



INTRODUCING MULTI-USER ENVIRONMENTS INTO AUSTRALIA'S VIRTUAL CLASSROOMS

A VALUE PROPOSITION FOR AUSTRALIA'S NATIONAL BROADBAND NETWORK

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As debate ensues over the nation's priority to build 'a gold-standard Internet network' as Communications Minister, Senator Stephen Conroy describes it, his government's broadband initiative, the NBN, has many Australians asking what the business case for a super-fast broadband service might be.

With educationalists alert to the fact that the 21st century classroom leaves the closed, teacher-centric, facts-based model of learning behind, the curriculum is being redesigned, teacher practice is changing, and technology tools that cater for an extensible, customised approach to learning are being developed.

Amongst the most compelling technology services for consideration are multi-user virtual environments (MUVes); these are emerging technology platforms which can be hosted on servers or sold as software that enable 3D rendering of real or composed scenarios, events, people and places, which may be shared in real time with multiple other users, stream rich media and which can integrate learning management systems, such as 'moodle'.

The aim of this paper is, firstly, to outline the important role MUVes could play in our virtual classrooms, and, secondly, to assess whether policy and curriculum development are mindful of the advantages of implementing MUVes, as there is evidence that MUVes are being overlooked by ICT strategists and in the setting of Australia's first national curriculum. This discursive paper shows where the omissions are, and suggests that, as far as the implementation of 3D virtual environments in the education sector goes, there may be a disconnection between those who 'do' (the teachers) and those who 'plan' (the policy makers).

INTRODUCTION

As debate ensues over the nation's priority to build 'a gold-standard Internet network', as Communications Minister, Senator Stephen [Conroy \(2010\)](#) describes his government's broadband initiative, the NBN¹, many Australians are asking what the benefits of a super-fast broadband service might be.

In December 2010, Minister Conroy's Department² released its 'Progress Update', flagging the new education services that the NBN would facilitate. The planned new superfast technology infrastructure, promising speeds of up to 100 megabits per second (Mbps) to 93% of all premises, would create 'virtual classrooms', 'addressing the distance and isolation barrier...providing access to the best specialist teachers...and enabling collaborative learning between education institutions, both domestically and internationally...' ([DBCDE 2010](#)).

The NBN is of course, a means to an end, not a solution in itself, and, concomitantly the complex job of scoping the 'virtual classroom', understanding how to learn and teach within

it, and determining which services need to be developed for achieving the aims must, must also be undertaken.

The conundrum is being energetically discussed in forums across the nation and indeed internationally. Outlining the nature of the shift, at the education and technology conference ‘Questnet’, Nick Cross, Education Outreach Manager at the Australian Academic Research Network (AARNet), surmised:

‘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 in the participation of targeted learning’ ([Cross 2009](#)).

Similarly, in its ‘Teaching and Learning with Web 2.0 Technologies’ report, the Victorian Department of Education and Early Childhood Development referred to ‘the need for more collaborative learning, with student connections formed with experts, parents and peers’ ([DEECD 2010](#), 5).

With educationalists alert to the advantages of the 21st century classroom over the the closed, teacher-centric, facts-based model of learning, the curriculum is being redesigned³, teacher practice is changing, and technology tools that cater for an extensible, customised approach to learning are being developed.

Amongst the most compelling technology services for consideration are multi-user virtual environments (MUVES). These are emerging technology platforms which can be hosted on servers or sold as software that enable 3D rendering of real or composed scenarios, events, people and places, which may be shared in real time with multiple other users, can stream rich media, and can integrate learning management systems (Gardner et al 2008), such as ‘moodle’ ([Sloodle 2010](#)).

The aim of this paper is, firstly, to outline the important role MUVES could play in our virtual classrooms, and, secondly, to assess whether policy and curriculum development are sufficiently cognisant mindful of the advantages of implementing MUVES, as there is evidence that MUVES are being overlooked by ICT strategists, and those charged with constructing Australia’s first national curriculum ([ACARA 2010](#)).

This discursive paper shows where the omissions are, and suggests that, as far as the implementation of 3D virtual environments in the education sector goes, there may be a disconnect between those who ‘do’ (the teachers) and those who ‘plan’ (the policy makers).

The research entailed:

1. Observing the use of MUVES at Melbourne Grammar School.
2. An environmental scan of government support and initiatives.
3. Collecting and annotating perceptions about the ‘immersive Internet’.⁴

It was then considered whether such perceptions constitute the view amongst policy makers that MUVES are not yet ready for deployment in classrooms – or indeed if they are sufficiently cognisant with them.

The paper does not delve into the machinations of departmental jurisdictions, in particular, the Department of Education, Enterprise and Workplace Relations (DEEWR) and the many committees across the education sector which report to it. Such detail is beyond the scope of this paper, although following this thread would further illuminate the blockages.

In terms of the promise of the NBN and the educational opportunities envisioned, this enquiry is, hopefully, timely.

MUVES IN THE VIRTUAL CLASSROOM

Reports about trends in online learning ([Allen et al. 2008](#); [Johnstone et al. 2009](#)) indicate that a range of factors constitute today’s virtual classroom, but that the range itself is predicated on a network-enabled computer as the baseline requirement, after which all or some of the following features may become involved:

- web-derived content including rich media
- remote access with limited or no face-to face contact with teachers and students
- synchronous and asynchronous access to content
- self determined learning pathways and time frames
- online collaboration tools such as wikis and blogs for knowledge acquisition

The relationship between the learning community (including teachers), the curricular, and ICT tools and skills are further components for consideration ([U.S. Department of Education 2010](#), 14-22).

