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Researching Learning in Virtual Environments 2008

16 Ways to Use Virtual Worlds in Your Classroom:

Pedagogical Applications of Second Life

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Abstract:

This paper examines the emerging ideas for implementing the usage of virtual worlds as an educational tool. It is part of an ongoing doctorial researcher project being conducted at Lancaster University in the United Kingdom (UK). The majority of the information used to create these 16 pedagogical approaches was derived from a series of participative inquiries, personal observations, formal and informal interviews, surveys and ten months of documenting the perceptions of teachers and students using (and trying to use) Second Life as an educational tool. Both qualitative and quantitative methods were used within an action research strategy. The majority of the data remains in raw form (datasets) and are currently being analyzed. However, 16 pedagogical approaches have thus far emerged. How teachers apply the use of this technology is of growing interest throughout the academic world. These strategies offer teachers pragmatic solutions to implementation and usage dilemmas.

Introduction

All dressed up and no where to go? Educators new to virtual environments spend time getting themselves 'ready' to teach *inworld*. They search for the perfect virtual outfit, they adjust their avatar's physical features, and they practice moving around. But after the preparation is over and it's time to ring the virtual school bell, they start to get cold feet [Dataset 3]. Unsure of what to do next, they often never bring their students *inworld*. This phenomenon is not uncommon and it is fixable with a little pedagogical planning.

The context in which we use the terms *virtual world* and *virtual environment* is intended to refer to desk top applications of *virtual-reality-like* software platforms, such as Second Life. We tend to use these terms interchangeably. An *inworld*

experience is that which occurs within the virtual space, often called islands. This document discusses sixteen pedagogical applications supported by learning theories and exemplified through specific examples. For more detailed explanations and implementation strategies, please refer to the work of Michele Ryan (2008).

The 16 Ways…

1. Adding a Visual Element (Data Visualization)

Virtual worlds are highly graphical in nature. This, in combination with their open source environment, implies that any user can create 3D objects. From a teaching perspective this means that the ability to demonstrate ideas, visually, is now exceedingly possible. There are numerous examples of the use of visualization to teach complex and often abstract concepts. In the hard science disciplines these include 3 dimensional DNA strands, students creating complex chemical molecules, teacher created solar systems, mechanically accurate space ships, detailed and enlarged versions of microscopic organisms are all popular uses of the visualization possibilities [Dataset 4].

In the social sciences visualization is often based on theoretical concepts or datasets. For example, at Lancaster University (UK), we attempted to visualize the accounting concept of *balancing the corporate books* using the *scales of justice*. The idea was to create an interactive learning object that would respond, in real time, to data entries made by the students. Despite attempts to develop this tool, it remains uncompleted and does not currently operate properly. However, students who were engaged in the endeavour were able to achieve the learning objectives by participating in the process of attempting to produce the learning object [Dataset 5].

Therefore, as the educator, you can either use visual tools to teach your content, or make the creation of these tools part of the learning experience. In a 2002 study, researchers examined the implications of visual learning in a virtual world. Student's work after using the visual features of a virtual environment were "… more accurate, more complete, and showed a better conceptual understanding" than those in a control group (Trindade et al, 2002, p.486).

2. Interactive Library

In the field of educational technology, there is a common expression regarding the use video for educational purposes. *A talking head is still a talking head regardless of whether it is projected from a video, or in the form of a real life lecturer.* Using multimedia only as an alternative method for delivering content will have no significant effect on student learning (Clark, 1983). It merely allows liner delivered content to be delivered electronically. Yet, educators indicated that there was a time and a place when talking heads and linear delivered content were pedagogically appropriate [Dataset 1]. The balance between linear and nonlinear delivery is an important factor in the success or failure of an educational technology. Utilizing the features of a technology, in conjunction with good teaching, can significantly improve the educational effect (Bates & Poole, 2003). Having a database of multimedia resources is more valuable if it is not the primary mode for delivering the content of the course.

Virtual worlds can be used a data repository to host interactive learning objects, text based documents and provide links to other learning materials such as recorded lectures. These can be used to supplement the synchronous classroom activities and provides a new resource for students to use in exam preparation. On demand learning tools also allow students to take responsibility for expanding their knowledge base.

