — more of a diagnosis than a theory". This is because postmodernism is perceived as a response to modernism, or more a rejection of it and of conventional styles of academic discourse. Schwandt (2007, p.235) further argues that many scholars assert that postmodernism is characterised by its opposition to four central doctrines that represent the core of the Enlightenment. Those four central doctrines are as follows:

1. "The notion of a rational autonomous subject, a self that has an essential human nature.
2. The notion of foundationalist epistemology.
3. The notion of reason as a universal, a priori capacity of individuals.
4. The belief in social and moral progress through the rational application of social scientific theories to the arts and social institutions" (Schwandt 2007, p.235).

Unlike constructivism, postmodernism is centred around an opposition of modernism and philosophical ideals associated with modernism and foundationalism. "The basic concept is that knowledge claims must be set within the conditions of the world today and in the multiple perspectives of class, race, gender, and other group affiliations" (Creswell, 2012b p.27). Postmodernism involves active participation in the perspectives of groups outside the status quo. This shares some similarities with constructivism, as constructivist ideas are often used by different groups to challenge the status quo; however, this is done with an interpretation of issues related to class, race, gender, not with a perspective of class, race and gender.

Arguably the most noticeable difference between constructivist and postmodernist philosophies occurs within the spectrum of epistemological belief. While constructivists may have 'strong' and 'weak' beliefs (or levels of conviction) regarding the social construction of what modernists may describe as indisputable truths,

> Postmodernism refuses all semblance of the totalising and essentialist orientations of modernist systems of thought. Where modernism purports to base itself on generalised, indubitable truths about the way things really are, postmodernism abandons the entire epistemological basis for any such claims to truth" (Crotty, 1998, p.185).

Unlike postmodernism, social constructivism is not as deeply rooted in opposition to foundationalist philosophy, but is deeply rooted in constructivist philosophy and sociological research related to social construction. However, when it comes to the concepts of social construction, it should be noted that there are differences between social constructivism and social constructionism:

> It would appear useful, then, to reserve the term *constructivism* for epistemological considerations focusing exclusively on 'the meaning-making activity of the individual mind' and to use *constructionism* where the focus includes 'the collective generation (and transmission) of meaning'" (Crotty, 1998, p.58).

However, social constructivism is the worldview that resonates most with the researcher because of personal experience with this content through a background in digital design. This makes social constructivism a strong choice, as "Researchers recognize that their own background shapes their interpretation, and they 'position themselves' in the research to acknowledge how their interpretation flows from their own personal, cultural, and historical experiences" (Creswell, 2012b, p.25).

Theoretical Lens

The theoretical lens or theoretical framework is a particular perspective that provides a way to examine the topic that enables a new dimension to be brought to the topic being researched. Theories and concepts relevant to this research include activity theory (Engeström, 1986) and communities of practice (Lave & Wenger, 1991). However, each relevant theoretical framework is different. The theories involved in communities of practice and activity theory deal with somewhat different subject matter, though both have a historical basis in Vygotsky's literature (Vygotsky, 1978). Vygotsky's cultural-historical psychology and socio-cultural theories form the foundation for the two theoretical frameworks used in this study, as both have influenced the creation of activity theory and communities of practice

theory respectively. At its core, Vygotsky‘s socio-cultural theory focuses on ~~t~~he understanding of human cognition and learning as social and cultural rather than individual phenomena” (Kozulin, Gindis, Ageyev & Miller, 2003, p.1). In its most basic definition, cultural-historical psychology refers to the relationship between the mind and the activity in which the mind participates.

It should also be noted that Vygotsky‘s cultural-historical psychology and socio-cultural theories, along with other social constructivist literature (Rubinshtein, 1946, 1986), have impacted on the development of concepts like situated learning, activity theory, and communities of practice. For that reason, a theoretical approach that includes the social constructivist worldview and the concepts and theories involved in the theoretical lens is seen as suitable to this study.

Activity theory primarily involves the study of human activity, however it has also been used to study human activity on a computer within the field of HCI research (Daniels, Edwards, Engestrom, Gallagher & Ludvigsen, 2010) and interaction design research (Kaptelinin & Nardi, 2006). Its suitability to similar research is partly why it has been included in this study. Communities of practice, however, is noticeably different from activity theory, as it involves social learning and interacting with communities, and shared resources produced by a virtual or real-world community. Both theoretical frameworks (communities of practice and activity theory) are used in this study because they assist in understanding both the social and procedural research. However, the justification to use both communities of practice and activity theory together in this thesis does not only come from their shared theoretical basis in Vygotsky‘s literature (Vygotsky, 1978) and their relationship with constructivist philosophy, but from other research (Guldberg 2010).

Guldberg (2010) advocates using communities of practice and activity theory together as a theoretical lens when conducting an empirical study:

> ~~B~~By focusing on the social activity taking place within the learning environment, and by locating that activity within a social structure, in which participants work towards goals through using tools specific to that community, the theoretical perspectives enabled a focus on what makes learning productive” (Guldberg, 2010, p. 174).

Although not all of the methods (found on page 83) are empirical, as this is a mixed methods study, including both qualitative and quantitative methods, and non empirical methods. The theoretical lens and the associated theories are reasonably influential in the understanding and conclusion reached in the study by the methods that are empirical. As those are the methods involving in studying activity and activity is what the theoretical lens applies to.

Activity Theory

The processes involved in this study are a type of activity, specifically digital design practice. This approach (with social constructivist origins), which accounts for the actions and the activities involved in the creation, distribution and use of procedural and tutorial video content or DDTVs, is well suited to this study, as processes and actions are central to this thesis. Videos record human interaction with a computer, and for this reason this activity is considered practical for digital designers. Activity theory provides a unique understanding of processes in CAD software. An activity or design often involves multiple actions and operations, and in some instances the repetition of multiple actions, to create a desired effect.

The concept of CoP only covers the community interaction, motivation, and participation around online tutorial videos; it does not cover the activity or use of the tutorial video content (DDTVs) and how that is conducted. (Tutorial videos are as discussed previously, are instructional videos that explain a process or activity) Although it may be used to help explain the creation and social use of tutorial videos, it does not address aspects involved in the reproduction or use of the actual processes and procedures covered in the tutorial videos. In an attempt to understand them, activity theory focuses on the context around events, organisations, and general contemporary phenomena. As such, activity theory is proposed in this study as the means to analyse the context around the use of tutorial video content.

Postma, Lauche and Stappers (2012) assert that the media services used to propagate tutorial and procedural videos have made ‗the social' aspects an essential topic for design. Despite this, most existing models in design still focus on the individual rather than on the social processes that could be occurring between individuals. Communities of practice and activity theory could be used to investigate social aspects involved in design. Postma, Lauche and Stappers (2012) contend

that when it comes to design, activity theory is relatively unknown. Nevertheless, their examination of the HCI literature surrounding activity theory suggests that it could also be a powerful tool for design. As activity is a major aspect of design, and most designs are conceptualised and created using human activity.

As previously described, activity theory originates from constructivist philosophy, and has Russian psychological roots in the work of Rubinstein (1946, 1986) and Vygotsky (1978). However, activity theory grew from the socio-cultural perspective presented by these theorists into an activity theory influenced by Leontiev (1978, 1981). Activity theory is a conceptual framework or form of theoretical lens that stems from socio-cultural psychology (cultural historical activity theory), a psychological theory formed by Vygotsky (Cole, 1995) and post-Vygotskian scholars who played a critical role in the development of activity theory. The framework of activity theory was originally developed by Russian psychologist Aleksei Leontiev (1978, 1981). In the 1980s, Finnish educational researcher Yrji Engestrom proposed a version of activity theory based on Leontiev‘s framework. Leontiev‘s and Engerstrom‘s variations of activity theory are employed in a range of fields. Kaptelinin et al. (1999) later defined several basic principles of activity theory: *hierarchical structure of activity*, *object-orientedness*, *internalisation and-externalisation*, *tool mediation*, and *development.*

Activity theory involves two ideas. The first is that ―the human mind emerges, exists, and can only be understood within the context of human interaction with the world” (Kaptelinin et al. 1999, p. 28). The second maintains that ―this interaction, that is, activity, is socially and culturally determined” (Kaptelinin et al. 1999, p. 28). These two main ideas are expanded into the five basic principles previously discussed.

The first of these is the principle of the hierarchical structure of activity, which is the assumption that the interaction between human beings and the world is organised into functionally-subordinated hierarchical levels. Kaptelinin et al. (1999) assert that actions are goal-directed processes carried out to fulfil a motive. They emphasise that the activity theory hierarchy (see below) is not a static model. When moving through the hierarchy of actions, there are conscious and automatic processes. Actions are dynamic, and can move through the hierarchy, changing from a conscious process to an automatic process.

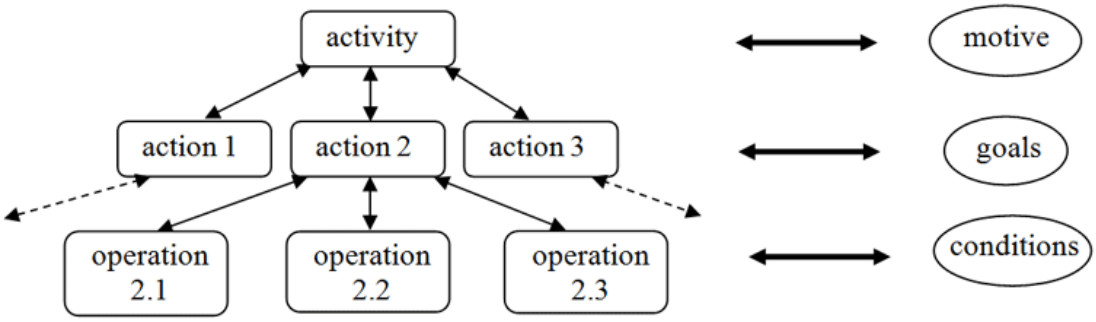

Figure 7: Activity hierarchy diagram taken from (Kaptelinin, Nardi & Macaulay, 1999)
Kaptelinin, V., Nardi, B. A., Macaulay, C. (1999). Methods & tools: The activity checklist: a tool for representing the —space" of context. Interactions, 6(4), p. 27-39.

Looking at other principles, Kaptelinin et al. (1999) note that the principle of object-orientedness states that every activity is directed towards something that objectively exists in the world. Regarding the principle of internalisation and externalisation, they assert that internal activity cannot be understood if it is analysed separately, due to the assumption that a constant transformation between external practice and internal mental process is the basis of human cognition and activity. Kaptelinin et al. (1999) propose that mental representations, as well as holistic activity, are crucial for internalisation, and that externalisation is important when collaborating between several people, requiring external coordinated activities. For this reason, the principle of internalisation and externalisation can be considered important, as it indicates the difference between watching a tutorial video and acting on what is viewed.

Kaptelinin et al. (1999) state that the principle of tool mediation relates to activity theory's emphasis on social actors and the interactions between people and their environments. They argue that a tool comes into being when it is used knowingly; this is identified in the statement that –The use of tools is an evolutionary accumulation and transmission of social knowledge" (Kaptelinin et al. 1999, p. 32). They also note that activity theory broadly embraces both technical and psychological tools.

Lastly, Kaptelinin et al. (1999) assert that the principle of development determines that a tool may be more useful when observed from a single use. According to Kaptelinin et al. (1999), the principle of development in activity theory is that activity theory requires that human interaction be analysed within the context of

development. As such, activity theory views all practice as being informed and shaped by development. They maintain that these principles of activity theory should be considered as an integrated system, and that a systematic application of one of the principles makes it necessary to involve the rest.

According to Kaptelinin, Nardi & Macaulay (1999), there have been several attempts to create tools and techniques that take into account the context around a social phenomenon. They state that there is a need for conceptual tools to deal with this context at a practical level. This is something that could aid research on tutorial videos by explaining the practical aspects involved in their use. Kaptelinin et al. (1999) present a tool called the activity checklist, which is directly shaped by a general theoretical approach known as activity theory. They assert that activity theory provides a broad theoretical framework for describing the development, structure and context of human activity.

Kaptelinin et al. (1999) go on to argue that the *activity checklist* is best introduced as an analytical tool and used to evaluate existing systems, with its main potential being to support researchers in their search for solutions by asking meaningful questions. The activity checklist is aimed at attempting to deal with context in the field of HCI. Kaptelinin et al. (1999) indicate that the main advantage of using the activity checklist is that it provides a preliminary overview of relevant contextual factors, and allows for the selection of appropriate tools for further exploration and evaluation of the limitations of these tools. For that reason, activity theory may be appropriate for exploring how designers use procedural and tutorial video content.

The activity system model devised by (Engestrom 1987) is essentially an extension on what Leontiev (1978) conceptualised as activity. This means viewing activity as a ‗subject‐object' interaction involving collective activity within a community of other actions. This creates a three-way interaction between ‗subject', ‗object' and ‗community'. This has since been expanded to include other relevant parameters.

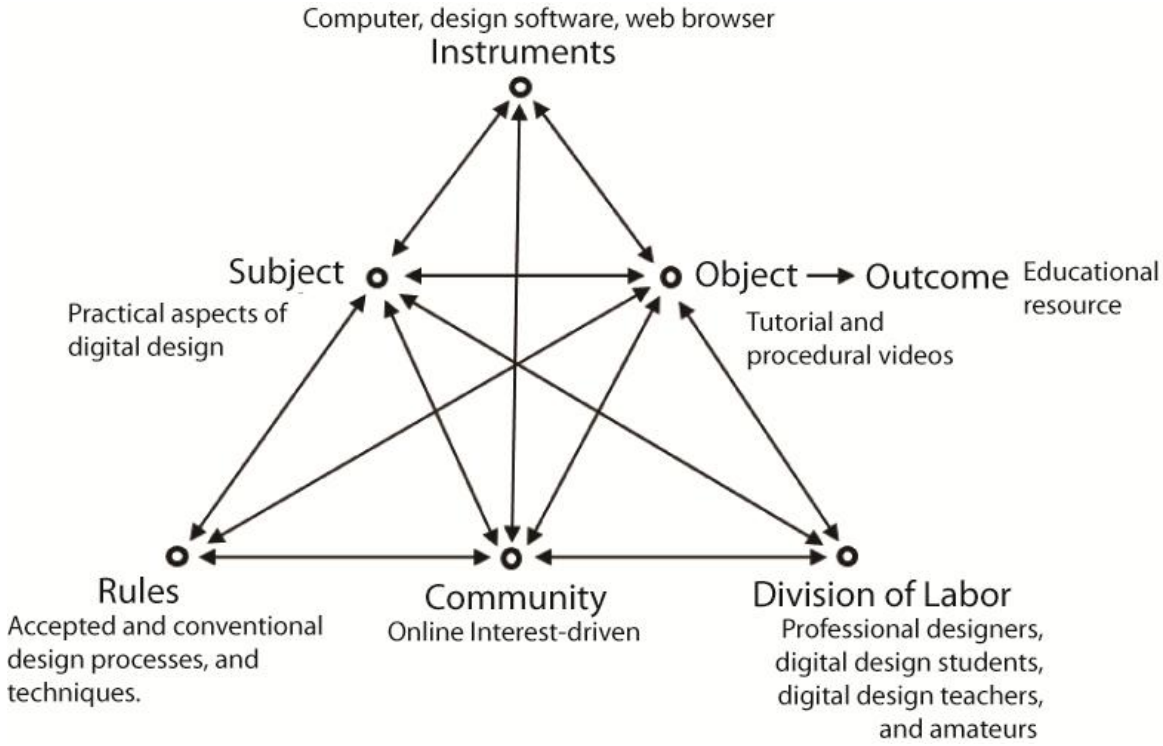

Figure 8: The activity system model proposed by (Engestrom 1987) and adapted to suit the DDTV phenomenon this study is concerned with.

The adapted activity system model above indicates the relevant aspects of activity related to the tutorial phenomenon involving DDTVs. Community, subject and object all have descriptions of what their relationship with the phenomenon is. The subject refers to the practical aspects of design, while the object is DDTV, used as an educational resource in the outcome. The community is virtual and largely interest-driven, and as a result of the online environment, the division of labour is diverse and the rules not strictly enforced.

Situated Learning - Communities of Practice

Social learning, as described by (Lave & Wenger, 1991), is an important aspect of this study. When it comes to social learning in communities of practice, there are four peripheral components that apply directly to learning: meaning, practice, community and identity (Wenger 1999). Meaning is not referred to in its traditional sense, but more in terms of context. The contextual meaning that surrounds practice is important in our *negotiated meanings* (Wenger 1999); that is, the negotiating of meanings or contexts that shape the way we perceive the practice. As implied by Wenger (1999, p.64), —The communicative ability of artefacts depends on how the

work of negotiating meaning is distributed between reification and participation". The participation and reification involved have a duality that ‗negotiates meaning' in a community of practice. This concept of a negotiated meaning can be explained using the following metaphor: When the practice is driving around a corner, we are negotiating the meaning of the corner when we view the angle, recommended speed, surrounding area, dampness of the road, and the car that we have seen take the corner before us.

In this sense, meaning is gained though the experience of advancing our ability, by watching and learning from others, or in the case of this thesis, from tutorial videos and gaining insight from others who may have more experience in aspects related to our own interests. Yet —Practice is, first and foremost, a process by which we can experience the world and our engagement with it as meaningful" (Wenger, 1999, p. 51). Meaning is gained though practice. In this study, practice refers to the creation and viewing of tutorial video content. Video content makes up the majority of the practice in this study, but not the communication. This is because the video content (or DDTVs) studied in this thesis involves digital design practice, or activity, and accordingly video is not used as the primarily tool of communication between individuals, but as the primarily tool to express practice for the groups involved in this study.

Practice, as described by Wenger (1999, p. 5), can involve —A way of talking about the shared historical and social resources, frameworks, and perspectives that can sustain mutual engagement in action". This could be interpreted as communication, especially when the practice is video content shared on the internet and, like other online videos, may take on a communicative role, if the individuals involved decide to add a level of communication with the audience though audio or other means. Practice, although confined to the video medium, is still varied. Many different ‗types' of tutorial videos exist that can be regarded as important resources for the digital design community. Some examples include:

Table 3: Examples of different DDTVs.

General design knowledge videos that talk about some of the fundamentals involved in designing on a computer	http://vimeo.com/2158374 (—The Polygon," 2012) http://vimeo.com/2165443 (—Smooth Shading," 2012)
or more specific videos that focus on teaching specific skills, procedures, or techniques	http://vimeo.com/9914517 (—Flt Tips' After Effects Quick Tips #3," 2012)

	http://vimeo.com/21424722 (—Red Giant QuickTip #39,” 2012)
Other videos involve recording a design process or technique over a long period of time. The video is then edited and sped up, and condensed into a shorter video	http://vimeo.com/30357729 (—Explosions in the Sky,” 2012) http://vimeo.com/8866839 (—ZBrush Sculpting Session,” 2012)
Some videos are simply simulations and design testing, essentially done by setting up automated processes within programs, and recording the outcome	http://vimeo.com/26347803 (—Some fun with the sound effector,” 2012) http://vimeo.com/33798754 (—Water splash test,” 2012)

Wenger (1999, p. 47) states that —The process of practice always involves the whole person, both acting and knowing at once”. Therefore practice is both a physical and mental act that involves the participant‘s full attention. Using a computer to design an object requires both the physical use of a computer and visual attention on the screen. For a tutorial video, this requires the participant to be involved in the physical and mental use of a computer, and because digital designers are conducting the design practice on a computer (the same object which they are using to interact with community), they are potentially improving the community‘s ability to organise itself. By populating the environment (online video platform) with different types of DDTVs, genres are created based off associations with application and the type of design that is being conducted. As Wenger (1998) states, —They self-organise, but they flourish when their learning fits with their organisational environment”.

Another peripheral component that applies directly to learning, like meaning and participation, is the community of practice concept of a community. Wenger (1999, p. 5) defines engagement in a community as communication and participation that involve —A way of talking about the social configurations in which our enterprises are defined as worth pursuing and our participation is recognizable as competence”. This concept situates the participant within a community of similar but varied individuals who are competent, to an intermediate degree, in the production of video content. This can include a range of individuals from different backgrounds, with different levels of experience, ranging from novices to experts, Teachers and students, as well as industry professionals.

Participants or learners who do not directly participate in generating their own content, but who maintain a reasonable competence in video design, could be referred to (using web jargon) as *lurkers*. These community members mostly watched content (more information regarding this can be found in the analysis), but

from a community of practice perspective, lurking is interpreted as legitimate peripheral participation', a crucial process by which communities offer learning opportunities to those on the periphery" (Wenger et al., 2009, p. 9).

The final peripheral component that applies directly to learning is identity, an aspect that is technically represented in some online communities, and seems to aid the user in their personal representation online. Wenger (1999) states that identity involves A way of talking about how learning changes who we are and creates personal histories of becoming in the context of our communities". Therefore identity can involve both the participant's personal perception of themselves and the actual online representation. These representations of identity are manifested in small pictures called avatars, or in more complex ways with video composed of montages of previously-made content — what is referred to as a *showreel*. Entire websites can be devoted to the identity of a specific participant or designer (and commonly are). This is because participants are usually studying in a design field, or working professionally in it, and their websites act as a *portfolio*. In this thesis, identity tickly manifest itself thought the use of pseudonyms, avatars, text-based comments and the videos produced themselves, this is in part due to fact the type of community being studied is a design community, and could be more likely to identify with designed visuals such as images and videos.

Collaborative Learning: Computer Supported Collaborative Learning

Computer supported collaborative learning has many similarities with virtual communities of practice; however, it is not being used as a theoretical lens in this study; rather the theory associated with communities of practice is used. There are two primary reasons for this. The first is because of the way activity theory and communities of practice can be used together. Activity theory relates to the digital design processes or activity studied in the thesis, and communities of practice relates to the community formation around digital design processes and educational resources online. Using both activity theory and communities of practice as a theoretical lens together allows the researcher to gain a broader theoretical understanding in the thesis. The second reason is that computer supported collaborative learning has more relevance in research that comes from a postmodernist perspective, and according commonly focuses more on participation instead of interpretation (McKay, 2007).

Table 4: Displaying similarities between VCOP & CSCL

	Virtual community of practice	Computer supported collaborative learning
Overlapping concepts	Computer supported, collaborative, informal learning, self-directed (McKay, 2007, pp.90)	
Differences	Unstructured practice (McKay, 2007, pp.90)	Self-directed practice (McKay, 2007, pp.90)

It should be noted that this second section on activity theory is addressed here under the heading ‗Theoretical Lens'. This could be referred to as a framework if different terminology were used. This current chapter (Methodology) does discuss some methods, but the main intention is to cover theories and concepts that relate to the study and are intended to inform the methods and the study. The methods cannot be contained within the theoretical lens, because the latter contains no processes that could be used as methods. Although a method (the activity checklist) is discussed in this chapter, this is not because this method is being used in this study. It is discussed in this section of the thesis in a similar way as the chapter above related to computer supported collaborative learning (CSCL).

Mixed Methods Research

This study takes the form of a concurrent mixed method design. The strategy involved collecting quantitative and qualitative data simultaneously, merging the data, and then analysing it. This mixed methods approach has been adopted because qualitative data has the ability to provide a more in-depth observation of the design procedures and practices involved in the tutorial and procedural videos, while quantitative data can be used to analyse the networks and connections between users. This mixed methods study gives equal priority to both quantitative and qualitative data, allowing for both generalisability and in-depth information about the context. As Creswell asserts, —Some methods are more closely associated with one worldview than the other, but to categorize them as ‗belonging' to one worldview more than another creates an unrealistic situation" (2012a, pp.537).

CHAPTER 4

METHODS

Participants

This thesis draws into focus some of the aspects involved in online and digital interactions between users and applications when creating and using DDTVs, during engagement with digital design. The research population studied in this thesis is a diverse group, containing a mix of digital design students, digital design hobbyists/amateurs, digital design professionals, design teachers, and design teaching organisations. All, however, would be required to have produced, created, used or interacted with tutorial videos online, in order to be considered actively involved in the social phenomenon (OVTP) with which this thesis is concerned. Examples of these interactions are the sharing, commenting, liking or even disliking a range of videos (DDTVs) that mostly contain screen-recorded video explanations, tutorials, experiments and projects (with an explanation of process). The population sampled in this thesis, fall into two different groups because of the two methods involved in sampling data.

The first method of data gathering involved data mining, with the use of the ‗NVivo plug-in' for the software application ‗Chrome'. This plug-in allowed research application ‗NVivo' to mine data from videos that have been determined to be DDTV's and selected via a inbuilt search function within the website platform (youtube.com). This involved searching for DDTVs by using an appropriate application (digital design application) and the words ‗tutorial' or ‗procure' together to return a desirable result (a DDTV). Before the data was sampled all of the cookies and associated internet data was removed from the computer this work was conducted on. The data was sampled for 8 different applications, this included ‗Adobe Photoshop', ‗Adobe Illustrator', ‗Adobe InDesign', ‗Adobe Flash' (also known as ‗Adobe Animate'), ‗Adobe After Effects', ‗Autodesk Maya', ‗Autodesk 3DSMAX' and ‗Maxicon Cinema 4D'. Each application was entered into the search function with the prefix ‗tutorial' to search for relevant DDTV content (e.g. ‗3DSMAX tutorial'), this search returned thousands of relevant DDTVs for study, however only the first 100 of each application chosen were sampled. Of the 800 videos samples, there were some duplicates (the same video uploaded twice), however the sample size

was large enough to enable the researcher to determine the structure of the associated content (DDTV).

The population gathered during the sampling depended on who the authors of the videos sampled were, and other individuals who interacted with the content, by rating, commenting or sharing the video content with associated platform (youtube.com) functions. The population gathered in this stage consists of internet users who view or interact with DDTVs; this could contain a wide range of individuals from all over the world. They are potentially geo-graphically dispersed all over the world as most countries have free access to this content. This means that membership is not closely controlled and open to the public, this results in the identity and role of the participants being difficult determine without closer examination of the data gathered. Although the membership, identity and role of the participants involved in this aspect of the data gathering are undetermined during sampling, they can be later determined from the data gathered. For example, some roles of users who left text based comments were determined upon viewing the data, and it was also apparent from viewing information related to the authors of DDTVs that they were a mix of digital design professionals, design teachers, digital design hobbyists/amateurs and digital design professionals.

The second method of data gathering involved the use of a questionnaire directed at students studying digital design and communication design and Swinburne University of technology, in Melbourne Australia. The population in this instance was far more confined to a set role and membership, as a design student studying at university. In the first method of data gathering the population was open to anyone around the world, however in this instance the online questionnaire was only emailed to students currently enrolled in design courses studying at Swinburne University, via their student email address. This allows the researcher to safely determine that all of the students who respond to the questionnaire are design students, who are activity learning digital design and accordingly can be considered ideal participants in this study. While the researcher is able to determine that they are students studying design at Swinburne University of technology in Australia, indicating that the membership of the participants as students and designers are both easily determined. The role and identity however could be somewhat varied between graphic designer and digital designer, because when sampling students

they came from two different class groups referred to as digital design and communication design. Despite the name (digital design) both of the groups were involved in digital design, and students primarily conducted design on digital systems using digital application in both instances.

Measures

The main data gathering methods involved in the thesis were ‗data mining' and questionnaire. The data had to be gathered in a way in which the information provided allowed the methods of analysis to be undertaken. The main methods of analysis in this thesis being the content analysis and the social network analysis.

The data mining involved the use of an NVivo plug-in for the web application ‗Chrome', the data gathered involves data related to location, comment, like, dislike, author and associated audiovisual data. Both the text-based comments and audiovisual data were collected and collated for the content analysis. The associated audiovisual data constitutes most of the content analysis; however word counting was also conducted on the comments left on DDTV content. Interactions and connections between comments, viewers and authors, were taken from the data gather and used as interactions for the social network analysis. This data was also collated and separated from the data set minded for the content analysis. The remaining data that was minded was used for descriptive statistics, this included geographical location, author, like and dislike ratio and other data that did not contain information useable in the content analysis (content) and social network analysis (connections).

Methods and Instruments

As previously described ‗DataMining' was one of the main measures and instruments implored to gather data in this thesis, however there are also methods and instruments used in thesis for analysis. Data is mined primarily using ‗NVivo' software and plug-in for web browser ‗Google Chrome', the data is then exported into ‗NVivo' and ‗excel' to collate and separate the results for different types of analysis. The main instruments involved in this study were software or web applications, this included the ‗NVivo' plug-in and ‗Opinio for gathering data. Other

software was used, and this included using ‗excel' to collate and sort the data for analysis, and finally ‗NVivo', ‗Gephi' and ‗SPSS'for the analysis.

Excel was only used for ordering data for social network analysis, content analysis and descriptive statistics. This involved removing data gathered relating to different aspects of the analysis, for example the social network analysis involved removing the names of those who had left a comment or message, and who they were responding or writing to. This information only contained the connections or interactions between users of DDTV content, not the actual content of the message as that was to be analysed in the content analysis. In the content analysis both text-based data and audiovisual data is analysed in ‗Nvivio', as ‗Nvivio'has built in word counting functions and the ability to process audiovisual information. Audiovisual data is coded during analysis with ‗NVivo'; and it should be noted that they only data coded was qualitative audiovisual data, the coding framework is provided in tables 7,8 and 9 within this chapter.

The first method of data gathering covers enough data to combine functions from content analysis and social network analysis. Supporting literature is provided regarding *content-based social network analysis* (below under the heading Social Network Analysis), which was conducted on the website YouTube. This method was used to analyse a range of publicly-available content and the possible social formations or communities that were created, and therefore associated with these videos and their users. This method explored only material in the public domain, was unobtrusive, and any proper names or user names were de-identified in discussion to give the participants anonymity.

The second method of data gathering involved the questionnaire using the ‗Opinio' web application to gather responses online, this consisted of an online survey presented to design students at Swinburne University, investigating whether or not they use these publicly-accessible videos, and if so why, what for and how often. The responses were then downloaded into an ‗excel' document and opened in relevant analysis software ‗NVivo' and ‗SPSS'.In this instance data was sampled from digital design students, and as a result the same methods involved in gathering data from DDTV viewers was not applicable, and different instruments had to be used (Opinio). Because the researcher released the questions to students, the

questions phrased to give information not found in the data from data mining. However, just as previously responses are received data and sorted for content analysis and descriptive statistics. This includes open ended questions that are analysed within the content analysis with the software application ‗Nvivo'.

Procedure

After the data was gathered from both sources (data mining and questionnaire), the data was then collated into the relevant areas for analysis, this involved collating data for content analysis, including comments and audiovisual information in ‗Excel' before importing this data into ‗NVivo' for analysis. When collating for the social network analysis, just usernames and interactions were collated in ‗Excel' and exported into ‗Gephi' for analysis. The reaming un-analyzed data is collated in ‗Excel' into relevant categories, (e.g. location, and author) and then exported into ‗SPSS'for analysis and presentation of descriptive statistics. The procedures undertaken for the analyses above are described bellow under the relevant headings. Noting that these procedures are only undertaken after the data is imported into the relevant instrument (software) for analysis.

Content Analysis

Variables in the study are involved in the content of the videos themselves. This means that what is used to create the content within the videos is the meaning and a symbolic quality that designers derive from this content, and what makes the information or content of significance to digital designers. This also included text based comments and the terminology associated with digital design. Categorisation of variables involves predicted software specific categories including Photoshop, Illustrator, Indesign, Maya, After Effects, Cinema4D, and so on. In order to categorise these variables from online video content, a content analysis that involves ethnographic content analysis, audio-visual coding and categorisation is required. However, that is not all that will be conducted using the content analysis method; word counting is also utilised on the text-based comments left on the associated online video content. Word counting involves collating all of the comments left on the sample of videos collected, and then counting the number of times words or phrases occur. This can be conducted on all videos involved in the study together, or on a single video. In this study, the word counting involved all of

the videos together, with the intention of establishing what words and phrases occurred most frequently on the associated video content.

The categorisation tables and categorisation procedures involved in content analysis are detailed below. They involve a three-tiered categorisation of multiple different variables associated with the content, including the atheistic differences, objectives, and the program used to complete the design task captured within the video content (DDTVs). Most variables involved will be covered with the categorisation tables below; however, some may not be included, as the researcher cannot completely determine which program is used and which design objective is being achieved until the video content is analysed. Accordingly it is noted that the last two categorisation tables can be expanded depending on what the content contains or is designing; for example, a motion graphics piece, a logo or the architectural layout of a house. Activity theory is only used as a framework for the content analysis, and was involved in the generation of what can be categorised in the second level and third level of the coding agenda. This categorisation framework is taken from the figure 7; where different levels of activity are shown and correspond with the levels of coding agenda. The second level could be described as categorising the instruments(in terms of figure 7, the ‗actions' or ‗goals'), and the third level the object or outcome (or in terms of figure 7, the ‗Activity' or ‗motive'). In order for this information to be understood and correctly categorised by the researcher, a theory that involves activity has to be involved in assisting in the defining of shared meanings.

Table 5: Coding and content categorisation agenda for presentation styles.

Category	Definition	Time	Sound	Example	Coding Rule
Tutorial	Involves describing specific skills, procedures, or techniques involved in digital design	Normal	Verbal instruction	http://vimeo.com/9914517 (—Elt Tips' After Effects Quick Tips. #3. Chain Rendering", 2012)	IF: Involves continuous verbal instruction. IF: Involves step by step procedures.
Procedural	Involves conducting automated processes within programs, and recording the outcome.	Normal	No Verbal instruction	http://vimeo.com/12214906 (—Stormy coast, realflow 5 test", 2012)	IF: Involves no verbal instruction. IF: Involves step by step procedures.
Time-Lapse	involve recording a design process or technique over	Increased	Little verbal instruction	http://vimeo.com/30357729 (—Explosions in the	IF: Involves no or little verbal instruction.

	a long period of time. The video is then edited and sped up, and condensed into a shorter video.			Sky," 2012)	IF: Involves procedures with increased speed.
Documentary	Involves describing a process or technique previously used in a design.	Dependent	Some verbal instruction	http://youtu.be/Aj_eaclFPWE (—Revenge - Behind the scenes", 2012)	IF: Involves some verbal instruction. IF: Does not involve step-by-step procedures.