Immersive tools are a part of this new paradigm; they are extensible environments for creating, sharing, and building knowledge. Multiple users gravitate or enter the simulated environments because of a common interest or purpose, such as collaboration, education and training, co-design, entertainment, industry and community events, and social interaction. A graphical representation, an avatar, denotes a user's presence. Numerous users may share the same digital space; they see the same objects and avatars as one another, and can interact with all. Interaction is via multiple channels (chat, voice, gestures, and movements) and many such platforms enable users to share common content synchronously. A computer keyboard is used to navigate and manipulate viewpoints, although new modalities such as gesture, which Xbox's *Kinect* brought to market in 2010, are being introduced. MUVes' variable elements include graphics, interaction, media input, documentation and presentation tools, scalability and bandwidth.

In his book, 'Getting Over The Slump: innovation strategies to promote children's learning', James Paul Gee describes how new digital environments assist in problem solving, in that they enable educators to 'build worlds full of the sorts of content we have associated with books', allowing 'young people to enter these worlds and experience directly the connections between words and other symbols and the world.' ([Gee 2008](#),16). MUVes open up an enormous range of imaginary tasks, with content which can mimic a historical setting, but which equally, can simulate real world scenarios that allowing students to role-play and problem solve.

The Northern Beaches Christian School (NBCS) in outer Sydney has made a major commitment to 3D learning environments. Teacher, Steve [Collis \(2009\)](#), reports that NBCS students are practised in their use of 3D interactive tools, and that they have created clothing designs and started a business for selling them using an 'in-world'⁵ currency. There is bookstore for student writing, a welcome centre, an auditorium, an art gallery showing monthly exhibitions of student work, and an in world radio station streaming student-made programs. Governance, in NBCS' virtual environment is handled by its 'land council' there is a content regulatory body for programmers. Directed learning might take place at the Maths Maze, whilst group work has students beaming up into pods that hover above the terrain. Text chat is part of the assessment and is emailed directly to the teacher. A dance club enables students to socialise with their French counterparts, developing language skills and cultural insights at the same time. Importantly, Collis, who has a language teaching background, believes that the students are learning 'high order skills' that 'would impress any employer' (video narration in [Collis 2009](#)). He also emphasises that implementation of MUVes in to the curriculum would not have occurred without support at the highest level of the school.

CASE STUDY: 'MAKE POVERTY HISTORY' IN SECOND LIFE, MELBOURNE GRAMMAR SCHOOL

MUVes have many properties that lend themselves to remote and distance learning ([O'Neill 2010](#), [Salmon 2009](#)) but if they were merely a substitute for a physical classroom, there would be no need to use it when students were co-located. Multi-user virtual environments are being used in situations where students are both in the same room as well as connected to each other in a virtual world. This so-called 'mixed-reality' learning' ([Gardner et al. 2008](#), 8) involves

class sessions structured around the integration of virtual worlds and traditional face-to-face group work, building on the ideology that knowledge becomes valuable when it is created and devised through the collaborative processes.⁶

The following case study, a three-day workshop entitled ‘Make Poverty history in Second Life’ (MGS 2008) which was conducted at Melbourne Grammar School (MGS) in July 2008, demonstrates this. The multi-media project, which used the 3D virtual environment platform Second Life, could not have been achieved using more traditional collaborative tools, such as web conferencing or document sharing.

Facilitated by the school’s director of eLearning, Alberto Rizzo, 22 students decided to build on the theme ‘Make Poverty History’ by creating 3D objects and posters in an exhibition space to draw attention to the poor living conditions for communities in developing countries. The location for the activity was Skoolaborate, a schools site within the ‘Teen Grid’, a region purposed for 13-17 year olds in the virtual world, Second Life.⁷ The project was ambitious in terms of the short time frame, however a project blog was used to help students navigate, two experienced MUVE facilitators, or ‘para-teachers’, as well as MGS staff were on hand to assist.

The awareness campaign culminated in a mixed-reality concert featuring local bands performing in the school’s hall while simultaneously, a virtual version, consisting of the live audio feed and an avatar band (students were controlling the avatar movements) streamed into the ‘Make Poverty History’ virtual space. At the same time, the in-world version (the simulation), comprising a virtual stage, and avatar representations of the band members and their instruments, was streamed into the school hall on a large screen. Skoolaborate member schools from around the world logged in to the region and were able to view the virtual concert in real time, as well as view the creative content designed by the MGS students. Those for whom conflicting time zones were a problem were able to visit the exhibits after the event and watch the real-world concert as an archived machinima⁸ (Rizzo 2008).



