Bringing 'second life' to a tough undergraduate course: Cognitive apprenticeship through machinimas

Nona Muldoon and David Jones
Division of Teaching and Learning Services
Central Queensland University

Jennifer Kofoed
Faculty of Business and Informatics
Central Queensland University

Colin Beer
Division of Teaching and Learning Services
Central Queensland University

This paper discusses a novel use of Second Life to produce a series of 'machinimas' to support a cognitive apprenticeship model of learning in accounting education. In this paper, the notion of 'second life' has dual meaning: first, it is about curriculum renewal; and second, it pertains to the widely talked about social software. The paper describes both meanings of 'second life' in this context, shows how when combined they have resulted in a significant increase in the quality of student learning outcomes and argues that technology only becomes transformational when it is used to enable alignment across all curriculum elements.

Keywords: cognitive apprenticeship, constructive alignment, accounting, second life, machinima

The problem

How do we respond to the ardent and repeated calls made by researchers, employers and professional bodies to provide learners with learning experiences that demonstrate the authentic practices and values of the accounting profession (Accounting Education Change Commission (AECC), 1990; Adler & Milne, 1997; Mathews, 1994)? How can we move away from the traditional methods of instruction that continue to dominate the pedagogical practices in accounting education, whereby learners are taught in an abstract and decontextualised form, providing little or no opportunity to develop skills and attributes that prepare learners for the profession (Booth, Luckett & Mladenovic, 1999; Boyce, Williams, Kelly & Yee, 2001; Muldoon, Pawsey & Palm, 2007)? Can we develop learning experiences that provide students with the opportunity to develop higher order thinking skills, the ability to communicate, work in teams and solve ill-structured problems, capabilities which are key attributes that equip accounting graduates to face the challenges of today's competitive business environments (AECC, 1990; Adler & Milne, 1997; Boyce et al. 2001; Kern, 2002; Tempone & Martin, 1999)?

These questions were posed and answered in the re-design of a course in Auditing and Professional Practice, an advanced core course within a Bachelor of Accounting program at a multi-campus university with large numbers of international students. This offering of the course included 322 students studying at 8 campuses and via distance education supported by 10 staff. Traditional pedagogical practice in this course followed the traditional methods complained about above. The last five offerings of the course, prior to the re-design offering, had an average failure rate of 36%.

The work described in this paper is part of an on-going design-based research (Joseph, 2004) investigation into the design of technology-enhanced learning environments, which integrate cognitive apprenticeship (Collins, Brown & Newman, 1989) into traditional delivery modes. This first phase of the study was focused on designing, developing, implementing and evaluating the design of an educational intervention aimed at facilitating active learning engagement in authentic contexts. The overall goal for the research is to study the impacts of providing practice fields (Barab & Duffy, 2000) within which students are empowered to perform and practice the kinds of activities that they will encounter once they join the profession.

Curriculum renewal

The renewal of the design of this course draw upon a process informed by a combination of constructive alignment (Biggs, 2003) and Chickering and Gamson's (1987) seven principles for good practice in undergraduate education. This renewal process led the design towards the learning theories and approaches embodied in situated learning (McLellan, 1996), cognitive apprenticeship (Collins, Brown & Newman, 1989) and practice fields (Barab & Duffy, 2000). Practice fields, originally coined by Senge, are contexts in which learners can perform and practice the kinds of activities that learners will encounter outside of formal learning environments (cited in Barab & Duffy, 2000). Practice fields provide a useful construct for the type of situations and problems faced in situated learning environments, giving rise to the situated development of knowledge that can be used as tools in problem-solving situations. Aspects of the learning design used in this course are outlined in Table 1, underpinned by the practice fields design principles suggested by Barab and Duffy (2000). This table illustrates that the instructional strategies used in the learning design are explicitly linked to authentic practices of the auditing profession, and are based on the Australian auditing standards and pronouncements, including but not limited to ASA 220, 230, 300, 315, 320, 330, 500 and 520.

Implementation, *Second Life* and machinimas

As a multi-campus institution spread throughout Australia and South-East Asia and with a high level of casual academic staff the implementation and support of authentic contexts for students is challenging. However, the advent of multi-user virtual environments like Second Life provides an ideal platform for the types of activities that epitomise dynamic, active engagement (Hargis, 2008) and authentic learning conditions (Dieterle & Clarke, 2007). Herrington and Oliver (2000) support this assertion and suggest that computer-based representations and micro-worlds provide a powerful and acceptable medium for the critical characteristics of apprenticeship in classroom environments.