Table 6: Coding agenda for first level [program based] sub-categorisation of content.

Category	Definition	Example	Coding Rule
Photoshop	Adobe product that processes bitmap images.	https://youtu.be/pFyOznL9UvA (—Adobe Photoshop Tutorial: The Basics for Beginners", 2016)	IF: Computer-based application Photoshop is being used.
Illustrator	Adobe product that processes vector images.	https://youtu.be/IBouhf4seWQ (—The Complete Beginners Guide to Adobe Illustrator", 2016)	IF: Computer-based application Illustrator is being used.
After Effects	Adobe product that processes moving bitmap and vector images.	https://youtu.be/C913enLWYxE (—After Effects Tutorial: Disintegration Effect", 2016)	IF: Computer-based application After Effects is being used.
InDesign	Adobe product that processes multiple-page documents.	https://youtu.be/iHDy_nEvgd4 (—Adobe InDesign for Beginners", 2016)	IF: Computer-based application InDesign is being used.

Table 7: Coding agenda for second level [objective based] sub-categorisation of content.

Category	Definition	Example	Coding Rule
Visual effect	Visual effects involve live action footage and computer-generated images to create an effect.	https://youtu.be/8EbWAXYMcac (—After Effects | VFX & Video Editing Tutorial", 2016)	IF: Indication that a visual effect is being produced.
Logo	A symbol or other small design adopted by an organisation to identify itself.	https://youtu.be/7XuoKGoRVco (—Illustrator Tutorial: Logo Design Process by Swerve", 2016)	IF: Indication that a logo is being produced.
Motion Graphic	Graphics that use video and/or animation technology to create the illusion of motion or a transforming appearance.	https://youtu.be/C7dvRpceouk (—After Effect Tutorial: Accent Explosion 2D Motion Graphics", 2016)	IF: Indication that a motion graphic is being produced.
Illustration	A picture that may serve to clarify something written.	https://youtu.be/LvOX9nQgXus (—Adobe Illustrator Tutorial: How to Draw an Astrochimp",2016)	IF: Indication that an illustration is being produced.

More subcategories emerge during research if more are in existence (for example 3D house), or product packaging if that is what is being designed and explained within the video content. If the sampled DDTV content does not contain any content instructing the viewer on the digital design of a ‗Logo', then those subcategories would not emerge, and others that were present would. It should be noted that this is only the case for the two tables above that refer to objective-based coding and program-based coding. In the image below (Figure 9), the DDTV would be categorised as a tutorial, with a program of Maya, and an objective of 3D modelling.

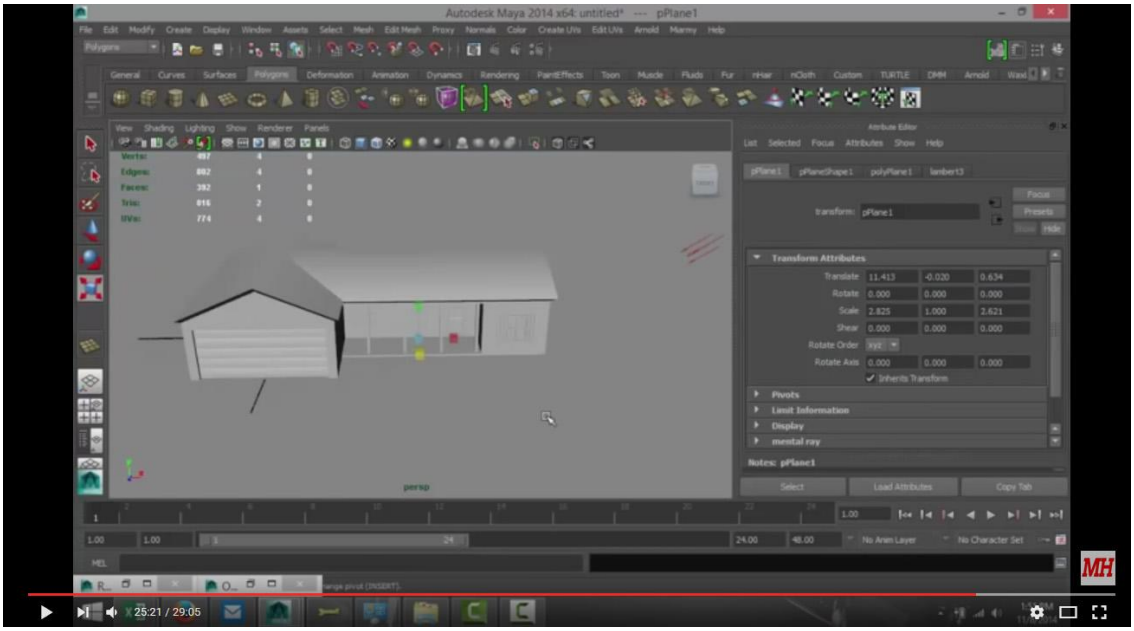

Figure 9: This image indicates how some of the variables appear visually and how they relate to the videos involved in this study.

However, there are other variables involved in these videos that are not classified within the three tables above. These involve visual communication during videos that included tool use and visual indications of tools and processes, usually created digitally using video-editing software. Tools came from a range of applications, and are coded into the study as they are used in each video. However, it should be noted that not all of the videos involved tools being coded. Only 100 of the 800 videos sampled were analysed with further categories related to tools to uncover process in videos — for example the colour correction tool, shape creation tool and contrast adjustment tool. Using activity theory as a framework (the level of activity presented in figure 7), informed parts of the ethnographic content analysis, and was conducted in this way because the researcher was looking at uncovering a process

or activity that involves a set of actions according to activity theorists (Kaptelinin & Nardi 2006, 2012) and designers who have studied process (Cross, Christiaans & Dorst, 1996) this involved ‗activity' or ‗motive', and ‗action' or ‗goals'. This tool-coding method involved more variables than covered in the three tables of categorisation. As a result, including all 800 sampled videos is regarded as unfeasible, as within the existing categorisation tables it was expected that hundreds of variables would be counted, and in many cases they were. To summarise, the content analysis involves the analysis of themes in the text-based comments, the categorisation of variables and shared meaning held by designers, and patterns in design activity.

Social Network Analysis

After a network boundary was established and a sample made, network data had to be formatted in a matrix (using the software application Excel), as the size of some networks became difficult to chart using only graphs and digraphs (Prell, 2012, p.13) for both the researcher and Prell. The type of network matrix used in social network analysis is called an ‗adjacency matrix'. Many different types of adjacency matrices exist: binary, asymmetric, symmetric and valued, but because the data collected in this study is valued data, a valued adjacency matrix was required to adequately map the network data. A valued matrix is better able to represent the strength of ties than other matrices designed to measure numerical data (Prell, 2012, p.16). This form of matrix was applied based on a number of factors, including the number of ties between actors (users). After data was structured into a matrix, a series of structural analyses began looking at features and patterns within network data.

Below is a sample valued adjacency matrix built to resemble the matrices used in this study. In this matrix, the potential participants' names have been altered to show a simple representation. Pseudonyms rather than real names are used, including numerical variations and fake names.

Table 8: Example of an adjacency matrix

		1	2	3	4	5	6	7	8	9
		A001	A002	C001	E001	G001	F001	S001	J001	K001
		-	-	-	-	-	-	-	-	-
1	A001	0	1	0	3	4	0	0	0	0
2	A002	0	0	3	0	0	0	0	1	0

3	C001	0	4	1	0	0	0	0	0	0
4	E001	3	0	0	0	2	0	0	0	1
5	G001	3	0	1	0	0	0	0	1	0
6	F001	0	0	0	1	0	0	1	0	5
7	S001	0	0	0	0	0	1	0	0	5
8	J001	0	1	0	0	2	0	0	0	0
9	K001	0	0	1	0	0	4	4	0	0

The table above is intended as an example of what is created from the data gathered using ‗NVivo'. It is a matrix that represents the number of connections made between different individuals or actors — a quantitative map of the interactions between individuals or actors. The representation of this data in this tabular form is only temporary, as it is later represented using more visual means that better display the connections between actors. As previously explained, ‗NVivo' gathers all the data required for the content analysis and the social network analysis. In order for the data gathered to be analysed and processed into network maps, it first has to be put into an adjacency matrix before being processed by an application that specialises in social network analysis (Gephi). This is conducted by exporting the relevant data from ‗NVivo' and removing the tables that involve data irrelevant to the social network analysis, including geographic location, time, date and other information that Gephi is unable to process.

Content-based social network analysis (Velardi et al., 2008; Bohn et al., 2011) was the method selected because of the role of contents in this study. However, it was necessary to adapt this method, as the communicated content required more than ‗text mining' (as outlined in Bohn et al. [2011]), to investigate audio-visual tutorial and procedural video content. This adaptation was intended to come from content analysis, and more specifically content analysis that focused on the qualitative study of audio-visual content. However, the text-based comments were also ‗text mined' and analysed with a content analysis approach (for example word counting, and categorisation).

Questionnaire

A cross-sectional survey design was chosen because of the potential to mix different types of questions, and as a result, to gather a range of information related to attitudes and behaviours. The mixture of open and closed questions also allows

researchers to determine various factors relating to students‘ current level of design knowledge by accessing information such as what year of study they are commencing, while also questioning their attitudes towards sharing DDTV content. It should also be noted that the cross-sectional survey design was administered online, using students‘ pre-existing university email network, through an online service called ‗Opinio‘. This benefits the questionnaire, as the ease of use is increased for participants who are able to access it from any environment. Using a web-based questionnaire for data gathering has some advantages, including the ability to download data after the questionnaire is completed in a format that is easily imported by other applications involved in the content analysis. This enables the questionnaire data to be analysed using content analysis, and for themes and coding to occur in a simplified manner. This first involves a range (4 in total) of yes or no questions and a question that determines there design discipline. The first question asks:

> *„What area of Design are you currently studying?*‘ (Question 1)

For this question design students could only respond with ‗Digital Media Design‘ and ‗Communication Design‘, as they are the disciplines that students were sampled from. The other 4 yes or no questions also only have two variables, and are largely used to determine simple aspects related to use, and the type of design student that is responding. The first of four is used to ascertain what year level the design students are in (Question 2 *„What year level are you currently in?*‘), this allows the researcher to determine if there is a difference between new design students and experienced design students in terms of frequency of use, or how they are used, if they are. In the next question (Question 3) design students are asked if they have watched DDTVs before. The second question states:

> *“Have you ever watched video tutorials or other videos that involve a design process, technique, or procedure?”* (Question 3)

Note that in the question adobe DDTV is not used, this is because it is not used coequally and other phrasing involving ‗tutorial‘, and ‗design process‘ is used instead. Once it is determined that the participants have watched DDTVs before, they are then asked two more yes or no questions relating to sharing within a design

school (Question 4 „*Have you witnessed videos like this being shared between students online or at school?*") a real world environment and sharing online or interacting with DDTVs online (Question 5 „*Have you ever shared, commented on, or liked videos like this?*") Both of these questions allow the researcher to determine if there is a difference between sharing content like this within a real world environment, and interacting with it in the online environment. All of the questions above only involve two variables, and are mostly used to determine what type of design student the participant is, and if they use DDTV content, and if so, do they share this content and interact with it online. The researcher then, after determining the above, will move on to inquiring about frequency, stating:

„*How often do you use videos like this?*" (Question 6)

With the variables available to the participants indicating „Not at all", „once a day", „once a week", „once a month" and „once a year". This allowed the researcher to determine how often different design students used these videos. This question allowed more variables than previously, ranging from very frequent (daily) to not occurring at all. Another question that required more variables was the next (Question 7), which attempted to ascertain when these videos are used by the design student, at what stage during the design process. This question stated:

„*When during the design process would you use these videos?*" (Question 7)

The variables involved in this question were before, during and after, they were set as multiple choice. This allowed the participant to choose more than one stage of the design process, if they used these videos during multiple stages. If the students involved in the study used DDTVs, this question would help the researcher determine if DDTVs played an active role in the students design process. The next two questions were opened ended, and as a result more variables were involved, and in these questions themes and patterns in responses had more potential to emerge. These themes could be influenced by the phrasing of the questions and accordingly some variables and themes associated with the phrasing could emerge. The first of the two opened ended questions asked.

„*Are tutorial videos useful when learning design practice, if so how?*" (Question 8)

Open ended responses to this question were expected to show themes and present variables related to ‗learning' and ‗design practice', with other similar words like ‗technique' expected in some responses.

„Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class?" (Question 9)

Open ended responses to this question could involve references to what is taught in class to the design students participating in this questionnaire, however this may or may not occur depending on how the participants respond, which is also the case for the previous question (Question 8). Variables and themes in Question 9, could involve ‗processes', ‗techniques', and other ‗aspects of design'. But other themes could emerge within patterns in responses related to other aspects of digital design, or DDTVs themselves as this is an open ended questions and participants are free to respond as they see fit.

The full set of questions presented to participants in the questionnaire is presented below. The questionnaire is relatively small and only used to ascertain information not available to the researcher though data mining.

1. **What area of Design are you currently studying? :** Digital Media Design or Communication Design
2. **What year level are you currently in? :** 1,2,3,Honors
3. **Have you ever watched video tutorials or other videos that involve a design process, technique, or procedure? :** Yes or no
4. **Have you witnessed videos like this being shared between students online or at school? :** Yes or no
5. **Have you ever shared, commented on, or liked videos like this? :** Yes or no
6. **How often do you use videos like this? :** Not at all, once a day, a week, a month, a year
7. **When during the design process would you use these videos? :** Before, during or after
8. **Are tutorial videos useful when learning design practice, if so how? :** Open text response
9. **Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class? :** Open text response

Justification

This study involves two different methods of data gathering (questionnaire and data mining) and two methods of analysis: content analysis, social network analysis. The first two of these methods — content analysis and social network analysis — are combined by drawing from literature on content-based social network analysis

(Velardi et al., 2008, Bohn et al., 2011). This is done in an attempt to address both the social aspects involved in the proliferation of online tutorial videos and the digital design processes recorded by the authors of these videos. As previously discussed in the introduction (page 15), the gathering, coding and analysis of data are done primarily by digital means. When collecting data for the content analysis, the application ‗NVivo' (version 10) was used to gather both qualitative and quantitative data concurrently.

When gathering data with ‗NVivo' from video-based websites, many options were available, including the ability to capture text-based comments along with an additional option that enabled the video content to be captured. This option selected the largest amount of information possible, and captured all the data possible from a video-based website within the capabilities of ‗NVivo' (only the information the software was able to obtain). The ability of ‗NVivo' to capture this information is relatively new, only becoming possible after an update to their software which allowed researchers to capture both qualitative and quantitative data. The data collected were then analysed using social network analysis and content analysis.

In this study, both the communicated content (videos/comments) and the networks associated with this content (the social structure) are important. This is because the site being studied is both a provider of video content and a social network, so it is assumed that both the content and the social interaction situated around it are important aspects to study in order to understand the digital tutorial videos with which this thesis is concerned. A problem presents itself when the methods typically used to analyse social structure and interaction online (social network analysis) are not able to analyse or contextualise that communicated content. Social network analysis is not concerned with the communicated content as much as with the relationships between the users who are interacting; it is not concerned with what is said, but with who said it to whom it was said. Social network analysis online analyses relationship ties and social structures. As this study aimed to understand the communicated content, and considered this content important, another method had to be applied to the communicated content. The concept of applying two methods to one set of data in this area is not new, having been featured in two publications (Velardi et al. 2008, Bohn et al. 2011). In both cases, it was maintained that there were limitations to social network analysis, in that an important part of the

context in what was being said was not taken into account when analysing the data (Velardi et al. 2008, Bohn et al. 2011).

Bohn et al. (2011) argue that approaches that attempt to analyse content, such as text mining, neglect the social structure involved in online communication. In this study, text mining was combined with social network analysis under the title ‗content based social network analysis'. Velardi et al. (2008) present a content-based model for social network analysis. They analysed the communicated content of a social network as opposed to the quantity of relationships, which is the traditional approach in social network analysis (Prell, 2012). It was considered practical to involve both content analysis and social network analysis methods, because the computer applications that gathered data for the social network analysis simultaneously gathered the data required for the content analysis. Text-based comments are required for social network analysis because they contain the social interaction, and video information is required for the content analysis.

In this study, the application ‗NVivo' was only used in the content analysis and social network analysis aspects of this study. For the questionnaire, an online application was incorporated using the application ‗Opinio'. ‗Opinio' produces online questionnaires, and can produce a range of different question types, including multiple-choice and open-answer questions. This enables the questionnaire to contain a mixture of qualitative and quantitative questions, so that when the data is downloaded from the online application (Opinio), it can be viewed and analysed simultaneously.

The online application ‗Opinio' only deals with the collection of data. For the analysis of quantitative data, the data must be exported from ‗Opinio' into the statistical package ‗SPSS' for statistical analysis, and into ‗NVivo' for qualitative analysis. In this study, two separate applications were used in the analysis: one quantitative, utilising a digital application that deals with Quantitative (SPSS), and the other an application capable of many functions, including the capture and coding of qualitative data (NVivo). Data was exported for each of these programs, depending on the intended use. For example, quantitative data gathered by ‗NVivo' for the content analysis could be exported into SPSS for some specific quantitative functions. There are different stages involved when working with the data: the stage

in which the data is gathered is the collection stage; the stage in which data is exported for analysis, done during the preparation stage; and the final stage that deals with coding and analysis. In each stage, qualitative and quantitative data are used concurrently, and the methods are also conducted simultaneously. This is undertaken with the use of research software mentioned above (NVivo), which is able to process and collect qualitative and quantitative data simultaneously, since all of the data is available to do so.

Rationale

Bellow the rationale for including and conducting each analysis included in this thesis is presented bellow, this includes similarities with other research and other methods that have been devised to solve similar problems as those involved in the research this thesis is concerned with, and relevant information relating to each method. The relevant information includes the kind of networks, variables, or aspects involved in each type of analysis that are of significance for the research conducted in this thesis.

Social Network Analysis

Social network analysis involves multiple levels of analysis focusing on the differences between actors and the ties between them. This analysis is important, as tutorial and procedural videos are shared on websites that are referred to as ‗social media', and which involve multiple interactions between networked users. However, the possible methods used to interpret and analyse tutorial and procedural videos — an unusual form of communicated content that has not been thoroughly studied before — may have to be altered in an attempt to carry out a thorough investigation of the communicated content. Content-based social network analysis (Velardi et al., 2008; Bohn et al., 2011) was identified as a possible method. However, this method had to be adapted because the communicated content required more than text mining (Bohn et al., 2011) to investigate audio-visual content. Nevertheless, content-based social network analysis remained relevant because of the way it accounts for what characteristics the content users or ‗actors' have in common, not just the connections or ties between them and the time span in which the content is distributed. In addition, because of the differences in the content, employing some qualitative approaches used in ethnographic content

analysis (for example, Altheide, 1996) to analyse audio-visual content proved useful. Using these approaches — social network analysis (Prell, 2012) and content analysis approaches (Krippendorff, 2004) together — enabled a content-based social network analysis to be formed that also accounted for audio-visual information and was more rigorous than other methods.

This adjustment of the methods was done primarily because of the nature of the communicated content (both video and text). This content was suited to the content analysis method, because it covers both audio-visual and text-based communication. However, because the distribution involved social aspects and occurred on websites that could be described as social networks, social network analysis proved useful for discovering the connections between users in ways that content analysis could not.

Wesserman & Faust (1994, p. 17) assert that the fundamental concepts involved in social network analysis are actor, relational tie, dyad, subgroup, group, relation and social network. These are explained in more detail in the table below.

Table 9: Fundamental concepts in social network analysis.

Fundamental Concepts	Descriptions
Actor	Social entities, discrete individuals, corporate, or collective social units (Wesserman & Faust 1994, p. 17).
Relational tie	Actors linked to one another by social ties. These ties are extensive and can involve friendship, affiliation, behavioural interaction, etc. (Wesserman & Faust 1994, p. 18).
Dyad	A pair of actors with a linkage: ties or established relationships (Wesserman & Faust 1994, p. 18).
Triad	A subset of three actors with possible tie(s) among them (Wesserman & Faust 1994, p. 19).
Subgroup	Any subset of actors, and all with ties among them. (Wesserman & Faust 1994, p. 19).
Group	A collection of all actors for whom ties are to be measured; association is argued by theoretical, empirical, or conceptual criteria (Wesserman & Faust 1994, p. 19).
Relation	The collection of ties of a specific kind among actors in a group (Wesserman & Faust 1994, p. 20).
Social network	—A finite set or sets of actors and the relation or relations defined on them" (Wesserman & Faust 1994, p. 20).

All fundamental concepts (Wesserman & Faust 1994) involved in social network analysis are embraced in this content-based social network analysis. However, in this method, unlike other content-based social network analysis methods, the analysis occurs on two levels. On one level are ‗the social' aspects and relational ties between actors involved in the distribution and clique of tutorial and procedural videos. The other level contains ‗the aesthetic' differences and procedural variations in the audio-visual content and text-based responses.

Social network analysis originates from the work of Jacob Moreno (1933). It was presented at a medical conference in New York City, and subsequently discussed in a book titled ‗Who shall survive?' (Moreno, 1934). Originally called sociograms, social networking analysis studies were sociometric in that they surveyed all, or close to all, the individuals in a community. However, this is not always feasible, for example in situations where communities online are extensive. That is the case in this study, where the network boundary contains individuals from all over the world involved in digital design. This is a wide-ranging and very diverse group, and as a result, this social network analysis focuses on what could be described as an ego-centric network involving users who are creating, distributing and commenting on tutorial or procedural videos on websites with embedded networks. Prell (2012, p.119) asserts that ego centric networks focus on individual actors — referred to as an ego at the centre of a network — tied to other actors who are referred to as alters. These ties between an ego and its alters form an ego-centric network. Because the population in this study involved a wide range of individuals, a study focusing on ego-centred networks was seen as more appropriate, as its approach to sampling does not rely on the actors or participants involved in the study. A nominalist approach (Prell, 2012, p.66) to sampling is one based on the researcher's theoretical justifications. This avoids reliance on actors, but requires the research to have an understanding of the particular social event or communication content that can justify the approach.

In this study, the justification for a nominalist approach towards sampling and drawing a network boundary stems from the researchers past experience with procedural and tutorial video content online. This past experience involves using online video tutorials while both working in this field and studying towards an undergraduate design degree. This past experience allowed the researcher to

develop a sampling method that mimics the methods used by users/actors to discover tutorial and procedural content in online networks, by using the same search engine algorithm as the users/actors involved in these networks use to collect information. This approach could provide a random sample, but is nominalist in that it includes only actors who have responded to or created content, as opposed to all actors who have viewed the content. All comments left on the video, were left on a webpage containing only the video so it could be reasonably ascertained that the comment was made in response to the video (as it is the only piece of content present), unless it was a reply to another comment. Because of this, the data gathered can be seen as directed data, which is a type of data that looks at how a tie is passed from one actor to another (Prell, 2012, p.75). The data is also considered valued data; that is, data that can reflect the strengths, duration or frequency of ties between actors (Prell, 2012, p.75). This is because the data is recorded from the video‘s initial creation and all subsequent interaction is dated, and information on the duration of interaction is provided.

Actors in this content-based social network analysis are defined as website users, or active network account holders (within the online networks youtube.com and vimeo.com) interacting with tutorial or procedural videos. Interactions or ties between users or actors are perceived within an ego-centric network. The directed data informs the researcher what actions the actor is currently taking, and whether they are an ego or alter. When interpreting directed data, audio-visual information is accounted for in its differences when it is the communicated content as opposed to text, and can be seen as a factor indicating that an actor is an ego. A relational tie in this content-based social network analysis is defined as a range of content-based interactions, including the text-based comment/critique of a video, a video response, and further text-based interactions between video creators and commentators, or other video creators.

Content Analysis

Content analysis is quantitative, originating from positivistic assumptions about objectivity (Altheide, 1996), and intended as a way of obtaining data to measure the frequency and extent, as well as the meaning of content. Quantitative content analysis follows a serial progression of category construction, sampling, data collection, data analysis, and data coding before interpretation (Altheide, 1996).

However, Atheide (1996) asserts that ethnographic content analysis contrasts with conventional models of quantitative content analysis.

Neuendorf (2002) states that the typical process involved in content analysis research includes the following steps: theory selection, a conceptualisation of the variables involved in the study, defining operations and measurement of variables and data collection, defining coding and categorisation schemes, deciding on the sampling, conducting training, and coding tests that test reliability on each variable. Ethnographic content analysis and content analysis are driven by a theory and rationale — in this case activity theory. The rationale behind this argues that the content (procedural and tutorial videos) is based on following a procedure or process, or what could be described as a set of actions, within the hierarchical structure of activity (Leontiev, 1978). Prominent content analyst Krippendorff (2004 p.33) argues that texts accumulate significance in their meaning, content, symbolic qualities and interpretations. Analytical constructs are described by Krippendorff as hypothetical generalisations, and are inferences.

Questionnaire

A questionnaire or survey is the final method involved in this study. It was implemented to ascertain information that was not available to the researcher from the data gathered during the content analysis and social network analysis. This situation occurs because the survey method involves different data-gathering procedures, and typically involves a series of questions and other prompts for gathering information regarding a group of opinions, in this instance the opinions of a group of design students. This method has a long history of application, and has been widely used by a range of scientific disciplines, with its history dating back to Marc Antoine Jullien de Paris in 1817 (De Landsheere, 1985). The survey involved in this study follows a cross-sectional survey design, in that the method is only employed in one point in time. Creswell (2012a, p.377) asserts that this type of design has the advantage of measuring current attitudes or practices, an aspect important to this study, and central to the implementation of this questionnaire/ survey method. Creswell, (2012a, p.378) further indicates that cross-sectional survey designs can be adept at measuring community needs, and possibly student needs regarding practical digital design education.

A mix of open and closed questions were included in this study. This allows participants to expand on their answers, and for themes and patterns to emerge during the content analysis of the data received through implementation of the questionnaire. Including a mix of both open and closed questions can offer the study more information if the participants choose to expand upon their answers and leave a detailed response. Surveys typically consist of two types of questions: open-ended and closed. Closed questions allow researchers easily to compare responses (Cresswell, 2012a, p.386) while open-ended questions allow participants to provide their own responses, and are important as they allow the participants to answer in a more open manner. However, Creswell (2012a, p.378) asserts that open-ended questions have the drawback of requiring coding, a process that requires the researcher to categorise the responses into themes.

This drawback is not seen as significant here, as the potential amount of information gathered from including these open-ended questions far outweighs any potential time taken to code and categorise the data into themes and patterns. Although some of the closed-ended questions revealed aspects of participants‘ attitudes and behaviours, a clear perspective of design students‘ attitudes towards DDTVs could not be achieved without providing them with the opportunity to elaborate on the answers given to the close-ended questions by responding to open-ended questions later in the survey.

Visual Model

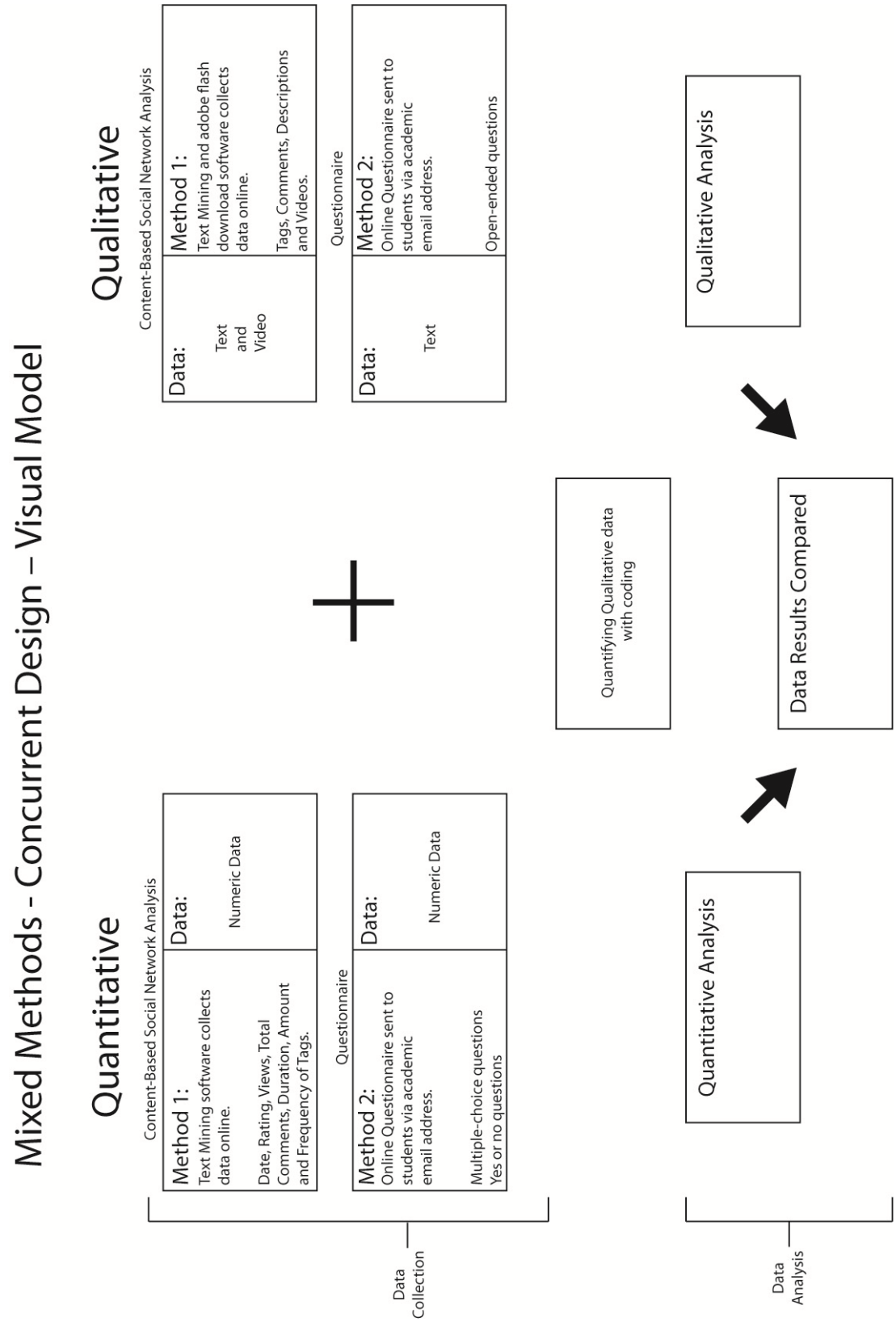

Figure 10: Visual model of the study design, methods and analysis.

Ethical Considerations

The principal problem in this study is the potential for anonymity to be compromised in the first study. However, since the users are not recording videos or images of themselves (just their computer screens, and even more specifically just process in design applications), the potential for individuals to be identified is far less likely in comparison with most studies that involve participants/users creating video content. Audio in these videos does frequently involve the use of an individual‘s voice to describe processes in applications, but this audio content will not be republished; instead it will be transcribed. Retaining participant anonymity in the data will require changing usernames so that users cannot be found and identified online. It is worth noting that most users supply usernames anyway, precisely to make their identity obscure.

There were no identifiable risks identified in undertaking this research, as it only concerns procedural processes in relation to instruction, and is not seen as controversial. Participants involved in the questionnaire were reminded that the research in not compulsory, and that they might withdraw from it at any time.

CHAPTER 5
STUDIES 1 AND 2

This chapter provides an outline of the study into the online phenomenon of design training videos and tutorials uploaded on websites such as YouTube and Vimeo. It begins with a brief discussion of how this phenomenon is situated within an environment that is open to the public, and how this may affect the process during which the data is gathered. The next section covers two of the methods used in gathering data, these being content analysis and social network analysis. The questionnaire method employed in this study is then explained, including the data-gathering process, the intentions in applying this method, the type of information gathered, and why. The section headed Outcome and Discussion presents the data gathered and findings, along with a short discussion. The chapter concludes with a visualisation of the method involved in this study.

Outline of the Phenomenon: Content, Users, Views, Websites

Online design communities that use video content, along with an analysis of their communicated content, form the core of this study. This content can involve the digital design process, techniques, and procedures used in education and professional practice, which are shared on networked websites in communities best described as interest-driven. Very little research has been conducted on interest-driven participation in creating video content, apart from what was described as an exploratory ethnographic inquiry by Mizuko Ito et al. (2010).

For the purposes of this study, this content will be referred to as DDTVs. Also know as *tutorial* and *procedural* video content, these terms are currently associated with this content in the online world. This research relates to the occurrence of these videos, and I attempt to explore the role of *procedural* and *tutorial* videos as a possible form of social practice in the contemporary online environment. The *procedural* and *tutorial* videos in question are videos that involve the recording of a digital design process, technique, or procedure. However, these videos are not merely recorded; they are also distributed openly online by a multitude of authors within a series of different networks and websites. The videos addressed in this

study were found on ‗YouTube'; however, it should be noted that they are also located on other websites. ‗YouTube' was included because of its size and compatibility with the research software and applications involved in this research. In addition, ‗YouTube' videos have been recorded and uploaded by multiple authors, as is the case for other websites that function as online media platforms.

The use of this type of content could be perceived as an interaction, with either the content or the user who created it. Examples of these interactions are the sharing of and commenting on a range of videos that have been described as *procedural,* but which could be also described as *video explanations*, *tutorials*, *experiments* and *projects* (with an explanation of *process*). Determining the value of this type of procedural video content when it is used to explain different methodological approaches and other processes involved in design is argued as an important pursuit. So, too, is consideration of the continual social advancement of many different methodological approaches and other processes used to create and design digital content. *Procedural* and *tutorial* videos can also be seen as an alternative type of educational resource, as they are always accessible and can be viewed from any device that has Internet access, at any point in time.