3. Connection Device

Virtual worlds provide an excellent platform for communicating with people who cannot physically be present. Not only are virtual worlds operating in real time, but they can also host material that can be accessed at a later time. Table 1 is a list of the features of the many virtual worlds compared to other technologies that you may be more familiar. This list is not intended to be all inclusive, but we use this chart to help explain what virtual worlds are and to help spark ideas for their usage.

Table 1: A comparison of the communication features of virtual worlds. Created by Michele Ryan, Lancaster University, March 2008.

Communication Features	
Virtual Worlds have	**Which is similar to**
Real time text chatting-private	Instant messaging
Real time text chatting-group	Chat room
Delayed time text chatting	Email
Real time voice	VoIP / telephone & conference calling
Real time video stream w/ audio	Video calling
Searchable networking tools	Social software / Web 2.0
Note card messaging	RSS / newsfeeds
Ability to create content	Forum, wiki, blogs
Record activities for later access	Podcasting
Uploading documents	File sharing

At Lancaster University (UK) some educators use Second Life to hold office hours so that others can reach us in a real time environment when we are not on campus. The

Open University (UK) recently concluded a series of pilot studies, conducted in Teen Second Life, referred to as Schome Park. This project brought together students from a wide range of locations to work together. In addition, the staff included a variety of teachers and researchers that were likely to have never collaborated without the virtual world [Dataset 6].

4. Role Playing Device

Virtual environments allow teachers to create fictional situations where students can assume roles. They provide a safe environment where students can immerse themselves in a scenario that would otherwise not be possible. Because the space is virtual, students can take chances, make numerous attempts and fail without the real world consequences. “Social simulators” or role play computer experiences allow students to work on the development of soft skills and “discovery-based learning” opportunities (Kapp & Hamilton, 2006, p.6).

Consider a Spanish language class, for example. Students meet inworld, in what looks like a Mexican marketplace. They assume roles such as shopkeeper, vendor and customer. In the virtual environment students practice their foreign language skills by communicating with one another [Dataset 8]. On Harvard’s (USA) Berkman Island law students practice their litigation skills [Dataset 9]. While educators in Singapore have used space on Teen Second Life to conduct role playing lessons to practice negotiation skills (Rappa et al, 2008).

5. Simulation Device

There is a significant distinction between using a virtual world as a role playing device and using it for simulation purposes. Simulations may or may not include assumed roles. Most importantly, simulations are designed to allow the students to practice a process. This provides an environment where students can learn through doing, and learn through it wrong.

According to Kapp & Hamilton, “The real benefit of simulations is their ability to reduce trivial computations and to allow students to deeply discover and test hypotheses” (2006, p.7). Trial and error allows for practice, and when combine with visualization, simulations can offer a safe learning environment for complex processes.

Activities organized on Minerva Island, by Andrew Macías-Díaz for the School of Management at the University of St Andrews (Scotland) use Second Life to teach film students how to arrange and hook up production equipment [Dataset 10]. Students move objects and simulate the connection of particular pieces of video equipment. Failure to connect them in the proper sequence with the proper items results in them not working. Correct connections allow the students to see the final arrangement functioning properly.

6. Games for Learning

3D online multi-user games are considered a “gateway drug” that can help students achieve more “intellectual practices” (Steinkuehler, 2008). Their immersive atmosphere and engaging interactivity can lead to experimentation with more complex virtual activities. Non-game based virtual worlds, such as Second Life, have no overall objectives and may not foster competition in same manner that games do,

but learning in these worlds feels like playing a game [Dataset 2]. In addition, their game like appearance and functionality can provide a venue for game creation and/or execution.

At Fontys Hogeschool-University of Applied Sciences (Netherlands) students can play a knowledge game. Similar to a question and answer game except that avatars must move to a different location before answering and before the time runs out. The scramble to move against a clock while trying to think of the correct response is both fun and challenging [Dataset 11].