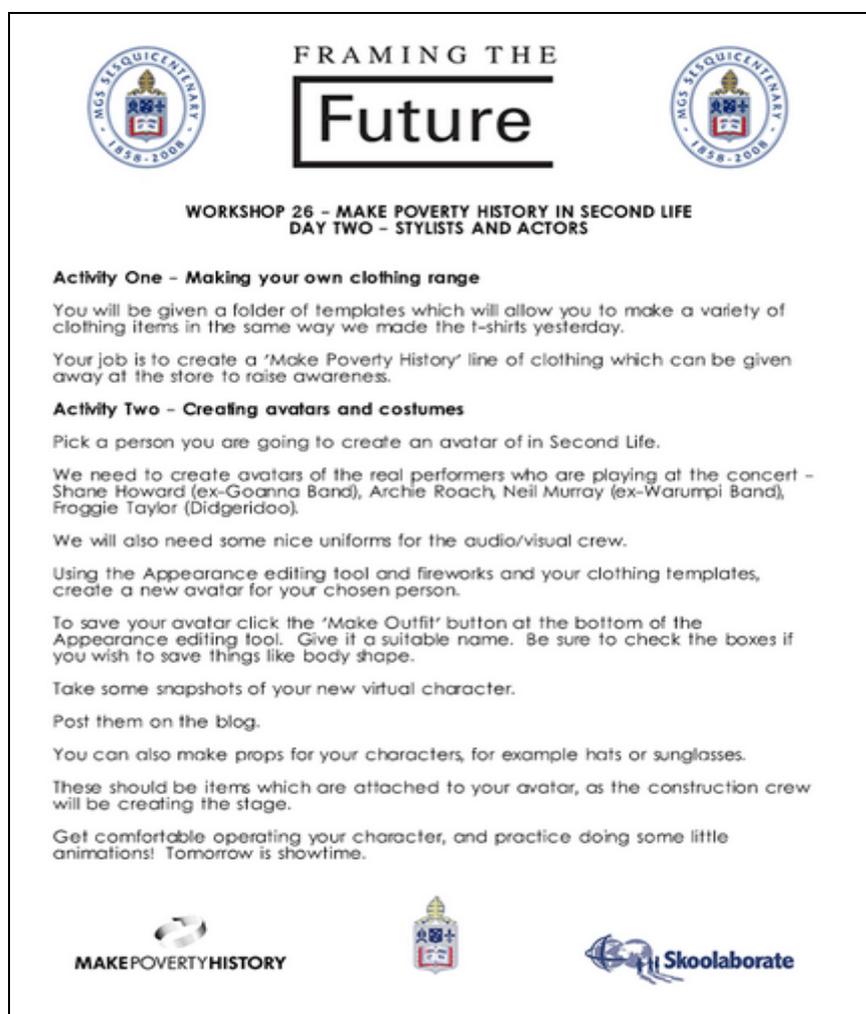
Figure 1 - Students from Debney Park Secondary College mentor Melbourne Grammar students In ‘The Make Poverty History in *Second Life*’ project. July, 2008

PRACTICAL ISSUES

The Second Life component amounted to around \$6k, a cost which MGS reasoned would be an investment in terms of future projects such as digital storytelling and machinima production (Rizzo 2008). The funds were allocated to employ technical personnel, including para-teachers with Second Life expertise, extra equipment and bandwidth, (though the school's existing bandwidth proved to be sufficient).

RESULT

Alberto Rizzo believes the cost was justified, given the steep learning curve for the School and the need for experienced hands on the day. Following the event, a school Second Life group was formed involving MGS staff and students, and weekly workshops. The group continues to collaborate locally with Debney Park Secondary College and further afield with Skoolaborate's global cohort. Activities include 3D modelling, content creation and storytelling. Some MGS students are proving to be so competent that they are employed as content builders in the wider education and training sector, (informal discussion with facilitator, Dale Linegar, in 2010).



The image shows a screenshot of a project blog page. At the top, there are two circular logos for MGS Sesquicentenary (1958-2008) flanking the title 'FRAMING THE Future'. Below the title is the workshop title: 'WORKSHOP 26 - MAKE POVERTY HISTORY IN SECOND LIFE DAY TWO - STYLISTS AND ACTORS'. The main content consists of two activity sections: 'Activity One - Making your own clothing range' and 'Activity Two - Creating avatars and costumes'. The text provides instructions for creating clothing templates and avatars, including prompts like 'using the appearance editing tool' and 'take some snapshots'. At the bottom, there are three logos: 'MAKEPOVERTYHISTORY', the MGS Sesquicentenary logo, and 'Skoolaborate'.

Figure 2 - The project blog; students were given series of activities, rather than a 'how to' manual. This activity focuses on creating avatars to represent the real world band members. Prompts to action include 'using the appearance editing tool', and 'take some snapshots'

A deconstruction of the event shows that:

1. Group work occurred simultaneously, in the real and virtual environment ('mixed reality').
2. Learning to navigate and build content in the virtual world was a hands-on experience. No textbook was used.
3. Students created and constructed visual metaphors for their ideas about poverty in developing countries using in-world tools; no physical resources were required to do this.
4. Students worked in teams, and designated one another roles.
5. A para-teacher with *Second Life* skills oversaw the event, as no teacher within the school had sufficient training to handle the event.
6. Students were in a position to demonstrate their newly found skills to their regular teacher – a reversal of the usual paradigm where the teacher provides information for students to consume.
7. The students had a critical time frame in which to achieve their goal, and were working with people from other schools whom they had not met before.
8. The project leveraged the mission, motivation and achievement characteristics of multi-player video games with which many young people are familiar and which is played recreationally, outside of school hours.

OBSTACLES

MUVEs are emerging technology, thus users commonly experience bugs such as lag and instability. Muvés' plug-and-play potential can be hindered by schools' IT policies and configurations. Lack of customer support, setup and registration time were identified as major problems by a Victoria University team who opted to use the *Second Life* 'Teen Grid' for their 'Avatar Project' ([Schutt et al. 2009](#)).

Virtual worlds can present some perplexing issues around governance, as regulatory elements are largely in the hands of developers. Real-world authorities are always in catch-up mode as virtual world practices evolve, and are uncertain about how to regulate public virtual worlds, especially where money laundering, tax avoidance, scams, harassment, and theft have been known to have occurred. These are some of the reasons why educators might seek to use platforms that sit behind their institutional firewall.

Subscribers have limited rights over the environments in which they have invested, and are subject to end user licence agreements (EULA) over which they have little or no input.