Content and Social Network Analysis Data Gathering Process Outlined

The type of data gathered in this thesis involves many different types of information, including video content, text-based comments, and a rage of numerical data. The data gathered was robust enough for the researcher to conduct a content analysis, social network analysis and basic statistical analysis using some of the available numerical data. Data was gathered using NVivo, a software application that was also used in the coding and qualitative analysis of the data during the content analysis and social network analysis of the actual procedural and tutorial video content. This involved data mining information related to these videos, and specifically the number of views a video has received, the date it was uploaded, and how many comments it has attracted, among many other types of information. ‗NVivo' was also used to collect usernames associated with comments and video content. These usernames will be removed and replaced with unidentifiable abbreviations if they have used an identifiable real name within the research. (For example a user who leaves a comment with the username ‗John Smith' will have

their name replaced with ‗A01). They are then placed into the adjacency matrix used in the social networking analysis.

For videos to be deemed *procedural* or *tutorial,* they are required to meet both of two key conditions. The first is that they involve the recording of a computer screen; the second is that they involve a digital design procedure, technique or process. The main difference between *procedural* and *tutorial* videos however, is the audio instruction, which is only present in *tutorial* videos. All videos involved in the study are categorised by differences in audio and visual aesthetics, and this requires video content itself to be analysed.

These videos are first located on either of the two video websites, and identified as being relevant to the study. They are then categorised based on various audio and visual aesthetic differences (presented in table 7 in the previous chapter), the most notable of which are the following:

- The amount of sound (voice or music);
- Whether the speed of the video is the same as it was recorded at, or whether it has been increased or sped up;
- The amount of editing;
- The total length of the video;
- Whether the design procedure, technique or process has been completed prior to or during the recording of the video.

Eight *tags* or key words associated with the videos were chosen based on the most popular tags used by the internet users who originally uploaded the videos that were found and identified as procedural or tutorial videos. This occurred after the videos were categorised based on different audio and visual aesthetics. These eight tags were then used to search for videos on two chosen video platforms, and a search function employed to find the ‗most relevant' videos on both platforms, with one search used for each of the eight tags.

The first 100 videos were selected from those found with the search function. A hundred videos were selected from each tag, with eight tags in total, so that between both website platforms the search function was run 20 times. Data was then mined from the videos using an online application called ‗Info Extractor'. This

data included number of views, date uploaded, who uploaded it (*channel*), number of comments, commentators on videos, video rating, tags, and the video‘s description).

Videos that were previously data mined when using the search function were excluded from this set of videos in order to remove the chance of duplicate videos being selected. Data was then mined from the videos including number of views, date uploaded, number of comments, commentators on videos, video rating, tags, and video description. The 800 videos selected with the search function were then categorised based on aesthetic differences. This method only explored material in the public domain, was unobtrusive, and any real names were de-identified. The process for coding data with data mined from electronic sources on the internet involved coding that occurs on multiple levels, as well as the video‘s atheistic objectives, and the applications and tools used to produce digital designs. The exact method this coding follows was outlined in tables presented in Chapter 3.

Outcome and Discussion

During the content analysis, a total of 800 videos were collected and analysed. However, not all were analysed qualitatively; 800 of the videos were analysed quantitatively. Of the original 800 videos, approximately 100 videos were coded based on the digital processes carried out in the video. These processes were analysed through the theoretical lens of activity theory, which aided in categorising the patterns of digital design activity. Many different patterns were analysed from multiple applications, with some patterns containing a vast number of different actions, and others involving the repetition of a few set actions with only minor differences between each repetition. Eight hundred videos were quantitatively analysed using SPSS software, and this analysis included variables such as country of origin, date of creation, view count, number of comments, and rating.

Differences in applications seem to be based on function. For example, the digital processes in 3D CAD applications operated more similarly to each other than do other applications dealing with 2D digital processes or digital animation. 3D applications that possess the ability to animate 3D objects do share similarities with other applications that are traditionally used for animation. In the later stage of the design process, differences occur between 2D and 3D application processes in the

refinement and generation of design elements. The findings derived using this method indicate that the responses to the content were overwhelmingly positive. A large viewership was discovered, and a statistically significant number of users within the comment section used phrases and words indicating that they approved of the content. This shows that participants may have found the content useful. The content was also considerably more popular than expected, with viewers in the millions. The researcher expected there to be potential hundreds of thousands of views, but 87 million was unexpected. This is shown in the table below headed ‗General Video Data'.

Content also contained recordings of digital design processes with slight variations. The findings in this study indicate that further research of a greater number of design processes could uncover new digital design principles that are being explained online. The popularity of this content demonstrates that this content, and the interactions with it, occur with reasonable frequency, and could be deemed a widely-used educational resource for digital design practice. It is likely that the use of this content could have an impact on institutions. The frequency, popularity, influence and teaching of design practice now occurs within the context of these resources for a significant number of students.

In the tables below — General Video Data, Category, Location and Author — the heading 'Frequency' refers to the number of times something occurred. The percentages displayed bellow indicate the amount each variable occurred. Valid Percent and Cumulative Percent are also shown in these tables. The terms ‗Valid' and ‗Missing' refer to the number of videos sampled and the number missing from the sample, while the location refers to the country of origin. ‗Author' refers to the video creator's pseudonym or replaced name, and the frequency refers to the number of videos they created that were featured in this study. The ‗Category' refers to the category in which these videos were placed by the video creator, or the platform to which it was uploaded.

The following tables (10, 11, 12 and 13) are summarized tables that only include the top ten most frequent occurrences in each category. The tables here have been made shorter as some categories included hundreds of different occurrences; the full tables are located in the appendix, on page 219.

Table 10: General video data table: likes, dislikes views and comments.

General Video Data

		Dislikes	Likes	Views	Comments
N	Valid	796	796	796	796
	Missing	0	0	0	0
Total		17095	382590	87831408	143607

Table 11: Video data table involving website-based categorization of video content.

	Frequency	Percent
How to & Style	276	34.7
Education	268	33.7
Film & Animation	133	16.7
Science & Technology	58	7.3
People & Blogs	23	2.9
Shows	15	1.9
Entertainment	12	1.5
Gaming	5	.6
Autos & Vehicles	4	.5
Music	1	.1
Pets & Animals	1	.1
Total	796	100.0

Table 12: Video data table regarding location of origin for the video content.

Location *(Video Origin)*

	Frequency	Percent
United States	437	54.9
United Kingdom	102	12.8
Australia	51	6.4
Canada	44	5.5
Egypt	27	3.4
Germany	26	3.3
India	12	1.5
Italy	7	.9
Philippines	7	.9
Sweden	7	.9
Total	796	100.0

Table 13: Video data table of authors of video content involved in the study

Author *(Video Creator)*

	Frequency	Percent
thenewboston	31	3.9
lyndapodcast	29	3.6
tutvid	27	3.4
easymaya	25	3.1
ifskills	20	2.5
gaudencez	17	2.1
lilredheadcomics	16	2.0
bakerstuts	14	1.8
acrezhd	13	1.6
ehowtech	12	1.5
Total	796	100.0

Note: Names above are pseudonyms or have been changed so that no real names are included.

Study 2: Why? How? When?

Introduction

This section explains the questionnaire method employed in this study, including the process undertaken to gather data, and the type of questionnaire used. The intentions in using this method are described first, as is the type of information being gathered. The questionnaire process is outlined and explained, and the findings are then discussed. The chapter concludes with a visualisation of the methods involved in this study.

Intentions

The intention of this study is to fill potential gaps in content analysis and social network analysis. This involves ascertaining the reasons for interaction with the phenomenon (OVTP), and developing an understanding of the attitudes students and practitioners who are learning design have towards education. This information was not available in the data gathered using other methods; accordingly, this study aims to fill these gaps and gather a broader picture of the phenomenon with which this thesis is concerned, and how design students interact with it.

Survey/Questionnaire Process Outlined

The second method is an *Online Survey* directed at undergraduate students studying design at Swinburne and other Australian universities. The research question around which the student survey is structured is as follows: *How and why do designers use procedural and tutorial video content?* This survey was intended to discover not only whether the students use these publicly-accessible videos, but why, what for and how often. It also aims to find out whether students in different areas or year levels of design use these videos more or less often than students in other areas or year levels. The online surveys were conducted using the online questionnaire application ‚Opinio', and audio-visual material was used in the explanation of exactly what a video tutorial or procedural video is. Students were informed about the questionnaire via student email. Neither the first nor the second investigators in this study are involved in teaching students in the Digital Design Program. Students were reminded that their participation bears no relation to their coursework studies.

Outcome and Discussion

Responses from students to the questions they were presented (shown on page 114) regarding DDTV content were overwhelmingly positive in terms of use. The responses indicated that a majority of them use the content, and that it fulfils a range of needs regarding practical design education. In their responses to both open-ended and closed questions, participants demonstrated that they found the content useful. DDTV content was used more frequently by design students than expected, with many using it on a weekly basis. This shows more frequent use than the researcher's previous assumption that it would be used on a monthly basis.

The results also show that content was used mostly before and during the design process. This was not expected, but identified an interesting area for further research. The popularity of DDTVs shown in the results of the other methods in this study was indicated by student feedback, which suggests that interaction with this content happens reasonably frequently, and that it is considered by students to be an educational resource for digital design practice.

Table 14: Question A: Data table for question A

What year level are you currently in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Year level 1	8	15.7	15.7	15.7
	Year level 2	17	33.3	33.3	49.0
	Year level 3	14	27.5	27.5	76.5
	Honors	12	23.5	23.5	100.0
	Total	51	100.0	100.0	

Table 15: Question B: Data table for question B

Have you ever watched video tutorials or other videos that involve a design process, technique, or procedure?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	1	2.0	2.0	2.0
	Yes	50	98.0	98.0	100.0
	Total	51	100.0	100.0	

Table 16 - Question C: Data table for question C

Have you witnessed videos like this being shared between students online or at school?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	23	45.1	45.1	45.1
	Yes	28	54.9	54.9	100.0
	Total	51	100.0	100.0	

Table 17: Question D: Data table for question D

Have you ever shared, commented on, or liked videos like this?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	51.0	51.0	51.0
	Yes	25	49.0	49.0	100.0
	Total	51	100.0	100.0	

Table 18: Question E: Data table for question E

How often do you use videos like this?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all	1	2.0	2.0	2.0
	Once a day	4	7.8	7.8	9.8
	Once a week	25	49.0	49.0	58.8
	Once a month	17	33.3	33.3	92.2
	Once a year	4	7.8	7.8	100.0
	Total	51	100.0	100.0	

Table 19: Question F: Data table for question F

When during the design process would you use these videos? (Before)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	51.0	51.0	51.0
	Yes	25	49.0	49.0	100.0
	Total	51	100.0	100.0	

Table 20: Question G: Data table for question G

When during the design process would you use these videos? (During)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	5.9	5.9	5.9
	Yes	48	94.1	94.1	100.0
	Total	51	100.0	100.0	

Table 21: Question H: Data table for question H

When during the design process would you use these videos? (After)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	43	84.3	84.3	84.3
	Yes	8	15.7	15.7	100.0
	Total	51	100.0	100.0	

Table 22: Question I: Data table for question I

Are tutorial videos useful when learning design practice, if so how? (free text)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	5	9.8	9.8	9.8
	Yes	34	66.7	66.7	76.5
	Other	12	23.5	23.5	100.0
	Total	51	100.0	100.0	

Table 23: Question J: Data table for question J

Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class? (Free text)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	3	5.9	5.9	5.9
	Yes	44	86.3	86.3	92.2
	Other	4	7.8	7.8	100.0
	Total	51	100.0	100.0	

Table 24: Question K: Data table for question K

What area of Design are you currently studying?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Digital Media	27	52.9	52.9	52.9
	Communication	24	47.1	47.1	100.0
	Total	51	100.0	100.0	

CHAPTER 6
ANALYSIS

Introduction

This chapter provides an analysis and discussion of data collected from the content analysis and questionnaire described and collated in Chapters 4 and 5 (pages 83 to 117). In this chapter, several types of analysis are applied to data collected from the application of two methods: a content analysis of tutorial videos and a questionnaire answered by university students studying Design. These analyses include a content analysis, social network analysis, and basic statistical analysis. However, it should be noted that different methods involve different types of analysis; this is because the data gathered in each method did not include information appropriate for a social analysis. In this thesis, the social network analysis was accessed through data gathered in NVivo. The chapter is structured to outline and discuss three different types of analysis in sequence: content analysis, statistical analysis, and social network analysis. Each section covers a different type of analysis of data gathered using the first and second methods. A justification for the use of the three methods of analysis follows. I conclude with a discussion of the material presented earlier in the chapter, including the community and social networks found, the activity of lurkers, and how this study relates to digital literacy and the democratisation of information.

Analysis

A variety of types of analysis were implemented in this thesis for a number of reasons. This type of content had not been analysed or studied before, as demonstrated in the literature review (Chapter 2) and related online resources. This required the researcher to develop an understanding of the content in terms of what it is, and whether it constitutes digital design activity. The second reason relates to the phenomenal proliferation of this content in recent years, and how it has involved computational and social mechanisms. Because the content studied (tutorial and procedural videos) involves social interaction with new media content, it was

considered appropriate to include an analysis of the social aspects involved in the proliferation and popularity of the content, as well as providing an understanding of relevant literature and past research on learning activities. This constitutes the social network analysis. Using the data recorded in the content analysis, the study was able to make connections between individual users who were interacting via text with content producers, and with a range of other individuals.

Table 25: Methods and the type of research involved in the analysis.

Data Gathered	Qualitative	Quantitative	
	Content Analysis	Social Network Analysis	Statistics
Online Data	X	X	X
Questionnaire	X		X

A social network analysis could not be conducted on the data obtained from the questionnaire, because the latter was not aimed at discovering the social networks within which students operate, but rather whether they use the content as a shared resource. That is, the questionnaire was intended to gather students‘ attitudes towards this content, and whether they interact with the content themselves, and share it with other students beyond an online, digital environment. Accordingly, the questionnaire included content and a statistical analysis only. This is because the data gathered using this method was only aimed at observing attitudes and other information that was not observable in the data gathered during the initial content analysis of the sample of tutorial and procedural videos as delivered online.

The content analysis includes the use of a theoretical lens to inform the analysis about aspects of the data related to design activity. This is a somewhat new approach that has only recently been applied, and is unconventional in that it included both a content analysis and a social network analysis. This decision is justified by the nature of the phenomenon being studied, brought about by the increasingly social aspects of the new media, and the related need for analysis of both social interaction and the interaction with information via online video content. The majority of content analysis research is with text, although some exists on video (Altheide, 1996). However, when visual content has been analysed, it is usually in the context of other media such as images, photographs and magazines, but rarely with video. This offers two advantages. The first is the combination of social network analysis originating from psychology and sociology. The second is content analysis,

originating from fields usually associated with media analysis. This is usually information gathered from traditional media and new media, an expanding area of research within content analysis.

Social network analysis has been used by others (Scott & Carrington, 2011) for analysis of social networks in the real world, and user interaction on web platforms such as the one studied in this thesis (Youtube.com). For that reason, it was seen as advantageous to include a social network analysis in this study. However, as previously noted, understanding the content around which the social interaction was centred was of primary importance. For that reason, this study investigated combining these two methods, with the intention of conducting a ‗content based social network analysis'.

It is argued that using these two methods together is a unique approach, as it combines qualitative and quantitative research. This can be considered a novel way of resolving problems encountered in the research of new media content.
This study was only able to identify two previous studies (Bohn, Feinerer, Hornik & Mair, 2011 and Velardi, Navigli, Cucchiarelli & D'Antonio, 2008) that have conducted a ‗content based social network analysis', using content analysis and social network analysis together. This is a rapidly emerging area of research that includes new media content and social interaction. However, it is expected that more studies may be emerging as this thesis goes to print. To date, these previous studies have focused on web mailing lists, whereas the current study looks at video content sourced directly from YouTube, and covers a significantly greater number of individually-submitted videos. Therefore it expands the ‗content based social network analysis' by applying it to the analysis of video content using qualitative content analysis methods (Altheide, 1996) and a qualitative theoretical framing. In so doing, this study builds on previous qualitative research on video content, with the addition of online video content that involves time-based screen recordings.

First Analysis: Visual Content Analysis

This section contains the content analysis of the tutorial and procedural video content. The content analysis was discussed in detail in Chapter 4, which was devoted to the method as a tool for gathering and analysing data. In this chapter, content analysis is utilised for discovering what the tutorial videos were ultimately

composed of, and what types of knowledge related to design education and design processes they contained, as well as the social interaction around them. This involved a method-based analysis (Krippendorff, 2013) that required the use of the software application NVivo. In this application, the data gathered from Youtube was coded based on various aesthetic and operational differences related to the four coding categories discussed in Chapter 4 (software differences, differences in objectives, aesthetic differences in the audio-visual composition, and the activity composed within the video). The last category was the most complex, applying the structure of activity theory as a framework to help inform the content analysis coding mechanism. While this category was related to differences in objectives, it was not tied to a set of variables, and was therefore able to expand based on what was gathered from the sample. This is because the study had no control over what video was produced. Whether or not each video's goals and 'production values' would be better was dependent on the sampling (described in Chapter 4, starting at page 83). The researcher only had control over this to the extent of what was being searched for ('tutorial') and what 'application' it was composed in. Everything else was out of the researcher's control, and only based on what was sampled.

The study was designed to be repeatable, but was not under the researcher's complete control because of the potential bias in sampling online videos: i.e. sampling those videos selected for inclusion in the research, or those considered worthy of inclusion, which could potentially add bias to the study. Although the study would be repeatable, the objectives could range across multiple different design solutions and routines. Similarly, the research had no control over the objectives, due to sampling. These differences should be factored in when repeating the study.

This explanation for the calibre of the categorisation also applied to the categorisation of activities, as only the actions and tools used in the software application were able to be captured, and this category was only able to expand as far as each individual software application. However, creating a set of variables that included every tool in each software application was not seen as feasible, as they numbered in the tens of thousands, and it was also likely that not all tools would be utilised. An analysis the activity proved this to be correct. Therefore the economy of scale in this PhD study forced a more limited analysis because of the exponential number of potential variables, and other social aspects that were involved.

As described in earlier chapters, according to Kaptelinin et al. (1999) — the latest champion of this theory — activity theory has a hierarchical structure. This structure was utilised during the coding process to understand the activity itself. The actions themselves (within the hierarchical structure of activity) were identified, described and recorded during the final coding stage. However, it should be noted that the activity (within the hierarchical structure of activity) was also coded in terms of the differences in objectives, but the operations within each of the actions were not. This would have added too much complexity to the study, as it would have dramatically increased the variables.

The process of activity found in the videos was viewed through the theoretical framework of activity theory. These videos are all tutorial videos on how to achieve a certain design process, and as such, the actions described and presented by the creators of the videos could each be considered an activity or process. Applying a content analysis to a piece of content requires counting the occurrence of variables (outlined in Chapters 1 and 3). In this content analysis, the variables counted were actions within an activity. This theoretical insight into activity draws from what Kaptelinin et al. (1999) assert is the first principle of activity theory, which is the principle of the hierarchical structure of activity. This involves operations occurring within actions and within an activity. This concept of a hierarchical structure to activity shares similarities with research on design processes, as presented in *An exploration of the design process* (Akin 1984). Akin (1984, p. 193) describes plans as —hierarchical processes that control the order in which a sequence of operations is to be performed. To fulfil their needs and intentions humans plan and execute series of actions.” Akin‘s work (1984) is based on Miller‘s (1960) writing on plans and the structure of human behaviour when involved in processes.

Similarities can be seen between the work of Akin (1984) and Kaptelinin et al. (1999). Despite conducting research in domains that are arguably different, both include reference to the concept of a hierarchical structure to activity. The similarities between the research on design routines and activity theory, both of relevance to this thesis, cannot be ignored. Akin‘s (1984) study employed a protocol analysis similar to the way in which content analysis was used in one aspect of this study. However, content analysis was chosen for this study because of the content

involved in the study, and the significant lack of research conducted on this content. Content analysis was seen as having the potential to gain a better understanding of a type of content that had not yet been studied.

As far as this research has established, no theoretical framework exists within design research for understanding activity and processes. For that reason, a content analysis was applied with the use of the activity theory framework in order to understand the activity presented in the videos. The content analysis method ultimately involves counting variables, but the meaning behind the variables and how they string together is informed by activity theory, because they are variables involved in an activity or process. Miller‘s (1960) writings show other similarities between plans and processes described by designers and design researchers, activity theorists and HCI scholars, and makes reference to a hierarchy and an understanding of design that includes a structure dictated by the objective or the activity being accomplished.

Digital methods were introduced for data collection, which was seen as appropriate since the content was entirely digital. The data collected using the content analysis involved software that could gather information in a similar way to the method known as data mining. Information was gathered from video tutorials directly, and from the associated website YouTube using ‗NVivo‘, along with other information including comments on the tutorials, ratings on the tutorials, and geographical information on the actors, also known as users. (These terms are used interchangeably in this chapter). This additional information enabled a social network analysis to be undertaken in support of the content analysis. The data gathered using the questionnaire was analysed using content analysis and statistical analysis. This was done because in contrast to the content analysis method, this data was not suitable for a social network analysis.

The data gathered using the content analysis method was analysed using the software NVivo, the only software currently available that permits the analysis of video content taken from the internet. This ability to analyse online video content became available after an update to the software (14th of February 2013). The creators of the videos undertook actions when explaining their different design processes. Activity theory provided a theoretical basis for understanding these

actions and design processes. NVivo allowed this data to be coded in accordance with the framework of activity theory by allowing the recording of information over time.

The actions of the video creators formed the basis of what was being taught (a design process), and every action represents a tool or function in a design application. Like actions within activity theory (Kaptelinin et al. 1999), tools have what could be described as operations within them, which affect how much a tool or function is utilised. Ultimately, these videos contain a digital design process with the practical aim of creating a digital artefact. However, the expected function of the videos was to engage in digital design practice with the intention of educating an audience, and the medium affected the ways the design processes were presented in the online videos. This is discussed in more detail later in this section.

Aesthetics were identified based on audio-visual information, with the editing functions relating to sound and time (the presence of voice or music, and whether time was increased or slowed down). Some additional aesthetics could have been included, for example introductions, as well as features such as zooming in on details or additional captions. Software interventions that purposely modified the objective of the video‘s image to improve reception were other aesthetics not identified or categorised in this study. However, these aesthetics were not seen as having a major impact on the videos‘ reception, as they only accounted for an incredibly small period of time in relation to entirety of the video, and seemed to exist mostly for branding purposes. The aesthetics involved in this study, including symbols and naming conventions, and the use of tools within the software application, are precisely those that are seen as representations of information in popular computer software. Outcomes, such as the design outcome explained within the tutorial or procedural video, were also coded based on their aesthetic appearance as interpreted by the researcher.

NVivo uncovered a range of different segments relating to the content analysis. The method of data gathering used by NVivo uncovered data for the content analysis of both text based comments and video content. Some of these related to differences in objectives between applications, and the structure of the activity identified in the videos. Using NVivo, two stages were identified when comparing multiple similar videos in the design processes. Similarities appeared in the ways in which certain

actions were being used in the beginning or later stages of the digital design process. These two stages were identified as the creation and refinement stages. The creation stage was categorised by an abundance of tools that created objects, colours, pixels and polygons. The later stage (refinement) was categorised by an array of different tools that edited or removed portions of objects, colours and pixels. These stages were identified in almost every video detailing a specific design task (99% of videos analysed), indicating that essentially what is communicated in these videos is the creation and refinement of digital files with a digital design process. Figure 11 below shows the creation stage, analysed from three videos teaching how to create a glowing line in a 3D space. The three separate videos were chosen because of their similarities to each other in objective and involvement in the exact same activity or digital design process. Figure 11 demonstrates that the same tool was used at a similar point in time by each of the different authors of the videos. These images illustrate the refinement and creation stages of the design process. They have been taken from a number of different applications, and each process identified is also intended to create a different object or effect. However, in all of the examples presented, and in the majority of videos analysed, these two stages were found in the digital design process.

The diagrams in Figure 11 are time based, and illustrate the hierarchical structure of digital design activity. They do this by contrasting three different individual design processes, and by representing actions (or tools used within the application) with colours. Each action that is the same has the same colour, and the similarities between the three are seen in the order or the routine used to complete the activity. Each colour represents a different tool used in the video: blue represents the pen tool, yellow represents the stroke path tool, green the brush tool, and red the new layer tool. The occurrences of tools were counted using the content analysis method. The occurrences are mapped out over a specific time period (starting on the left and ending on the right) and are represented at the top with the numbers 0, 2 and 7, which represent the minutes taken to complete the task. The time period represents the activity that occurs over a period of time, or the actions involved in a digital design process. A different author produces each video, and a line separates each author.

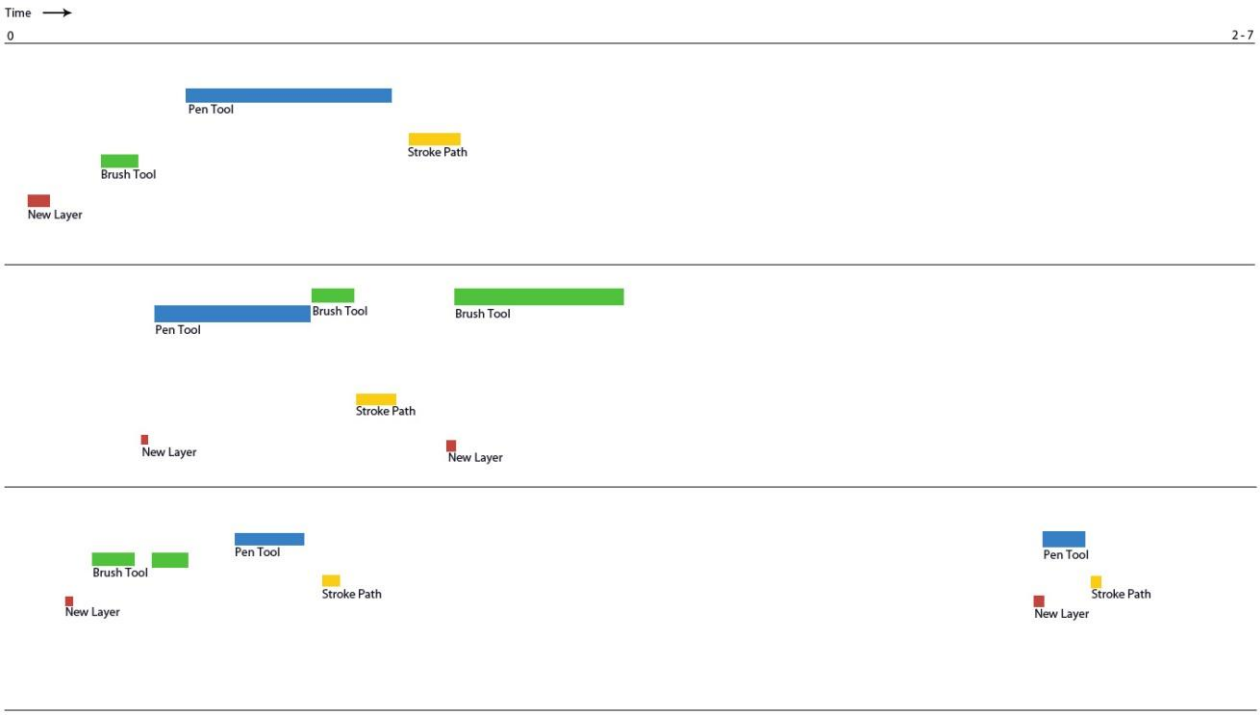

Figure 11: Coded digital design process displaying the creation stage for 3 different videos displaying the same design process.

Figure 11 demonstrates that the creation stage process is very similar in all three videos, despite their different authors. The sequence of actions is almost identical apart from a few small variations, which include variations in the order and time period in which actions are conducted. As the data in Figure 11 shows, in terms of hierarchy, before the action ‗brush tool' is completed, the action 'new layer' must be completed. This behaviour indicates the nature of digital design and the hierarchy to digital design activity. It is argued that this hierarchy helps form routines that are similar among multiple designers. The routine followed above involves using multiple actions to complete an activity in a set order. Figure 11 presents only the ‗creation stage', the stage involved in creating objects; nevertheless the data shows that a routine is followed to create an object within a digital design application. This routine as shown in Figure 11 is specifically conducted in the following actions: ‗new layer', ‗brush tool', ‗pen tool' and ‗stroke path'.

Forming routines with similar processes is an important aspect of the phenomenon observed. Routines are shared and formed online, are viewed by thousands of

people around the world, and are distributed by large and diverse groups. Despite this diversity, similarities can still be found between the processes shared when the goal is identical. The same goal, similar routine and process, and small variations occurred, but all the same tools were implemented, and a similar hierarchy was found within the activities studied that had similar or identical goals

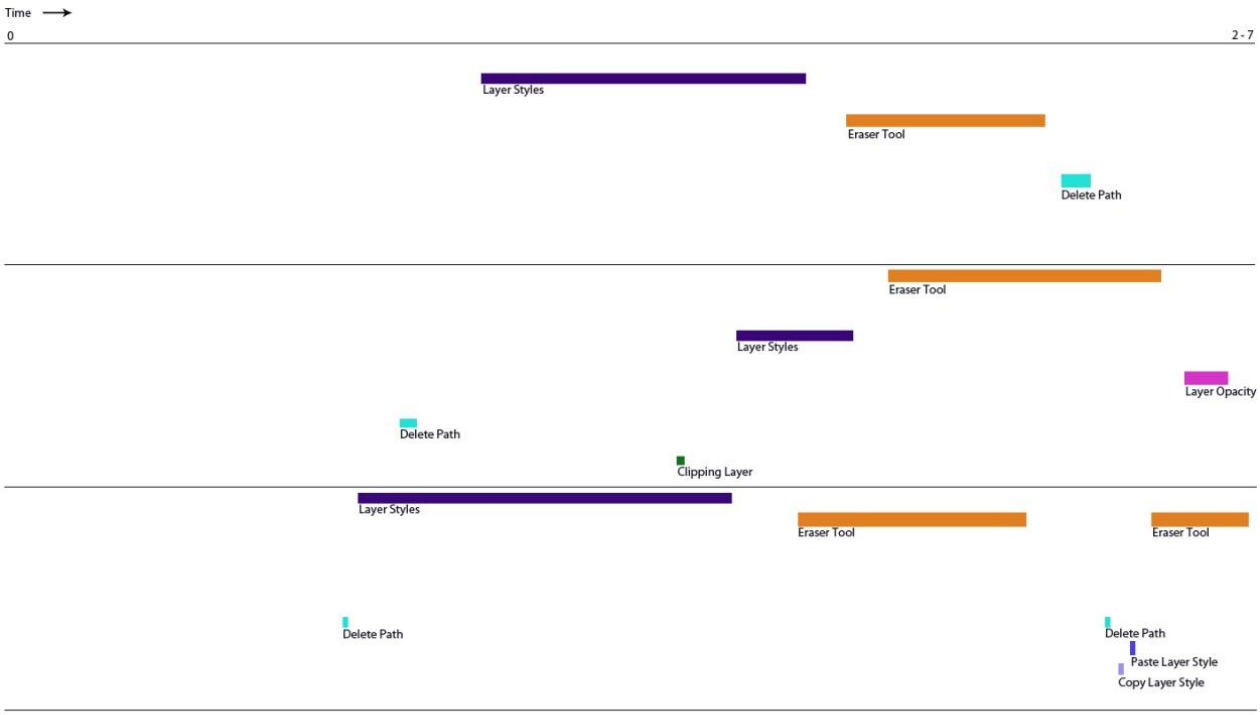

Figure 12: Coded digital design process displaying the refinement stage for 3 different videos displaying the same design process.

Figures 11 and 12 above involve three design processes that contain the same activity. These three design processes come from three different authors, and contain minor differences. Unlike the other processes, which contrasted different applications and activities against each other, this image(Figure 12) shows the same application and activity. However, as in most instances in this study, not all actions were exactly the same. What this image(Figure 12) illustrates is that the creation and refinement stages are found in nearly all tutorial videos.

Figure 13 shows actions coded from the same three videos represented in Figures 11 and 12, using the framework of activity theory within an activity, as illustrated in the diagram (Figure 7 on page 76) by Kaptelinin, Nardi, and Macaulay (1999). Each

action is coded to help create a picture of the composition of digital design activities. These processes have a routine to them, and share a large number of similarities. However, this is usually the case when tutorial videos share the same activity; otherwise the processes could be considered vastly different, and often are.

Differences in actions within a similar activity were also observed, but these differences only constituted what could be considered small variations. These variations included the use of the same tools or actions in a slightly different order, and over a slightly different time period. Reasons for the differences might include the visual aesthetic differences required by authors, or the influence of a multitude of authors socially communicating the same process in different ways.