However, this approach to authentic learning is not without its challenges. The design and development of micro-worlds can require specialist skills. Learning how to use and navigate within these micro-worlds, particularly for new users, can be difficult and likely to elicit ‘extraneous cognitive load’. Extraneous cognitive load pertains to unduly loading learners with unnecessary information, such as spending extra time trying to learn how to navigate through the unfamiliar learning environment, diverting the focus of attention away from the direct object of learning (Pollock, Chandler & Sweller, 2002). Widespread usage of Second Life as the platform for these micro-worlds brings additional problems including questions about whether or not students have sufficient network bandwidth and computational power to effectively use the environment. Second Life usage also raises organisational issues including the difficulty of getting the Second Life client installed on University computers and some campuses blocking access to Second Life at the network level.

To address these problems, this project used Second Life as a platform to create machine-based cinema (machinima). Machinima is described by Merino (2004) as “real-world filmmaking techniques applied within an interactive virtual space where characters and events can be either controlled by humans, scripts, or artificial intelligence”. Berkeley (2006) explains that machinima offers “some distinctive new possibilities for creative audio-visual narrative production” (p. 66), and that at a minimum, “it can be seen as a means of facilitating and accelerating the creative story development and storytelling process” (p. 75).

The design can enable the embedding of critical stages of apprenticeship in classroom environments and at the same time minimise the risk of extraneous cognitive load. In this learning context, learners are exposed to highly engaging third person experience by viewing the story, but then changes to a first person experience when learners actively engage in identifying problems and in helping to solve the main character’s dilemmas. With the same story format and characters, additional conditions can be set for individuals and/or teams of learners working together to solve a series of new challenges. Such challenges are situated against the backdrop of authentic workplace activities and practices, within which the stages of apprenticeship are creatively entwined in the story, i.e. modeling, scaffolding and fading (Brown, Collins & Duguid, 1989).

Consistent with the traditional approach to the delivery, textbooks were prescribed and, regardless of the mode of enrolment, students also received a print study guide as well as access to an electronic version of the guide. All electronic learning resources, including the machinimas, group spaces with collaborative tools, discussion spaces, personal spaces for journal writings and guidelines for active engagement, were accessible from the course website.

Table 1: Aspects of the learning design based on practice fields design principles

Practice fields design principles	Learning design strategies
Engagement in domain-related practices	Integrate authentic learning activities To evaluate the professional auditors' working environment, the student assumes a junior auditor's role as 'Audit Assistant', and is then given an opportunity to take a leadership role on certain tasks as 'Audit Senior' for Hird & Co – students' fictitious employer introduced via machinima. These roles enable students to experience and engage in audit practices and perform real-life audit procedures, the activities and guidance for which are anchored in machinima.
Ownership of the inquiry	Facilitate assessment of performance which directly relates to domain-related practices The 'Audit Assistants', working as a team, plan and perform certain aspects of the audit for Hird & Co's new major client, Sealant Products Pty Ltd. Each Audit Assistant engages in inquiring into the business structure and practices of Sealant and contributing their views and perspectives on audit engagement. A nominated 'Audit Senior' for the week takes ownership of the inquiry to lead others in completing certain aspects of the audit. The team produces authentic audit artifacts involving a series of audit working papers, which are an integral part of the team's portfolio submission for assessment.
Coaching and modeling of thinking skills	Provide continuous access to expert knowledge and performance 'Audit Assistants' attend lectures or view e-lectures to hear the perspectives of 'Audit Managers' about audit practices and procedures, and/or watch how the 'tools' for solving auditing problems are used. 'Audit Assistants' access other forms of coaching/scaffolding and modeling of thinking skills on demand, e.g. the machinima 'Audit Senior' explains the process for audit engagement; the 'Audit Manager' demonstrates tacit knowledge and expertise during tutorials; the Study Guide documents the perspective of the 'Audit Partner' and provides print-based modeling of audit procedures; the Hird & Co intranet provides frameworks, templates and guidelines for audit engagement.
Opportunity for reflection	Link the value of reflection to workplace practices Individual students engage in journal writing online about their experiences as 'Auditors' to record perceptions of performance and developmental requirements, which will be used as evidence to support their 'Performance Review' document. This strategy simulates workplace approaches when monitoring performance and developmental needs of staff through reflective practice.
Dilemmas are ill-structured	Make explicit workplace practices and processes for identifying and solving problems from different angles and varying perspectives The 'Audit Assistants' try to help the machinima-based 'Audit Senior' minimise incidences of unethical practice at Hird & Co by first identifying the underlying ethical and legal issues for the company involving a particular audit client, and then formulating and articulating their strategies through a 'Guidance Statement'.
Support the learner rather than simplify the dilemma	Provide multiple sources of modeling, scaffolding and feedback mechanisms Each 'Audit Assistant' examines complex auditing processes and attempts to complete an audit program for the Sealant audit. Prior to their attempt, modeling and scaffolding are provided by the machinima 'Audit Senior', followed by modeling of expert performance by the 'Audit Manager' (Lecturer/Tutor) during lecture and tutorial where procedures and issues are practically demonstrated and discussed. Support fades during the workshop but the 'Audit Assistants' work as a team in this environment and support each other to complete the team's audit planning tasks, within the required deadline to facilitate timely feedback on completed work from the 'Audit Manager'.
Work is collaborative and social	Facilitate reciprocal teaching and learning through goal-based activities In leading the team to complete certain aspect of the audit, the nominated 'Audit Senior' for the week opens discussions to brainstorm strategies, compare and reflect on individual's ideas, and provide guidance/direction to 'Audit Assistants' on specific tasks. Team members learn from each other through activities that involve collective problem-solving processes, within which ideas are shared and modified enabling collaborative construction of knowledge.
Learning context is motivating	Provide a virtual representation of the workplace on a rich, integrated and supportive online space To start work for the week, the 'Audit Assistants' access and view the machinima to seek guidance from the 'Audit Senior', then peruse the Hird & Co intranet to prepare for the team meeting. The presentation of content is in a story-telling format supported by interesting and realistic 'tools' commonly found in the professional auditors' work environment. The 'Audit Assistants' motivation is driven by the goal to complete the required audit working papers for review and assessment by their 'Audit Manager'.