The process of planning and creating a game will get your students thinking through the content material in greater detail. However, if time does not permit, you may be able to find games created by others that can serve your purposes. Students can partake in a game that was created by another institution. After participating in the learning game students can be required to write an essay about their experiences and tie the subject content into the paper by answering several questions proposed by the teacher.

7. Soft Skill Development

Interactive learning environments are required in order to transfer soft skills to the real world (Kriz, 2003). Clark outlines the attributes of a soft skill learning model that uses examples and problems, lets students inquiry, provides feedback quickly, allow students to play out the consequences of their actions and allows for repeated attempts (Kapp & Hamilton, 2006, p.2). Similarly, Klabbers has a four step process for teaching soft skills which includes 1) model the desired behaviour 2) students deduce the key elements individually 3) use examples within select contexts 4) allow students to practice and adjust based on feedback (Klabbers, 2000). In the virtual world these skills can be practiced in a variety of ways. In general, the concept of soft skill development is applicable when the pedagogy is not task-oriented. In other words, the assigned virtual task is not the learning objective in itself. Instead it is a method for practicing the desired skills.

These may include less tangible skills such as critical thinking, problem solving, team building, and collaboration. Teachers start by assigning a task that is easy enough for the students to accomplish based on their inworld experience; yet difficult enough that the execution of the task will require them to use the skills you desire they use. In the virtual world when students do not know how to perform a task, they often figure it out through collaboration and end up practicing these skills along the way [Dataset 4]. If, however, the skill can be directly related to the task then the learning experience may be even more powerful.

8. Research

Virtual worlds can be used as a backdrop for learning about a course's content. In this sense they become an engaging reference point. Due partly to the fact that they are open environments with a large number of participants engaging in a diverse range of activities. Teachers wanting to use them as a research tool can assign students to study various aspects of the virtual world.

Anchored Instruction allows students to explore, question and contemplate course material presented in a specific context (Bransford et al, 1990). In addition, by

scaffolding these learning experiences, educators can transfer what is learned in the virtual world to a different context. For example, students can learn about economic topics by studying an inworld economy. The Second Life currency exchange resembles similar aspects of a real world currency. Sociology students can create avatars of a different race or gender and examine their experiences. Anytime the subject being studied is represented as a natural part of the virtual community, students can study it from a first person point of view [Dataset 4]. Depending on your subject area, there is probably a locale of Second Life that students could study.

9. Virtual Tourism and Field Trips

Imagine being able to take your students on a field trip to anywhere in the world, and to any time in history. Where would you go? Virtual worlds host a variety of recreated places that can help engage your students within your defined context. Exploration of these spaces is an enjoyable way to imitate an undoable physical adventure.

Schank & Cleary tell us that when students are having fun, they may not notice how much they are learning. Good story telling that poses problems and allows students to navigate to solutions, does not have to realistic to be effective. It needs only to provide the backdrop necessary to engage the students. (Schank & Clearly, 1995). If students are engaged, and having fun, then they will stay in the learning environment longer and do more and thus learn more (Regian et al, 1992).

10. Social Device

Virtual worlds are a social space. In this context, you can hold social activities. These events can be excellent ice breakers to help team members get to know one another. It has an added benefit that it will inevitably help students practice communication and other social skills. These social events break tensions, plus they are a lot of fun!

Throughout the Open University's (UK) Schome Park project in Teen Second Life, teachers, researchers and students gathered together for various social occasions. Avatars shared gestures, students played music and sang. It added a lighter atmosphere and helped new users integrate into the group. At the end of the third phase of the project, a going-away party was held. Avatars took turns giving speeches, dancing and saying goodbye [Dataset 2]. While at Lancaster University (UK) starting new people out together proved to be a great team building experience as well a fun social activity [Dataset 1].

Creating avatars and going inworld for the first time is also an excellent class project. Even students, who were physically in the same room, enjoyed going through the discovery process together. They helped one another and the sharing of the new user experience helped overcome reluctances. It is not uncommon for schools to have technical barriers that prevent account creation from within the institution. In this case, information could be gathered in advance and accounts created off campus. The participants then meet in a campus computer lab and log on for the first time altogether. Students play and experiment with their avatar's appearance. Keeping the first sessions socially focused can help build camaraderie. The main goal for the first class is to simply help students get more convertible in the virtual world. They will learn from each other and probably have an enjoyable experience.