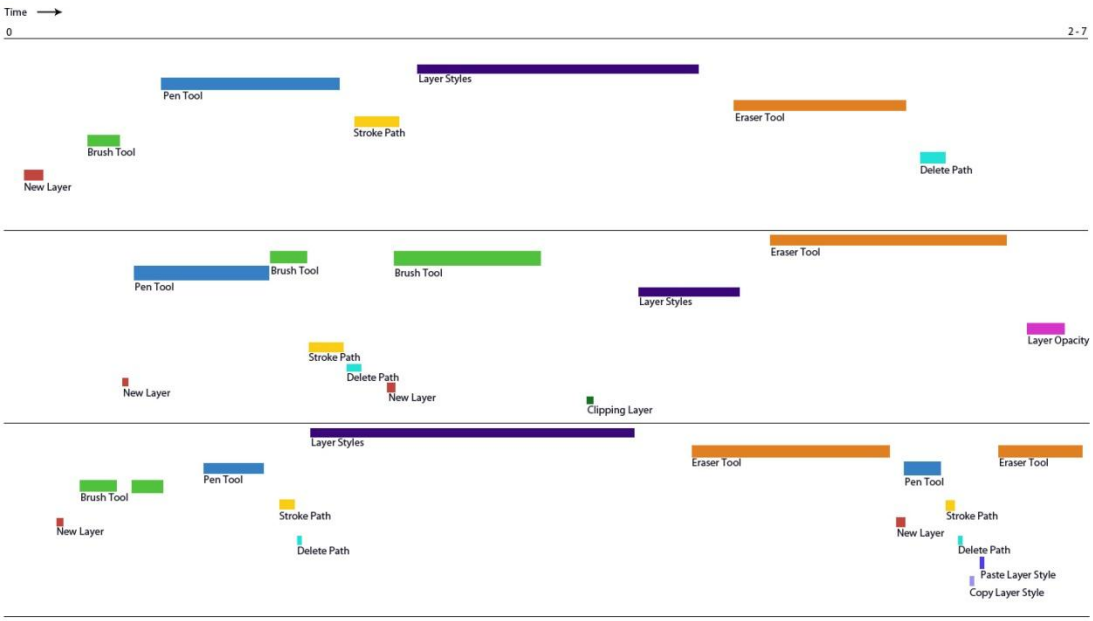

Figure 13: Three complete coded digital design process for three different videos displaying the same design process.

Figure 13 illustrates three different design processes using the same design application, with the aim of achieving the same goal (or effect). Not all digital processes contained actions that could be considered routine for the specific activity, as some processes have been automated by computer applications, and did not contain enough actions to be considered a routine. These videos could serve as an example of contemporary design practice, but not completely, as they are intended to teach aspects of digital design by teaching a process in the form of a

tutorial, and this requires them to use and explain tools for longer than would be required when engaging in digital design in private.

Table 24 indicates aesthetic differences based on sound and other aesthetics related to the video medium. For example, time is increased but not slowed down in the ‗Time-Lapse‘ videos analysed.

Table 26: The categorisation of audio-visual aesthetic differences found in DDTVs.

Category	Sound	Time
Procedural	No Voice / music	Normal
Tutorial	Voice	Normal
Time-Lapse	Voice / music / no voice	increased
Documentary	Voice	Past tense

Table 25 illustrates some the aesthetic differences found in the tutorial and procedural videos analysed. These differences were first identified in a case study conducted before this thesis began, aimed at better understanding what was being analysed, and the aesthetic differences of a new, rapidly-emerging and expanding type of online video content. The differences were regarded as audio-visual aesthetics, as they occurred within video content. Some of these differences related to audio differences in the representation of the process. Some videos included a voice instruction, while others did not. This audio difference was noted in the creation of two different categories: tutorial and procedural. These categories represent the videos that contained a voice instructing the user on a process, and others that did not. It should be noted that the main difference in the audio aspect between these videos is not the just presence of audio — as many procedural videos included music — but the presence of a voice instructing the viewer. Other differences were based more on the aesthetics of the video content and the differences in relation to time. For example, if the time was increased and the process was occurring on the screen quicker than it normally would, it was considered a time-lapse.

Table 27: Data presenting the audio-visual aesthetic categories for online videos sampled.

Name	Sources
Documentary	0
Procedural	57
Time-Lapse	1
Tutorial	737

Table 25 includes aesthetic categories, as these are the categories chosen to represent different audio-visual phenomena and presentation styles. As noted, the most frequent video found in this study was that categorised as a tutorial video. This means that in the majority of the videos studied, a voice accompanied the video and instructed the user on how to complete the process conducted within the video. This could have occurred for various reasons. One relates to the need for assistance, where the video creator may have believed that users might find it easier if they were able to both see and hear instructions on what to do. This method of including both what is being done and being instructed in it mimics what occurs with video between an instructor and student in class in a tertiary learning environment. This may be why it was more popular with viewers and creators of video content. The familiarity (and usefulness) of this process makes it more popular with online users.

There was a potential search engine bias relating to the algorithms that run the search engine and the relation to popularity. This potential bias was due to sampling for _tutorial videos'. Sampling for the study followed a scientific sampling method outlined in the discussion on content analysis. The method of sampling was intended to be repeatable, and followed a strict protocol so that other researchers would be able to repeat the experiment. This was not the case with the case study conducted before this thesis, which was not easily repeatable because it requires interaction with the content and relevant past experiences in digital design. However, it should be noted that this case study was conducted before the thesis commenced, and as a result is not included as a method in this study. For this reason, some categories are missing completely, and very few, if any, videos could be found in relation to them. This may be due to the way the videos were sampled, and the differences between that and the original case study that informed categorisation of the videos.

This was not the case for other aspects of categorisation, as objectives had no set restrictions, apart from those within the objectives contained within the video. This means that a wide array of categories could emerge based on the content sampled; in this instance content was sampled from a wide range of different applications that are used to complete a somewhat varied set of design tasks. Accordingly, the categories included a larger range of design tasks than might be expected, and a significant amount of crossover from different applications. The applications included ranged from print design applications to 3D design applications, as well as a wide array of other applications such as video editing and those that are animation based. Some of these applications overlapped, and were intended to complete the same task. However, it should be noted that the study only included eight different applications, three utilising 3D technology, four focusing primarily on 2D design content, and one on video content. This selection of applications influenced the objectives that were received during the content analysis, as the applications function determines what type of design objective can be completed.

In Table 25 below, 26 differences in objectives (or design outcomes) are mapped out, and the extent to which any one objective was utilised in the video content studied is displayed. Table 26 shows which objectives were most popular, and which was most likely to be taught online in a video. This study included a total of 798 videos, and of those videos, many contain processes that are similar and objectives that are almost identical. Some of the most common objectives found focused on basic training and procedural effects. Procedural effects can be described as a process that includes the procedural generation of an aesthetic effect within the application. An example of this would be the use of a ‗filter' in the application ‗Photoshop'. Other applications also contain a multitude of different methods for procedurally generating an effect. Basic training is more self-explanatory, referring to training that would be considered basic, and rudimentary processes involved in the specific application.

Table 28: The objectives of digital design process found within video content online.

Name	Sources
Actionscript Game	8
Animation	93
Basic Training	116
Compositing	36
Design Elements	24

Editing	2
Illustration	35
Javascript	2
Layout Design	50
Lighting	9
Logo	26
3D Modeling	106
Motion Graphic	30
Photo Manipulation	16
Portrait	2
Poster	6
Printing	2
Procedural Effect	121
Rendering	21
Retouching	19
Rigging	6
Selection	1
Sound Element	1
Texturing	44
Typography	54
Web Design	25

In Table 26, many categories are shown to be more popular than others, with a larger number of sources. It should be noted that in the table above (28) that some categories are more popular than others, including ‗procedural effect', ‗basic training' and ‗3D modelling'. These categories could be more popular for two different reasons; one being that the audience has a need for this content, and it is frequently searched for a watched improving the contents ranking online and increasing the likelihood of it being sampled by the researcher. The other reason is that there is simply more of this content produced and available online, and therefore it was sampled more frequently. For some categories, this may be because of the choice of applications involved in the study. For example, the category ‗modeling' involves creating a 3D model, and within a 3D application this may be seen as a something quite routine, or something normally required before conducting animation or other design objectives; as a result, this objective may appear more frequently online. However, this could also be due to the inclusion of three different 3D applications within this study.

Eight design applications were selected for the study. These were intended to cover a broad spectrum of digital design disciplines. However, this only included digital methodology and practice, and did not include conceptualisation and other aspects

of design that were not digital. For this reason, it was considered important to record these applications, as they determined what could and could not be achieved with the chosen design outcome.

Table 29: The design applications or programs included in the study.

Name	Sources
3dsMax	99
After Effects	100
Cinema4D	99
Flash	100
Illustrator	100
InDesign	100
Maya	100
Photoshop	100

This concludes the chapter‘s section on the visual analysis of DDTVs. The following sections will address the analysis of text-based information.

Word-based Content Analysis

Other aspects of content analysis collected by NVivo include the associated comments left by viewers on the videos‘ YouTube site. These comments were an indication of the viewer‘s approval or disapproval of the content, and also constitute the majority of community interaction with the content. The words below are listed in order of frequency.

Top 10:

1. Thanks
2. Tutorials
3. Like
4. Video
5. Make
6. Thank
7. Great
8. Help
9. Use
10. Good

The most often-used word in a comment posted by a user watching a tutorial video was ‗Thanks‘. This word was counted a total of 10,674 times, based on the study of

800 videos, and 143,607 text comments associated with these videos. The top 10 words mostly voiced approval of the content.

Second Analysis: Social Network Analysis

Social network analysis was used in this study to gain a better understanding of the social aspects involved in the content use, audience distribution and proliferation across the internet. This first section of the social network analysis covers the connections between ‗viewers' or ‗users' of tutorial and procedural videos, and the producers of the videos. Social network analysis was used in this study to investigate the interaction between users on various online platforms (Twitter, Facebook) and was applied to the comments posted on various video tutorials. However, it deals only with the interaction between users and video creators online, not with the content directly. It is impossible for NVivo (or any form of software intervention or analysis) to read the pace or depth of reader intervention/interaction. In this study, social interactions are seen as text-based comments, but it should be noted that not only ‗users' or ‗viewers' of the content are involved in text-based interaction, but also the ‗video creator or producer'.

It should also be pointed out that in all the social network analysis data gathered, all networks had what is described as an ego network (Ref. SAGE). An ego network is one in which most of the social interaction is situated around a single user, or in this case a video producer. This study found that, like some other online platforms that involve communication between users with text based means (such as Facebook, Twitter etc.), the addition of another type of content can create the kind of social interactions that can be considered ego networks around the user who ‗posts' or presents the content first. This is the case for all of the 798 videos involved in this study, apart from the videos that featured no social interaction. The majority of the social interaction involved users making a comment about the video content or the video producer, and in the majority of instances, users made a comment via text-based interaction with the video producer, and did not interact with other users. The most probable explanation for this behaviour is the similarities with ‗lurking'. That is, commenters had either received the information they required from the video content, and therefore did not bother to communicate, or if they had not obtained what they wanted, they moved on without leaving a comment. However, it could also be noted that the YouTube platform itself encourages only limited interaction;

for example, servicing the site with two thumb icons (up and down) and reply/comment boxes for addressing the producer, but not encouraging interaction with fellow users beyond allowing them to reply to comments. Those who made comments had the opportunity to communicate with each other; they were able to leave messages in the comments section. These comments were acknowledged or reciprocated in only very few instances, and this interaction between commenters would often only occur a few times — between four and six on a video with hundreds of comments. I would argue that the essentially „visual' /non-word-based qualities of the video medium itself, along with the input limitations of the YouTube platform, have directly influenced interactive behaviour in this case. To understand this type of online behaviour better requires a discussion of „lurking' and „active lurkers', which is included in Chapter 7. However, the research indicated that the majority of viewers (99%) did not comment or interact with the video in any way apart from watching it, and this is a good indication of the type of social behaviour and online interaction with this content.

Data used in the social network analysis was first captured using NVivo before each video was exported into the social network analysis application Gelphi. This involved exporting all of the social interactions between the users on each video into a two-column table that mapped social interactions to and from different individuals or „users'. This was composed of comments between users and comments directed at the video producer. The table exported from NVivo was easily importable into the application Gelphi, and enabled the production of the network graphs below in Figures 14,15, and 16.

Network graphs map interactions between circular nodes (or users/viewers of tutorial and procedural video content) and connect them with lines, forming a graph. Each line contains an arrow which indicates which node (or user) is interacting with which. Another arrow will point towards the original node (user) if they have responded; if it points towards another node, this indicates that they have interacted with another user.

The following Figure (14) represents an ego network situated around a video tutorial. The first image involves an entire video, with the video producer situated in the middle, and a network with communication surrounding the producer. The

network of communication is directed towards the producer, with some others interacting with each other on the outside. Most of the communication is directed at the video creator, and is not often replied to by others or by the original video creator. This is indicated by the lack of interactions between users on the edges of the network compared with the number of interactions directed at the video producer. The graph below (Figure 14) follows the typical representation of an ego network, and the visual representation shows that most interaction is centralised on one node. This is because in this study, it was discovered that the majority of interactions occur in relation to the video content — comments made towards the content and towards the contents producer. The communication directed towards the video content should be emphasised above other aspects of the analysis, most importantly the word-based content analysis, which found that the most frequently-used word — 'Thanks' — was directed towards the video content.

It should be pointed out that the image below features only a single video with the attached text-based comments. It is presented first for simplicity, but graphs featured later in this chapter contain the social interactions found on multiple videos from various categories found in the content analysis. The image below (Figure 14) includes interactions between the video producer (central large red circle) and viewers or users (blue dots) of the tutorial or procedural video. It also shows interactions between other users who have made text-based comments; they are represented as red circles around the outside of the image.

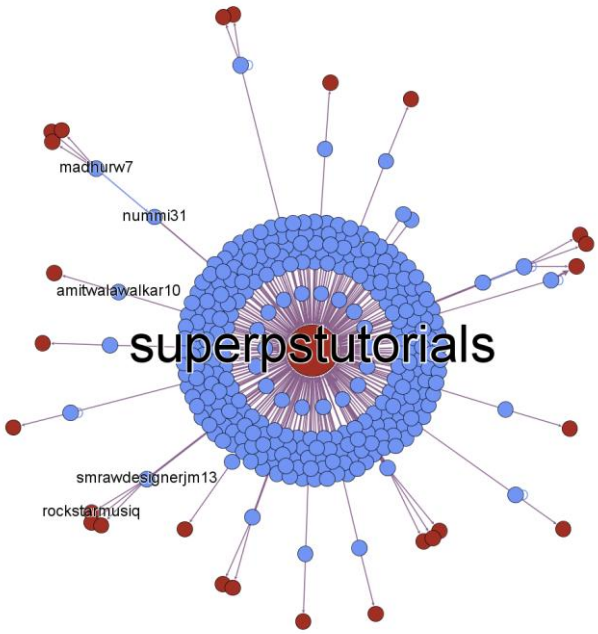

Figure 14: A social network analysis graph of a single video‘s social interaction. Red is users who have made text comments; blue those who have replied to text comments. Names have been altered to avoid identification.

The image above (Figure 14) shows the video producer ‗superpstutorials‘ (not a real name) has the majority of the social interaction operating around itself. It also shows the video content that has been produced. Other users are interacting with each other, but because of the amount of interaction directed at the video producer, it is hard to determine whether they are interacting with the users with text-based comments as well, or whether they are merely producing a piece of video content, and not interacting with anybody via text-based means.

However, this is a clear representation of an ego network, and a good example of the typical social network found surrounding a tutorial or procedural video in this study. Ego networks are situated primarily around one user (or video producer). This could be for various reasons, but this study enables us to determine aspects of the content and information that is represented during interactions. Content analysis has also been conducted on the content displayed within the network, which allows us to understand what type of content is at the centre of the network graph, and why it may create this form of social interaction.

This research has sought to explore the relation between the content and the number of connections within a network, as provided by popular networks that supply video content. These networks express interaction through the limited rating of popularity within a social network (rather than a more refined expression of feeling). Before the study was conducted, it was assumed (based on the literature reviewed) that the video content may gather more attention than the text-based comments. This is because of both the nature of the online platform in which the videos are located, and because video content presents itself primarily as a visual rather than a text-driven medium.

In the next image (Figure 15), the video producer‘s video content is omitted to indicate the amount of communication occurring with text-based communication alone. Figure 15 indicates that the original video producer is also involved in text-based communication. The graph (Figure 15) involves comments taken out of an ego network in order to see the interaction between those users who just leave comments and do not create videos. This allowed the researcher to determine if the

original video producer (superpstutorials) was interacting with text-based comments, or possibly replying to other users. In Figure 15, it can be seen that the original video producer is interacting with other users via text-based comments, and that this is also situated near a large branch of interaction between multiple users. Multiple users are featured replying to, and interacting with, the video producer. Other users are also interacting with them by replying to the text-based comments left by other users, leaving a string of connections between multiple users and the original video producer. This string is shown with the colours brown, orange, blue and pink.

Figure 15 does not feature any of the social interaction centred on the video content, but solely text-based activity; as a result, it shows that the majority of interaction without the video content involves just two users or (nodes) interacting with each other. In all, there are 800 interactions represented here; yet there were only nine different occasions (0.00001%) when users left only one reply to another user.

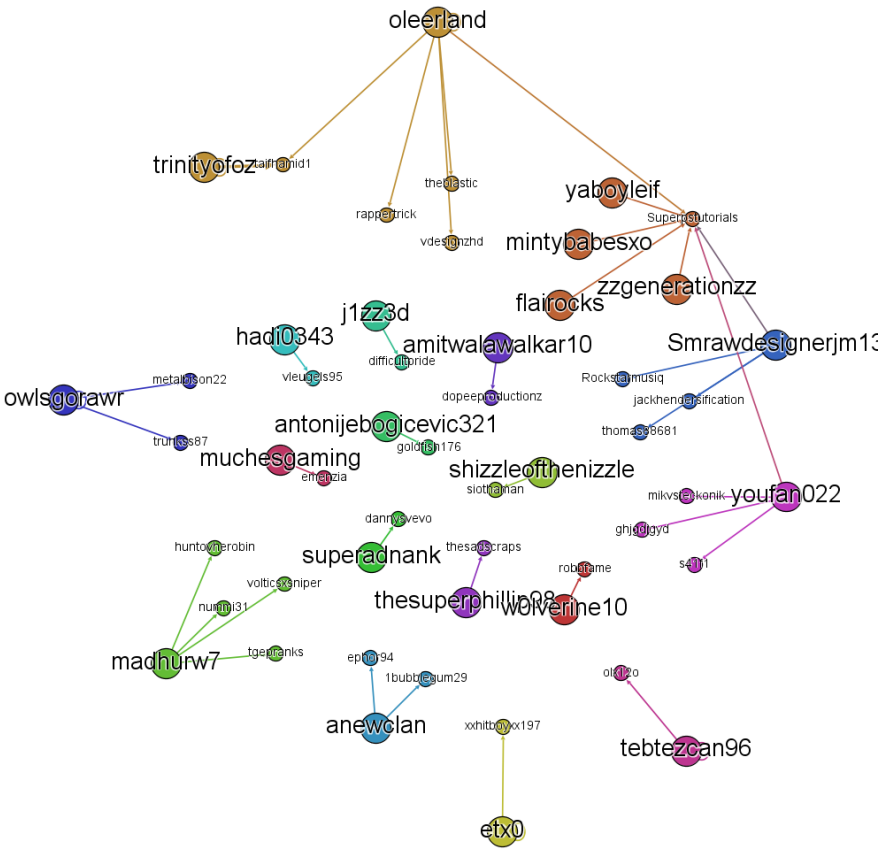

Figure 15: Social network analysis graph featuring mutual communication; it represents only users shown in Figure 12 who replied to each other. Users who reply to each other within the same comment chain share the same colour. Point size indicates who is being responded to.

Figure 15 features interactions between users with only text-based comments, meaning that only text-based interactions were included. As a result, the depiction of the network is noticeably different. This network features many connections between only a few users, and one larger group of connections that features multiple interactions occurring around a user who happens also to be the video producer; other users have interacted with the producer in this context. This user has produced video content in this network, but that video content is omitted, with only text-based interaction remaining. This corresponds with previous qualitative research on text-based comments regarding questions asked of the video producer by viewers, but responded to by other viewers. The level of interaction featured here is noticeably different from that of an ego network. It arguably involves more interaction between significantly larger groups of different users (actors).

The next image (Figure 16) is quite complex compared with the last two images (Figures 13 and 14). With regard to the social network analysis, it involves 30 ego networks represented together. This is intended to illustrate the videos in the context of each other, and to show how user contribution and activity exists in many videos, though it can be seen here that video producers are forming ego networks with video content, as previous discussed.

Figure 16 contains multiple ego networks that were previously separated. The image features a combination of 30 different video producers and thousands of interactions. However, these networks are not all situated on the same web address, but are all located on the same platform (youtube.com). Thus presenting them together allows the connections users are making in multiple videos to be represented.

Connections between and around users‘ interaction with ego networks indicates that an ‗audience‘ is interacting with many types of similar content, and/or each other, and are leaving text-based comments on many videos identified in the content analysis as being of a similar nature. However, not all interaction is solely situated around the ego networks, as multiple users are seen interacting with each other, and with multiple other video producers, on many different videos. This indicates that there is a range of individuals who watch and comment on multiple videos of the same nature regarding the same application. It should be noted that each ego

network does not represent a single video, but multiple videos by the same author. This means that authors who have created multiple videos, and who are included in this study as a result of sampling, may have larger ego networks as a result. These networked phenomena reinforce the presence of communities of interest actively forming and interacting around particular content located on YouTube and Vimeo. In relation to educational videos, this phenomenon has not previously been so clearly demonstrated.

The network below (Figure 16) features videos taken from the application _Photoshop'. It includes some of the most popular videos found in this study, and does not differentiate between videos based on their intended design objective. All videos included in this network graph could also be considered _tutorial' videos, as they include voice instruction. It should be acknowledged that the connections between multiple users on many videos does not form the basis for the majority of interactions, and the individuals interacting in this manner could be considered in the minority when it comes to online behaviour when interacting with tutorial videos. In fact, only .0019% of users leave a trace of their interaction with the ego networks, because they leave no trace of their presence.

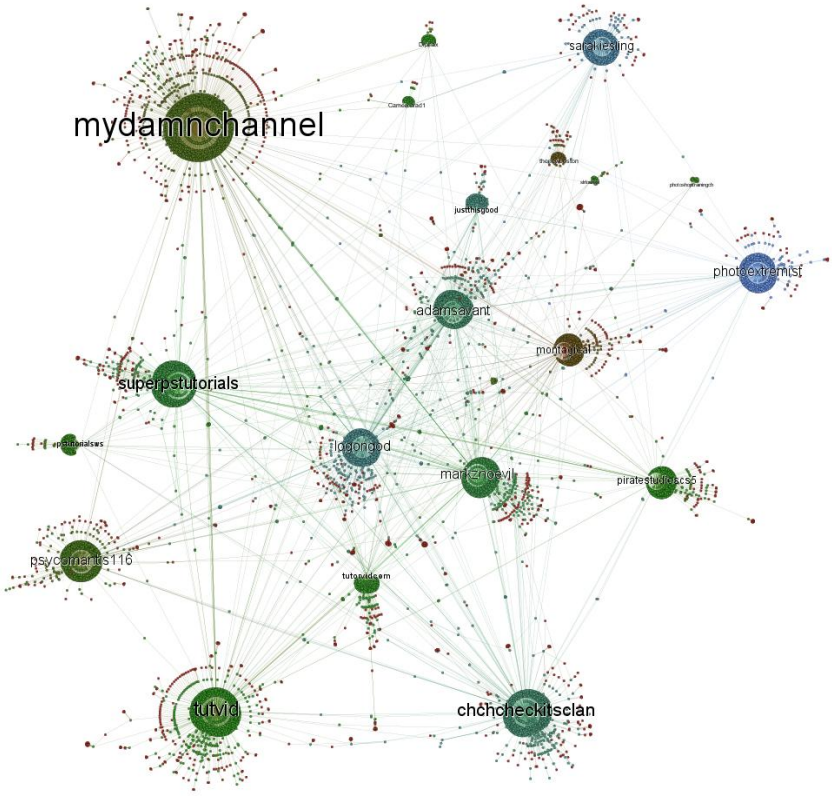

Figure 16 A large social network analysis graph, featuring multiple videos and the corresponding social interaction. Colours are used to both differentiate videos and users. Font size depends on the number of connections. Red indicates that the users have replied to comments, and the groupings for different videos are represented with different colours.

When ego networks that exist on separate web pages are represented together, an image that represents the connections between members of the community is generated. As all of the users involved in the image above (Figure 16) are situated around tutorial videos that involve the application Photoshop, this could be considered a snapshot of a video-based community of designers, students and hobbyists who use Photoshop. Unlike other studies of social media-based interactions online on other platforms (Facebook), this study identified a larger number of ego networks when analysing the interaction made around the content studied in this thesis. One reason for this concerns the way in which these tutorials could be accessed online. The video content studied in this thesis is used for basic problem solving when a problem arises or an aspect of a design is missing from the working knowledge of the designer. This is a probable explanation for the fact that users are making connections with just one video, or one video producer in the majority of instances.

Social network data and graphs from other online platforms such as Facebook appear markedly different to the networks found in this study. This could be attributed to the differences found in the websites and the way they function. As figures 14, 15 and 16 indicate there was social interaction present on these videos, and ego networks forming in most instances. In figure 15, an ego network was not present, however it should be noted that this network was isolated from the author of the video content and as a result did not feature an ego network. This was done to determine if video content assisted the formation of an ego network around its author, which was indicated when it was omitted. When the video content is omitted, dyad and triad networks were seen to form between groups of individuals leaving text-based comments. In every instance a video was present an ego network formed in this study, however some ego networks were significantly smaller than others due to differences in the size of the audience. Other network maps with different applications included the same types of networks (ego networks) found in the images displayed above (Figure 16). However, differences in relation to social formation around the tutorial and procedural videos studied in this thesis were minimal. This means that regardless of application, or audio-visual aesthetic

difference, the social formation was very similar, and in the majority of cases, could be regarded as multiple ego networks.

Data Mining Descriptive Statistics

Statistics in this section of the thesis represent the level of interaction surrounding tutorial videos. However, the presentation of descriptive statistics did not involve an analysis of direct social interaction with the content and other users, but was implemented to cover the popularity of the content online, and to highlight the level of social interaction that occurs. This type of social interaction includes the terms ‗likes' ‗dislikes', ‗views' and ‗comments'. These terms are used within the online platform as terminology that refers to various types of interaction users can make with the video content. A brief overview of the terminology is included below:

- ‗Likes' refer to the number of times different users or individuals have ‗liked' or approved of the video content they are they are viewing.
- ‗Dislikes' refer to the number of times different users or individuals have ‗disliked' or disapproved of the video content they are viewing.
- ‗Views' refers to the number of times different users or individuals have viewed the video content online. These are referred to as ‗unique views', and do not involve repeated views from the same individual.
- ‗Comments' refers to the number of times different users have left a text-based response towards the video content.

Other aspects incorporated into the statistical presentation include the locations of the video producers and the users who are interacting with the video content online; the percentage that interacts with the video content was only 0.49% of the total audience, as Nonnecke and Preece (2001) have reported the vast majority of virtual community participants are lurkers who engage in similar activity. This was done to give the researcher an indication of how geographically closely situated the users and producers of the type of content were to each other. This does not make up the majority of the statistics; it is only considered in relation to the global influence of the content and origins of the audience.

After reviewing the statistics, it was uncovered that ‗likes' greatly outnumber ‗dislikes' (382,590 ‗likes' and 17,095 ‗dislikes'). This indicates that in the majority of instances, the content in question was approved of by a huge percentage of its active audience. This correlates with the results found in the last section relating to the content analysis of text-based comments, in which the most used word was ‗Thanks' — an indication of approval and gratitude for providing the content. However, the total number of ‗likes' and ‗dislikes' was much smaller than the total number of ‗views'. This can be understood by the way in which the online platform functions, as viewers are required to sign up and become ‗member' users in order to ‗like' or ‗dislike' video content and leave text-based comments. This would contribute to the drop in ‗likes', ‗dislikes', and ‗comments'. However, other factors related to this behaviour (lurking) have already been witnessed in the social network analysis, and will be discussed in more detail in the discussion section of this chapter. The number of ‗views' greatly outnumbers both likes and dislikes. As previously stated, this is an indication that lurking behaviour, and what has been described as ‗active lurking', was present. This was demonstrated by the reduced number of likes and dislikes, in comparison to views. This shows that individuals watching online tutorial videos are mostly just viewing them, and not interacting.

The table below displays the total ‗likes', dislikes and views, as well as other basic statistical terminology. This is to give the reader an indication of the type of viewership this content has in terms of total and average per video, and the level of interaction occurring related to the content. It demonstrates that many more users are simply viewing the content.

Table 30: A table displaying the mean, median and mode of the dislikes, likes and views for the DDTVs sampled. Multiple modes exist. The smallest value is shown.

Type	Dislikes	Likes	Views
Mean	21.48	480.64	110340.96
Median	4.50	99.50	23214.50
Mode	0	1	43[a]
Total %	17095	382590	87831408

It is possible that the sampling could have been biased towards dislikes because of the sampling method. (The search function sample method included popular videos and videos with a positive rating related to ‗likes' based on search engine

algorithms.) The number of dislikes indicated in the above graph represents the percentages of likes found on each tutorial video. The largest section of the graph is covered with blue; this represents 0 and indicates that the greatest percentage of videos were not dislikes at all. This is followed by 1 and other low numbers, indicating that most videos did not receive any dislikes at all.

The number of likes per video compared with dislikes varied a lot. Each video had an almost completely different number of likes, ranging from just a few to thousands. In this graph, there is a significant number of different likes, and this illustrates the almost random and sometimes limited interaction to which these videos are exposed. Consequently, data regarding dislikes was similar, and occurrences also seemed random. They were also found to be incredibly varied, although fewer than the total number of likes.

The graph below represents the countries from which video producers and commenter‘s interacting with DDTVs originated. This is intended to indicate the global influence and audience of the content, and how new media content is accessed and produced by a wide array of individuals from all over the world. The majority of people came from western countries, as expected for a number of reasons. One is that western countries have more developed information technology infrastructures, and a more up-to-date focus on online technologies. However, this study was conducted from a western IP address using a search function in the English language. This means that the DDTVs were in English in the majority of instances. This might have biased the study towards a western audience because of search engine algorithms, but this bias may not have had much of an influence, considering the different countries identified during this analysis.

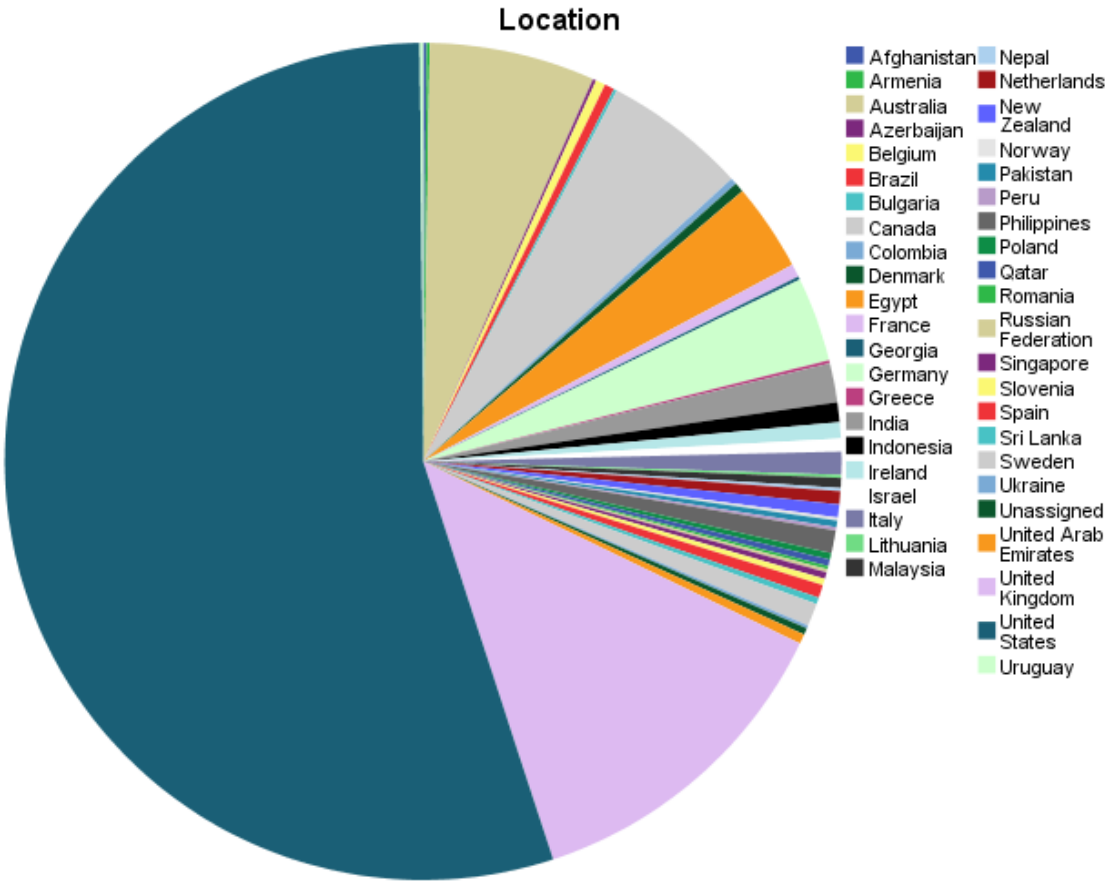

Figure 17: Pie graph indicating countries involved in interaction with DDTVs

The locations from which video tutorials originated constituted an interesting component in this phenomenon that spans most of the globe. Video producers came from many different countries, as did the users who commented on these videos. It was assumed that because this study only involved English-language content, the majority of the content would originate from western countries. This was illustrated in the pie graph above, where the United States, the United Kingdom, Australia and Canada display the greatest percentages, with citizens of these countries producing far more DDTVs than the others.

Second Method: Questionnaire

The questionnaire involved a different form of data gathering from that described in the previous section. This second method was an online questionnaire directed at design students studying Digital Media Design and Communication Design at Swinburne University of Technology. The intention was to collect information not obtainable from the other method of gathering data online, namely the Design

students‘ intentions and attitudes towards DDTVs, and most importantly, how they used them. While the researcher had previously been able to gather a range of information related to social interaction, communication, audience size, engagement, and the properties found within the content users of DDTVs, information directly related to use was unavailable. The questionnaire has enabled the researcher to ask users of DDTVs why and how they use them. Although this method generated less data than did the first method, the specifics of the data filled various gaps of knowledge related to DDTVs.