If a virtual world platform should close, users have little to no recompense for their digital assets. However, interoperability and content transfer between platforms is well underway, with the Boston-based Immersive Education Initiative ([IEI 2010](#)) able to transfer content across five platforms.⁹ This mitigates any losses, as users could transfer their work to an alternative product.

MUVES AND THE NBN

MUVEs become bandwidth hungry the higher their levels of 'immersion'¹⁰; even lightweight platforms¹¹ are impacted if user-groups are simultaneously looking at multiple, embedded, rich media, such as streaming video, streaming audio and presentations.¹² In terms of the NBN, other factors with a potential to impact of performance ([Given 2010](#)) will be periods of peak demand on the network, and the fact that many users will chose to opt in at the 'entry level', delivering a likely 12 Mbps, not the high end 100 mbps, which is applicable to the needs of large-scale-enterprise.

Whilst research for this paper did not uncover a definitive range of bandwidth required for optimum usage - variables include the configuration of the client, the number of plug-ins associated with the platform, its graphical density, the number of simultaneous users, the demands of the project at hand – anecdotally, service providers and developers interviewed¹³ all support the idea that increased bandwidth builds new services and extends existing ones, and that, ipso facto, demand by the public for these services will increase. This same view is expressed by Minister Conroy’s Department, which foresees that the NBN will ‘support a new wave of digital innovation that will change and improve the way Australians live their lives, receive services and connect with the world.’ ([DBCDE 2010](#)).

It is hardly surprising that exponents of the ‘immersive Internet’ are enthusiastic advocates of the Federal Government’s NBN strategy, if for no other reason than their own creative enterprises stand to benefit. But beyond this, MUVE providers cited (comprising a value chain of content developers, designers, technical staff and para-teachers), share Minister Conroy’s belief that the proposed fibre-to-the-premises infrastructure will ‘drive innovation and opportunity’ ([NBN 2010](#)).

PROJECT FUNDING AND POLICY GAPS

In spite of current bandwidth constraints, experimentation in MUVES within the education and training sector is well underway. Institutional advocates include the Department of Education and Training, NSW’s Curriculum and Learning Innovation Centre (CLIC) and the Distance Education Hub (DEhub) which includes a Virtual Worlds Working Group comprising representatives of over 30 higher-education institutions with some three hundred scholarly works attributed to them ([DEhub 2011](#)). Over 100 projects have been identified in the higher education sector (Salomon, 2010 pp.12-13), and this is by no means an exhaustive list.

In contrast, there is a notable lack of recognition in the Federal Government’s Digital Education Revolution (DER), which has committed \$2.4b over the seven years, 2009-16, to make the most of the ‘opportunities presented by the National Broadband Network’ ([Gillard 2010](#)). Of this, \$40 m has been allocated to professional development programs for teachers and school leaders. Within this parcel, a \$16m ICT Innovation fund has selected four large-scale programs designed to equip teachers with digital readiness ([DEEWR 2010b](#)).

Significantly, none of these programs make any clear reference to virtual worlds or multi-user virtual environments. As an example, in the \$5.4m program ‘Anywhere, Anytime Teacher Professional Learning’, designed to update teacher’s ICT skills, a program ideally suited to assisting teachers to become cognisant with MUVE technology. One outcome has been the establishment of ‘Pathways for Learning Anytime Anywhere ; a Network for Educators’ (PLANE) by the NSW government to create ‘*a 21st century immersive learning environment- a "digital virtual world" for experiential learning, problem based simulation learning, collaboration and communication*’ ([PLANE 2011](#)). However the bulk of the program focuses on Adobe *Connect* and Microsoft *Sharepoint* ([DEEWR 2010a](#)), which are cloud-based services designed for the business and enterprise sector; as such, their design is skewed towards project management rather than ‘experiential learning’, a central tenet identified by the Australian Curriculum Assessment and Reporting Authority (ACARA) in its vision for 21st century schools ([ACARA 2010](#), 5-19).

MUVES are also omitted from [DEEWR’s ‘Virtual Learning Environments’ report \(2008, 25\)](#), in favour of blogs, wikis, and interactive white boards. A word search for MUVES on the DER website in February 2011 produced no result other than to suggest it might be a misspelling of ‘MOVES’. The search term ‘virtual world’ produced only one result; it was used by the minister responsible – now the Prime Minister, Julia Gillard. In her 2008 address to the Australian Computers in Education Conference, Gillard used ‘virtual world’ generically, describing it as a place where students ‘spend hours...downloading information, playing games and socialising’ ([Gillard 2008](#)). Similarly, the term ‘immersive Internet’ and words associated with it. Such as ‘virtual worlds’ are omitted from the Federal Government’s

landmark emerging technologies-for-open-government roadmap, 'Engage: Getting on with Government 2.0' ([DFD 2009](#)).

That said, the funding and research landscape is abundant. Entities at the forefront of developments include Smart Services CRC industry partners: the NSW Department of Education and Training's Curriculum and Learning Innovation Centre (DET CLIC) and the Australian Academic Research Network (AARnet). Both are assessing virtual platforms for near-future implementation in the K12 and higher education sectors.

AARnet, as the national provider of high speed broadband to the education and higher education sectors sees the need for a timely and strategic approach, given academic communities' evolving interest in immersive technologies ([Sankar 2010](#)).

The 2008 University of Essex (UK) trials in which *Open Wonderland* was used as a demonstrator for mixed and simulated reality learning environments ([Gardner et al. 2008](#)), have helped to shape DET CLIC's view that virtual environments do indeed extend learning possibilities, and can be used to create 'a robust, safe, learning platform where' 'natural' collaboration is possible' ([Wood C 2009](#)). DET CLIC's plans to integrate immersive technologies into its slate of education products such as the popular interactive online science game 'Murder Under the Microscope' and continues to lobby its uptake in education policy circles.

