The background is a virtual world scene. On the left, there is a large sign with a teal border. The sign features a circular logo with many small portraits and the text "School of Information Studies" and "Second Life Learning Centre". In the foreground, there is a stone-paved path leading towards the sign, bordered by a wooden railing. The background shows a blue sky, green trees, and a body of water.

Institutional support for and barriers to the use of 3D immersive virtual worlds in higher education

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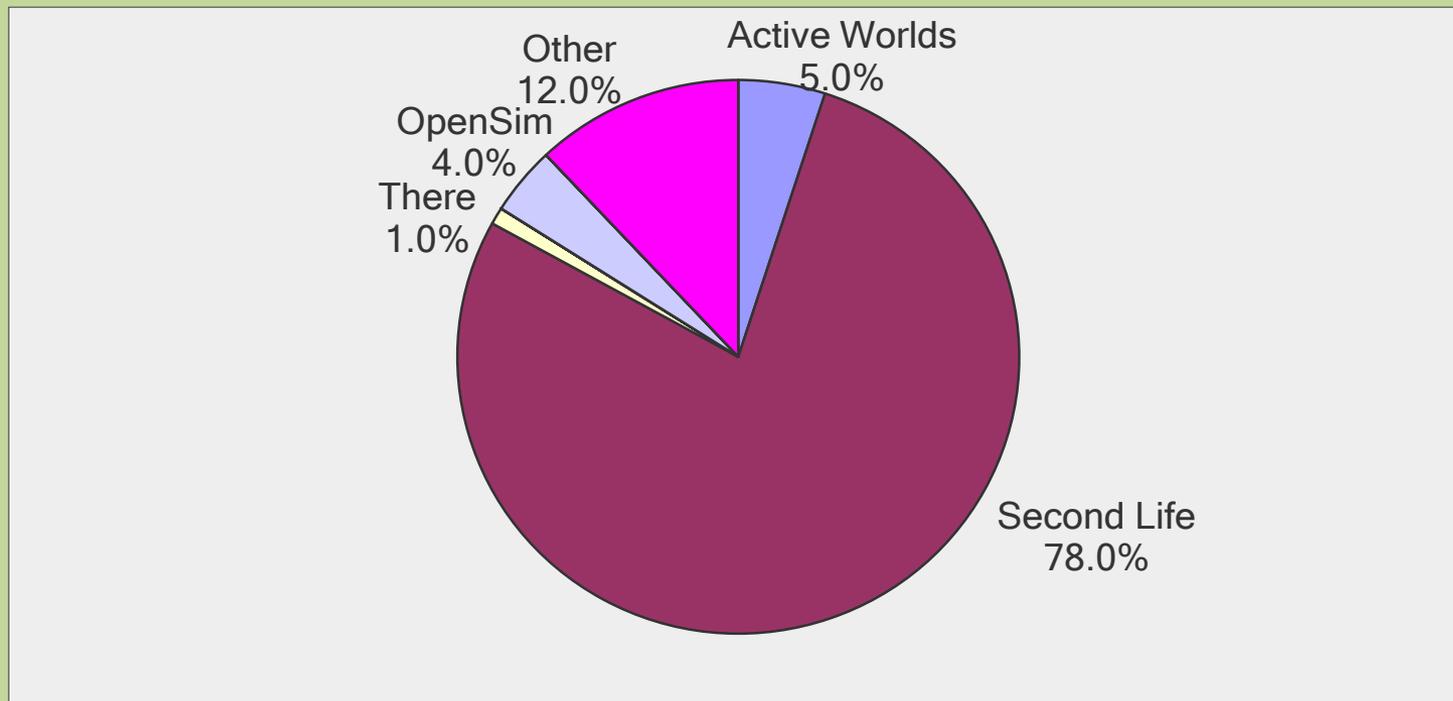
- **Scoping study** of the use of 3D immersive virtual worlds for learning and teaching in higher education in Australia and New Zealand
- Carried out by Barney Dalgarno, Mark Lee, Lauren Carlson, Sue Gregory and Belinda Tynan
- Funded by Distance Education Hub (**DEHub**), a federally funded research consortium based at UNE that involves UNE, CSU, CQU, USQ and Massey University
- Data collection consists of a **Questionnaire, Interviews, and a Literature Review**
- This presentation reports on **institutional support, barriers** encountered and **critical success factors**, based on **questionnaire responses**