The questionnaire used a range of different questions to obtain the information, including open-ended and multiple-choice questions. The questions were analysed using content analysis and a statistical analysis. The next section begins with a content analysis, as was also undertaken with the first method. The questionnaire involves open-ended questions, as well as questions where enough information was given to develop themes and an understanding of the attitudes and intentions of the students surveyed.

The questions are as follows:

1. What area of Design are you currently studying?
2. What year level are you currently in?
3. Have you ever watched video tutorials or other videos that involve a design process, technique, or procedure?
4. How often do you use videos like this?
5. When during the design process would you use these videos?
6. What do you commonly use tutorial videos for?
7. Have you witnessed videos like this being shared between students online or at school?
8. Have you ever ‗shared‘, ‗commentedon, or ‗liked‘ videos like this?
9. Are tutorial videos useful when learning design practice; if so how?
10. Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class?

Third Analysis: Content Analysis

Open ended questions in the second method allowed participants to provide feedback on what they used tutorial videos for, whether they found them useful, and if they engaged with tutorial video content outside university work. Questions were designed with the assumption that these videos contained practical design processes, and that students were aware of them. This allowed the researcher to conduct a content analysis on the data received from the questionnaire, in the form of responses to open-ended questions.

In the open-ended feedback, participants were mostly positive in their responses to DDTVs, indicating that they had used tutorial videos before, and had used them as an educational resource. This data re-shaped some of the previously-held assumptions about the attitudes of students and users of the content; it had not been assumed that all students would have such a positive response and willingness to use DDTVs as an educational resource. On pages 88, and 89 variables and phrases as well as themes that were expected to emerge were largely related to ‗learning' and ‗design processes', some technical language related to the design applications being used by design students was also expected. Some of the hypothesized variables related to ‗processes' and ‗techniques' emerged in the content analysis and are discussed with other themes and variables that emerged in this section bellow.

In should be noted that in the previous content analysis of text-based ‗comments', responses for both methods were overwhelmingly positive with regard to how users perceived video tutorials. In addition, the majority of participants in the questionnaire responded positively when asked if they used video tutorials. The content analysis of the questionnaire explores this and other themes more deeply. It was conducted primarily by word counting, and extrapolating themes related to the words and phrases that were most used, or the context of the sentence to which they related.

Multiple themes were found when analysing the open responses. These included responses about a process or technique, responses that included software or technical language, and responses that indicated learning or knowledge. The themes arose from the responses, and were not pre-defined by the researcher, though some information related to learning and knowledge was hypothesised

before the research began. The questions phrased indicated this through responses using words related to learning, teaching and completing design tasks.

Responses to the open-ended question, „What do you commonly use tutorial videos for?‟ usually included all three themes identified and described below:

1. Understanding a design process or technique
2. Understanding a piece of software or technical language
3. Learning or knowledge about design

The themes frequently outlined how tutorial videos were used „to learn‟ a „process or technique‟ or piece of „software‟. This indicates that tutorial videos are an education resource for design students, and are used for many reasons, all related to learning design processes or techniques. The following table presents responses from students about what they used tutorial videos for, and is intended to illustrate the similarities between responses.

Taken from Question 6 „What do you commonly use tutorial videos for?‟
“Learning how to make things and how to perform particular jobs on computer programs”
“Learning how to achieve specific techniques and styles, also how to approach the design process most efficiently and orderly.”
“To learn how to do something in the program I'm using. Either to enhance a project or just to increase my skills”
“I only use tutorials during the actual production process when I either can't remember how to do something in a particular program, or would like to do something more advanced that we have not yet learned in class.”
“*To learn a new technique or process. Videos enable me to follow along with the instructor.***”**

Table 31: „Learning or knowledge about design‟ responses to Question 6.

As stated, the themes were related to learning or knowledge, and forming an understanding of a design technique or process. This relates to learning styles, information flows, and learning by doing. Learning styles involve the ways in which students engage with software to create conceptualised designs and learn new techniques via video footage. Learning by doing relates to practical education and methods of engagement that involve play and experimentation through the use of DDTVs. Information flow relates to changes in media distribution and the use of new

technology to access new media that is required to inform designers of practical aspects of design.

Question 6 (‚What do you commonly use tutorial videos for?‘) provided new insights into what type of knowledge the users of DDTVs were intent on acquiring. This differed from responses left in the comment section in the data analysed via content analysis. Users rarely (less than 1%) left any explicit detail in the comment section about what they used the video for. However, responses to the questionnaire indicated that DDTVs were used for a range of aspects related to design techniques, technical processes and design programs. A majority of responses indicated that participants used DDTVs to learn design. Some indicated that the video — the time-based medium itself — was useful in assisting them to learn how to design over time. Others indicated that they used tutorial videos to learn aspects of design that had not yet been taught in class, or were not taught in class. This indicates that students sought out design information that was not covered at university, and used DDTVs as a resource to supplement their design education.

Some students indicated that they used DDTVs when they had forgotten a particular design process during the production process, or to acquire a technique they had not yet learned or achieved. This indicates that design students might use the phenomena associated with the digital production and online distribution DDTVs as a ubiquitous library of digital design processes to be drawn upon as a learning resource when required. In addition, as a learning resource, DDTVs can function as a source of media situated within the range of legitimate peripheral participation, as they involve learning processes and techniques that are drawn upon when required. This type of design could be referred to as ‚generative‘, and has some relation to play and experimentation with computer software. This further indicates that DDTVs are used primarily by designers who are learning their craft, and who are more involved in experimenting with design methods, techniques and processes than completing conceptualised design outcomes.

Important to note is that only 10 years ago, students in the same learning predicament would have had to supplement their knowledge through a design magazine or a so-called ‚digital design for dummies‘ guidebook. This information would have provided new designers with the practical knowledge they required, and

also with step-by-step instructions, in a similar way as the DDTVs. It could be argued that the only difference is the medium and the technology used to propagate the knowledge of methods, processes and techniques. However, video has a major advantage over written text in delivering ‗how to' knowledge with visual actions because of the way it is able to record the entire process and relay it back to the student or user for continuing use.

The new learning styles exhibited by digital designers, changes in information flows, and acts of learning by doing, all relate to situated learning (Lave & Wenger, 1991). They also concern the changes in access and distribution of information (Lash & Ury, 1994) affecting education in relation to professional interests such as digital design and associated phenomena. These are some of the main aspects of this study that are related to theoretical concerns about the use of new media and digital design education. The open-ended questions prompted students to give responses which indicated that some of the previously-held assumptions regarding information flows online for university students and digital design education need to be re-visited, and that the use of tutorial videos and freely available online resources needs to be taken into account.

The next question to be analysed was, ‗Aretutorial videos useful when learning design practice; if so how?' In designing this question, the researcher made the assumption that DDTVs are used to learn design practice. However, it was demonstrated in the analysis of the last question, and during the initial content analysis of DDTVs, that they are in fact used to learn design practice by design students and aspiring designers. This previous assumption was held before the research was conducted, but was made based on previous experience as an aspiring designer, student and as a practising digital designer.

Taken from Question 9 ‚Are tutorial videos useful when learning design practice; if so how?"
"Very useful as I would be stuck with my assignment. The mind is a free and imaginative tool that can think outside the box but a lack of knowledge in particular software can restrain that energy. Video tutorials give power back to the designer."
" I find them useful to reinforce previous knowledge"
"I, personally, find it a lot easier to learn by emulating others' processes."
"Teach you to know the capacity of your software and make your designs possible."
" Yes, very useful. They teach me things that I wouldn't learn in class."

Table 32: „Learning or knowledge about design" responses to Question 9.

In response to the question ‚Are tutorial videos useful when learning design practice; if so how?', a large number of participants said yes, indicating that the video was used in relation to acquiring knowledge related to design.

Some participants indicated that they found DDTVs useful when trying to reinforce or expand their practical design knowledge, and this shows that the design process others had shared contained shared knowledge, which could constitute emerging digital design routines. Knowledge that was believed to be lacking, or needed to be reinforced, could be considered to belong to a shared base of knowledge that experienced digital designers are aware of, and students are learning. However, participants wrote about knowledge related to design practice that they deemed useful.

Some of this knowledge may relate to software and design practices that are emerging routines online. This is deduced from the fact that students stated they used these tutorials to supplement knowledge already learned about procedures, thus allowing the designer to spend more time on creative and conceptual aspects of design. Again, this relates to the supply of knowledge not taught in university classes, or that supplements knowledge taught in classe. In both instances, it assists the student; however, in some cases, this may refer to aspects of design that are related to the crafting of a design as opposed to its conceptualisation.

In response to the questions, themes around a process or technique were explored. This was understood as an aspect related to a craft or the final stage of the design process, where the design is crafted. Many participants indicated that they used DDTVs for learning or understanding techniques or processes related to digital design. The content analysis research confirmed that the DDTVs themselves did

contain a visual record of digital design processes over time. The responses from the majority of participants indicated that they used DDTVs for something related to digital design techniques or processes.

Taken from Question 6 „What do you commonly use tutorial videos for?“
“Learning a technique that will help me get to the level of design I am working toward at that time (during a project); at times I have watched them to add on to a skill I have learned when not working on anything in particular.”
“ If I have forgotten a process which I have previously used or searching for something new.”
“3D processes, or for any program which I am not familiar with”
“ For learning technical processes and approaches that I can use in my design.”
“ To figure out certain skill sets; also at times it helps generate new ideas.”

Table 33: „Understanding a design process or technique“ responses to Question 6.

In response to the question „What do you commonly use tutorial videos for?‘, participants indicated that their use involved a design process or technique; many students said that the video tutorials were related to a particular piece of software, or an aspect of design. These varied between participants, because the questionnaire was directed at participants who were undertaking courses related to both digital design and communication design. This means that the techniques used by the respondents could vary to some degree, though for some there was overlap. Some students said they learned techniques and processes to advance the „level‘ of the design; this is assumed to mean to improve on the design task they were currently undertaking, or an aspect of it. This indicates that students using tutorial videos intended to use them as a resource to become more accomplished designers, and move from being a beginner to being an intermediate designer.

Other participants noted that they used DDTVs to supplement their knowledge base by utilising the online videos when an aspect of a process or technique had been forgotten and had to be re-learned. A video could be watched again and used to help the students remember past processes they may have learnt some time ago. Participants also referenced skill sets and learning skills that are required as designers. This indicates that there is a distinction between theoretical design knowledge and skills acquired to complete design outcomes, as previous research has similarly concluded (Burdick & Willis, 2011). It also demonstrates that this type of educational resource aids students and aspiring designers to gain the skills required to complete designs that are conceptualised.

Reference was also made to students‘ personal familiarity with design applications. These applications and students‘ familiarity with them also relate to their ability to complete design outcomes with the use of practical design applications. For some students, becoming familiar with these applications can be a key aspect in gaining confidence as designers.

Taken from Question 9 „Are tutorial videos useful when learning design practice; if so how?“
“It's useful to watch the process of someone who knows how to do what you're trying to do. However, I often dislike ones where they are speaking at you. it's just a personal preference, but I usually prefer written instructions to spoken ones.”
“I believe they do. At times they can give a new perspective on the process and how things are done.”
“They show other designers“ workflows, and through that you might pick up some interesting techniques or shortcuts you didn't know.”
“Yes. They help to show who (sic how) certain effects are created by others. The skills can then be transferred and adjusted in your own work”
“Yes. Supporting video allows for easy following of what the tutor/video maker is doing. Subsequently, I can easily replicate what (sic how) they're doing it and apply it to my own design.”

Table 34: „Understanding a design process or technique“ responses to Question 9.

In response to the question, „Are tutorial videos useful when learning design practice; if so how?‘ participants indicated that it was either for the purpose of a design process or a technique. This indicates that DDTVs were used primarily for practical purposes related to the creation of design outcomes.

Some participants said they had experienced learning through watching other designers. Some stated that they watched the video to gain a new perspective, or for learning other workflows. Others indicated that they watched DDTVs to witness another designer go through the same process, in order to replicate it in a way that was applicable in their own designs. This shows that many digital design students will learn design practice from watching other designers engage in it, and in this instance, the participants were demonstrating that practice is being represented by DDTVs. This refers to styles of learning and education that were previously more prevalent in design, before the advent of design schools, and are now online in relation to situated learning (Lave & Wenger). They also bear some relation to previous styles of learning referred to as „master and apprentice‘ and the

apprenticeship learning process, which involves watching a practitioner conduct work you are about to do, or about which you wish to be informed.

Some participants said that they found the videos useful in representing the design information they required, while others expressed that they found other versions of representing the same information useful. For example, responses shown in Table 21 from the first participants show that they preferred the video shown with still images and text, or in written format. This relates to previous forms of media (magazines) illustrations and digital design processes in publication and online (discussed as a process of remediation more thoroughly in the literature review). This change in delivery relates to theoretical concerns regarding remediation and information flows online, and changes in digital design education. These issues are covered in more detail in Chapter 7. The next group of questions involved terminology related to the use of tools, and themes around software or technical language related to the use of tools.

Taken from question 6 „What do you commonly use tutorial videos for?“
“For learning techniques in programs like photoshop, illustrator and indesign.”
“ InDesign, Audacity and Flash because I am still new to these programs.”
“ When starting out in a new program or when I haven't understood something completely in class or when preparing for a big project.”
“ Finding out how to do things on illustrator, photoshop, CAD and indesign.”
“ Techniques I am aware of but have forgotten - usually for things within the Adobe suite”

Table 35: „Understanding a piece of software or technical language“ responses to Question 6.

In response to the question, ‚What do you commonly use tutorial videos for?‘, participants indicated that their use involved a design application or software involving technical language regarding tools and applications. An example of this technical language would be the use of the phrase “CAD” in the fourth example in Table 33 above. Although this phrase or abbreviation can refer to ‚computer automated design‘ (the type of design studied in this thesis), in this instance the participant is listing the design software they used in conjunction with DDTVs, and “CAD” is used as shorthand for the popular design software computer assisted design, or „AUTOCAD”. Many participants very often used shorthand and phrases associated with design and used by design practitioners, and it is important to

understand the exact meaning of these phrases in order to ascertain what is actually being said.

In many instances, participants indicated that they used DDTVs for an issue related to design applications. Many applications were referenced by participants, including Photoshop, Illustrator, Indesign, and quite a few others. Adobe products were frequently referenced when participants made responses involving software, and they were also referred to directly as the —Adobe suite" of software by one participant, shown in the last example, number 5, in Table 33. The responses show that the use of design software and DDTVs were related in many ways, and that the majority of participants used DDTVs to assist them in learning design software.

Participants indicated how the DDTVs were used in relation to the software. This suggests that communities of interest around specific software applications can form online. In some cases, these can be personified in ‗blogs', and ‗forums' related to the software application itself, as well as in a potential ‗official forum' hosted by software creators themselves, or by other associated training partners or companies. However, they can also be personified in the creation of DDTVs and their use as an object for learning digital design software.

Table 36: ‗Understanding a piece of software or technical language' responses to Question 9.

Taken from question 9 ‗Are tutorial videos useful when learning design practice; if so how?'
"Very useful when using any of the adobe products. I taught myself photoshop using online tutorials."
"Yes, in terms of process but most I watch do not focus on design technique, but on technical processes."
"Yes they are useful, when you need to achieve certain results through computer programs, and also with model making."
"Definitely, I find they are mostly useful when using the design programs as quite often there are small things that I don't know how to do and the videos are easy to find and use when online at home."
" Teach you to know the capacity of your software and make your designs possible."

In response to the question, ‗Aretutorial videos useful when learning design practice; if so how?' participants indicated that the video tutorial was useful in learning design practice, and related to design software or applications and technical knowledge on multiple levels. Digital design practice and the relation to computer software now comprise most design outcomes, as digital applications and

computer software use in design has become the norm. Respondents indicated that they had taught themselves software applications used in design.

The majority of responses to question 9 included the word ‗Yes', and respondents used a range of terminology that indicated DDTVs were useful for learning digital design and the skills required to complete designs with digital applications.

This finding has an impact on how knowledge is represented and controlled — or in this instance not controlled — and is open and accessible to the wider public. Use of the content in this way allows for self-education to commence without the assistance of outside institutions (universities), and for interest-based communities to form online.

Taken from question 9 „Are tutorial videos useful when learning design practice; if so how?"
"Yes, because they guide you step by step, they are easy to follow and can be rewound or forwarded depending on what you need help with. Also, there is often an instant answer through online videos which is faster than most other sources of help (i.e. email, waiting for the next class etc.)."
"Very useful, „cause we can learn the step by step."
"Yes, they are more precise and teach us the step by step, that we usually won't get in a tutorial. So I like a 1 on 1 kind of thing."
" Yes, usually they talk you through it step by step, it makes it very easy to understand."
" Yes they are, they show you visually how to do something. It's a very in-depth step by step"

Table 37: „Step by step" responses to Question 9.

In response to the question, ‗Are tutorial videos useful when learning design practice; if so how?', participants indicated that the step-by-step process found in DDTVs and other types of video content was helpful. This indicates that students believed that the capacity of video to document what occurs over time has a beneficial effect on learning about processes involved in digital design. Many responses showed that learning aspects of design with video content, by progressing over a linear timeline in the same way that many would be involved in the process themselves, was beneficial for a number of reasons. Some participants indicated that the step-by-step process was more precise and visual, aiding in the explanation of the processes involved in digital design. Participants said that DDTVs were visually effective in providing information for design processes. Because they are recordings of a computer-based application, the DDTV provides all the information required to complete a process in a digital application.

The time-based visual media (video) also covers processes over time, explaining each step with recorded speech. For the participants this was seen as ‗step by step', going through each interval in the process and showing the entire uninterrupted process to the viewer, from start to finish, with narration. The step-by-step process is similar to older learning styles found in design such as the ‗master and apprentice' model. This process was previously used in master/apprentice relationships, and involved either direct participation or watching from a close distance as a process was conducted. Similarly, DDTVs constitute a recording of a process from a distance where most details can be easily observed. The ability of video content to be rewound and replayed at one's convenience was noted by one of the participants. This response directly stated that ―they are easy to follow and can be [rewound] or forwarded depending on what you need help with" (Table 35). This indicates that the participant found that the ability of video content to replay an event or aspect of a process was beneficial in learning different aspects of digital design with which they may have been struggling.

Questionnaire Descriptive Statistics

A basic statistical presentation was also conducted, since four questions in the questionnaire required only a ‗Yes' or ‗No' response, and other questions, despite having an open answer option, received a large number of responses that were simply ‗Yes' or ‗No'. These responses were easily quantifiable, so it was seen as pragmatic to include a basic statistical analysis on them. In the following analysis, some questions are represented with graphs if they include multiple responses that are varied enough to merit being displayed visually. However, other responses were so significantly one sided that a graph was seen as redundant. Two of the previous questions discussed in the content analysis of the questionnaire are also presented here with graphs. Some of the responses that could not be categorised as a clear ‗Yes' or ‗No' have been given the category ‗Other', and these responses are shown as examples in the previous section (the content analysis of the questionnaire). In response to the Question, ‗Have you ever watched video tutorials or other videos that involve a design process, technique, or procedure?', the majority of participants said ‗Yes'. Nearly 100% (98%) of students in the study stated they had used tutorial videos. Thus a significant percentage had watched video tutorials or other videos involving a design process, technique, or procedure.

This positive result was much higher than expected, and demonstrated that almost all students involved in the study, and a large number of students studying at university in the courses represented, used DDTVs. Extrapolating from this percentage, if university students around the world watch this content at the same rate, this suggests that a significant audience (for DDTVs) might be represented in previous areas of the analysis (content analysis and statistical analysis of the data minded from DDTVs). As previously noted, other questions (6 and 9) had the option for an open-ended response. Questions 6 and 9 also contained the same themes (understanding a design process or technique, understanding a piece of software or technical language, learning or knowledge about design) as already discussed in the content analysis. Question 9 was directly related to a theme, specifically inquiring whether the students watched the tutorials for the purpose of learning design practice or process. Some indicated the specific purpose, while others provided a simple 'Yes' or 'No' response. Results are displayed in Figure 18 below.

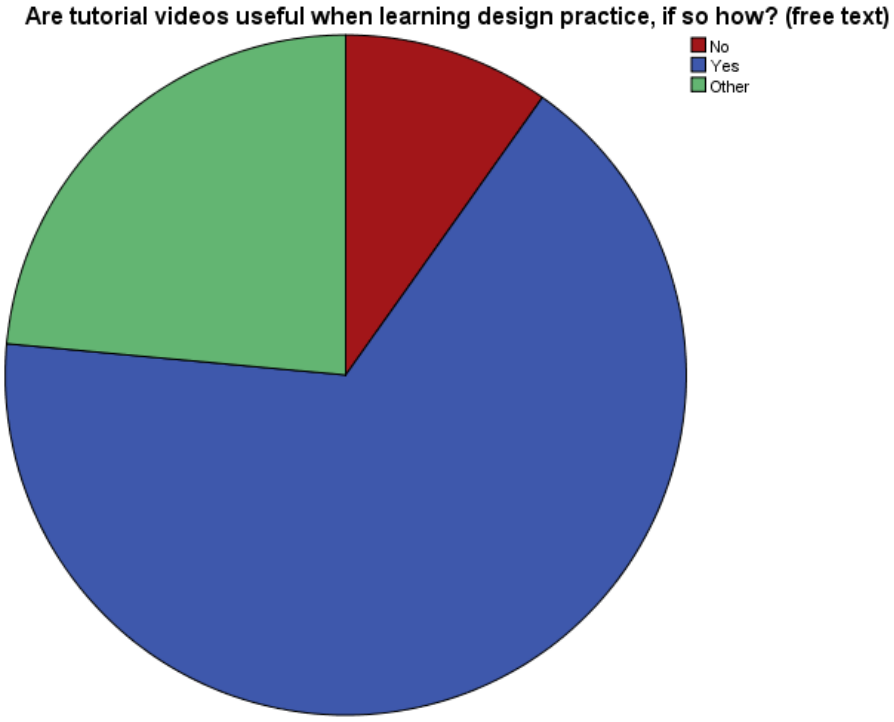

Figure 18: Pie chart showing the number of students who found tutorial video useful in response to Question 9. Red indicates 'No', Blue indicates 'Yes' and Green 'Other'.

Responses shown in Figure 18 emanated from an open-ended question. Those who responded 'Yes', and then explained how, were put in the 'Yes' category, and those who responded 'No' were placed in the 'No' category. The category 'Other' included

those who did not give a definitive ‗Yes' or ‗No' answer. The pie chart above indicates a positive response to tutorial video (DDTVs) content, showing that the majority of students in the study found tutorial videos (DDTVs) useful when learning design practice. This was seen as positive, but when compared with the number of students who had indicated that they had used DDTVs (98% — Question 3), it can be understood that not all students who use this content find it useful when learning design practice; however, the majority do. This demonstrates that DDTVs are used by a large percentage of students involved in the study for learning practical aspects of digital design.

The next question (Question 10) expands on Question 9, but with a more specific focus that inquired about practical aspects in digital design not taught in class. From personal experience, the researcher hypothesised beforehand that in the majority of instances, these videos would be used by university students studying digital design to supplement their education with information not presented within the institution.

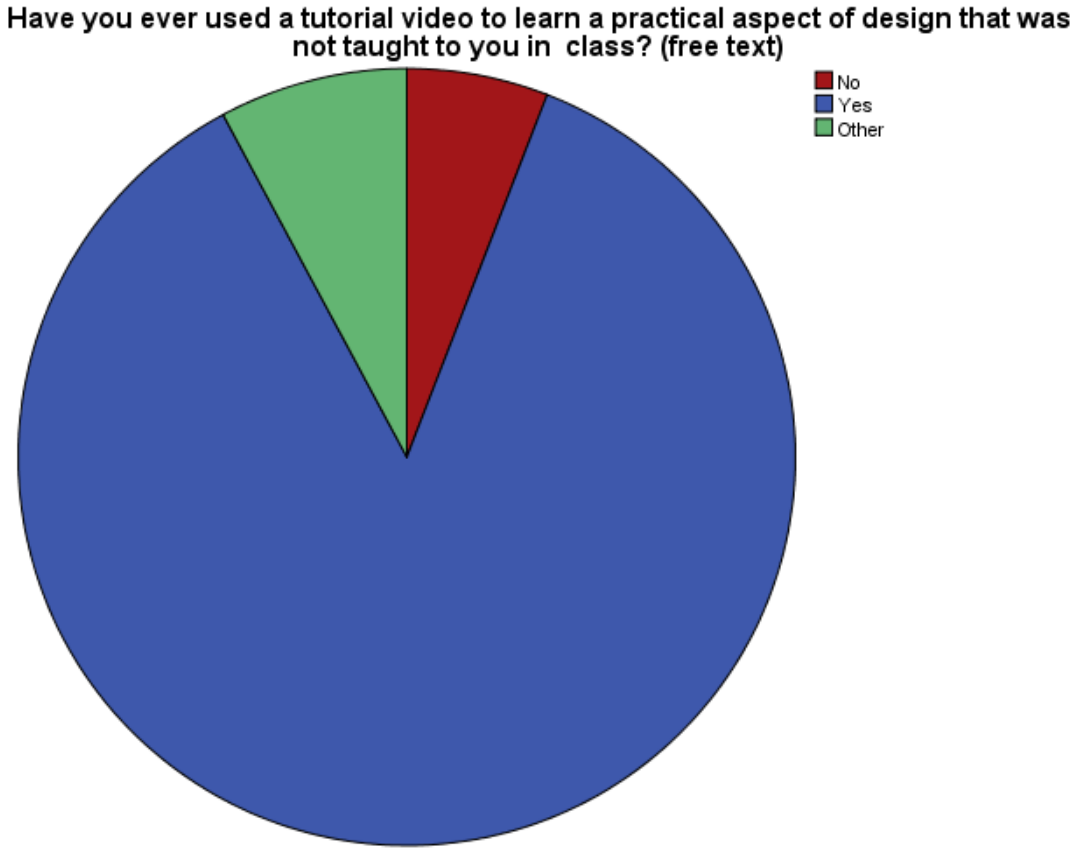

Figure 19: Pie chart showing the number of students who used tutorial videos to learn design outside of school in response to Question 10. Red indicates ‗No', Blue indicates ‗Yes' and Green ‗Other'.

Figure 19 presents the responses to the open-answer section of Question 10, „Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class?‘, and this response was overwhelmingly „Yes‘. This demonstrates that students were using tutorial videos outside of class to learn practical aspects of design that were not taught in class. This is a surprising response, given that tutorial videos are utilised by the university in classes attended by these students. This result shows the influence free educational resources can have on design students. The clear difference in response between this question (10) and the last question (9), suggests that students use DDTVs for a range of issues related to digital design outside of class, ones that are not deemed to be theoretical aspects of digital design. This could include information regarding aspects of the participants‘ own personal interests that are not related to the students‘ coursework, but to design more broadly.

The first question gathered information on what „type‘ of design students were studying at university. This was intended to help further identify what sort of application the students would be likely to use and what their interests in design would be. At the institution in which the questionnaire was conducted, there are two disciplines related to digital design, and students from both disciplines were asked to participate. The areas participants could select in the questionnaire were „Digital Media Design‘ and „Communication Design‘. The number of students from each discipline was fairly even, with 55% studying Digital Media Design and 45% studying Communication Design. The results show that a slightly larger number of Digital Media Design students responded to the questionnaire. This could indicate that students from „Digital Media Design‘ are more likely to use DDTVs, given that participation in the questionnaire was completely voluntary, and responding to it could indicate at least an interest in DDTVs. However, the response from participants from both Digital Media Design and Communication Design was overwhelmingly positive (98%) to the question of whether they used DDTVs or not, indicating that both groups used the content regardless of what area of digital design they were studying.

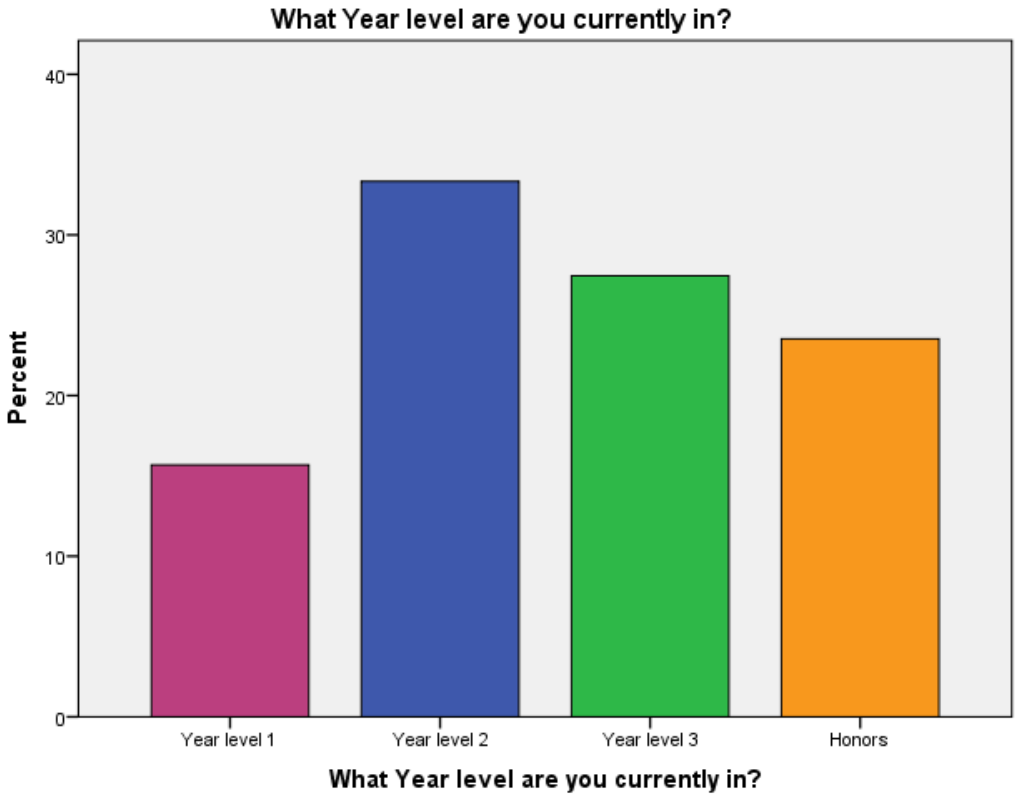

Figure 20: Bar graph represents what year level of the student sampled. This was Question 2

Figure 20 shows that a mixture of students from different year levels completed the questionnaire. This was because it was voluntary, and participation was open to all year levels studying at the University. The greatest percentage (35%) were in their second year of study at university, followed by students in their third year. From these results, it can be interpreted that students at an intermediate level in their design education were benefitting most from the use of DDTVs. However, it could also be that it is only in their second year that students begin to learn about, or become interested in, DDTVs. This is a more probable explanation, as the content analysis demonstrated that students viewed DDTVs as an educational resource, and knowledge of such resources may not be available to students who are just starting to learn design, and who are relatively unaware of various design resources available online.

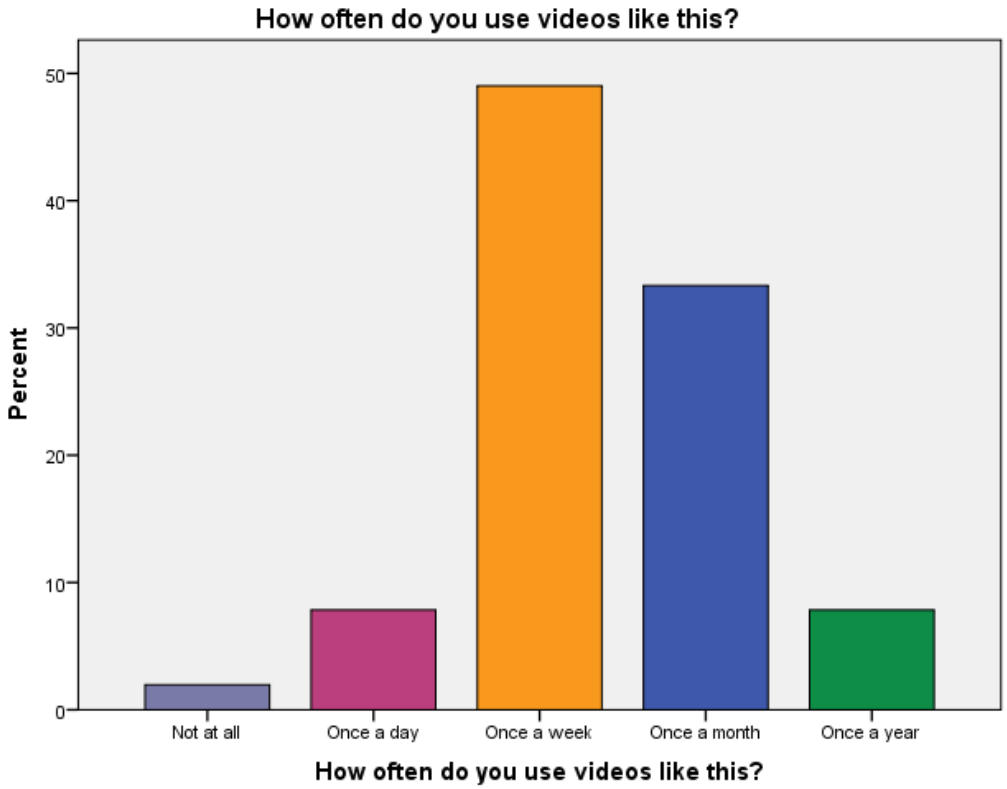

Figure 21: Bar graph indicates how often students use video tutorials. This was Question 4.

