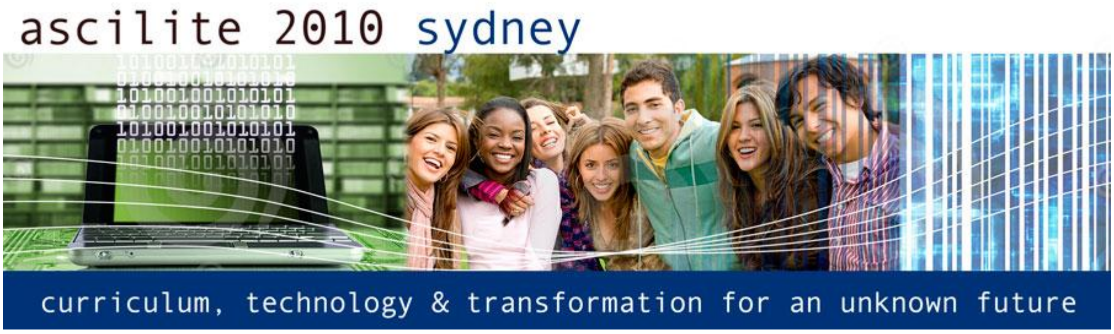

MUVEing slowly: Applying slow pedagogy to a scenario-based virtual environment

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This paper presents the research theory and design of a work in progress that investigates how the application of slow pedagogy can be applied to an ICT rich educative environment. More specifically, the research will focus on an inquiry learning strategy within a scenario-based multi-user virtual environment and will evaluate the impact of such a strategy in terms of student interaction and engagement with a complex inquiry problem. The research proposes that by applying the philosophies of slow to the learning experience and permitting students to explore a problem space, without the rigid structure normally encountered in inquiry learning, that students will not only be more motivated and engaged, but the result will be the acquisition of a greater depth of knowledge and the procurement of transferable inquiry skills.

Keywords: Multi-user virtual environment, inquiry learning, scenario-based learning, slow pedagogy

Introduction

There is a growing body of research surrounding the use of scenario-based multi-user virtual environments (MUVEs) in inquiry learning in secondary school science education. Scenario-based MUVEs such as *Quest Atlantis*, *River City* and *Virtual Singapura* provide opportunities for an enriched learning experience, and several ongoing research projects have shown the value of these tools in engaging and maintaining student motivation (Barab, Thomas, Dodge, Carteaux, & Tuzun, 2005; Dede, Clarke, Ketelhut, Nelson, & Bowman, 2005; Jacobson, June Lee, Hong Lim, & Hua Low, 2008; Ketelhut, Nelson, Clarke, & Dede, 2010; Shaffer & Gee, 2007). Yet, moving beyond the motivational aspects of such environments there has been little proof of actual learning transfer of inquiry skills outside of the learning space (Jacobson et al., 2008), and theoretical and practical strategies for designing pedagogically sound activities for virtual spaces are still embryonic.

The relative 'newness' of the use of MUVE technology within a classroom means that teaching strategies and material that maximise the benefits of virtual world technology are yet to be outlined in any detail. This paper outlines a work in progress that draws together slow pedagogy, productive failure and inquiry learning in a scenario-based MUVE. This paper addresses the background of the study and provides a brief outline of the research design for this work in progress that is aimed at informing pedagogical practices that may harness the potential of virtual world technology within the science classroom.

Background

Slow pedagogy

The international and national agendas driving ICT in education appear to be largely based on greater access to technology, faster connectivity, and the expansion of access to information, various software applications and the use of ICT across the curriculum. In particular, the *A Digital Education Revolution Policy Document* (Australian Government, 2007) has stated "to have the best job and life opportunities in the future, Australian students must receive a world class education today … a critical component of a world class education system in Australia will be having computers on every desk and having access to reliable, high speed broadband" (p. 3). As a result of this education revolution the Australian government has recently invested $1 billion in ensuring that every Australian secondary school child will have access to technology, a laptop for every secondary school student along with sophisticated software and broadband Internet connection for each school. An increase in access to 'knowledge' for all Australian students?