Students appeared to connect strongly as a group when they logged on together for the first time [Datasets 1,4].

11. Create Anonymity

Have you ever wondered what your students would say about your class if they could hide behind avatars? Virtual worlds can be used as a place where students can express themselves more honestly, talk about sensitive or confidential matters, take social risks, and overcome fears. Nearly any situation, where anonymity enhances the quality of the communication, virtual worlds can be valuable.

Although at Lancaster University (UK) we have not yet attempted this, we cannot help but wonder if our course evaluations and focus groups conducted inworld would yield the same results as paper surveys. If complete confidentiality is required then consider providing generic or rotating avatars. This means that you have a slate of user names and passwords that are used for one purpose and then reused by a different person. No singular person can be associated with one avatar. Take caution to ensure that you do not infringe on the *Terms of Service* agreement with the virtual world platform owner.

12. Machinima Creation (Video Filmed Inworld)

A Machinima is a video created through screen capturing software. Using Machinima as a class project requires a plethora of project management skills. Thus the assignment will force students into planning, organizing and structuring their content based message. Learning theories based on a Gestalten view believe that accomplishing the overall project is more significant than the individual tasks required to achieve it (Hergenhahn & Olson, 2005).

Machinima can be used as an assigned task, part of an e-portfolio or added to traditional PowerPoint style presentations. However, Machinima can be too complex for short courses or for novice inworld students. Students at Lancaster University (UK) actually worked around the concept of Machinima by simply placing a video camera in front of their computer screens. This happened, partly due to their ignorance of screen capturing technology (and our neglect to properly inform them) and partly due to technological barriers associated with Second Life's inworld filming capabilities when running on Microsoft based PCs. The result, however, did yield accomplishment of some of the learning objectives [Dataset 13].

13. Recruitment

There is a growing sense of urgency, especially within the educational sector, to establish a 3D web presence [Datasets 1,4,6,7,12]. Just as we saw in the early days of the original internet, we are starting to see in Web 3D development. Schools, who have developed their islands (or virtual spaces) and use them regularly, find that they is a valuable tool for recruitment [Datasets 7,12]. Islands are being used to promote institutions, degree programs, specific courses and research projects.

Nine institutions of higher learning in the European community battled for the right experiment with virtual worlds. Four of the nine were repeatedly denied funding for island development intended for educational purposes. Two schools were offered funding contingent upon their ability to recoup the expenses. Three other intuitions secured funding for pilot projects only to have their virtual spaces taken away from

them at the end of the projects. In all nine cases, when the ability to use Second Life as a recruitment tool to showcase the institution was suggested, the funding became easier to obtain [Datasets 7,12].

Although some of the literature on virtual world education condemns the replication of real world campuses, institutions often start there. This helps provide the stakeholders with a tangible way of understanding why their school is using the virtual environment. Providing an island intended for student recruitment may be an easier way to convince governing bodies to allow such development. Once the virtual space is established then it can take on other, perhaps more educational, purposes.

14. Build Awareness and/or Promote an Event

Peer pressure can be a powerful motivator in teaching. If students know their work will be viewable in a public environment, they are likely to be motivated to work more diligently and produce at a higher level. Students will pressure each other and increase their own expectations (Dillon & Walsh, 1992).

Virtual worlds can be used as a platform for displaying student work, promoting events organized by students and supporting inworld social issues. Students involved in such projects may be motivated by the fact that their work will be available in a public arena. This motivation may increase their commitment to achieving the goals, and thus learning the material. For example, Hope University in Liverpool (UK) hosted a series of *open-days* (built by the students) to engage in conversations about issues at their university [Dataset 14].

15. Building for the Sake of Learning How to Build

The ability to create content in an open source environment is a primary feature of virtual worlds. The term *building* in this context refers to creating and combining primitive objects (prims), textures and scripting to limitless possibilities. For those that teach a computer science course, virtual worlds can be the ultimate platform for learning by doing.