In designing this question, the researcher hypothesised that students would be using the content less regularly, and relying more on the institutions in which they were receiving their formal education. For this reason, they would be using the content on a monthly basis only. However, the results indicated otherwise. Almost half of respondents (48%) stated that they used DDTVs at least once a week. This demonstrates that for design students — the participants in this study — the types of video studied in this thesis were popular and regularly utilised. This questionnaire was conducted during semester, so students were responding with their current behaviour during the teaching period. Taken in conjunction with the results of a previously-discussed question (‗Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class?'), the conclusion is that participants regularly used DDTVs to learn aspects of design that are not taught them in class during the semester.

The three graphs in Figure 22 below relate to the multiple-choice responses to the question, ‗When during the design process would you use these videos?' It was important for the researcher to understand at what point in the design process the

students utilised this resource. This information provided an understanding of how the resource affected the design process and the methodologies related to design processes (generative design processes), as well as the potential educational benefit of this content in teaching design processes. In Figure 22, ‗Yes' responses are colour categorised as blue, and those indicating ‗No' are in red. This was a multiple-choice question allowing participants to choose ‗Yes' or ‗No' for multiple instances.

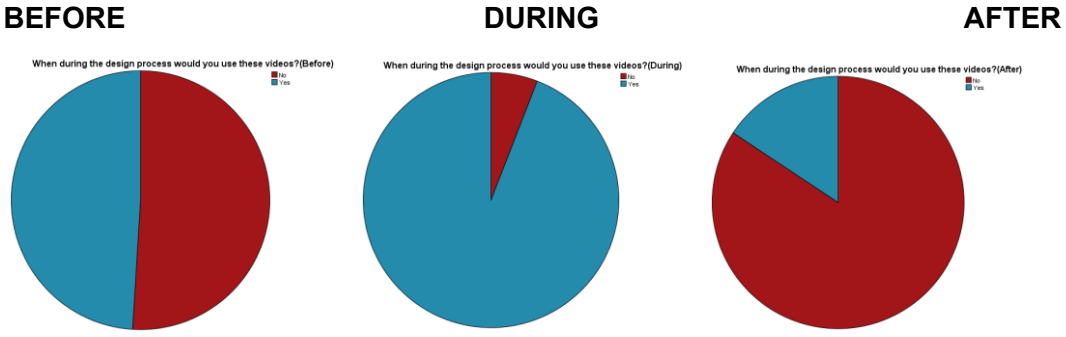

Figure 22: Pie charts showing the number of students who indicated that they use tutorial videos, and during which stage of the design process, in response to Question 5. Blue Indicates ‗Yes'; ‗Red' Indicates ‗No'.

These results show that a large percentage of participants used DDTVs during the design process. However, it should also be noted that a reasonable percentage of participants responded, meaning that they used DDTVs before the design process, and that they used them to learn how to conduct an aspect, specific operation or process related to digital design, before producing the final design outcome. It should also be remembered that Question 5 was a multiple-choice question where participants were able to choose multiple options. As such, it seems that many participants may have used DDTVs before the final design process was conducted, and then again during the design process. This result may be accounted for in a number of ways. Students might have been learning design and were unsure of the process, so checked back on videos multiple times, or students may have valued the content and seen it as a reliable source of information. However, the main finding is that for some students, the use of DDTVs was an integral aspect of instigating the design process and conducting it. This data was from one question — Question 5 — directed towards design students. However, the responses show that

the majority of students used tutorial videos or DDTVs during, rather than after, the design process. This was surprising, because it was assumed that the tutorial videos would be utilised as a learning resource. It was suspected that most students would use these videos before beginning the design processes, in order to learn them first. However, the numbers of students who stated that they used tutorial videos before beginning the design process is spilt relatively evenly between those who did, and those who did not. One interpretation of this data is that some design students have sufficient working knowledge of design to complete the design task, but they may engage with design content such as tutorial videos during the creation phase if potential problems are encountered, or in an effort to make their design more functional or aesthetically pleasing.

Participants were also asked, ‗Have you ever shared, commented on, or liked videos like this?' The results show that 48% had engaged in this behaviour, while 52% had not. This almost even split did not correlate with previous research presented earlier in the analysis, thus indicating a significant decrease in the number of ‗Likes' or ‗Comments' compared to total views. However, this question did include the word ‗shared', and previous research methods were not able to discover whether or not this content was shared on private networks, groups or pages (for example, a private Facebook page). Participants may have been sharing this content among themselves privately, accounting for a larger percentage than previously noted stating they had interacted with this content online.

Nevertheless, the results for this question are somewhat in line with those from the other method — content analysis and social network analysis — in that 52% of students stated that they did not directly share with tutorial videos, but they did watch the content with the intention of learning a practical aspect of design. In the content-based social network analysis, the number of views compared to the number of likes, dislikes, or comments was significantly higher, which shows that users were partaking in an online activity called lurking.

Question 8 sought information on sharing content, asking the participants, ‗Have you witnessed videos like this being shared between students online or at school?' The responses demonstrate that slightly more participants had witnessed sharing, rather than actually being involved with it. Of the total number of responses, 55%

answered „Yes“ when asked if they had witnessed videos like this being shared between students online or at school, while 45% responded „No“. The fact that more students had witnessed DDTVs being shared than becoming directly involved could indicate that they had formed their own friendship groups and small communities of practice, since more students answered „Yes“ compared to when asked if they had interacted with videos online. This supports results for the number of views as opposed to the number of times users interacted with the content, as it was shown that a larger percentage did not interact directly with tutorial videos. A larger percentage (99%) was also found when it came to video tutorial views, meaning that the user merely viewed the video, and did not leave a comment or like.

CHAPTER 7
DISCUSSION OF RESULTS

This chapter is devoted to a discussion of the key findings from the analysis. Most importantly, it interrogates the relationship between the research analysis and the literature discussed in the first half of this thesis. The discussion of results intends ultimately to consider the relation between findings and a broader body of research. Some of the key findings have already been discussed to an extent in the analysis, specifically those regarding the overwhelmingly positive responses from university students who participated in the research, the popularity of the content studied (DDTVs) online, and how these findings relate to a wider body of research emerging in this recently-developing area.

The qualitative research questions are as follows (central and sub-question):

1. *How are DDTVs structured?*
2. *How do design students use DDTVs to learn digital design?*

The quantitative research question is as follows:

3. How much social interaction is involved in the use of DDTVs?

Other aspects of the findings will be discussed here in more detail, including the frequency of the use of DDTVs by university students involved in the research, and the extent to which routine processes were utilised and identified during the research. The findings are also discussed in relation to the future of higher education and training in digital media and the delivery of online education. This is relevant to the wider application of education in the 21st century, one of the focuses of this study.

Other key findings to be discussed include student participants who indicated that they may have found the content useful in relation to learning digital design; the fact that the content studied contained recordings of digital design processes with slight variations; and that the findings in this study indicate that further research of a greater number of design processes could discover new principles involved in digital design that are being explained within a social context online. This encompasses

findings related to the popularity of this content, which may indicate that this content (DDTVs) and interactions with DDTVs occur with reasonable frequency, and can be considered a widely-used educational resource for digital design practice, at least by the student body that participated in the research.

I also discuss the potential impact of this content (DDTVs) on institutions, and the frequency, popularity, and influence on design practice for individuals being introduced to digital design. This includes how the teaching of design practice now occurs within the context of these resources for a significant number of students, as was indicated in Chapter 6.

Table 36 below shows the relationship between the various findings in this study and the broader body of research. These findings and the research interacted in multiple ways, and are discussed in further detail in the following sections of this chapter. These include the volume of recorded content, views and interactions (the total amount of content and the data related to this), lurkers (the type of interactions found to relate to the content studied), text and video (the differences between mediums when analysing and discussing interactions), social networks (the direct relationships between people involved in the sharing of DDTVs), community (the social networks formed and the value that they and the content hold to the community), the democratisation of information (changes in access and distribution), and digital literacy (the use of digital content to self-educate users in aspects related to digital literacy).

Table 38: Findings and their relation to the broader body of research.

Findings in the analysis	Relevance to broader body of research
Responses to the DDTV content were overwhelmingly positive.	Resources used within a community are viewed with positive intent.
Participants indicated that they may have found the DDTV content useful.	Community-based resources for learning are useful for beginners and intermediate designers.
DDTV content was more popular than expected, as the researcher did not hypothesize that this content would have millions of viewers.	Changes in the way information is accessed and distributed.
DDTV content contained recordings of digital design processes with slight variations with the same objective.	Related to design routines and limited creativity in the later stage of the design process.
The popularity of DDTVs indicates that this content and interactions with this content	Educational resources are deemed as aspect of a CoP, and in this instance this

occurs with reasonable frequency and could be considered a widely-used educational resource.	content could be seen as online educational resources utilised by a virtual CoP.
Educational Institutions could likely be impacted by the use of this content.	Changes in the way information is accessed and distributed can impact on the institutions that previously dealt in this information.

Volume Recorded

The amount of communication between users compared to the level of viewership was much less than what was assumed before conducting the study. There was, however, a larger than expected level of viewership. A total of 87,831,408 unique viewers watched the video tutorials involved in this study — many more than anticipated.

This extremely large viewership indicates that this phenomenon is more influential than previously assumed. It can now be posited that tutorial videos and the concept of using them as educational resources is present in the minds of most design students and hobbyists; however, we cannot assume that most of them interact with this content directly by leaving a text-based comment such as a ‗like' or a ‗dislike'. The reasoning for this is based on both sets of data. In the first study, the number of total viewers was in the tens of millions. However, when it comes to comments, likes and dislikes, the total number is in the hundreds of thousands — significantly lower. In the second study, design students responded to two specific questions differently. When asked if they had used tutorial videos, the majority responded ‗Yes', and a positive response within the 90%-100% range was recorded (98% exactly). When asked if they had shared or commented on tutorial videos, the responses were split, with between 40%-50% of students responding positively. This indicates that a significant number of students watch these videos, but many do not interact with them by commenting or liking/disliking a video tutorial.

The limited response options and associated inputs available within the platform (YouTube) could contribute to the limited responses from users of DDTVs. It is possible that the limitations of the online application YouTube influenced the type of behaviour found. There was only asynchronous activity for the user to engage with, and therefore there was no true interaction between the maker of the content (DDTVs) and user (students). This might have discouraged users from engaging in what could be considered limited text-based interaction. The reason the interaction

is considered limited and offers a narrow response is that, in comparison with being able to produce video content, users are only currently able to respond with text on the YouTube webpage on which the video is presented.

The frequency of use indicated by students could contribute to the high number of unique viewers (87,831,408). This means that because design students are searching for and viewing this content on a weekly basis, it is likely that large numbers of design students are interacting with this content, and this could help form a significant part of the viewership. However, this may not completely account for the number of unique viewers seen. It could show that students learning design use these materials frequently, and research from the questionnaire does indicate weekly use. If students all over the world who are learning design are using these videos frequently, this could partially account for the large number of viewers. However, it should be noted that although some students have indicated in the questionnaire that they were actively using these materials and were actively engaged in interactions online, many viewers did not engage in online interaction, as recorded in the content analysis. This demonstrates that some design students are using these materials (DDTV) actively, and others passively. The latter is what some researchers (Katz, 1998; Mason, 1999; Nonnecke, 2000; and Nonnecke & Preece, 2001) consider to be lurking behaviour. Lurking is applied by these researchers to situations where comments are not posted, and people are not interacting with the content in any other way apart from viewing it.

Lurkers

The majority of interactions surrounding DDTVs were just viewers, in that people who visited the video content were most likely simply to watch and leave. As previously noted, a total of 87,831,408 views was recorded; however, a significantly smaller number of likes, dislikes and comments occurred. It should be acknowledged that 99% of the time, users of DDTVs were only recorded viewing the content. This may seem strange at first, but it is not uncommon for online users in social networks and online communities to engage in this behaviour often. In fact, —pcir research has shown repeatedly that approximately 90% of community members are passive — so-called lurkers” (Schneider, Krogh & Jager, 2012, p. 293). It should also be noted that many researchers have indicated that lurkers

reportedly make up the majority of members in online groups and discussion lists (Katz, 1998; Mason, 1999; Nonnecke, 2000).

Lurking is a well-known practice within internet culture, and is defined in this thesis as users reading or viewing the material, but not contributing to the discussion. This term has also been defined by other researchers (Nonnecke, & Preece, 2001; Katz, 1998) as "anyone who posts infrequently or not at all". Several studies (Katz, 1998; Mason, 1999; Nonnecke, 2000; Nonnecke, & Preece, 2001; Rau, Gao & Ding 2008; Kucuk, 2010; Schneider, Krogh & Jager, 2012) have researched lurking behaviour. They have explored individuals engaging in lurking behaviour online, researching lurking with regard to various online environments, and exploring a range of reasons why users lurk and what possible reasons they might have for not lurking. A study by Nonnecke and Preece (2001), titled "Why Lurkers Lurk', states that the reasons for lurking behaviour are varied, and can fall into a range of different categories related to personal and work-related rationale, and that ultimately, "lurking is capable of meeting members' personal and information needs" (Nonnecke & Preece, 2001, p. 9). This indicates that users of DDTVs may have their needs met by simply watching the video content, and may not need to post/comment in order to gain the information they intend to access.

This contention that users may have their information needs met by the content is consistent with assertions made by Schneider, Krogh and Jager (2012, p. 293) that "the information-and knowledge-seeking behaviour entailed in lurking can be directly related to people's psychology of curiosity". This means that the user's curiosity needs to be fulfilled, and this may not require posting/commenting. However, this depends on the amount of information available to users of the content. As the content analysis in this study demonstrates, more than one DDTV exists for each specific design task; in fact, the total sample identified for the content analysis was in the millions. This shows that users have an overwhelming number of options, a situation that might contribute to people not interacting, as they are not required to interact if all the information is accessible without doing so.

Schneider, Krogh and Jager (2012, p. 294) have determined that epistemic curiosity (curiosity regarding knowledge) is "the individual desire to gain new knowledge by closing information and knowledge gaps and tackling intellectual problems". An

individual‘s epistemic curiosity might be satisfied by the content (DDTVs) or posts made in regard to the information the user is seeking. The ability of DDTVs to satisfy knowledge gaps and complete a digital design task could be influencing lurking behaviour in this study. If lurkers lack knowledge of a particular design process, this is one reason they are looking at the DDTV and not commenting. ―This observation that members may profit similarly from OCs (online communities) without posting or leaving any mark has recently been referred to by Dennen (2008) as pedagogical lurking” (Schneider, Krogh & Jager, 2012, p. 294). Lurking thus functions as a type of self-education within an existing online community, without interaction with the online community. Studies investigating ―why lurkers lurk” (Nonnecke & Preece, 2001; Kucuk, 2010) have concluded that they ―did not need to post” or ―wished to remain anonymous. A later study (Kucuk, 2010) with a larger sample used a questionnaire to replicate the study conducted by Nonnecke and Preece (2001), and found similar results, with 48.3% of participants stating they ―did not need to post” and that ―reading/browsing is enough” (Kucuk, 2010).

Reasons for not lurking are often the opposite of the reasons for lurking, in that the users may have a reason to post or comment if their information needs have not have been met, and they need to enquire further to gain the information they require. In networks that are not asynchronous, users are not able to maintain anonymity in all circumstances, and as a result, staying anonymous no longer becomes a sufficient reason to justify not contributing or interacting with others. However, the main motivator for de-lurking and joining a discussion is that the users' information-based needs are not met simply by lurking the content, and they are required to comment/post to gain access to the information they are seeking. As stated by Schneider, Krogh and Jager (2012, p.299), ―Individuals are inclined to contribute actively to the OC (need-state stimulating curiosity) if the value of the expected information exceeds the cost of contributing (joining, posting, inquiring)”.

Lurking has been identified in some research (Schneider, Krogh & Jager, 2012) as an act that is motivated by curiosity and an intent to gather information. This is seen as part of a process involved in learning new information or filling gaps in existing knowledge. Behaviour that relates to lurking and interacting may not be present on the actual site (youtube.com) where the information is presented. Based on responses by students to the questionnaire in this study, a larger percentage of

them shared information and posted/commented about it, but this occurred within their own social networks or communities not directly associated with the content (DDTVs). Students are thus part of an online community, though it may not be a community central to the discussion of the content itself, but one dedicated to discussing and sharing this information on other websites and social networks. This was demonstrated in the social network analysis, with similar types of design presenting a range of users who had posted/commented on similar videos from different video producers, or who were involved in the use of different applications with similar outcomes (for example, illustration in both Photoshop and Illustrator applications).

Based on the positive responses to the questionnaire posed to students in this study, and on the comments left by non-lurkers in response to the DDTV content, (where the most common response was ‗Thanks'), it is clear that information needs are being met by users of DDTV content. The most common response left by individuals/users who did not lurk did not offer further information, but indicated that they were thankful for the amount of information offered to them. The results from other studies have also shown that other needs not related to information gathering may not be fulfilled if the lurker starts to post/comment. Users may be content with simply reading/browsing information related to a range of needs, and not posting/commenting does not only relate to curiosity and information gathering, but also to other social and emotional needs. An example of these social and emotional needs being met is found on other websites not associated with the website studied (youtube.com) that are related to mental health and general health-based websites, for example webmd.com, and which were the focus of the study by Rau, Gao and Ding (2008). This includes discussion forums and social networks specifically focused on connecting users socially (facebook.com) or creating an online space for users to discuss emotional and health-based problems. However, Rau, Gao and Ding (2008) still found that some emotional and social needs are satisfied by lurking, and not just information-based needs.

Behaviour that constitutes lurking was considered good when ―satisfying information needs was important to the participants" (Nonnecke & Preece, 2001, p. 9). Further, ―In some cases, information was more important than interaction" (Nonnecke & Preece, 2001, p. 9). This could be the case for users who engaged in lurking

behaviour during this present study, as it was stated as the main reason why many participants used DDTV content. A prevalence of lurking could be an indication that DDTV content fulfils the user‘s needs, with users not needing to comment because sufficient information has been provided. However, other reasons as to why users engage in lurking behaviour have been offered by previous research (Katz, 1998; Nonnecke & Preece, 2001), including those linked to work-related commitments and how the user may be perceived within the community. This means that in this instance, lurking behaviour could constitute a strategic behaviour related to the work environment.

The findings relating to lurking behaviour are allied with other research that shows that social hierarchies are formed within online communities in regard to information and responses being presented by members of these communities as a form of ‗virtual social capital‘. In the context of this study, DDTVs are seen as a type of social capital that is valued by members of the community as a resource for knowledge gathering and information regarding digital design. Text-based comments that are helpful, or that present new information, could also be seen as a type of ‗virtual social capital‘ produced within this online community. However, if a video content (DDTV) is poorly produced, or if the text-based comments indicate incorrect information, this may reflect poorly on the individuals who partake in these actions, and may constitute a reason not to post or comment for fear of representing themselves in a negative way. This is in line with previous research by Nonnecke and Preece (2001, p. 9), where it is stated that ―One general conclusion drawn from the study is that lurking is a strategic and idiosyncratic activity‖. In this regard, lurking can be viewed as a strategic activity related to work (within the digital design field) and as a professional appearance within an online community. If users remove their anonymity by engaging in text-based comments, or by producing video content themselves, this could potentially reflect on their professional standing as digital designers. To an extent, it could be dependent on the use of pseudonyms, which could aid in maintaining a user's anonymity.

However, if users engage in this activity and do disclose their professional interests and relationships with digital design, their professional reputation could be positively or negatively influenced. ―This may be particularly relevant for professional communities (including Communities of Practice [CoPs]) where enhancing a

member‘s professional reputation is of relevance” (Schneider, Krogh & Jager, 2012, p. 295). Digital design and design communities are in many instances considered CoPs. In these cases, users' participation could be directly linked to their professional reputation, as often a professional digital designer's portfolio is situated online, albeit potentially not in the same environment as the platform that hosts the videos, but assessable in a very similar way, and easily accessed.

—Members may feel more comfortable and are more likely to post to OC‘s (online communities) after having reached a certain level of expertise (Wasko & Faraj, 2005, in Schneider, Krogh & Jager, 2012, p. 295). In a sense, a post or comment represents a trace, and to an extent reflects experience, competence, and expertise. However, if it is only a ‗like‘, not much can really be discerned apart from approval from a potential member of an associated community or viewer. But it should be understood that likes might be shared on an individual‘s personal page on the associated social network (youtube.com or facebook.com). 'Likes' could therefore positively impact the search results when users are searching for this type of content, making them desirable for a producer of DDTVs, as they could potentially increase the audience of the video content.

Lurkers who engage in behaviour that only involves liking or disliking content can be considered ‗active lurkers‘. During the practice of lurking, users can more easily become ‗active lurkers‘ and retain anonymity, which may be a reason why the content analysis on the videos in this study found a larger number of likes or approvals than comments. ‗Active lurkers‘ can also be considered confidence endorsers, who reinforce the status quo to the extent that they endorse content that they and other users consider to be of good quality. ‗Active lurkers‘ may not engage in direct interaction, but they do influence content, and can unintentionally share content within their own network with those whom they have allowed to see their own ‗personal page‘ on associated platforms, and on the websites involved in this study (youtube.com). ‗Active lurkers‘ have influenced the results of this study, with the interactions in likes/dislikes affecting the comments ratio.

It could be argued that ‗how to sites‘ have emerged to replace ‗how to books‘ (for example, ‗dummies‘ guides). This presents a difference in the medium that contributors value for informing people about how to do something. They would be

more likely to leave a comment on a different service that does not deal with information directly, regardless of whether the service is completely in text or on a video-based website. This is because lurking is related to gaining information, and anything that informs a user is less likely to receive a response. However, it should also be noted that there is the potential for lurking behaviour to occur as a result of the fact that video content is more prominent than text. Video as a medium contrasts with text, as do images (Mitchell, 1994), and accordingly any image-based medium, including online video content, contrasts with text as a medium. Therefore, what should also be discussed is the result of the prominence of video content on a video-based platform (youtube.com) in comparison with text-based comments. The following discussion addresses the assertion that, based on the research uncovered in this study, video has prominence over text on this specific online platform.

Text and Video

It was expected that there would be less text-based interaction between users on this social network because of the video content presented, and its presence in comparison to a text-based comment was assumed to be of less importance. This is because of the richness of the media (video) in comparison with text (comments), and its focus on the website on which it is featured (YouTube). The video content is functional, detailed and rich in content, so it is not surprising that leaving one‘s trace through text is not particularly compelling. Video content often offers more engagement than text, and the internet has seen a dramatic increase in video use in recent years. It possible that it is because of richness of the content and its desirability to audiences that moves towards richer media content have already been made by many educational intuitions.

Image-based content has been used to represent a range of different things (information, entertainment, religion) since the emergence of images in mass publication in the 18th century, and television in the 21st century. The study of different mediums and comparisons between them on the basis of their technological differences is perhaps best covered in the work of McLuhan (1963) and Williams (1974). That there are differences between image-based mediums and text-based mediums is not a new idea; however, the understanding that information previously represented in text is now being covered by video content is relatively new, and this is a focus in this study. Images and video content representing

information and culture online have become a rapidly expanding area of study recently. The explosion in the use of online platforms and the dramatic increase in the level of viewership of video content is a strong indication that in western society, the use of images and video content (as opposed to text) to represent information is becoming a key preference for audiences.

Mitchell (1994, p. 11) refers to this shift as the ―pictorial turn", defining it as ―A complex related transformation" that is ―occurring in other disciplines of the human sciences and in the sphere of public culture". This shift towards images can be seen in the emergence of multiple areas of media, including online video and computer games. There has been some pushback from areas with long involvement in more traditional forms of media, for example in academia, and other areas of pre-existing media. Mitchell states, ―This need to defend 'our speech' against 'the visual' is, I want to suggest, a sure sign that a pictorial turn is taking place" (Mitchell, 1994, p. 13). The pictorial turn is relevant to this study, and the results seen in the analysis indicate significant popularity for online video content. The pictorial turn can be regarded as one of the factors involved in the rise of visual stimulation. The use of video content and images to convey information that was previously displayed in 'how to' and 'a beginner's guide' books and is now located online as video content.

Since the inception of Web 2.0, visual culture has become prevalent online. This has become apparent to web developers and the traditional media via the expanding popularity of various technologies and services that now proliferate in information and entertainment online via a range of different services. ―It seems overwhelmingly obvious that the era of video and cybernetic technology, the age of electronics reproduction, has developed new forms of visual stimulation and illusionism with unprecedented powers" (Mitchell, 1994, p.15). In the current age of technological advancement, this is undeniable, especially when considering the rise of video content online, and the decline of print media and magazines across western countries.

If the internet does represent a change in the prominence of visual culture, it may be because images and videos can now be represented and shared online across the world, and the accessibility of visual content and text has dramatically increased. ―The fantasy of a pictorial turn, of a culture totally dominated by images, has now

become a real technical possibility on a global scale" (Mitchell, 1994, p. 15). Nevertheless, this possibility does not explain the increase in the use of online video content around the world, and in the case of this study, of DDTVs. This can only be attributed to certain factors, such as the rise in numbers of people who can access the internet and the associated content online, the rise of visual content, and the preference of visual as opposed to text-based content online.

Audience preferences represent differences in the medium and changes in viewing/reading habits. It was hypothesised before this study began that there would be differences between mediums involved in the propagation of information. However, the results have shown that the differences were so great that the amount of text-based interaction accounted for less than 1% of the total viewership. This result differs from other studies involving only text-based interaction and text-based-information displayed online on message boards, mailing lists, and platforms such as twitter.com and facebook.com. The video medium may contribute to the low proportion of total views that are text-based comments and interaction. This could be indicative of the video medium and its impact on the audience, despite the application's inherent functionality that allows users to leave a text-based comment if they choose to.

> —Most importantly, it is the realization that while the problem of pictorial representation has always been with us, it presses inescapably now, and with unprecedented force, on every level of culture, from the most refined philosophical speculations to the most vulgar productions of the mass media" (Mitchell, 1994, pp.16).

This statement also rings true for online video content, as it now exists to fulfil every whim and want of western society, from academic lectures to personal Vlogs (video blogs), and everything in between. Visual content is no longer generated by the mass media, but by individuals all around the world. As a result, it is all-encompassing, involving almost any topic. Mitchell's comment also applies to the internet, which is in effect a massive, ubiquitously-accessed database of information, larger than any known library. The differences between mediums (video and text), and the expected impact, can now be assumed to influence all further interaction. This could occur for various reasons. The video medium itself could be perceived as more important, and users may not see the need to comment. In other

instances, the video medium may convey all the necessary information, and leaving a text-based response may be perceived as unnecessary the users of DDTVs.

The results of this study show that there is a significant viewership (in the millions) for DDTVs, but not a significant number of text-based comments (in the thousands). The differences between text (used for interaction) and video on the platform should be distinguished. One is used as a device to communicate, and the other only represents information or beliefs. For this reason, one may be considered a richer form of media given its prominence on the webpage, and the lack of interaction with other forms of media (text) present on the same page. Limitations of online video media should also be distinguished, and especially the removal of video responses (from youtube.com functionality). This feature was previously used on sites like YouTube, but is no longer. Speculation about possible reasons why video responses have been removed — and with their removal, communication via video content in the public domain — are beyond the scope of this study, but could prove a rewarding topic for future research. Reasons could include abuse or harassment of users, or other potential technical problems involving the algorithms on the associated websites.

However, the medium being used in this instance is the internet or world wide web, with text and video coming together as a combination described by some (Bolter & Grusin, 2000) as a form of hypermedia. "In digital media today, the practice of hypermediacy is most evident in the heterogeneous 'windowed style' of World Wide Web pages, the desktop interface, multimedia programs, and video games" (Bolter & Grusin, 2000, p. 31). This is evident on every webpage studied in this thesis, involving a combination of video content and text-based interaction. In these webpages, video is placed in a window above the text, giving it a privileged place. More research would need to be conducted to adequately assess the discrepancies between image (video) and text within the online domain, as suggested by Mitchell (1994) with regard to film:

> "A broad, interdisciplinary critique will be required, one that takes into account parallel efforts such as the long struggle of film studies to come up with an adequate mediation of linguistics and the imagistic models for cinema and to situate the film medium in the larger context of visual culture" (Mitchell 1994, p.15).

This also relates to Kress' (2010) work regarding theory and multimodality. Many theories have been applied and tested against mediums or modes of information delivery within the online environment, and more broadly though the history of media with regard to similar media (video) such as film and television. Kress (2010) asserts that multimodal social semiotics theorises meaning from three different perspectives: "semiosis', "multimodality' and the "specific mode'. What is relevant in this theoretical approach is the use of the perspective of "multimodality' and the specific mode (or medium, type of media). "Multimodality' refers to issues common to all mediums and the relationships between them. The "specific mode' (or medium) is a "Theory [that] has categories that describe forms and meanings which are appropriate to the specificities of a given mode — its material affordances, its histories of social shaping and the cultural origins/province of elements of that mode" (Kress, 2010, pp. 61). As previously stated by Mitchell (1994), these theories are part of a broad interdisciplinary critique that is attempting to come up with an adequate mediation of linguistic and imagistic models for the wide array of media that now proliferate in the globalised world. (The findings in this study also indicate globalised interaction. Refer to page 144).

Social Networks

The media being discussed (DDTVs) is not, however, completely isolated, and is not occurring within a bubble, but within an open online platform that allows for social networks to form. The content is also embeddable and sharable on other popular online social networks such as twitter.com and facebook.com. This sharing allows for other social networks to form that are outside of the scope of the study. This assumption is based on student feedback received in the questionnaire, which indicates that the type of social networks formed around this content could be broader than those discovered in the social network analysis. This could also include institutionalised networks — social networks set up by institutions, and encouraged with teaching programs like Blackboard. This suggests that there are open social networks, where anybody can become a member, and there are closed social networks formed through friendships or associations within intuitions. The latter are not addressed in this study, as the information surrounding them is not open to the public. Unless the researcher were able to gain access, it would be harder to learn much about them apart from their existence.

Social networks have a limited influence on video-based platforms (youtube.com vimeo.com) and websites that are mostly associated with video content. This is assumed to be a result of video content becoming the main focus of the site, which contrasts with other sites like facebook.com that primarily focus on connections between users. This contrasts directly with youtube.com, which focuses on proliferating video content and displaying related content relevant to the user‘s likes and dislikes based on past viewership. On websites like youtube.com (the type of website involved in this study), the prominence of video content was hypothesised to lead to the formation of ego networks around the video producers of DDTV content, and this was validated in the results from the analysis. What is the significance of ego networks forming in these settings, none apart from that it could indicate that the content (video content) is prone to forming ego-centred networks, more likely to form an ego network with video content and the way it is presented online.

When using network maps to look more closely at communication between users in the analysis, it was identified that there was significantly less communication between users than expected, with only a few users responding to each other on individual videos. Most users who left a text-based comment did not respond to another user, but to the original video producer of the DDTV content. This means that communication on tutorial videos was limited; the majority of responses were positive (offered thanks, or appreciation) and did not involve communication between users. It should also be noted that all the networks discovered could be referred to as ‗ego-centred networks‘, in that the majority of the communication was directed at a single individual — the content producer (the individual who produced the DDTV content). The response was somewhat limited when it came to other individuals or users and reciprocal communication.

Ego-centred networks are defined as —…the network surrounding one particular individual, meaning, usually the individual surveyed and his or her immediate contacts” (Newman, 2010, p. 44). Ego-centred networks are formed from data that looks at individual networks usually situated around a single individual, but in this case, around a single DDTV video. They are represented the way they are in the analysis because the majority of connections are related to the original video producer or ‗ego‘, leaving only weak communication ties between users outside the

ego. The research in this study focused on multiple networks situated on the same online platform, Although the networks were separate, the topics they involved were similar and sometimes identical, often resulting in connections between these networks, which would previously have been viewed in isolation. This differs from previous research regarding the proliferation of cultural information online, in that other —…esearch in this area focuses on single mode networks of relations among culture producers and on dual-mode networks linking producers to gatekeepers" (DiMaggio, 2011 p. 287). In contrast, this study involves a range of different networks and the relations between them and other cultural producers, as well as the users who are engaging with their content and connections between these networks.

In this study, culture producers are viewed as gatekeepers, but not in a traditional sense. Rather they are the gatekeepers of a specialised form of practical knowledge that relates to digital design though the production of video content that aids others in learning design and becoming involved with digital design culture online. DDTVs could be seen as a type of cultural product for online design culture, or as virtual social capital for digital designers using the online domain as a learning environment. Cultural products are identical to social capital, and both terms seem to be used interchangeably by academics (DiMaggio, 2011 and Kadushin, 2012) involved in social network analysis, who describe the relation between what is cultural and social as somewhat blurred, and as something that is produced and seen as a cultural product within a community or social network. As an object, it has also garnered social capital for its producer. The producers of DDTVs and other content associated with informing people involved in digital design could be seen as culture producers turning out cultural products for people associated with digital design culture online. These products may seem mundane or not important to people who are not associated or involved in digital design culture online, but for individuals who are just beginning to engage with this material online, they would gather a lot of virtual social capital. This is because they would become a key person of interest, informing the relevant individuals about issues required to become a digital design practitioner, and involving them in digital design culture online — some for the first time.

Kadushin (2012) has noted –the rapid development since 2002 of social networking websites to make connections between people. But the social capital implications of these sites, as of this writing, have not been extensively researched" (Kadushin, 2012, p. 166). This is what has been explored in this thesis, as DDTVs are essentially the by-product of social capital, and a representation of the knowledge involved in digital design possesses. Sharing this content (DDTVs) within social networks could be a reason for the popularity of the content. As the source of the viewership is not easily interpreted by the researcher, it could be assumed that other social networks online are involved in the propagation of these resources. The implication of this is that a vast library of knowledge related to digital design could be created — one that is open and accessible to anybody with an internet connection. This results in connections forming between strangers whose only mutual interest is digital design. It allows them to gain knowledge they would previously not have had access to, and to make what could be referred to as ‗weak ties' between individuals involved in producing the resources or cultural products, and others who are engaging with the content and who share an interest in digital design, though are not connected in any other way.

These resources — or cultural products in this instance — are open and available to people with access to the internet, and there are inherent benefits to being able to access this knowledge free of charge.