- Warburton (2009):
 - Undertook a survey of online communities and wider literature with a focus on usage of Second Life for learning
 - Cautioned that the promise of virtual worlds needs to be balanced against the barriers to use
 - Listed eight broad areas in which barriers exist: **Technical, Identity, Cultural, Collaboration, Time, Economic, Standards, and Persistence.**
- The New Media Consortium in the US (NMC, 2007):
 - Undertook a survey on the activities, attitudes and interests of educators in *Second Life*
 - Most frequently cited issues were **technical**, and particularly the **steep learning curve** required to master the software

- The US-based EDUCAUSE Centre for Applied Research (Kelton, 2007):
 - Bulletin drawing on literature and interviews with educators
 - List obstacles to *Second Life* adoption including **technical** issues and **complexity** of use issues
- The UK Joint Information Systems Committee (de Freitas, 2008):
 - Scoping report on ‘serious virtual worlds’
 - Identified challenges including **accessibility** (eg. broadband), and a lack of open **standards, guidelines**, and well documented case studies
- Kirriemuir (2010), sponsored by the Eduserv Foundation :
 - Conducted a number of ‘snapshot’ surveys in the UK
 - Listed issues including **technical** problems (hardware needs, proxy/firewall issues), **staff attitudes, funding**, and **workload**

1. Demographic data
2. Views and beliefs about the potential of 3D IVWs
3. Summary information about subjects where 3D IVWs were used
4. **More detailed information about a single subject, including:**
 - The platform used and whether the environment was developed specifically for this subject
 - Whether institutional support was provided
 - The main problems that impeded their efforts
5. **Key success factors, barriers and advice, including:**
 - Up to five general limitations
 - The three most significant barriers
 - The three most critical success factors
 - Additional recommendations and advice

- Invitations sent to 163 higher education staff members using 3D IVWs in their teaching
- Questionnaire also publicised through various listservs, newsletters and online communities
- 117 respondents, including:
 - 59 males, 56 females and 2 not specifying
 - 82 from Australia and 35 from New Zealand
- 62 respondents had used 3D IVWs in their own teaching, and this use encompassed 125 discrete subjects



31 respondents had developed a world or space specifically for the subject

- 31 received support
- Support came from:
 - IT support staff (16)
 - Educational designers (9)
 - Academic colleagues (6),
 - Casual staff (3)
 - Project officers (2)
 - Library staff (1)
- Categories of support:
 - Connectivity or firewall issues (9)
 - Development (8)
 - Software installation and configuration (5)
 - Ongoing technical support (4)
 - Workshops (3)
 - Pedagogical support (1).

Analysis of open ended responses

- Open ended responses relating to problems, limitations, barriers and success factors were coded using a common set of categories.
- 26 categories were identified, then grouped into 7 higher-level categories (in order of frequency mentioned):
 1. Technological
 2. Support, funding and time
 3. Usability and familiarity
 4. Equity and ethical issues
 5. Inherent limitations of virtual worlds
 6. Acceptance of virtual worlds
 7. Management and planning

Results: Technological issues

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of specific subject mentions
Bandwidth	47	19	6	14
<p><i>“limited to people with broadband Internet”</i> <i>“connecting from home always presents the user with problems in our regional area”</i></p>				
Firewalls and other IT policy issues	34	31	18	10
<p><i>“campus IT infrastructure limitations (bandwidth, security firewalls, etc)”</i> <i>“firewalled at the University so all work by the respondent done at home after hours”</i></p>				
Hardware requirements	25	11	8	6
<p><i>“availability of computers with the necessary system requirements whether they be university or the students’ own computers”</i> <i>“some students did not have the technology to enable them to enter Second Life which is why it could not be compulsory”</i></p>				
Audio problems	2	0	2	4
<p><i>“initial problems with voice for some students”</i> <i>“there were technical issues of trying to get students to talk (in real time) to each other (voice and text)”</i></p>				
General technology requirements or problems	32	18	10	9
<p><i>“some students weren’t able to get their software to run on their computer”</i> <i>“challenges in configuration of applications on desktops”</i></p>				