The Australian Learning and Teaching Council (ALTC) has funded a number of virtual worlds research projects driven by UniSA's Dr Denise Wood, including two disability access projects worth upwards of \$500k ([Wood D 2009](#)).

The Flexible Learning Network has a national allocation of \$2.65m for 2011 innovative –e-learning projects in the TAFE/Vocational training sectors, and it has a track record for funding virtual environment projects (Flexible Learning Network 2010)

The Victorian Health Promotion Foundation (VicHealth) has funded two 3-year projects, being the '[Avatar Project](#)' (2009)) and 'Connected Lives' ([Schutt 2009](#)). The latter involved children with disabilities, including autism, from Melbourne and Gippsland regions. Other funding bodies supporting immersive service development include ARC, the Australian Teachers Learning Council, Centre for Creative Industries (CCI) and NICTA. The Smart Services Cooperative Research Centre has a dedicated Immersive Services stream, with the *iSee* platform, its cornerstone as well as a QUT team under Dr Ross Brown, researching the way virtual worlds can be used as workflow management systems, and a social research team based at Swinburne University of Technology ([SSCRC 2010](#)).

At a state level, government agencies are looking to build broadband enabled services, and the construction of its ICT project funds reflects this. In Victoria, for example, the Institute for a Broadband Enabled Society (IBES) is developing a number of immersive and 3D projects, particularly in the health domain ([IBES 2010](#)), and Multimedia Victoria (MMV), is embarking on Round 2 of its 'Collaborative Internet Innovation Fund' (cIIF). Whereas Round 1 was designed to develop Web2.0 enabled projects, Round 2, announced in October 2010, has a broader brief: to assist with the development of projects 'dependant on characteristics of the National Broadband Network such as its ubiquitous nature and high bandwidth' ([MMV 2010](#)). A sum of \$5m has been allocated. Further project funding may be available within the context of the State Government of Victoria's 2010 \$110m dollar 'ICT Action Plan'.

On the creative side, the Australia Council has funded a number of *Second Life* digital arts projects, including \$20k for 'Babelswarm' ([Australia Council 2007](#)), 30k for 'MMuve IT' ([Australia Council 2010](#)) and ongoing support for the Australian Centre of Virtual Art (ACVA) which grew out of the Babelswarm project. The Council has also instituted a 'Geek in residence' program, to service the digital component within creative practice. Screen Australia, along with state film agencies jointly funds the Laboratory for Advanced Media Production (LAMP) convened by AFTRS.

Screen Australia and Film Victoria have shown leadership with their joint 'Serious Games Initiative' in recognition of the emerging market. This program attracted 53 applicants, a

significantly higher number than expected. Two projects were ultimately selected for development (Financial Review, 2009). Given the interest and potential, the funds allocation of \$375k for 2009-10 is small, and suffers in comparison to the investment made by the French Ministry for the Digital Economy program in which EU20m has been earmarked for developing 'serious games' (Telecom.gouv.fr 2009).

Looking at the wider services sector, support for the industry is adhoc. Virtual world developers such as Keren [Flavell \(2009\)](#) and [Bob Quodling of Simmersion \(2008\)](#) point out that their projects tend to fall between funding camps. This suggests that if Australia's home grown innovation is to flourish, there may be a case for recognising the immersive Internet as an enterprise entity in its own right.

SUMMARY AND OUTLOOK

This paper is a response to the call by the Australian public, and an eager parliamentary opposition, for a clear indication as to how the bandwidth supplied by the National Broadband Network might be applied. The Government needs strong cases, clearly put. The much-vaunted 'virtual classroom' is an ideal case for arguing for super fast connection speeds as taxpayers need little encouragement to approve policies that advantage their own.

MUVEs are contextualised with this broader agenda in mind. As flexible, editable, interactive, shared online tools, they are part of our broadband future in which students will extend their own learning by collaborating within shared networks.

Well over 100 Australian education institutions are now trialling virtual worlds, and among members of education's innovation circles, such as the Distance Education Hub (DEhub), MUVEs' attributes are well known. But, whilst individual projects are being supported, the immersive Internet industry (services such as content makers, designers, consultants and marketers) is not recognised as an ICT niche in its own right. This lack of identity may be contributing to the immersive Internet industry's failure to register on some strategic radars,¹⁴ resulting in piecemeal rather than systematised take up. Further evidence to this case is the apparent low level of government ICT purchases of in this bracket: MUVEs have only very recently been directly mentioned ([PLANE 2011](#)) in DER projects, whereas, for example, Microsoft's and Adobe's collaborative tools have been procured, and teacher training in their use is underway. Although these tools currently have no interactive 3D component, they may have found favour because of the way they integrate with existing government ICT, and for the attractive procurement and service conditions on offer.

If MUVEs are being overlooked because their marketing and support teams cannot compete with their big-tech counterparts, virtual classrooms run the risk of not reaching their potential; users needs and the technology need to be built together. MUVEs cannot be replaced by other collaborative tools as they contextualise human input into a computer by orientating it within an interactive, editable, and graphically satisfying online 3D environment. Document sharing or video conferencing cannot reproduce this experience. Projects at Melbourne Grammar School and The Northern Beaches Christian College have been described in order to support this.