> —Social capital defined as access to networked resources, has many observable correlates. Getting a good job, the original hypothesized outcome of the position generator set of indicaes(sic), has been widely confirmed as a correlate of network diversity and/or the prestige of the positions an individual can access" (Kadushin, 2012, p.172).

This points to some of the benefits of being able to access this content, but which may not be directly observable or studied in this thesis. The access to knowledge that informs individuals about practical aspects of digital design allows them to become designers in a practical sense. This does not mean that they are informed on all of the theoretical underpinnings of design, but are now able to form and build designs that they have conceptualised. This can allow them to build a portfolio, and eventually gain a job in the relevant industry if their work is of sufficient merit.

These videos are not produced within an isolated environment, and often come from individuals associated with industries and professions related to design. This was not recorded in this research due to ethical considerations regarding exposing an individual's identity. This was indicated in multiple videos, and noted when looking into many 'profile pages' associated with individuals who produced DDTVs. It comes as no surprise that "Much social-scientific work on culture examines settings — industries, professions, organizations, informal work groups — in which cultural products are produced" (DiMaggio, 2011 pp. 287), as this is a typical environment in which you would expect the production of resources related to digital design culture to take place. However, the online domain has become a hub for digital culture, and as a result, it seems that a large amount of material associated with digital design culture and design culture has been uploaded online.

These resources are not produced within an isolated environment: "Such cultural products are produced in and by networks of collaborating firms and persons" (DiMaggio, 2011, p. 287). They are produced by others who have also been taught not just how to produce the resources themselves, but how to reproduce the practical aspect of design covered in the DDTV. The knowledge is conveyed with video content in an environment open to the entire world, whereas in earlier times it might have been conveyed socially within a work environment, or through a book or other print-based publication. The publication of these recourses occurs in an open manner, meaning that it is open to the public, and anybody can access it. Accordingly, the social network and all the information associated with this content (knowledge, video, author) is open to the public. This allowed the researcher to explore the social network of a wide range of DDTVs. In so doing, it became apparent that the open social networks directly involved with this content contained a large number of weak ties.

However, it should be noted that the number of design students that indicated that they do share, like/dislike or comment on videos was more than the difference between the number of users who were recorded commenting or liking/disliking video tutorials in the first study. This could mean that they shared this information via a more private network. They might have emailed a particular video to another student or friend, but this peripheral information would not be recorded in this study. Neither was this study able to see whether video tutorials were shared by viewers

on other websites such as twitter.com and facebook.com. Perhaps students and others who viewed these videos chose to share or comment on this information via their preferred virtual social network platform. These possibilities could obviously form the foci of future studies.

The results of the analysis indicate that different networks exist and are seen online, and that different degrees of sharing occurred on these networks compared to the commenting on youtube.com by students involved in this study. The level of interaction on platforms with video content may be significantly less than on other platforms such as facebook.com and twitter.com. This might occur for similar reasons as were discussed above relating to lurking, in that their information-based needs are being satisfied with the video content provided, or perhaps they do not want to expose their identity and be seen by the wider public, and therefore remain anonymous, unless they are comfortable sharing information among individuals they consider friends. To an extent, this explains the discrepancies seen in open social networks where anybody is able to join in, and private networks (such as Blackboard in educational settings) that require students to identify themselves without a pseudonym. However, it should be noted that video platforms have not been socially networked to the same extent as other platforms (such as facebook.com and twitter.com). This could contribute to the lack of connections and weak ties seen in the social network analysis, and the discrepancies indicated by design students involved in the study. The opportunity for sociality in relation to video may change in the future with the introduction of video on Facebook and other technologies and platforms. Regardless of this, social network functionality exists on the sites studied, but is limited compared with other sites that do not propagate or ‗host' video content; rather they are primarily platforms for social connection. This leads the researcher to believe that preferences might be being demonstrated when design students are using different social networks online.

Nevertheless, ―The implications of networked resources and improved capability of collective action are enormous" (Kadushin, 2012, p. 167). As has been shown in this thesis, the ability of users all around the world to access networked resources and form new social networks with others (who are complete strangers apart from a shared interest in digital design) has never occurred before in human history, and has the potential not only to influence digital design culture online with the

proliferation of cultural resources within various social networks (both open and private), but also to influence the routines and processes digital designers use in the industry. A large percentage of students indicated that they use these resources (DDTVs) to learn design and practical processes, which are then repeated to create conceptualised designs during their design career.

The openness of membership within the social networks surrounding the associated content (DDTVs) is amplified by its accessibility. The ease of access to, and membership of, the social networks studied in this thesis was believed to be a factor influencing differences noted in this social network. The likelihood of individuals who are complete strangers becoming involved in the same social network, regardless of geographical distance, race, gender and socioeconomic status, is a factor that typically limits membership to a social network. Access to DDTVs and the associated social networks is possible for a wide range of people around the world, and this includes people who do not live in western nations, and who do not have access to a computer. The reason for this is that mobile devices are able to play DDTVs and interact with social networks involved in the propitiation and commentary surrounding the content. This accessibility via mobile devices means that DDTVs are more available and accessible for a more people around the world, as many people in non-western countries may not own a computer, but have access to mobile devices with internet access.

Community

In the previous section of this chapter, DDTVs were discussed within the context of ‗social capital', and specifically ‗virtual social capital' and how it manifests itself online in the form of blog posts, online images, tweets (on twitter.com), and in the case of this study, online videos. These manifestations of social capital are viewed as ‗cultural products' by some researchers (DiMaggio, 2011), as they are produced by members of a culture, that culture being the newly-formed culture of digital designers. However, there are other perspectives on shared resources (DDTVs) within a social network or online community. Within the theoretical frame of CoPs (Wenger, 1998), they are seen as a ‗shared repertoire'. According to Wenger (1998), a ‗shared repertoire' could involve stories, artefacts, historical events, concepts, discourses, tools, actions and styles. When it comes to DDTVs, they embody the representation of actions, styles, and to some extent concepts involved

in digital design. These aspects of digital design are represented in video content that occurs over a period of time, allowing actions and styles involved in a process to be represented visually. Some may also perceive these online videos as ‗digital artefacts', as they are objects that exist inside a virtual environment, and are not just a representation of actions and styles, but also a virtual object that can be copied, reproduced and shared.

The CoPs involved in this thesis are forming out of interest-based communities, and other communities that take advantage of the accessible nature of the content as a resource for digital design knowledge. This involves overlapping communities emanating from a range of areas, from students studying design at university (as in this research), to groups of friends with a shared interest in digital design. (A virtual club for example) However, it is difficult to determine which groups are involved in using these resources (DDTVs) unless they are questioned directly (for example, the students involved in the questionnaire). It is hard to ascertain whether or not they use the content. Nevertheless, the CoPs involved are all sharing the same open resources or ‗shared repertoire' because of the nature and availability of the content, and this has been indicated by at least one source outside the community that loosely formed around the content on the associated website youtube.com. CoPs form around this content partly because it is driven by a larger interest-based phenomenon, with multiple smaller CoPs around the world producing the content and interacting with it.

> —The repertoire of a community of practice includes routines, words, tools, ways of doing things, stories, gestures, symbols, genres, actions, or concepts that the community has produced or adopted in the course of its existence, and which have become part of its practice" (Wenger, 1998, p. 83).

DDTV content represents exactly this element of the practice involved in digital design, and this is the primary reason it is utilised by multiple different communities around the world. It has become a pivotal part of learning digital design or of filling existing gaps in individuals' digital design knowledge base through the finding and accessing of DDTVs. This was demonstrated by students who responded to the questionnaire, who indicated that they used DDTVs in many different ways to learn digital design while studying this at university.

The DDTVs studied in this thesis were found to be quite diversified with regard to the different applications presented in them. —The elements of the repertoire can be very heterogeneous: They gain their coherence not in and of themselves as specific activities, symbols, or artefacts, but from the fact that they belong to the practice of a community pursuing an enterprise" (Wenger, 1998, pp.82). However, most of the DDTVs involved a similar method, or practice, of displaying the content, regardless of what application was involved in the study. There were differences found in the representation of process; for example, a small percentage of videos did not include vocal narration of the digital design process involved in the video, but these videos still represented the digital design process for individuals seeking information regarding them. This shows that coherence was still present for people looking to learn the specific routines involved in particular videos, regardless of the aesthetic differences, or differences in presentation, found among multiple DDTVs. This is because, as previously stated in earlier sections of the thesis, DDTVs are not merely representations of digital design practice, but direct recordings of the practice using an application capable of recording the computer screen as a designer conducts a task. This is what these videos share in common. Despite aesthetic and other differences regarding application, these videos gain coherence with the audience because they pursue a shared enterprise that is digital design practice. Accordingly, the audience will be familiar with the content involved in DDTVs, as they are familiar with digital design practice themselves. —The fact that actions and artefacts have recognizable histories of interpretation is not exclusively, or even primarily, a constraint on possible meanings, but also a resource to be used in the production of new meanings" (Wenger, 1998, p. 83). The ability of digital designers to use aspects of a DDTV to create a different design outcome, or as the basis for an aspect in a large conceptualised design, is relevant to this, as it produces new meanings and design outcomes that would not previously have been possible without the use of DDTV content.

Filling gaps in an individual's knowledge allows them to create more than they were previously able to, and in the case of digital designers, to develop new design outcomes that create new meanings not previously found in the type of content that focused on reproducing and sharing practical aspects of digital design (DDTVs). As Wenger (1998, p. 83) states, —The repertoire of a practice combines two

characteristics that allow it to become a resource for the negotiation of meaning": that it reflects a history of mutual engagement and remains inherently ambiguous. It is ambiguous in that it could be used to produce a range of outcomes vastly different from the original process, and simply utilise the routine involved in the DDTV to complete an aspect of a larger design outcome.

A variety of people are involved in virtual communities: video producers, students, hobbyists, and others. It is hard to recognise all of these groups, as their membership of other networks is not recorded, and the majority of them maintain a level of anonymity through the use of pseudonyms. Some of these CoPs could be assumed to be between students learning design, and others between people who work together; however, they all interact, and are assumed to share this content between one another, partly because they have what could be referred to as a shared enterprise. The shared enterprise that brings CoPs together in the use of DDTVs is the process of learning digital design, as any individual or group involved in the use of DDTVs is doing so for the purpose of learning an aspect or process related to digital design. Wenger (1998, p. 82) asserts that, "Over time, the joint pursuit of an enterprise creates resources for negotiating meaning". DDTVs are believed to be one of these resources (known as a shared repertoire) that are used by members of multiple communities to aid them in understanding practical aspects of digital design.

However, it should be noted that the sharing of resources online does not always occur in a straightforward manner that is easily studied. In many instances, sharing information and resources between individuals involved in a shared enterprise could involve websites and platforms that are private (not open to the public), but who are recognised members of an online group associated with digital design. The sharing of resources such as DDTVs occurs in a dynamic way, as the overlapping virtual communities do not function in the same way as a regular community in the real world. Lash (2002, p. 27) argues that "electronic communities" or virtual communities are not traditional communities, and involve more impersonal and distanced communication: "Because the repertoire of a community is a resource for the negotiation of meaning, it is shared in a dynamic and interactive sense" (Wenger, 1998, p. 84). This is more than present in the proliferation of DDTVs online, within various communities and between students when engaging in digital

design activity together, or in what is referred to as mutual engagement. Electronic communities or virtual communities may not be aware of each other, and may feature communication limited to the sharing of open resources that are networked together online.

The democratisation of Information

The changes seen in the way information is shared online — in an open and freely available manner — are in stark contrast to what occurred just a few years ago, when this type of content (information related to digital design processes) was monetised, requiring payment for access. Previously, this type of information could be found in design magazines, books and on DVDs that could be purchased in order to access the information, whereas the information is now freely available online. Earlier, the tutorials that embodied the same aspects found in DDTVs may have involved text and image, and there are still websites that offer these services, but they are now also found on popular video-sharing websites such as youtube.com and vimeo.com. It should be noted that videos existed before the popular video-sharing websites that now host them, and long before the advent of Web 2.0 and popular social media services, the content was found on DVDs, and was sold by companies who specialised in training digital designers. The type of content that was found in these DVDs and the previous content that embodied the same instructional aspects found in DDTVs was determined by editors and individuals who compiled the DVDs and magazines; now it is only determined by the author and the audience. Where the information used to be produced by a publication or business, it is now produced by a range of individuals all around the world, and its popularity is completely determined by the audience and the level of viewership it receives, as opposed to the publication‘s market share or brand recognition. With the decline of print media and the advancements of technology online (access speed, HTML5 and video-streaming platforms), this type of content has been democratised, and the production of the content has changed from a national or international manufacturing society (publication and sales within an established marketplace) to a global information culture (mass distribution and viewership online).

This involves what Lash (2002) describes as changes in information flow from national to global, and changes from manufacturing manuals to online design

videos. This is related to a broader phenomenon that has been occurring online for the past few years involving the expansion of the internet, with vast quantities of information now being available online free of charge. This also relates to the increase of information — largely user driven — being propagated by video content online and other mediums that do not involve text. Other aspects related to this content, such as the evaluation and quality control of the content in the online environment and the free access to information, are at the disposal of the audience, rather than only to an editor or publisher. The evaluation and quality control online is completely democratised, and involves the number of views, as well as votes for and against each piece of content. This involves likes and dislikes, assumed to affect the rank a video receives when being searched for. This contrasts with the ways in which information would have been evaluated before — within the framework of a publisher and editor evaluating the content from an „informed" position. This change in evaluation is a key factor in the democratisation of the content. It represents a change in the way information is propagated (or the flow of information), moving towards a global information culture that is specific to digital design. Lash (2002, p. 26) addresses various aspects of contemporary society's transition from a national manufacturing society to a global information culture. In so doing, Lash focuses on three main factors involved, presented as three governing logics (2002, pp. 26). This transition from manufacturing (producing magazines and books) and trade (sold in stores, monetised products) to online skills and freely-available digital education online has had an impact on the existing related industries. This impact is acutely related to the governing logics that effect the flow of information, services, products and technology, and involves transitions from national to global, from manufacturing to information, and from social to cultural.

In this thesis, the first logic — from national to global — involves social networks and the forming of relationships and connections globally, as opposed to within a nation or city. Lash asserts that —National economic, political and cultural relations are in decline and being displaced by global flows. These include flows of finance, technology, information, communication, images, ideas, immigrants, tourists and business travellers" (2002, p. 26). This is the case for DDTVs, which are forming communities and social networks around them as the flow of ideas and information related to digital design (studied in this thesis) occurs on a global level online, as does the communication regarding these ideas. In this study, a statistical analysis

was conducted on the origin of video producers involved in producing DDTV content. It was found that the majority originated from western countries, but not all; in fact, a large number of countries were seen to be involved in producing DDTVs. The situation is the same for individuals involved in commenting and interacting with these videos. While most interaction may come from western countries, it does happen globally, and access and production occurs at a global level.

The second logic — from manufacturing to information — relates to the production of DDTV content, and the emergence of Google (youtube.com) as a repository for this content (or library), and Adobe as a global producer and application used all over the world. Lash asserts that objects and products being produced are containing more and more information. He argues that —This is true both in the services and for the composition of material objects — such as children's computer games, consumer electronics items and their associated software" (Lash, 2002, p.26). This is also the case for any other type of software associated with digital design, and the materials produced to educate users of digital design software. Production and distribution now occurs on a global scale, and involves far more information than manufacturing, as the products are now digital, and no longer have the real-world, material basis that magazines and DVDs did. Adobe also now retails in this way, selling software (including updates) online rather than on DVDs.

Within the context of this thesis, the third logic — from social to cultural — relates to changes within the community and CoPs that engage with DDTV content. Lash argues that social meaning is declining, and is being displaced by symbolic or cultural goods. —It involves a decline in the prominence of social norms and a rise in the importance of cultural values" (Lash, 2002, p. 27). This relates to the values held by designers who engage in digital design-related activity online, and can be seen in the value attributed to DDTVs. Previously, DDTVs were discussed in relation to cultural products, and are recognised culturally in a similar way. This does not involve a type of social norm — or in this instance a design-based norm — they may be representing or reinforcing, but the values they offer other designers who are intending to learn about digital design — values involved in digital design procedures and processes. These cultural values are overarching, and do not apply to specific circumstances, but more generally to other designs that have already

been conceptualised, and which can make use of the procedures in the implementation or the creation of the finalised design product or artefact.

The three logics just presented have brought about changes in the flow of information globally. This has occurred primarily online in relation to digital design, but has an impact on private institutions that are not online. The emergence of the online phenomenon associated with digital design, and the level of viewership of DDTV content, could signify a cultural change for digital design. Lash (2002, p. 31) asserts that —Cultural change dissolves institutions as, or more, does than it builds on them". This could very well be the case with the cultural changes in the way digital design students access design-related information. As this study has indicated, 90% of the design students surveyed watch and use DDTVs on a regular basis (weekly), where previously they may have received all their information from tuition, or from other sources recommended to them by the institution (for example magazines or other resources found in the institution's library). This could affect the institution in multiple ways, as students may now come up with designs and solutions external to what would typically be prescribed by their intuition. In more drastic circumstances, they might even shun the institution in favour of freely-available information related to digital design, with which they might educate themselves. However, the extent to which this may occur has not yet been researched, and factors such as aesthetics may be harder to control.

Cultural changes to patterns involved in the flow of information can also impact social structures. Referencing Poster (1990), Lash (2002, p. 28) argues: —Now no longer is social class determined by access to the mode of production, but by access to the mode of information'". This is reflected in this study, in that social class does not determine one's access to DDTVs and information regarding digital design, because they are free and openly accessible to anybody with an internet connection. The ability to access this content and learn digital design does have the potential to elevate an individual's social class. Research does not yet provide clear evidence of this, but the potential does exist. With wider access to information comes wider access to opportunities.

Regardless of these possible changes, the potential effects of online resources (and DDTVs) on digital design culture should be discussed. This is of significant

importance to design educators and others who may feel the impact of cultural changes in design. Lash (2002, p. 31) defines culture as —a set of more or less coherent, more or less loosely held together symbolic practices". DDTVs could be described as embodying this. DDTVs that replicate and explain processes and procedures related to digital design are, in some instances, symbolic practices that can determine one's ability as a practitioner (intermediate, beginner) and as a designer — one's membership of the design discipline. Taking the position that symbolic practice is a way of doing or living, Lash (2002, p. 32) defines symbolic practices in contrast with semiotic communication, asserting that —Symbols are always inscribed in practices, in forms of life, in a 'world', a 'being-in-the-world'". These symbolic practices may be the same as those contained within DDTVs, as often these videos teach symbolic practices that create semiotic content, and as indicated by students in the questionnaire, content that is suited to fit a design brief.

As demonstrated in the social network analysis, and discussed in the community section in this chapter of this thesis, loose networks and associations were made between individuals from all over the world, and included multiple different communities, some public and some private. Lash (2002, p. 35) argues that social movements in the public spheres are made up of sociations not direct associations: —Associations are based on individuals and membership. Sociations are based on mutual recognition and not membership, but belonging." The phenomenon this thesis is concerned with is global, and like other 'sociations', —It is based not so much on rationally choosing individuals or the granting of validity to discursively redeemed speech acts. Its basis instead is affective bonding, the innovation of ritual and shared meanings, it is recognition based on the co-production of horizons" (Lash, 2002, p.35). This indicates that loose connections are made between individuals in regard to DDTV content, as discovered in this study. The real bonding and membership comes from the shared meanings derived from practical design content that focuses on design process and practice. It also occurs through the ability to create conceptualised designs with this newfound information during the ritual of design practice. These sociations and behaviour are in line with lurking behaviour, in that users might only engage in lurking behaviour, and still make sociations and loose connections (or meanings and understandings) to content and individuals.

Digital Literacy

This section of the chapter, and the next on activity theory, will be briefer, as they were not deemed to be such important topics for discussion. However, they have been included because of their relevance and importance to many aspects of this study. Regarded as one of the best ways of learning practical tasks, learning by doing after being shown what to do is similar to many other types of training and apprenticeship.

Digital literacy generally relates to new media studies that focus on improving educational skills related to the use of digital services, namely computers. Digital designers are thought to possess a high level of digital literacy, because their profession often requires them to complete complicated tasks that use digital software and knowledge related to computers and design. For this reason, many of the skills required to be digitally literate would be considered to be skills required by digital designers. Accordingly, the phenomenon with which this thesis is concerned is of importance to researchers engaged in research regarding digital literacy, as it involves the propagation of educational information related to improving an individual‘s digital literacy within specific digital software applications.

In this instance, this type of education is related to the remediation of an older form of education that existed around trades (vocational skills) and practical crafts. Such education is typically referred to as an apprenticeship, and still exists in many industries around the world, for obvious reasons. However, in this case, it is remediated by video content, which involves displaying very similar processes to those that would in earlier times have been demonstrated to a designer, except that they are now recorded and propagated via the internet. As does an apprenticeship, this involves learning by doing, and active involvement in the educational process with practical tasks. However, the difference in this instance should be noted, as instead of replicating what is produced in front of them in a real-world environment, they replicate the process that is recorded with their own computer in a separate location. DDTVs could also be regarded as an effective means of learning, because they are transparent, and mimic an apprenticeship. Online education and research on the need for digital literacy in a 21st-century society is relevant to some of the discoveries in this thesis. It is also relevant to DDTVs in general, and to the research conducted in the analysis.

Activity Theory

Activity theory was involved in this thesis on a theoretical level, in that it informed the analysis of activity. The research in this thesis also relates to activity theory in that it opens up a new area of activity, composed of millions of videos that are direct recording of an activity — specifically activity related to human computer interaction with design software — and as a result activity that engages in design-related behavior and design activity.

The DDTVs in this study are composed of digital design processes, and accordingly design activity; therefore an associated theory was used to help understand this. Activity theory assisted in gaining insights regarding DDTVs, such as the structure of the activity, the similarities between digital design processes that are attempting to achieve the same objective, the routines found in the design process, and the repeatability of the activity discovered. Activity theory relates to the isolation of practical pathways and routines for practical development though virtual communities and the distribution of knowledge (discussed above), and was used in this study to come to the understandings achieved.

Activity theory was used in this thesis to discover the structure of digital design activity within DDTVs. This was a new contribution to knowledge, but not unique in that it coded activity in a similar pattern (over time, in sequence) as other design researchers Cross, Christiaans & Dorst (1996), as well as Akin and Lin (1996). The main difference being the method and theory employed the use of activity theory as a theoretical lens when coding DDTVs within the content analysis differed from other research that employed a procedural analysis. This was done primarily because what was being studied was considered content and processes were not recorded specifically to be analyzed with a procedural analysis, they were containing within the content found online. This is done mostly with the hierarchical levels of activity, involving Activity (Motive) Action (Goal) and Operation (Conditions) originally defined by Leont‘ev, (1981) (Displayed in figure 7). This hierarchy allows the researcher to code the activity or in this instance design process into three distinct categories modeled after the hierarchy. Each level is displayed bellow with a definition and example that is relevant to digital design while referencing both words Leont‘ev (1981) uses when referring to each hierarchical level.

Activity level — Motive

Defined: Intended design Outcome.

Example: Design a Logo.

Action level — Goal

Defined: Action used within a design process to achieve an outcome.

Example: Using the Pen tool.

Operation level — Conditions

Defined: The specific differences within each action that create a desired effect.

Example: Drawing a line with the pen tool on a 45 degree angle for 8 centimetres.

The above examples of Activity, action and operation help explain how activity theory is used when looking at digital design practice and is similar to activities, actions and operations presented by Kuutti (1996, 28). When coding in this thesis, only the Activity level and Action levels were coded because the variables evolved in the operation level. Since there were hundreds of activities and almost thousands of actions and within each action there would be a further 2 or 3 variables (examples indicate 45 degree angle, and 8 centimeters). This in turn would means that within the operation level there are potential hundreds or thousands of variables to be coded within a single digital design process depending on it length. There may be some usefulness in employing this theoretical approach in the future, in larger studies that sample digital design process in similar and different means.

CHAPTER 8
CONCLUSION

Introduction

In this thesis, social network, content and statistical analyses were conducted to explore the emerging online phenomenon related to the sharing of practical digital design information via video content that is universally available on the internet. The data was gathered through the use of data mining software and administration of a questionnaire. The results indicated a resoundingly positive response to the tutorial video content, with the number of ‗likes' expressed and students who found tutorials useful far outweighing any ‗dislikes' and negative responses. However, the results also showed that direct interaction with the content was limited, as most student participants stated that they had not directly interacted with it, but had simply viewed it. The combined number of views found on the tutorial videos involved in the study was approximately 87 million (the exact figure can be found in Chapter 5, page 111). This demonstrates that an extremely large group of people watched the content, and may have found it useful, but did not interact with it. This led the researcher to believe that there are multiple social networks engaging with this content, some institutional (such as students and corporate practitioners), some private, and others (like the social networks involved in this study) open and publicly assessable.

This study had access to a significant amount of publicly-assessable data. Therefore, some of the methods involved in this thesis were conducted differently to methods applied in other research related to the analysis of design activity. Some of these methods involved using activity theory as a theoretical lens for content analysis, as opposed to a protocol analysis. Protocol analysis involves different ways of analysing design activity (such as those uncovered during the Delft protocol trials (Cross, Christiaans & Dorst,1996). It appears that there are two types of design activity referred to in design research: conceptualisation, and what the researcher has personally heard some refer to as actualisation. However, this could also be referred to simply as creation, because it is the creation of the actual design that is conceptualised. Resolving design problems involves both conceptualisation

and actualisation. When designers need to resolve a design problem, they must employ design activity of the type reported in this thesis; otherwise the resolution they came up with would have existed only in their head or in writing. Often the design that resolution designers are required to produce is not a sentence, but diagrams and designs requiring the actualisation of their conceptualised design resolution.

It should be noted that this thesis did not involve conceptualisation, but it could be argued that conceptualisation is not design activity but an aspect of design thinking. The method that has the most in common with the way in which the design activity was analysed in this study is that set out by Akin and Lin (1996), where each action taken to resolve the design problem is counted in the order in which it occurs. In a content analysis, words and visual aspects (for example colour) of the content are counted, and typically ordered from most frequent to least frequent. As stated, the use of a content analysis in this study, as opposed to a protocol analysis, contrasts with other research on design activity (Cross, Christiaans & Dorst, 1996).

A content analysis was used for a number of reasons. The first is that this study had access to an extremely large amount of data that was not available to those previously engaged in research related to design activity. Other reasons include the fact that the content was not under the researcher‘s control, and the researcher did not have the ability to constrain all of the variables involved in the study. The content was also open and available online, and was produced by a wide range of international authors. The researcher was not able to constrain the geographic breadth of the study, or exert direct control over the design protocols and procedures involved. Accordingly, it was seen as more practical to employ a content analysis rather than a protocol analysis. The way in which website content is distributed shares some similarities with mass media and other types of media studied using the content analysis method, in that it is occurring in an open online environment, and the content reaches a large audience. This contrasts with the way design activity is distributed in a protocol analysis (Cross, Christiaans & Dorst,1996), which is to a small audience and within a controlled environment.

The behaviour associated with the DDTVs — summarised as watching but not interacting — occurred in the majority of cases (98% of all interaction). It was also

considered lurking behaviour — a type of online behaviour that has been researched already. Previous research on this behaviour validates some of the responses found in the questionnaire, especially with regard to filling gaps in knowledge related to digital design, and the need to leave (or not leave) a response, because sufficient information has been provided. However, the online phenomenon investigated does not only involve students in closed social networks and lurking behaviour. There is also a shift in behaviour from established methods of information gathered from authoritative sources, to the access of digital design information online with sources coming from more diverse areas. This shift has occurred simultaneously with the shift from ‗analogue to digital' and from ‗print to web', and has the potential to impact on new media research and research related to design education and digital design culture. The potential impact on new media is similar to the ways in which the phenomenon has affected digital literacy and design education, and has occurred for similar reasons. These reasons are connected with the propagation of resources that are directly related (and deemed beneficial by some involved in the study) to digital education, and as a result education related to new media, because the practical elements involved in new media studies and digital design often overlap. For instance, ‗how to' phenomena (such as wikihow.com) are provided freely through the web, and are no longer necessarily the property of experts and only made available through education or commerce.

Impact

This research impacts students, teachers, organisations and individuals involved in practical education and software training in digital design. As a broad online phenomenon, DDTVs affect many areas of design. They impact the teacher's control over learning materials, but also open up digital design to a much larger audience than those people currently enrolled in educational institutions. The online phenomenon researched in this thesis operates as a form of democratisation, which perhaps has the greatest impact on design culture globally. The impact of more open educational resources in design can bring a whole new audience to design — potentially a much larger one than is currently available. The growing numbers and diversity of people interacting with design culture on and offline could impact on the design profession.

This phenomenon has also affected students‘ learning resources and the availability of information related to design online for individuals who are already engaged in design education though traditional means (educational institutions as opposed to self-education online). It also has the potential to impact existing design models and processes. This is because some students have indicated that they use these resources during the design process to complement their digital design-based knowledge, and to fill gaps in their knowledge base to help complete design outcomes. These factors all indicate that DDTVs are competing with the resources available to design students within existing educational institutions.

This open availability will affect institutions‘ (universities) and organisations‘ (companies, production houses) provision and use of open resources. Individuals engaged with these resources for their education and training would previously only have had access to resources specified by the institution or organisation. Now they can freely access information related to education and training. Some of this impact cannot be seen directly in this study, but the scale of usage of DDTVs, as evidenced in this research, is bound to affect all levels of design production and training. The questionnaire and content analysis of this study have shown some of these effects in student‘s attitudes and the sheer popularity of online sources of information. Other effects include the generation of social networks outside the institutions, and the real-world engagements with which individuals are associated.

Implications

The implications of the findings of this research are substantial. They include the whole delivery of educational information, and design education in particular. Design education will now have to take into account the resources and information available to students online, and educate them in how to determine whether the information is of good quality or unreliable. Because there are millions of DDTVs available to students, it is important when working to complete practical design tasks that the students are aware of their existence and understand how best to use the information provided. The majority of students surveyed in this research indicated that they already use these resources, as well as others online, to aid in their digital design practice. This information could be used to benefit course coordinators when they are devising design tasks to assign to students.

In addition, the findings from this research could have implications for design models; that is, the process or methodology involved in the design process — sometimes referred to as a pipeline. One example of a design model is ‗generative design', a model that can be followed by designers using generative processes and the automation of different processes related to the design. More emphasis could be placed on different design models (especially design processes) that include the use of outside teaching materials to supplement the designer's knowledge base. A high percentage of students surveyed in this thesis indicated that they use DDTVs while conducting their design process. This could mean two different things: First, students are using DDTVs to fill gaps in their practical design knowledge while conducting the design process; and second, that students are using DDTVs to enhance and improve their designs while they conduct the design process. Added to this second point is the fact that students search for and find these videos during a different stage in the design process than the stage designers may typically assume, or was hypothesised by the researcher. It was anticipated that students would be gathering useful resources at the beginning of the design process compared to after a design had been conceptualised or while it was being created.

The use of DDTVs by design students also opens up the potential for an exploration of the impact of the differences between knowledgeable, experienced designers who do not have access to DDTVs, and intermediate designers who have access to a large knowledgebase on demand (DDTVs). Researchers D'Mello, Graesser and King (2010) have found that beginners and intermediate practitioners are able to complete tasks of the same quality as advanced users because of their ability to access to a large database of resources. However, those who are professionally trained may use the knowledge provided by these DDTV materials differently from those who are untrained, who might use them naïvely. This means that professionals may still possess valuable knowledge that could assist them in using resources more effectively. However, differences between professionals and untrained users with DDTVs have not been explored, providing an opportunity for future research.

Significance

This online phenomenon (DDTVs) is significant enough to affect millions of people, and has the potential to affect entire professions, changing their ability to complete practical design-based outcomes. The extent of this phenomenon could lead to changes in digital design culture online. This is mostly in relation to access to information and digital design processes, as these videos have been found to be large in number and highly popular, having a significant impact on individuals learning design processes.

Students are very likely to come in contact with DDTVs because of the high numbers of them that are available, their popularity and the frequency with which they are accessed (millions of DDTVs and millions of views). These resources are being provided beyond the confines of educational institutions, and this ultimately threatens the exclusivity of the training provided, and democratises the acquisition of knowledge. This could have positive implications for students and their knowledge acquisition.

The significance of these resources is likely to increase in future, as ever greater numbers of individuals use them to educate themselves in design and other processes. They could motivate possible changes in the creation and implementation of design teaching and delivery models, which directly involve ubiquitous resources. The phenomenon also has the potential to directly impact digital literacy, as students and individuals educating themselves in digital software are likely to stumble upon DDTVs, providing them with a lot of information in a similar way as the open-source movement has provided more information and access to those involved in coding.

The findings of this research also have implications for digital design and design research. As this research identifies online phenomena related to the propagation of information about practical design processes, this opens up possibilities for research to be conducted to further understand this phenomenon and its potential impact on the digital design process. The identification of this phenomenon is significant for digital designers, because for the first time, research is being conducted on what has been identified as a major practical resource, which gives a better

understanding of the evolving skill set of digital designers in the 21st century as it is taking place. This could provide many benefits for digital design students and practitioners. Other individuals outside the design community could also be affected, as this resource will facilitate on-going learning, and enable the continuous acquisition of skills central to the presentation of information in the post-digital age.

A significant aspect of the research findings involves research into students‘ digital resource habits and attitudes, and more specifically research into the frequency with which DDTVs are used, and during which stage of design practice. This information has not been previously identified, making this study relevant to digital design educators in the creation of their courses.

The other strand of this research relates to social network analysis on YouTube, which has not previously been conducted on design resources. This analysis could be significant for those involved in research on lurking behaviour, and in its relation to filling gaps in individual designers‘ practical working knowledge base.