Results: Support, funding and time related issues

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of specific subject mentions
Time commitment	25	23	17	5
<i>“commitment and enthusiasm of lecturer for that mode of pedagogy”</i> <i>“[lack of] time to devote to project”</i>				
Cost and funding	19	26	12	4
<i>“cost to students and institutions (Internet charges, land rentals, etc)”</i> <i>“lack of resources to keep application current and well supported in a teaching context”</i>				
Management support	5	7	11	0
<i>“support from intuitional management/ IT department on board – i.e. the infrastructure issues”</i>				
Resources – general	0	0	6	0
<i>“sufficient resources to build something worthwhile”</i>				
Support – general	16	16	32	4
<i>“support across the university from academic and general (IT support) staff”</i> <i>“lack of understanding/help from IT support”</i>				

Results: Usability and familiarity issues

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of specific subject mentions
Student user familiarity and learning curve	24	7	5	8
<i>“getting students au fait with the mechanics of the 3D world, how to move around ...”</i> <i>“students slow to acquire requisite control of the technology and interface”</i>				
Academic user familiarity and learning curve	12	13	8	3
<i>“many lecture[r]s are still new to us[ing the] 3D environment”</i> <i>“colleagues are generally ‘scared’ of learning to use SL [Second Life]”</i>				
General user familiarity and usability of software	13	7	8	8
<i>“complex software that is difficult to learn”</i> <i>“challenges with setup and the proficiency learning curve / intuitiveness”</i>				

Results: Equity related and ethical issues

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of mentions in relation to a particular subject
Ethical issues	23	3	1	1
<i>“possible grieving by rogue users”</i> <i>“supporting unsocial character development”</i> <i>“getting ethical clearance to use a ‘social networking’ tool with students”</i>				
Equity issues	3	3	0	0
<i>“access and equity – financial and age restraints”</i>				

Results: Inherent limitations of virtual worlds

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of mentions in relation to a particular subject
Limitations of communication mode	18	1	1	0
<i>“not being able to identify people outside of the avatar appearance”</i> <i>“interaction is very much through an interface, face-to-face behaviour and practices could be lost”</i>				
Need for clarity of learning benefits	9	8	16	0
<i>“needs to provide opportunity not possible in other methods”</i>				
Limits in the authenticity of the representation	4	0	0	0
<i>“possible missing of steps in real world process unless the virtual experiment is set absolutely accurately”</i>				
Student distraction by virtual world or game like appearance	6	0	0	0
<i>“technology can distract from learning”</i>				

Results: Acceptance of virtual worlds

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of mentions in relation to a particular subject
Student acceptance	15	7	9	8
<p><i>“student reluctance to use the technology”</i> <i>“students were concerned about the validity – saw it more as fun than as a learning tool”</i> <i>“students thought it was weird and decided against it”</i></p>				
Academic staff acceptance	11	6	13	1
<p><i>“when it is not valued by current assessment, students and staff do not usually value it”</i> <i>“general scepticism of other faculty”</i></p>				
General acceptance	8	17	6	2
<p><i>“bad press of VWs – although dropping off”,</i> <i>“resistance to a new paradigm concerning teaching and learning”</i></p>				

Results: Management and planning issues

Category	Number of mentions as a limitation	Number of mentions as a barrier	Number of mentions as a success factor	Number of mentions in relation to a particular subject
Planning for learning (content, outcomes, timelines)	12	1	32	0
<i>“[need for] clear purpose and goals in the implementation”</i>				
Design and development of the environment	10	0	7	0
<i>“creation of useful, repeatable simulations can be difficult”</i>				
People synchronisation issues	6	2	0	0
<i>“time zone differences can make synchronous participation challenging”</i>				
Continuity as subject is revised and/or teaching staff changed	0	3	0	0
<i>“the way courses are passed from lecturer to lecturer inhibits continuity”</i>				
Need for workshops, meetings, training	0	0	6	0
<i>“professional development of staff that includes pedagogical changes and task modification needed to maximise new learning opportunities in 3D”</i>				
Need to collaborate with others	0	0	5	0
<i>“good support from educational community and good contacts with relevant people”</i>				