If negative perceptions are indeed an issue, then the fact that MUVE technology is still in its early stages of development is the likely deterrent; stability, useability, security, integration into existing IT, and the need to set standards continue to challenge the rate of take-up. However, barriers to adoption such as maintenance and upgrades are being averted as services transition to being browser-based and hosted in the data cloud. Already a next wave is discernable, and whilst *SecondLife* is the lead platform in the education community, Open Source platforms such as *OpenSim*, *Open Wonderland* and the Australian product *VastPark* are well positioned for integrating third party applications, as well as for use behind a schools' firewall.

Developments in interoperability and content transfer between platforms are moving well (IED 2010), as are moves towards an industry standard, known as X3D. This is welcome

news to developers and consumers as it means more flexible arrangements between institutions, and the ability to share, migrate and re-purpose content.

There are many projects under the auspices of the Digital Education Revolution that could assist the progress of MUVE product development and usage. the aforementioned PLANE project appears to be in the early planning and development stage, and is unable to capitulate on DER's National Secondary School Computer Fund plans, in which children in upper secondary levels (years 9-12) are to receive their own laptop computer by the end of 2011 ([DEEWR 2010b](#)). These are fitted with video cards and inbuilt web cameras, meaning that these computers are capable of hosting most lightweight virtual world platforms.¹⁵ Students have the immersive tools at their fingertips but DEEWR is not optimally using them. This is a lost opportunity. Even if educators are reticent to experiment, their students are not, for they are already familiar with the play structure and protocols of MUVES, due to MUVES' shared attributes with online video games and entertainment virtual worlds, places where young people like to be.¹⁶

So, the hardware is there, the pedagogy getting there, (it is being constructed by innovative teachers who are conducting their own trials and experiments). What seems to be missing is an understanding of the immersive Internet at the higher branches of the education tree. Could it be that, like many of their fellow Australians, education's decision makers need high capacity broadband up and running before they will really understand the value in this new service? MUVES can run with existing ADSL 2 or cable broadband speeds¹⁷, but where large numbers are involved, or the MUVE platforms carry extra services such as rich media streaming or high resolution video and graphics, bandwidth is quickly filled, and the experience becomes unsatisfactory. This is a pity, because were MUVES more widely used, strategists within ACARA (Australia's national curriculum project), and the offices of the Digital Education Revolution (even the Prime Minister herself, who stridently engineered both the DER and the NBN agenda in her previous portfolio) would be assured of some timely insights, which could then be relayed to a nation looking for arguments in the NBN debate that extend beyond the bottom line.

MUVES are a good news story, but even better, is that unlike schoolbooks, it is the communities of users, not the tools themselves, that give online virtual environments their purpose and definition. The more virtual worlds are used, the quicker progress is made, resulting in more robust platforms, an invigorated pedagogy, an industry of third party services and applications, and a 'real' sense of the 'virtual' classroom.

REFERENCES

- Avatar Project 2009, (press release), retrieved September 2009, < <http://www.avatar-project.org/>>
- Allen, I; Seaman, J. 2008 *Staying the Course: Online Education in the United States* Needham MA: Sloan Consortium, retrieved January 2009, <http://sloanconsortium.org/sites/default/files/staying_the_course-2.pdf>
- Australia Council.2007. 'Australia's first Second Life residency'. <http://www.australiacouncil.gov.au/about_us/the_arts/features/australias_first_second_life_arts_residency>
- Australia Council. 2010. 'Australia Council Arts Project Harnesses virtual worlds with brain power' (press release) <http://www.australiacouncil.gov.au/news/items/pre2010/australia_council_arts_project_harnesses_virtual_worlds_with_brain_power>

- Australian Curriculum Assessment and Reporting Authority, (ACARA). 2010 *The Shape Of The Australian Curriculum, Version 2.0*, retrieved January 2010, available at <http://www.acara.edu.au/verve/resources/Shape_of_the_Australian_Curriculum.pdf>
- Collis, S. 2009. 'Practical Examples of using a Virtual 3D-environment for Learning in High School' (video), retrieved September 2009, <<http://www.youtube.com/user/lestep-play/uploads>>
- Conroy, S. 2010. 'ICT Leaders' Debate' National Press Club (Canberra, Aust) on August 10, 2010. (video archive), retrieved January 2011 <http://www.youtube.com/watch?v=xRHbeONYdUc&feature=player_embedded>
- Cross, N. 2009. 'AARnet K12' at *Questnet* Brisbane, July 7-10 2009 (conference presentation), retrieved September 2011. <<http://www.uq.edu.au/qnarchive/questnet2009/speakers.html>>
- Department of Broadband Communication and the Digital Economy (DBCDE). 2010. 'National Broadband Network Progress Update', retrieved February, 2011 <http://www.dbcde.gov.au/_data/assets/pdf_file/0020/132068/Policy_brochure_National_Broadband_Network_Progress_update_December_2010.pdf>
- Department of Education and Early Childhood Development (DEECD), Victoria. 2010. 'Teaching and learning with Web 2.0 technologies', available at <<http://www.education.vic.gov.au/reseachinnovation>>
- Department of Education Employment and Workplace Relations (DEEWR) 2008, 'Digistory #2 Extract: Virtual Learning Environment' in *Exemplar Schools: Using Innovative Learning Technologies*, (Report), retrieved February, 2011 <http://www.deewr.gov.au/Schooling/DigitalEducationRevolution/Documents/exemplar_schools_report_pdf.pdf>
- Department of Education Employment and Workplace Relations (DEEWR). 2010a. retrieved October, 2010 <<http://www.deewr.gov.au/Schooling/DigitalEducationRevolution/DigitalStrategyforTeachers/Documents/AnywhereAnytime.pdf>>
- Department of Education Employment and Workplace Relations (DEEWR). 2010b. retrieved October, 2010 <<http://www.deewr.gov.au/Schooling/DigitalEducationRevolution/ComputerFund/Pages/NationalSecondarySchoolComputerFundOverview.aspx>>
- Distance Education Hub (DEhub). 2011. 'Virtual Worlds Working Group' retrieved February, 2011 <<http://www.virtualworldsworkinggroup.wikispaces.com/>>
- Department of Finance and Deregulation (DFD) 2009, 'Engage: Getting on with Government 2.0', retrieved January 2010, <<http://www.finance.gov.au/publications/gov20taskforcereport/index.html>>
- Flavell, K. 2009. Interview with author, September 2009, courtesy Treet TV, <<http://www.treet.tv>>
- Gee, JP. 2008. *Getting Over The Slump: innovation strategies to promote children's learning*. New York: The Joan Ganz Cooney Center at Sesame Workshop, retrieved October, 2010
- Gardner, M; Ganem, A; Helvert Van, J. et al. 2008. 'Designing and building immersive education spaces using project Wonderland: from pedagogy through to practice1' retrieved October 2010, <<http://www.jisc.ac.uk/media/documents/programmes/elearningpedagogy/simillepapermarch10.pdf>>