Also useful to digital designers is the research presented here on the structure of DDTVs, which has not been conducted previously. The research identifies that the structure of the majority of the DDTVs is almost identical to that of digital design activity, with most differences probably occurring because of the time it takes to explain the task being conducted. This should not come as a surprise, as students indicated they used DDTVs to inform themselves on digital design processes.

This research shows that a vast array of resources has become available to design researchers, who now have an understanding of what is available to study online relating to design activity or the recording of design activity. Studying these could aid the development of a theory about digital design or computational design in the later stage of the design process.

Relevance

This research has considerable relevance in the context of current changes to digital design culture and technologies online. This involves the expansion of what is described as ‗Web 2.0‘ services, such as Twitter, Pinterest and Instagram, that enable new possibilities for sharing design-related information online. The changes

in the way many individuals and groups share design-related information is also relevant to the future of digital design culture, the technological evolution of design education, and other areas such as digital literacy and research into new media.

The technological evolution of design education and the evolution of design practice are intertwined. Design education is typically involved in giving practical and theoretical knowledge to students, in addition to knowledge related to conceptualisation and ethical practices. The evolution of design education was occurring long before design was conducted with computers, and dates back thousands of years. This thesis, by concentrating on the changes wrought on design production by the computer, is perhaps identifying the greatest and most challenging shift in the development of communication and digital design production. The evolution of design education has involved different mediums, most of which are visual in nature. This is partly because of the types of design with which this thesis is concerned.

Historically, the evolution of design education has been linked with advancements in technology. At first, design education involved interactions in person, and first-hand instruction by master to apprentice. The next transition was to present information related to design education in printed materials. This stage enabled the mass distribution of educational material in magazines, journals and photocopies, transitioning to international mass distribution. Now there is ubiquitous access to videos online and other forms of digital media. Around 1990 in Australia, training diplomas progressed into design degrees and design schools. Design became a subject taught at various universities before becoming a discipline in many major higher education institutions. Design education is now common throughout the world, and as a discipline is supported by design publications — both commercial magazines and academic journals. These changes are accelerating with the ubiquitous access to design information via the internet, and the advent of online design courses associated with major universities and other providers. This also involves the propagation of digital design-related information via a range of sources including DDTVs, podcasts and blogs.

The evolution of design education primarily involves different ways of disseminating information, culminating in the massive production of DDTVs, which tend to require

self-motivated learning. This is the case with the student participants in this study, who used DDTVs on their own accord to supplement their existing education. This theoretically begins when individuals are motivated to design, to conceptualise designs and become involved with design production in some way. Learning design in the 21st century can begin for some designers by searching the internet, and in so doing, they are very likely to stumble upon interest-based resources like DDTVs. Self-motivated and self-directed education and the discovery of interest-based information are considered a part of _legitimate peripheral participation' within the Community of Practice framework (Wenger, 1998). However, it could be argued that this is more related to communities of interest, as individuals' interests motivate them to seek out information. Regardless, individuals are engaging with practical design activity, and students have indicated that they engage in practice while using DDTVs as a resource. This helps embed the relationship between the theory of Communities of Practice (Wenger, 1998) and the communities situated around this content. Aside from the differences between traditional learning methods and self-directed and interest-based methods, this study has found that self-directed learning forms a part of the acquisition of information for digital design students studied in this thesis.

Limitations of the study

Some issues raised in the context of this massive DDTV phenomenon are outside the scope of the thesis. These include issues relating to the extent of the material available as data. Only a small percentage of the millions of available videos were researched, although this still amounted to a total of 800 videos and is a very large number compared to other studies that involve video content. Other design practitioners, such as design studios, were not researched as the focus was on student designers, the content and the social interaction around DDTVs. In future studies, it would be useful to carry out this research on cohorts of students at other universities that were not involved on this occasion. It would be especially interesting to include design educators and practitioners.

Further Research

The potential for future research in this area is enormous. Bigger issues could be explored related to the changes seen in digital design practices and the potential

influence of online culture. The impacts on design practice could also be examined more, with research done in conjunction with industry and design studios, rather than concentrating only on the impact on design education. The data now available on design practices (DDTV content) is so vast that it could help inform a theory of digital design, or at least the processes that are followed in the later stage of design production. The study could be repeated, allowing for variables related to the search engine algorithm with which this study was conducted. Specifically, the sampling in this study, which involved the search engine algorithm built into the website Youtube.com, was used to find relevant videos to include in the study. The possibility exists for different videos to be featured in future research, as new videos and information may be given priority by the search engine algorithm. Using other videos might lead to different results. However, it is expected that the result might be somewhat similar — especially in terms of scale. There are some similarities with other types of internet research involving popular websites like Youtube.com or Twitter.com, as the environment is not static, changing day to day and hour to hour based on what is uploaded or posted, and what the search engine algorithm deems important in each case. Accordingly, variations in results should be expected.

Concluding Statements

This thesis has identified a major online phenomenon related to skill acquisition in digital design and the propagation of useful, instructive information. The scale of the phenomenon is far greater than expected. There is still a need for future research to determine its impact across multiple institutions around the world. This thesis serves as an introduction to a long process that could include a lot more research on a phenomenon involving millions of individuals and videos. This is a data-rich area of digital design that could prove to have a significantly greater impact on future digital design culture and design education than movable type had on the invention of printing, the book and the commercial publishing industry.

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APPENDIX: STUDY DOCUMENTATION

Questionnaire

Project Title: An investigation into procedural and tutorial videos online
Investigator: Adam Walker
Supervisor: Dr Keith Robertson

Disclaimer:
In this research we are investigating issues relating to tutorial videos and their use by design students. We do not request your name and there are no questions that would reveal your identity through participating. Your participation is entirely voluntary so if you wish to withdraw from this research feel free to exit at any time. By completing and returning the following questionnaire you will be allowing me to use this information in the development of my PHD research at Swinburne University of Technology. Thank You.

NOTE: The following is just an example of what could be described as a video tutorial, you are not required to watch the video.

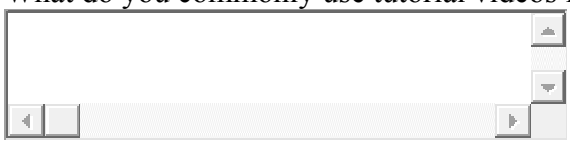
Video Content example

1. What area of Design are you currently studying?
   - ○ Digital Media
   - ○ Communication
2. What Year level are you currently in?
   - ○ 1
   - ○ 2
   - ○ 3
   - ○ Honours
3. Have you ever watched video tutorials or other videos that involve a design process, technique, or procedure?
   - ○ Yes
   - ○ no

4. How often do you use videos like this?
   - ○ Once a day
   - ○ Once a week
   - ○ Once a month
   - ○ Once a year
   - ○ Not at all

5. When during the design process would you use these videos?
   - ☐ Before
   - ☐ During
   - ☐ After
   - ☐ Not at all

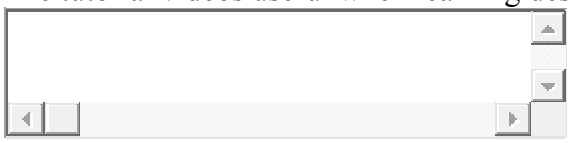
6. What do you commonly use tutorial videos for?



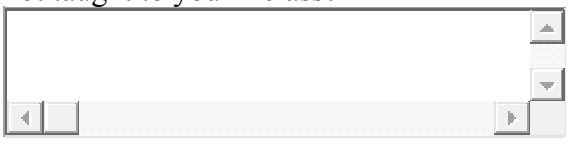
7. Have you witnessed videos like this being shared between students online or at school?
   - ○ Yes
   - ○ No

8. Have you ever 'shared',' commented on', or 'liked' videos like this?
   - ○ Yes
   - ○ No

9. Are tutorial videos useful when learning design practice, if so how?



10. Have you ever used a tutorial video to learn a practical aspect of design that was not taught to you in class?



If you would like further information about the project, please do not hesitate to contact:

Adam Walker
adwalker@swin.edu.au

This project has been approved by or on behalf of Swinburne's Human Research Ethics Committee (SUHREC) in line with the National Statement on Ethical Conduct in Human Research. If you have any concerns or complaints about the conduct of this project, you can contact:

Research Ethics Officer, Swinburne Research (H68),
Swinburne University of Technology, P O Box 218, HAWTHORN VIC 3122.
Tel (03) 9214 5218 or +61 3 9214 5218 or resethics@swin.edu.au

Data Tables

Table 39: Additional general video data table: likes, dislikes views and comments.

General Video Data

		Dislikes	Likes	Views	Comments
N	Valid	796	796	796	796
	Missing	0	0	0	0
Total		17095	382590	87831408	143607

Table 40: Full table of video data table involving website-based categorisation of video content.

Category *(Web based categorisation of videos)*

	Frequency	Percent	Valid Percent	Cumulative Percent
Autos & Vehicles	4	.5	.5	.5
Education	268	33.7	33.7	34.2
Entertainment	12	1.5	1.5	35.7
Film & Animation	133	16.7	16.7	52.4
Gaming	5	.6	.6	53.0
How to & Style	276	34.7	34.7	87.7
Music	1	.1	.1	87.8
People & Blogs	23	2.9	2.9	90.7
Pets & Animals	1	.1	.1	90.8
Science & Technology	58	7.3	7.3	98.1
Shows	15	1.9	1.9	100.0
Total	796	100.0	100.0	

Table 41: full table of video data table regarding location of origin for the video content.

Location *(Video Origin)*

	Frequency	Percent	Valid Percent	Cumulative Percent
Afghanistan	1	.1	.1	.1
Armenia	1	.1	.1	.3
Australia	51	6.4	6.4	6.7

	Azerbaijan	1	.1	.1	6.8
	Belgium	3	.4	.4	7.2
	Brazil	3	.4	.4	7.5
	Bulgaria	1	.1	.1	7.7
	Canada	44	5.5	5.5	13.2
	Colombia	2	.3	.3	13.4
	Denmark	3	.4	.4	13.8
	Egypt	27	3.4	3.4	17.2
	France	4	.5	.5	17.7
	Georgia	1	.1	.1	17.8
	Germany	26	3.3	3.3	21.1
	Greece	1	.1	.1	21.2
	India	12	1.5	1.5	22.7
	Indonesia	6	.8	.8	23.5
	Ireland	5	.6	.6	24.1
	Israel	4	.5	.5	24.6
	Italy	7	.9	.9	25.5
	Lithuania	1	.1	.1	25.6
	Malaysia	3	.4	.4	26.0
	Nepal	1	.1	.1	26.1
	Netherlands	4	.5	.5	26.6
	New Zealand	4	.5	.5	27.1
	Norway	1	.1	.1	27.3
	Pakistan	2	.3	.3	27.5
	Peru	1	.1	.1	27.6
	Philippines	7	.9	.9	28.5
	Poland	2	.3	.3	28.8
	Qatar	2	.3	.3	29.0
	Romania	1	.1	.1	29.1
	Russian Federation	1	.1	.1	29.3
	Singapore	2	.3	.3	29.5
	Slovenia	2	.3	.3	29.8
	Spain	4	.5	.5	30.3
	Sri Lanka	2	.3	.3	30.5
	Sweden	7	.9	.9	31.4
	Ukraine	1	.1	.1	31.5

	Unassigned	2	.3	.3	31.8
	United Arab Emirates	3	.4	.4	32.2
	United Kingdom	102	12.8	12.8	45.0
	United States	437	54.9	54.9	99.9
	Uruguay	1	.1	.1	100.0
	Total	796	100.0	100.0	

Table 42: full table of video data table of authors of video content involved in the study.

Author *(Video Creator)*

	Frequency	Percent	Valid Percent	Cumulative Percent
13shimmy	1	.1	.1	.1
1747robotics	1	.1	.1	.3
2vdesigns	1	.1	.1	.4
3dargondesign	1	.1	.1	.5
3dflashanimator	1	.1	.1	.6
3dmacdaddy	1	.1	.1	.8
3dsmaxtutorials	1	.1	.1	.9
3dtutorialzone	1	.1	.1	1.0
3dworldwide	1	.1	.1	1.1
aaronh678	3	.4	.4	1.5
ab0x	1	.1	.1	1.6
acrezhd	13	1.6	1.6	3.3
acritomedia	4	.5	.5	3.8
adamsavant	1	.1	.1	3.9
adnpartnerchannel	1	.1	.1	4.0
adobequicktips	1	.1	.1	4.1
adobetutorials94	1	.1	.1	4.3
aeptemplates	1	.1	.1	4.4
aftermathlogodesign	1	.1	.1	4.5
aleksmarkeljfoto	1	.1	.1	4.6
alexmel93	1	.1	.1	4.8
alexptwigg	3	.4	.4	5.2
alexsmallbutera	1	.1	.1	5.3
aliginge	1	.1	.1	5.4

	alloutvideos	1	.1	.1	5.5
	alltutorials4u	1	.1	.1	5.7
	almarinastudio	1	.1	.1	5.8
	am110394	1	.1	.1	5.9
	andreasheng	1	.1	.1	6.0
	andres6478	1	.1	.1	6.2
	A10002000	1	.1	.1	6.3
	anishwij	1	.1	.1	6.4
	A200100	1	.1	.1	6.5
	arnoldrenderer	1	.1	.1	6.7
	ashhardesign2012	1	.1	.1	6.8
	availor	1	.1	.1	6.9
	azri3d	2	.3	.3	7.2
	bakaarts	1	.1	.1	7.3
	bakerstuts	14	1.8	1.8	9.0
	baldurmods	1	.1	.1	9.2
	base14productions	1	.1	.1	9.3
	bluelightningtv	2	.3	.3	9.5
	bmsweb	1	.1	.1	9.7
	bob20b07	1	.1	.1	9.8
	borgfriend	1	.1	.1	9.9
	breakfastatlunch	1	.1	.1	10.1
	bsktcreation	2	.3	.3	10.3
	calvinhollywood	1	.1	.1	10.4
	cameronrad1	1	.1	.1	10.6
	capricorn8	1	.1	.1	10.7
	carlos85333	1	.1	.1	10.8
	casedogg87	1	.1	.1	10.9
	cgalekz	1	.1	.1	11.1
	cgfxtips	1	.1	.1	11.2
	cgswot	4	.5	.5	11.7
	chadandtoddpodcast	1	.1	.1	11.8
	chchcheckitsclan	7	.9	.9	12.7
	chickenbonequinto9	1	.1	.1	12.8
	chris180kc	1	.1	.1	12.9
	chrisconverse	1	.1	.1	13.1

	chriscook1981	1	.1	.1	13.2
	chromedesignshd	6	.8	.8	13.9
	chudleighdesigns	1	.1	.1	14.1
	cinemafourdeetuts	1	.1	.1	14.2
	cinemagfx	1	.1	.1	14.3
	claybutler	1	.1	.1	14.4
	collegetut	1	.1	.1	14.6
	cookiemonstermods	1	.1	.1	14.7
	coolconvertible999	1	.1	.1	14.8
	coregfxproductions	2	.3	.3	15.1
	coyleart	2	.3	.3	15.3
	cr8vcow	1	.1	.1	15.5
	craydesigns	1	.1	.1	15.6
	crystalclearartshd	2	.3	.3	15.8
	damonstration	1	.1	.1	16.0
	danonabouncycastle	3	.4	.4	16.3
	danstevers	1	.1	.1	16.5
	darkofdecade2	2	.3	.3	16.7
	datsart	1	.1	.1	16.8
	davetyner	1	.1	.1	17.0
	davidplato	1	.1	.1	17.1
	deepfriedectoplasm	5	.6	.6	17.7
	designaholism	1	.1	.1	17.8
	designcourse	1	.1	.1	18.0
	designer3500	1	.1	.1	18.1
	designerlukefx	1	.1	.1	18.2
	designlikeapro	1	.1	.1	18.3
	designtrendy	1	.1	.1	18.5
	dezignzone	1	.1	.1	18.6
	digitalarchland	3	.4	.4	19.0
	digitalartsguild	3	.4	.4	19.3
	digitaltut	1	.1	.1	19.5
	diphax	3	.4	.4	19.8
	domsworkcn	1	.1	.1	20.0
	drawwithjazza	1	.1	.1	20.1
	dreamwarestudios	1	.1	.1	20.2

	drivelinebrodie	1	.1	.1	20.4
	duckhouseproductions	1	.1	.1	20.5
	dudelypro	1	.1	.1	20.6
	easymaya	25	3.1	3.1	23.7
	ecabrams	6	.8	.8	24.5
	eddievedda1	2	.3	.3	24.7
	ehowtech	12	1.5	1.5	26.3
	emibanana	1	.1	.1	26.4
	emil1585	1	.1	.1	26.5
	erraticoblivion	1	.1	.1	26.6
	esarantopoulos	1	.1	.1	26.8
	escapeephil	1	.1	.1	26.9
	eternal3lade	1	.1	.1	27.0
	evaneckard	4	.5	.5	27.5
	extremeuploaders	2	.3	.3	27.8
	facethevenom	7	.9	.9	28.6
	facultydev	1	.1	.1	28.8
	fenikzfx	2	.3	.3	29.0
	fenixchannel	1	.1	.1	29.1
	ferretsniff	1	.1	.1	29.3
	fictionalhead	1	.1	.1	29.4
	fidatoo2070	1	.1	.1	29.5
	flashacesdesign	1	.1	.1	29.6
	flashbuilding	3	.4	.4	30.0
	flashpilothd	2	.3	.3	30.3
	flashthingy	5	.6	.6	30.9
	flashvideotutorials	1	.1	.1	31.0
	flashyoda	1	.1	.1	31.2
	flew2012	1	.1	.1	31.3
	flyingpanda1990	2	.3	.3	31.5
	fmms1350	1	.1	.1	31.7
	forrestvfx	1	.1	.1	31.8
	fortres008	1	.1	.1	31.9
	francismediaent	1	.1	.1	32.0
	freshmaya	4	.5	.5	32.5
	fsulibraries	1	.1	.1	32.7

	funymony	1	.1	.1	32.8
	gamer0451	1	.1	.1	32.9
	gaudencez	17	2.1	2.1	35.1
	gcostudios	1	.1	.1	35.2
	gfxmp	1	.1	.1	35.3
	glazefoliodb	3	.4	.4	35.7
	glyndewis	2	.3	.3	35.9
	goldentotproductions	1	.1	.1	36.1
	goodcreativetutorial	6	.8	.8	36.8
	grafxtv	3	.4	.4	37.2
	graphicdesignertips	11	1.4	1.4	38.6
	gvfxtutorials	1	.1	.1	38.7
	hacobo	2	.3	.3	38.9
	harrypmgaga	1	.1	.1	39.1
	hdvideotuts	1	.1	.1	39.2
	helpvid	1	.1	.1	39.3
	hyperiondzign	1	.1	.1	39.4
	hypolab	1	.1	.1	39.6
	iamwanted4net	1	.1	.1	39.7
	iceflowstudios	4	.5	.5	40.2
	ideasnextdoor	1	.1	.1	40.3
	idigitaluniverse	7	.9	.9	41.2
	ifskills	20	2.5	2.5	43.7
	illustrationdan	1	.1	.1	43.8
	imask8r	1	.1	.1	44.0
	imfxtutorials	1	.1	.1	44.1
	imztech	3	.4	.4	44.5
	infuzedmedia	2	.3	.3	44.7
	irvin390	2	.3	.3	45.0
	japresent	1	.1	.1	45.1
	jaxnentertainment	1	.1	.1	45.2
	jayceevids	1	.1	.1	45.4
	jclaycast	2	.3	.3	45.6
	jodroboxes	1	.1	.1	45.7
	jpfaraco	1	.1	.1	45.9
	jreamdesign	8	1.0	1.0	46.9

	justthisgood	6	.8	.8	47.6
	kennyvanpaemel1	1	.1	.1	47.7
	keres993	1	.1	.1	47.9
	kevinharper3dartist	2	.3	.3	48.1
	khdownes1	1	.1	.1	48.2
	killnasty2012	1	.1	.1	48.4
	knowflash	1	.1	.1	48.5
	kravenark	1	.1	.1	48.6
	kruzedesigns	1	.1	.1	48.7
	laurittheartist	1	.1	.1	48.9
	learntoprogramdottv	1	.1	.1	49.0
	legendzeldamaster1	1	.1	.1	49.1
	lethargicbannanazz	2	.3	.3	49.4
	lighternoteprod	1	.1	.1	49.5
	lilredheadcomics	16	2.0	2.0	51.5
	lockianhound	1	.1	.1	51.6
	logongod	1	.1	.1	51.8
	looozaaa	1	.1	.1	51.9
	lopudesigns	1	.1	.1	52.0
	LR-Yr4ubitWFRDx8WGVJgQ	1	.1	.1	52.1
	ltcreativestudio	1	.1	.1	52.3
	lyndapodcast	29	3.6	3.6	55.9
	macboyproductions	1	.1	.1	56.0
	mackenziereidrostad2	1	.1	.1	56.2
	macrotutorials	1	.1	.1	56.3
	mahalodotcom	3	.4	.4	56.7
	mamchic	2	.3	.3	56.9
	maskznoevil	1	.1	.1	57.0
	matmig82	1	.1	.1	57.2
	mattyboy7777	1	.1	.1	57.3
	maxscobe	1	.1	.1	57.4
	mayabuddy3d	1	.1	.1	57.5
	mchughm1	1	.1	.1	57.7
	mcomjohn	1	.1	.1	57.8
	mentalarmory	1	.1	.1	57.9

	mguild44	3	.4	.4	58.3
	mham3d	3	.4	.4	58.7
	michaeljglen	1	.1	.1	58.8
	minutephysics	1	.1	.1	58.9
	mlwebco	2	.3	.3	59.2
	mogomedia	1	.1	.1	59.3
	montagical	1	.1	.1	59.4
	moretoart	1	.1	.1	59.5
	motiongraphic1	1	.1	.1	59.7
	motionsquared	1	.1	.1	59.8
	mrcglot	4	.5	.5	60.3
	mrmylifeiscamp	1	.1	.1	60.4
	msulib	1	.1	.1	60.6
	mydamnchannel	3	.4	.4	60.9
	mylkhead	1	.1	.1	61.1
	nareko90	1	.1	.1	61.2
	newcollegebuddy	2	.3	.3	61.4
	newworldops	3	.4	.4	61.8
	nextwaveg	1	.1	.1	61.9
	ngraver001	1	.1	.1	62.1
	nikonwow	1	.1	.1	62.2
	nipexmilad	1	.1	.1	62.3
	notoriouskeyframe	1	.1	.1	62.4
	nuan07	1	.1	.1	62.6
	nuronlylight	1	.1	.1	62.7
	o0curiousturtle0o	1	.1	.1	62.8
	octotuts	2	.3	.3	63.1
	oneyng	2	.3	.3	63.3
	opblaaskaas	1	.1	.1	63.4
	overgroundcomics	1	.1	.1	63.6
	owadesign	1	.1	.1	63.7
	oxob3000	1	.1	.1	63.8
	panyamapanti	1	.1	.1	63.9
	paulfatkins3987	3	.4	.4	64.3
	pav3dtutorials	2	.3	.3	64.6
	pentofilm	1	.1	.1	64.7

	photoextremist	2	.3	.3	64.9
	photogavin	2	.3	.3	65.2
	photographish	1	.1	.1	65.3
	photoshoptrainingch	1	.1	.1	65.5
	pierrrecesar	1	.1	.1	65.6
	piratestudioscs5	1	.1	.1	65.7
	pixelatornyc	1	.1	.1	65.8
	pmhpbl	2	.3	.3	66.1
	polyfacecom	2	.3	.3	66.3
	presbarkeep	1	.1	.1	66.5
	prodesigner24x7	1	.1	.1	66.6
	project4d	2	.3	.3	66.8
	protemplates	1	.1	.1	67.0
	pspfreak007	1	.1	.1	67.1
	pstutorialsws	4	.5	.5	67.6
	psycomantis116	1	.1	.1	67.7
	quintaldesigns	1	.1	.1	67.8
	rathergrim	1	.1	.1	68.0
	rcgtutorials	10	1.3	1.3	69.2
	rdaveido	1	.1	.1	69.3
	redwinggraphic	1	.1	.1	69.5
	ritutorials	1	.1	.1	69.6
	rivercitygraphix	9	1.1	1.1	70.7
	rmfmedia	1	.1	.1	70.9
	R100200	1	.1	.1	71.0
	robtazor	1	.1	.1	71.1
	romanhorol	3	.4	.4	71.5
	royalaus	1	.1	.1	71.6
	rsmrt	1	.1	.1	71.7
	saba2357	1	.1	.1	71.9
	saginthebag	1	.1	.1	72.0
	sampleminded	1	.1	.1	72.1
	samwickert	1	.1	.1	72.2
	sarakiesling	1	.1	.1	72.4
	scareddogdotcom	1	.1	.1	72.5
	scotttrudeau	1	.1	.1	72.6

	seanclausen	1	.1	.1	72.7
	sergburma	1	.1	.1	72.9
	shadowtutorials	1	.1	.1	73.0
	shepperdoneill	1	.1	.1	73.1
	sherbertmelon	1	.1	.1	73.2
	shortformvideos	5	.6	.6	73.9
	shotafem	8	1.0	1.0	74.9
	sicdesignz	1	.1	.1	75.0
	simplymayacom	2	.3	.3	75.3
	skillforgetv	1	.1	.1	75.4
	slrlounge	1	.1	.1	75.5
	slyphotography	1	.1	.1	75.6
	smash5media	1	.1	.1	75.8
	snowflakegfx	1	.1	.1	75.9
	soundmicpromo	1	.1	.1	76.0
	spazkidin3d	2	.3	.3	76.3
	spicynachofilms	1	.1	.1	76.4
	squidink14	1	.1	.1	76.5
	starw0lf	1	.1	.1	76.6
	steeletraining	1	.1	.1	76.8
	stefitms	1	.1	.1	76.9
	sterlingteaches	1	.1	.1	77.0
	superpstutorials	4	.5	.5	77.5
	t3htechi3s	2	.3	.3	77.8
	taimanero	1	.1	.1	77.9
	talal0khalid	1	.1	.1	78.0
	taraartsmovie	4	.5	.5	78.5
	tareaperz	1	.1	.1	78.6
	tasktutorialcom	1	.1	.1	78.8
	tastytuts	1	.1	.1	78.9
	techmindblow	1	.1	.1	79.0
	technologyguru77	8	1.0	1.0	80.0
	teckstuf	1	.1	.1	80.2
	terrald0	2	.3	.3	80.4
	terrywhitetechblog	4	.5	.5	80.9
	the3dpalace	1	.1	.1	81.0

	the3dsmaxtutorials	1	.1	.1	81.2
	thecgbro	1	.1	.1	81.3
	theedix	2	.3	.3	81.5
	thegarettfranz	1	.1	.1	81.7
	thehowtomac	1	.1	.1	81.8
	themadcowmoo	1	.1	.1	81.9
	themrmenagerie2	2	.3	.3	82.2
	thenewboston	31	3.9	3.9	86.1
	thepixellab2011	1	.1	.1	86.2
	thepsychstudios	2	.3	.3	86.4
	thethundertutorials	1	.1	.1	86.6
	thetreebus	1	.1	.1	86.7
	theunholybudders	1	.1	.1	86.8
	thevfxbro	8	1.0	1.0	87.8
	thinkindesign	3	.4	.4	88.2
	tkblackknight	1	.1	.1	88.3
	tlilak	1	.1	.1	88.4
	tomlg1992	1	.1	.1	88.6
	toneygriffincorp	1	.1	.1	88.7
	touchmyweenis	1	.1	.1	88.8
	trooperfx	3	.4	.4	89.2
	troy2062	1	.1	.1	89.3
	tutorials101videos	3	.4	.4	89.7
	tutorvidcom	3	.4	.4	90.1
	tutvid	27	3.4	3.4	93.5
	twiistedxciinema	2	.3	.3	93.7
	uelgraphics	1	.1	.1	93.8
	uhvcbctitlev	1	.1	.1	94.0
	unc0nscious	1	.1	.1	94.1
	unexdesigns	1	.1	.1	94.2
	unluckylion	9	1.1	1.1	95.4
	vaporgraphics	1	.1	.1	95.5
	vicommdotorg	1	.1	.1	95.6
	victorart	1	.1	.1	95.7
	videofxuniverse	1	.1	.1	95.9
	videzetutorials	4	.5	.5	96.4

	vidubzx	1	.1	.1	96.5
	visualknights	1	.1	.1	96.6
	votekick	1	.1	.1	96.7
	voxlabtv	1	.1	.1	96.9
	vvcomphelpvv	2	.3	.3	97.1
	wackaalpaca	1	.1	.1	97.2
	wanteddesignshd	1	.1	.1	97.4
	waywardson256	2	.3	.3	97.6
	westdrake	1	.1	.1	97.7
	worldofleveldesign	1	.1	.1	97.9
	xefpatterson	1	.1	.1	98.0
	xexdesigns	1	.1	.1	98.1
	xxiamg0dlyxx	8	1.0	1.0	99.1
	youmayatutorials	1	.1	.1	99.2
	youmograph	1	.1	.1	99.4
	youyouyouyouit	1	.1	.1	99.5
	zeboedits	1	.1	.1	99.6
	zipman11	1	.1	.1	99.7
	zkgraphics	1	.1	.1	99.9
	zturchansky	1	.1	.1	100.0
	Total	796	100.0	100.0	

APPENDIX: ETHICS DOCUMENTATION ETHICS APPLICATION APPROVAL

SUHREC 2012/252 Investigating Online Procedural and Tutorial videos and their use by design students

Dr Keith Robertson, Design, Mr Adam Walker
Approved Duration: 19/11/2012 To 31/08/2013 [Adjusted]

I refer to the ethical review of the above project protocol undertaken on behalf of Swinburne's Human Research Ethics Committee (SUHREC) by SUHREC Subcommittee (SHESC4) at a meeting held on 19 October 2012. Your response to the review as e-mailed on 15 November was reviewed by a SHESC4 delegate.

I am pleased to advise that, as submitted to date, the project has approval to proceed in line with standard on-going ethics clearance conditions here outlined.

- All human research activity undertaken under Swinburne auspices must conform to Swinburne and external regulatory standards, including the National Statement on Ethical Conduct in Human Research and with respect to secure data use, retention and disposal.

- The named Swinburne Chief Investigator/Supervisor remains responsible for any personnel appointed to or associated with the project being made aware of ethics clearance conditions, including research and consent procedures or instruments approved. Any change in chief investigator/supervisor requires timely notification and SUHREC endorsement.

- The above project has been approved as submitted for ethical review by or on behalf of SUHREC. Amendments to approved procedures or instruments ordinarily require prior ethical appraisal/ clearance. SUHREC must be notified immediately or as soon as possible thereafter of (a) any serious or unexpected adverse effects on participants and any redress measures; (b) proposed changes in protocols; and (c) unforeseen events which might affect continued ethical acceptability of the project.

- At a minimum, an annual report on the progress of the project is required as well as at the conclusion (or abandonment) of the project.

- A duly authorised external or internal audit of the project may be undertaken at any time.

Please contact the Research Ethics Office if you have any queries about on-going ethics clearance, citing the SUHREC project number. Please retain a copy of this clearance email as part of project record-keeping.

Best wishes for the project.

Yours sincerely

Kaye Goldenberg
Secretary, SHESC4

Informed Consent Statement

Swinburne University of Technology

Faculty of Design

Research Information Statement

Project Title: An investigation into procedural and tutorial videos online

Investigator: Adam Walker
Supervisor: Dr Keith Robertson

Project Summary

The purpose of this project is probe into the occurrence of *procedural* and *tutorial* video content within online design communities and universities; this is done in an attempt to explore the role of procedural and tutorial videos as a possible form of social practice in the contemporary online environment. The procedural and tutorial videos in question are videos that involve the recording of a digital design process, technique, or procedure. However, these videos are not just recorded, but distributed publicly, by a multitude of authors, within networks and websites online. Videos that explain a design process or procedure have been used by designers and design educators to aid them in the practical aspects involved in design, and this research aims to investigate into the student and teacher use of this video content.

In this research we are only investigating issues relating to tutorial videos and their use by design students. We do not request your name and there are no questions that would reveal your identity through participating. Your participation is entirely voluntary so if you wish to withdraw from this research feel free to exit at any time. By completing and returning the following questionnaire you will be allowing me to use this information in the development of my PHD research. Thank You.

Research

We are conducting questionnaires with students and teachers about their use of tutorial and procedural videos. We expect that it might take 10 to 15 minutes of your time. We hope to come to a better understanding of tutorial videos, and investigate the contents use as an educational resource, and the virtual communities that surround this content online.

Privacy Protection

We do not collect your name for this research, so you will not be identifiable through your participation. If you feel uneasy and wish to terminate your involvement you should feel free to withdraw consent at any time and no further questions will be asked. By completing the Interview however you are allowing us to use the information in our studies.

If you are happy to proceed we will be asking you to sign an Informed Consent Form before completing the Interview.

Thank you for reading this and for your participation.

Further Information about the project:

Any questions regarding the project entitled *an investigation into procedural and tutorial videos online* can be directed to the Senior Investigator Dr Keith Robertson, Faculty of Design, Swinburne University. Email: krobertson@swin.edu.au Phone: 9214 6092

Ethical Statement

I certify that the treatment of human subjects as required by the Swinburne Research Ethics Committee for the thesis entitled, ‗Investigating Tutorial and Procedural Videos Online', submitted for the degree of Doctor of Philosophy were properly met.

I verify that all conditions pertaining to the ethics clearance have been properly met. Hard copies with all material in relation to this ethics clearance have been submitted to the Head of Research, Faculty of Design, Swinburne University of Technology and have been securely stored in the faculty according to the regulations. Furthermore, I acknowledge that where required annual and final reports have been submitted.

Name: Adam Walker

Signed: 

Date: 25/04/2016

PUBLICATIONS

This thesis and the work created has not been featured in any publications

Conference Presentations

This thesis and the work created has not been featured in any conferences