Results: Recommendations and advice

Category of recommendation	Number of times mentioned in relation to overcoming problems in a particular subject	Number of times mentioned as additional advice or recommendation
Professional development	11	6
<p><i>“I will continue to learn as much as possible myself so as to enable me to reduce my reliance on technical assistance”</i></p> <p><i>“Attend classes, meetings, events and explore in the virtual world to learn from others and don't limit this to universities”</i></p>		
Learning design	6	8
<p><i>“Continue to develop lesson designs, tools, the environment and the bots to the point where they overcome the ... challenges and enable the learner experience of interacting with the environment”</i></p> <p><i>“Has to be a purpose for the learning other than simply being in SL [Second Life]”</i></p> <p><i>“We used machinimas to overcome the problems we encountered during the design stage”</i></p>		
Technology infrastructure	8	1
<p><i>“Put in a case for a new lab with equipment designed to facilitate SL [Second Life] teaching”;</i></p> <p><i>“Provide open access to labs were students can practice and play in SL [Second Life]”</i></p>		
Virtual world platform	8	0
<p><i>“Moved to an open source platform (Project Wonderland) so we could work with Java and not pay a third party for ... land”</i></p> <p><i>“moved to OpenSim on a LAN to avoid dealing with Linden Labs”</i></p>		
IT support	5	3
<p><i>“Made submissions to ICT regarding access – firewalls are supposedly coming down [next year]”</i></p> <p><i>“collaborative approach to dealing with the politics of getting it through the damn firewall”</i></p>		

Results: Recommendations and advice (cont.)

Category of recommendation	Number of times mentioned in relation to overcoming problems in a particular subject	Number of times mentioned as additional advice or recommendation
Research, scholarship and evaluation	5	3
<p><i>“More focused research to explore the factors effecting ‘intuitiveness’ as it pertains to Second Life and medical education”</i></p> <p><i>“One current 3D MUVE project has benefited from the experiences of the earlier encounters and this has resulted in design elements helping to facilitate student engagement”</i></p> <p><i>“Read what others have done in this field”</i></p>		
Networking	3	5
<p><i>“I networked with other people using Second Life in education, in particular the New Media Consortium”</i></p> <p><i>“network and connect with the ‘experts’ and mentors who are already using VWs in education”</i></p>		
Policy and support	2	6
<p><i>“Attempted to explain to the gatekeepers that if innovation is desired then gates must be opened and barriers removed”</i> <i>“Give yourself time and get support”</i></p>		
Time and commitment	2	5
<p><i>“It takes time to get on top of the virtual world and its capabilities but once you have reached a sufficient level of familiarity the potential for creating engaging and effective learning experiences is boundless”</i></p> <p><i>“Also be prepared to commit substantial time to the effort, but have fun in doing so”</i></p>		
Planning	0	3
<p><i>“Make sure that resource requirements (R&D, support, hardware, software) for a proposed system are detailed and costed in advance”</i> <i>“Plan everything. Have a Plan B, and a Plan C, and a Plan D”</i></p>		

- As with earlier studies, the most frequently reported problems were technological (eg. **bandwidth** and **firewall** issues and client **hardware requirements**).
- Issues related to the **steep learning curve** and **student and staff scepticism** are also consistent with other studies.
- Issues such as **time commitment** and **support needs** are common to any early adoption of technologies for learning, while some of the technical, ethical and pedagogical issues are more specific to virtual worlds

- Using Virtual Worlds for learning and teaching is a time and resource intensive activity involving a steep learning curve
- Hardware and network configuration requirements mean that without IT support major barriers will occur
- However, institutional support is variable but generally very low, with few IT departments seeing virtual worlds as 'core business'
- And we are not yet at the point where we can assume that all students have a sufficiently powerful computer at home
- Despite this, the overwhelming majority of respondents indicated that the use of virtual worlds in their subject had positive benefits for student learning
- So be cautious but don't shy away

- de Freitas, S. (2008). *Serious virtual worlds: A scoping study*. Bristol, UK: JISC. Retrieved 16 December 2009, from <http://www.jisc.ac.uk/media/documents/publications/seriousvirtualworldsv1.pdf>
- Kelton, A.J. (2007). *Second Life: Reaching into the virtual world for real-world learning*. Boulder, CO: EDUCAUSE Center for Applied Research. <http://www.educause.edu/ir/library/pdf/ERB0717.pdf>
- Kirriemuir, J. (2010). *Virtual world activity in UK universities and colleges: Virtual teaching in uncertain times. Snapshot #8: Spring 2010*. Bath, UK: Eduserv and Virtual World Watch.
- New Media Consortium (2007). *Spring 2007 survey: Educators in Second Life*. Austin, TX: NMC. <http://www.nmc.org/pdf/2007-sl-survey-summary.pdf>
- Warburton, S. (2009). Second Life in higher education: Assessing the potential for and the barriers to deploying virtual worlds in learning and teaching. *British Journal of Educational Technology*, 40(3), 414-426.