In virtual worlds, users can experiment with 3D rendering, scripting, spatial relationships, animations, database and grid management issues and using third party software applications such as Adobe's Photoshop and Illustrator, video and audio capturing programs. In many computer science courses these same areas are part of the content knowledge that students strive to achieve. Therefore, using virtual worlds to teach them appears to be a simple method for applying learning by doing into the curriculum.

Aldrich believes that learning through doing may be only way to teach explicit computer skills to a tacit level of understanding (2005). If computer education embraces virtual worlds for teaching, then it may be possible that more students will become proficient with these technologies. This could lead to a new generation of virtually literate people who can then help re-define the future of education in other subject areas.

In addition, if you teach a class that requires the students to learn about the theoretical foundations of computing concepts then you can use the virtual world to link these concepts. Learning by doing is a powerful pedagogy. The nature of virtual

worlds offers a valuable way to apply and practice using the various technical features. For example, Temasek Polytechnic (Singapore) uses Second Life to explore the concepts of data structures and algorithms (Seng et al, 2007).

16. As an Open Learning Environment (Virtual Action Learning)

The final pedagogy explored in this document is that of an open learning concept with the theory of Action Learning applied. Action learning draws from the work of Reg Revens (1988). When this method of teaching is used in an environment such as Second Life, it could be considered Virtual Action Learning. Virtual Action Learning (VAL) draws from several learning theories, such as experiential learning of Kolb & Dewey, reflective problem solving of Schon, Knowles' Andragogy theory and combines them with e-learning pedagogies like those of McFadzean. Dickenson, Pedler & Burgoyne define VAL as "…action learning which takes place in a virtual environment… via a range of enabling, interactive and collaborative technologies" (p.3). In virtual worlds, VAL can be used as the underlying pedagogical strategy.

In its simplest form, using VAL involves getting your students to participate in the decision making process. Through collaboration your students decide how to accomplish the learning objectives. This is done through cycles of learning sets that involve inquiry, action and reflection. We found few examples in Second Life courses using VAL exclusively. However, the University of Southern Queensland (Australia) reports using Second Life specifically for action learning sets. The Open University's Schome Park project used a similar pedagogy for some of the phases of their project [Dataset 6].

Conclusion

Virtual worlds, as an educational technology, may be exciting for both students and educators. However, it is only through the utilization of the technological features, along with the required re-thinking of the teacher's pedagogy, that will make them successful educational tools. To put it in the words of Tony Bates, "Good teaching may overcome a poor choice in the use of technology, but technology will never save bad teaching; it usually makes it worse" (1995, p.12).

It is for this reason that these sixteen approaches were developed. They are intended to help educators improve the quality of teaching by enabling them to experiment with new, often more constrictive pedagogies. Further research at Lancaster University (UK) will expand on these ideas and provide more empirical evidence in the near future. It is our desire that these sixteen pedagogical approaches and our experiments with virtual assignments will empower and inspire educators. While simultaneously challenge them to re-think what and how they are teaching.

Appendix: Dataset Descriptions

Dataset 1: Documented conversations, both formal and informal, workshops and inworld activities involving the volunteer group of educators at Lancaster University. This group later became known as LUSLUG (Lancaster University Second Life Users Group). October 2007 to present.

Dataset 2: Semi-weekly inworld conversations with educators, students and researchers participating in the Schome Park project met inworld and communicated

via email. February 2008 to present. For more information on their activities see http://www.schome.ac.uk/wiki/Main_Page

Dataset 3: Formal interviews with 4 educators who had dropped out of the Schome Park project. April 2008 to May 2008.

Dataset 4: Ideas derived from semi-daily journal entries made from observed inworld educational activities from a variety of institutions involving students, teachers and researchers. October 2007 to present.

Dataset 5: Focus group consisting of first year accounting students with no prior Second Life experience. Met in person at Lancaster University. May 2008.

Dataset 6: Ethnographic journal entries documented while volunteering inworld with the Schome Park project from February 2008 to May 2008.

Dataset 7: Documented conversations, inquiries and discussions with virtual educators at European conferences between January 2008 and July 2008. In person followed up via email and inworld communications.