- Gillard J. The Hon.. 2008. Address to The Australian Computers In Education Conference, Canberra, 1 October, retrieved February 2011
<http://www.deewr.gov.au/ministers/gillard/media/speeches/pages/article_081003_124033.aspx>
- Gillard, J The Hon. 2010. (media release) '\$16 m for a digital revolution in the classroom' retrieved February 2011
<http://www.deewr.gov.au/ministers/garrett/media/releases/pages/article_101101_110738.aspx>
- Given, J. 2010. 'Inside Conroy's Implement', *Inside Story: Current Affairs and Culture*, Institute for Social Research, Swinburne University of Technology, 16 May. Retrieved February 2011 <<http://www.inside.org.au/inside-conroys-implement/>>
- Hayes, G. 2010. last retrieved July 2010
<<http://www.muvedesign.com:http://personalizemedia.com>>
- Immersive Education Initiative (IEI) 'Create Once Experience Everywhere' (blog) retrieved November 2010, <<http://www.immersiveeducation.org/>>
- Institute for a Broadband Enabled Society (IBES) retrieved November 2009/10
<<http://broadband.unimelb.edu.au/about/aims-objectives.html>>
- Jenkins, H et al. 2006. Confronting the Challenges of Participatory Culture: Media Education for the 21st century, John D and Catherine T MacArthur Foundation (2006)
- Johnson, L; Levine, A; Smith, R; Stone, S. 2009. *The Horizon Report: 2009*, Austin Texas, New Media Consortium.
- Joy, B. 2008 – 9. Interviews with the author, 2008-9, courtesy of *VastPark*,
<<http://www.vastpark.com/>>
- Kay, J. 2009. Interview with author, 28th September, courtesy Jokaydia, <<http://jokaydia.com/>>
- Melbourne Grammar School, (MGS). 2008. 'Make Poverty History in Second Life (blog)
<<http://www.workshop26.wordpress.com/>>
- Multimedia Victoria (MMV) 'Collaborative Internet Innovation Fund' last viewed March, 2011.<<http://www.mmv.vic.gov.au/CollaborativeInternetInnovationFund>>
- NBN. 2010. 'How will this benefit you?' (Australian Government information site) retrieved February 2011, <<http://www.nbn.gov.au/content/how-will-benefit-you>>
- O'Neill, S; Scott, M; Conboy, K. 2010. 'A Delphi study on collaborative learning in distance education: The faculty perspective', *British Journal of Educational Technology*, pp. no-no, <<http://dx.doi.org/10.1111/j.1467-8535.2010.01132.x>>.
- Pathways for Learning Anytime Anywhere ; a Network for Educators (PLANE) 2011.
<<http://www.plane.edu.au>>.
- Quodling, B. 2008 interview with author, November 2008, courtesy of Simmersion Holdings,
<<http://simmersionholdings.com/>>.
- Rizzo, A. 2008. Interview with author August 2008, courtesy 'Make Poverty History in Second Life' Project, Melbourne Grammar School,
<<http://workshop26.wordpress.com/>>.
- Salmon, G. 2009. 'The future for (second) life and learning', *British Journal of Educational Technology*, vol. 40, no. 3, pp. 526-538, <<http://dx.doi.org/10.1111/j.1467-8535.2009.00967.x>>.