There is an assumption here that knowledge can be acquired via a laptop and accessed through the Internet and that learning will automatically be enhanced through the use of such technologies. Orr (2002) characterises this 'knowledge' as "fast knowledge" (p. 699), a knowledge driven by rapid technological change that rests on the following assumptions: the greater the access to information the better and that knowledge that can lend itself to use is superior to that which is contemplative. Teaching students how to use technology can take only a few moments, that is fast knowledge. Teaching students how to realise the full potential of the technology through emphasising the importance of digital and critical literacy, inquiry, creativity, innovation and evaluation is a task that requires time and reflection.

In order to develop and foster such metacognitive skills one must shift from the educational paradigm that exists today that centres on technology to one that favours people (Tanti, 2010). Such a change does not involve removing all technology, it involves shifting the focus away from the fast knowledge and mechanical model where the immediate ends are central to current educational policy to a different setting, a slower setting where deep thought and action are closely connected, one where insight can be gained from unexpected and unpredictable experiences and collaboration is fostered (Holt, 2002).

Such a concept has emerged out of the Slow Food movement, a revolution that was conceived in Italy in 1986. McDonald's was to open amongst the historic and classical Roman architecture of the Piazza di Spagna, when Carlo Petrini, lead a small protest against the opening of the fast food restaurant. The revolt was held in the name of traditional foods as Petrini saw the franchise as a representation of everything commercial and industrial, where food preparation was centred on standardised methods and the hamburger a representation of the first ageless and cultureless food (Ariès, as cited in C. Petrini & Padovani, 2005). The concept of slowness is one that: awakens our senses through a strong philosophical position motivated by the desire to experience life more fully, to enjoy the company of like minded people through which one can pursue one's natural curiosity; values tradition and character, because eating well means respecting culinary knowledge and honouring the complexity of the gastronomic practices undertaken; and is about making moral choices, where taste holds the central position supported by our direct relationship with food growers and our direct link to the natural environment in which we live.

It would be difficult not to make connections between the values of the slow food movement and the objectives of education, to equip people with the knowledge and ability to act responsibly in such a complex world. Slowness emphasises the preservation of our cultural heritage, a long-term goal that schooling too could focus on as opposed to the short-term, quantitative rewards. In the same vain in which Petrini and his friends protested against the McDonalds by setting up tables outside the franchise and eating bowls of pasta slowly, savouring the food produced by man, not machine and enjoying each other's company education too could provide an environment "where students have time to discuss, argue, reflect upon knowledge and ideas, and so come to understand themselves and the culture they will inherit" (Holt, 2004, p. 1). The use of technology in education is often branded as being quicker, faster, more efficient, more effective, just in time, 24/7 and ubiquitous. This paper raises the question that does quicker, faster, just in time and more efficient result in better learning for students? As with the Slow Food Movement, slow pedagogy is a response to the homogenization of education which is driven by national and state standards (Holt, 2002; Narayanan, 2006).

In this study, slow pedagogy focuses on teaching strategies that focus on developing and guiding the learning process, it allows learners to create their own learning contexts, boundaries and parameters (Holt, 2002; Narayanan, 2006). Slow pedagogy affords learners with time to develop knowledge that is transferable to the real world, in particular, integrates narrative and storytelling with learning to help the learner with gaining an understanding of the value and relevance of the learning activity. How this translates to using a MUVE in the classroom is that rather than being forced to follow a structured sequence of activities (guided inquiry), students are allowed to explore, create and test their own virtual inquiry experiments. This research study explores the application of slow pedagogy to the learning experience by allowing learners to engage with and explore a complex inquiry problem without the use of structure to guide a student through their initial activity within the virtual space.