Dataset 8: Documented extensive brainstorming sessions with educators regarding specific topics. Ideas then further explored with members of LUSLUG; experiences shared and ideas investigated. Met both in person and inworld from October 2007 to present.

Dataset 9: Personal observations and informal conversations with participants on Berkman Island between November 2007 and June 2008. Communication via email and inworld at http://slurl.com/secondlife/Berkman/204/65/25

Dataset 10: Personal conversations, in person, inworld and via email with Andrew Macías-Díaz for the School of Management at the University of St Andrews. Contactable via: http://www.askin.tv. From May 2008 to present.

Dataset 11: In world exploration of school's island and in person conversations with Albert Sleutjes and Paul Dirckx of Fontys Hogeschool. From July 2008 to present.

Dataset 12: Usage Survey #1. Mixed-method survey conducted by Michele Ryan, concluding in July 2008.

Dataset 13: Personal observations of learning activities, inworld exploration of course project and formal interviews with participants in Masters course on Computing & Psychology (Lent term 2008) at Lancaster University.

Dataset 14: Documentation of personal conversations, inworld exploration and ongoing collaborations with educators and students at Hope University in Liverpool. From October 2007 to present.

References

Aldrich, C. (2005) Learning by doing : a comprehensive guide to simulations, computer games, and pedagogy in e-learning and other educational experiences. Pfeiffer: San Francisco.

Bates, A. (1995) Technology, open learning and distance education. London: Routledge.

Bates, A., Poole, G. (2003) Effective teaching with technology in higher education. Jossey-Bass.

Bransford, J.D. et al. (1990). Anchored instruction: Why we need it and how technology can help. In D. Nix & R. Sprio (Eds), Cognition, education and multimedia. Hillsdale, NJ: Erlbaum Associates.

Clark, R. (1983) Reconsidering research on learning from media. Review of Educational research, vol. 53, p.445-459.

Dickenson, M., Pedler, M., & Burgoyne, J. (March, 2008) Virtual action learning: practices, challenges and facilitation. RDF Report for Henley Management College: Henley Research Development Fund.

Dillon, C.L. & Walsh, S.M. (1992). Faculty: The neglected resource in distance education. In L. Foster, B. Bower, and L. Watson, (Eds.), *Teaching and learning in higher education, ASHE Reader Series* . 2001.

Hergenhahn, B.R., Olson, M. (2005) An introduction to theories of leanring (7th ed.) Person Education Intl.

Kapp, K., Hamilton, B. (2006) Designing instruction to teach principles (softskills). White paper. Department of Instructional Teachnolgoy and Institute for interactive technologies.

Klabbers, J. (2000) Learning as acquisition and learning as interaction. Journal of Simulation & Gaming, vol. 31 p. 380-406.

Kriz, W.C. (2003) Creating effective learning environments and learning organizations through gaming and simulation design.

Rappa, N., Yip, D. & Baey, S. (2008) The role of teacher, student and ICT in enhancing student engagement in muve. British Journal of Educational Technology, Digital Identification Number 10.1111/j.1467-8535.2007.00798.x. Retrieved from http://www3.interscience.wiley.com/journal/117984068/home

Regian, J., Shebilske, W. et al. (1992) Virtual reality: an instructional medium for visual-spatial tasks. Journal of Communication, Autumn p. 136-149.

Revans, R. (1988) ABC of Action Learning. London: Lemos & Crane.

Ryan, M. (2008) 16 ways to use Second Life in your classroom: pedagogical approaches and virtual assignments. Proceeding from the Second Life Education conference, September 2008.

Schank, R., Cleary, C. (1995) Engines for education. Lawrence Erlbaum Associates, Hove.

Seng, Jet Lim Kim and Edirisinghe, E.M. Nalaka (2007) Teaching computer science using Second Life as a learning environment. Temasek Polytechnic, Singapore. Proceedings from 2007 Ascilite Conference, Singapore.

Steinkuehler, C. (2008) Massive multiplayer online games as educational technology. Journal of Educational Technology, January-February.

Trindade, J., Fiolhais, C., Almeida, L. (2002) Science learning in virtual environments: a descriptive study. British Journal of Educational Technology, vol. 33, no. 4, p.471-488.

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