- Salomon, M. 2010. Immersive Internet Australia: education, Smart Services Cooperative Research Centre and Swinburne University of Technology, Sydney, pp. 1-36.
<[http://www.smartservicescrc.com.au/PDF/Immersive Internet Australia_Education.pdf](http://www.smartservicescrc.com.au/PDF/Immersive_Internet_Australia_Education.pdf)>.
- Smart Services Cooperative Research Centre (SSCRC), last viewed February 2011
<<http://www.smartservicescrc.com.au/>>
- Sankar, J. 2010 Interview with author, September 2010, courtesy of AARnet,
<<http://www.aarnet.edu.au/>>
- Schutt, S; Martino, J; Linegar, D. 2009. *Navigating the Labyrinth: the technical trials and misadventures of bringing virtual worlds into a government secondary school*. In: Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design: Open 24/7, November 23 to 27, 2009, Melbourne, Australia.
- Skoolaborate, <<http://www.skoolaborate.com/>> last updated December 2010
- Seely Brown, J. 2009. 'Introducing the Collaboration Curve', (blog post), retrieved September 2009, <<http://blogs.harvardbusiness.org/bigshift/2009/04/introducing-the-collaboration.html#>>
- SLOODLE, last modified December 2010, last viewed August 2010,
<<http://www.sloodle.org/blog/>>
- Sprout Labs. 2009. 'ideas for educational trials of the national broadband network nbn' (blog)
<<http://www.sproutlabs.com.au/idea-s-for-educational-trials-of-the-national-broadband-network-nbn/>>
- Telecom 2009, 'Utilisation professionnelle du jeu vidéo "Serious Gaming"', retrieved October, 2009 <<http://www.telecom.gouv.fr/rubriques-menu/soutiens-financements/programmes-nationaux/volet-numerique-du-plan-relande/utilisation-professionnelle-du-jeu-video-serious-gaming/395.html>>
- U.S. Department of Education. 2010. 'Transforming American Education: Learning Powered by Technology' (report to Congress, November) in the Office of Educational Technology's National Education Technology Plan, retrieved February 2011
<<http://www.ed.gov/sites/default/files/netp2010-execsumm.pdf>>
- Wikipedia. 2010. 'Second Life', retrieved February 2010,
<http://en.wikipedia.org/wiki/Second_Life>
- Wood, C. 2009. 'General Points about Immersive Worlds' (email) NSW Dept of Education and Training Centre for Learning Innovation, November 2009.
- Wood, D. 2009. 'The 3DVLE Project', retrieved, March 2010,
<http://www.altcexchange.edu.au/group/2008-2010-accessible-open-source-3d-virtual-learning-environment-projecthttp://me.edu.au/b/Denise_Wood/>
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ENDNOTES

1. National Broadband Network (NBN)
2. The Department of Broadband, Communications and the Digital Economy (DBCDE)

3. A core feature of the Australian Government's Digital Education Revolution, being developed by an independent authority, the Australian Curriculum, Assessment and Reporting Authority (ACARA) < <http://www.acara.edu.au/default.asp>>
4. The 'Immersive Internet' is a generic term for a range of computer-generated environments, including virtual worlds and immersive learning and collaboration platforms and virtual event platforms. The term was popularised by technology consultancy firm 'Thinkbalm (2008-2010) < http://www.thinkbalm.com/2009/05/26/thinkbalm-publishes-business-value-study/#high_1>
5. 'In-world' is a location term used to differentiate or clarify that a designated place is not the physical one, but the virtual one.
6. Thinkers proposing this view include [Henry Jenkins \(2006\)](#) [John Seely Brown \(2009\)](#) and [James Paul Gee \(2008\)](#)
7. Most virtual environments have a range of unique features. In the case of the social online world Second Life, 'regions' are connected to each other, giving the impression that land parcels adjoin one another. The user therefore senses that his or her avatar is travelling, (by flying or 'teleporting') to other locations and communities. Some locations are locked down and are not publicly accessible; the Teen Grid, is one of these, and is subject to high-level security protocols so that unidentified visitors cannot intrude.
8. Machinima is the term used to describe a video made of activities within the virtual environment. It might be a constructed narrative that is 'filmed' using avatars as actors, a recording of a live event, such as a conference hosted in a virtual environment, or a training exercise. Many examples of machinima can be found on the video sharing website YouTube, <<http://www.youtube.com/>>.
9. The IEI's 'Platform Eco-system' comprises Open Wonderland, Open Cobalt, Open Simulator (OpenSim) and realXtend and Sirikata, the latter being developed at Stanford University
10. The degree of 'immersion' in respect to simulated online environments, equates the number of services within the platform which heighten the sense of engagement, for example a spatial audio program, high end graphics program, coupled with the seamless transition and integration of scenes, situations and users' input.
11. Bruce Joy CEO of VastPark reports that the company's basic platform, without any add-ons, has 'a footprint smaller than Skype', (interview with the author, February 10, 2011).
12. As an example, [Sprout Labs \(2009\)](#), an e-learning platform developer based in Tasmania, writes, 'Our experience with the alcohol training simulation was pivotal in discovering a limitation of the technology over a broadband connection. We originally planned to create a video-based simulation of a conversation with a drunken patron in which the learner had to pick up on non-verbal cues to decide how intoxicated someone is. Video is the perfect medium for this. As the project developed it became clear that working with video was just not possible with the current bandwidth available to most learners. The learning experience had to be reduced to text, which affected the richness of the learner's experience'
13. In a number of discussions with the author, conducted 2007-2010, Bruce Joy, CEO of the virtual collaboration platform VastPark, envisages holographic experiences for

users <<http://www.vastpark.com/>>; Keren Flavell, former program director with virtual worlds video capture company Treet TV, sees collaboratively-generated entertainment programs on the horizon <<http://www.vastpark.com/>>; Gary Hayes, principal of MUVE design, a company which builds virtual environment content, scopes a future of augmented reality embedded into social networking applications <<http://www.muvedesign/>> .

14. For example, the ‘Broadband and Beyond’ conference, held in February, 2011, did not refer to the immersive technology tools. <<http://www.broadbandandbeyond.com/>>
 15. The laptops issued by NSW DET, the Lenovo IdeaPad S10e and the ThinkPad Mini 10 use the Intel Graphics Media Accelerator 950 and the Intel NM10 Express Chipset 200MHz graphics respectively (TALE 2010).
 16. Barbie World, Lego Land, Club Penguin, World Of Warcraft, UltimaII, Everquest , to name but a few.
 17. In inner city Melbourne, cable broadband connection speeds regularly clock in at 6.9 Mbps
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