Scenario-based Multi-User Virtual Environments

A scenario-based MUVE is a virtual environment derived from game technology that includes features such as an avatar that represents the participant, a 3D virtual environment, the ability to interact or manipulate objects within the virtual environment and the ability to communicate with other participants and, in some instances, communicate with in-world characters. Educational MUVEs are usually based on a ‘real world’ context that is created to provide an authentic experience that a student may not be able to encounter in a classroom environment (Barab et al., 2005; Dalgarno & Lee, 2010; Jacobson et al., 2008). As with most computer games, a scenario-based MUVE is underpinned by a narrative that forms the basis of the learning experience. The benefit of using a scenario-based MUVE in an educational space is that learners are engaged by the narrative and are motivated by the challenge offered by the in-world activities. This study uses *Virtual Singapura*. *Virtual Singapura* was developed in Singapore as part of a collaborative project between researchers at Singapore Learning Sciences Laboratory and Nanyang Technological University. Virtual Singapura can be accessed at http://155.69.101.53/wiki/index.php/Main_Page.

Productive failure

The removal of structure in the initial activity in a sequence of activities that encourage a student to struggle and perhaps even fail at arriving at a solution has come to be known as productive failure. Productive failure, a term coined by Kapur, has been the centre of several studies, all of which have shown that allowing students to explore and create their own problem solving strategies results in greater learning outcomes (Kapur, 2008; Kapur & Kinzer, 2009; Pathak, Jacobson, Kim, Zhang, & Feng, 2008). This study will be the first study that uses of Productive Failure in a scenario-based MUVE.

Method

Data collection

The data will be collected over several trials. Each trial will be used to inform the design of materials for the following trials. The purpose of each trial is outlined below.

Trial 1

The first trial was completed in March 2010. The purpose of this trial was to gain an understanding of how much instruction was needed for participants to be able to use the virtual world without affecting the productive failure design. The participants of the pilot study were 28 undergraduate and postgraduate education students studying at the University of Sydney. There were 13 female participants, 13 male participants and two that did not indicate gender. The participants were provided with a brief overview of the scenario and were then able to explore *Virtual Singapura*. The participants were then asked to complete an anonymous fifteen question open-ended questionnaire that addressed their knowledge of virtual worlds and the materials. The results of the questionnaire were used to improve the clarity of the student materials.

Trial 2

The second trial was undertaken in June 2010. The purpose of this trial was to train high school science teachers in the use of *Virtual Singapura* and to obtain their feedback on the design of the student materials. Nine teachers participated in the study, including five female and three male teachers with a range in teaching experience from five to 30 years. The feedback from the trial was used to re-design the materials and to provide more explicit instructions. The participants completed an anonymous sixteen question open-ended questionnaire that addressed their knowledge of virtual worlds and the materials. The results of the questionnaires were compared with the results of trial 1. The trial was also used to introduce slow pedagogy and productive failure to the teachers. The results of this trial indicated that teachers saw the value of the technology in terms of Orr's (2002) 'fast knowledge' in that having and using the technology was a chief benefit of using a MUVE.

Trial 3

The third trial was undertaken in August 2010. The purpose of this trial was to ascertain if there was a difference between productive failure and non productive failure problem solving processes. In this trial eight pre-service teachers, six females and two males, worked in pairs to explore the initial activity in the virtual world. Process data was recorded via *Camtasia* screen capture software. The participants completed an anonymous sixteen question open-ended questionnaire that addressed their knowledge of virtual worlds and the materials. The results of the questionnaires were compared with the results of trials 1 and 2. This was the first trial that will analyse slow learning and productive failure. Data from this trial are yet to be analysed.

Trial 4

The participants for the planned November study are a cohort of 150 ninth-grade students drawn from six general science classes at a private high school. The school was selected as it had sufficient bandwidth and the school is motivated to use technology in the classroom. Three of the classes will be given the productive failure activities and the remaining three classes will be given the guided inquiry activities. All 'in world' activities will be completed within the teams. Students will also be given pre and post tests that will be completed individually. Students will work pairs during the trial. Their audio and in-world communication will be recorded using *Camtasia*, an audio, visual and screen capture software. The processes used by the students will be analysed to see how slowing down of the virtual learning activities and allowing students to explore, plan, design, argue, reflect and evaluate their team's work impacts upon their learning outcomes, perspectives and attitudes towards inquiry learning. Students will participate in focus groups at the start of 2011 to see what information students have retained from their use of the virtual world and to gain an understanding of the long-term impact of their virtual experience.

Conclusions

Initial analysis of data from the trials with pre-service teachers and teachers have emphasised the motivational aspects of the world – engaging, fun, motivating and challenging. The pre-service teachers and teachers have also grappled with issues relating to the validity and value of the tool in questioning how they, as teachers, can find a practical use for *Virtual Singapura* in their science classroom. The underpinning of the teaching and learning design with slow pedagogy garnered a positive response from the teachers and future teachers, who supported using collaboration, authentic virtual environments and unstructured activities. The slow learning approach was seen as being useful, however, the practicalities of an outcome driven syllabus were seen as a constraints. Analysis of the process data from the trials should yield insights into slow learning pedagogy and productive failure. Overall, the use of MUVE technology in a classroom setting needs to be student driven rather than technology driven. Virtual worlds may currently posses a novelty appeal; however, to have lasting value as a learning tool it is possible that through exploring approaches such as slow pedagogy and by allowing students to collaborate, engage and reflect upon their experience in a virtual world that students will gain more than just 'fast knowledge'.

References

Australian Government. (2007). *A Digital Education Revolution*. http://www.alp.org.au/download/now/labors_digital_education_revolution_campaign_launch.pdf.

Barab, S. A., Thomas, M., Dodge, T., Carteaux, R., & Tuzun, H. (2005). Making Learning Fun: Quest Atlantis, A Game Without Guns. *Educational Technology, Research and Development*, *53*(1), 86 - 107.

Dalgarno, B., & Lee, M. (2010). What are the learning affordances of 3-D virtual environments? *British Journal of Educational Technology, 41*(1), 10 - 32.
Dede, C., Clarke, J., Ketelhut, D. J., Nelson, B., & Bowman, C. (2005). *Fostering Motivation, Learning and Transfer in Multi-User Virtual Environments*. Paper presented at the American Educational Research Association. http://muve.gse.harvard.edu/rivercityproject/research-publications.htm#2005.
Holt, M. (2002). It's time to start the slow school movement. *Phi Delta Kappan, 84*(4), 265 - 271.
Jacobson, M. J., June Lee, B. K., Hong Lim, S., & Hua Low, S. (2008). *An Intelligent Agent Augmented Multi-User Virtual Environment for Learning Science Inquiry: Preliminary Research Findings*. Paper presented at the 2008 American Educational Association Conference. Retrieved 25/06/2008.
Kapur, M. (2008). Productive Failure. *Cognition and Instruction, 26*(3), 379 - 424.
Kapur, M., & Kinzer, C. K. (2009). Productive Failure in CSCL Groups. *International Journal of Computer-Supported Learning, 4*(1), 21-46.
Ketelhut, D., Nelson, B., Clarke, J., & Dede, C. (2010). A multi-user virtual environment for building and assessing higher order inquiry skills in science. *British Journal of Educational Technology, 41*(1), 56 - 68.
Narayanan, G. (2006). *Crafting Change II: The Project Vision Hypothesis*. Paper presented at the Global Summit 2006: Technology Connected Futures.
Orr, D. (2002). *The Nature of Design, Ecology, Culture and Human Intention*. New York: Oxford University Press.
Pathak, S. A., Jacobson, M. J., Kim, B., Zhang, B., & Feng, D. (2008). *Learning the Physics of Electricity with Agent-Based Models: The paradox of productive failure.* Paper presented at the ICCE, Taiwan.
Shaffer, D. W., & Gee, J. P. (Eds.). (2007). *Epistemic Games as education for innovation*. Leicester: British Journal of Educational Psychology.
Tanti, M. (2010). ICT rich education: Let's fast track the slow times. Paper presented at ED-MEDIA 2010: World Conference on Educational Multimedia, Hypermedia & Telecommunications, Toronto.

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