Findings and discussions

The implementation of different pedagogical practices into a complex, multi-campus course is not easy and faced some initial reluctance from students facing an increased workload to become familiar with the approach. It was an on-going learning process during which staff learned as much as the students.

Some of the results, findings and lessons learned include:

- *Curriculum alignment significantly improved failure rate.*
  One of the critical findings in this study suggests that curriculum alignment, which ensured that the assessment clearly and noticeably measures the intended learning outcomes, optimised active learning and student performance. The average failure rate for the five previous offerings of the course was 36%. The failure rate for the re-design offering was 3.3%.
- *Improved quality of student work.*
  Reports from exam markers indicated the difference in the quality and quantity of students' answers in the exam papers for some of the traditionally weaker campuses. The quality of portfolio submissions provided further evidence of the depth of engagement that occurred from the beginning through to end of term across all modes of enrolment.
- *Better prepared students.*
  In recent offerings of this course, there has always been a specific e-lecture and an exam discussion forum to assist in exam preparation. Comparative analysis of summary statistics from web-based sources indicates that the frequency of access to exam preparation tools was significantly less for the re-design course offering, compared to previous terms, which suggests students' increased level of confidence and readiness for the exam.
- *Increased engagement by students.*
  Throughout the term staff at a number of campuses reported increased attendance at class sessions and active student discussion of course topics during the class and after hours. There was also a significant increase in use of the course website. The previous main offering of the course had 630 students who used that course website over 187,000 times. The re-design course offering had 322 students who used the course website over 233,000 times.
- *Students were daunted by the new course structure and workload.*
  This was particularly evident amongst FLEX students whose learning experiences have been mostly resource-based (predominantly print) and working alone.
- *Some students showed initial resistance because of their negative perceptions about group work.*
  Evidence from personal journals indicates students' lack of trust with group-based assessment for fear their grades will be affected by poor performing team members.
- *The importance of on-going involvement from the designer.*
  During the delivery of this course many learning artefacts and aids were developed in response to newly identified problems. Evidence suggests that these reactive design interventions contributed significantly to the transformation of the students' perspective during the course, facilitating enhancements to the quality of student learning outcomes.
- *Machinima provided a cheap and simple tool for the development of an anchor for apprenticeship-style learning.*
  The project team, starting with no experience with machinima and little experience with Second Life, were able produce almost 20 minutes in two machinima over about six weeks.

To conclude, the re-design course, even at this early stage, is now considered as being highly successful and is being held up as an exemplar for future course development at the university. This raises a range of interesting questions about how this might occur. The project certainly stimulated interests amongst the academic community, holding promise for others to rethink current practices, and/or engage in improving educational practice at the university.

References

Accounting Education Change Commission (1990). Objectives of education for accountants: position statement number one. *Issues in Accounting Education* 5(2), 307-12.

Adler, R. W., & Milne., M. J. (1997). Translating ideas into practice: An examination of international accounting bodies' calls for curriculum changes and New Zealand tertiary institutions' assessment methods. *Accounting Education,* 6, 109-124.

Barab, S. & Duffy, T. (2000). From practice fields to communities of practice. In D. Jonassen & S. M. Land. (Eds.), *Theoretical foundations of learning environments* (pp. 25-56). Mahwah, NJ: Lawrence Erlbaum.

Berkeley, L. (2006). Situating Machinima in the new mediascape. *Australian Journal of Emerging Technologies & Society*, *4*(2), 65-80.

Biggs, J. (2003). *Teaching for quality learning at university: What the student does* (2nd ed.). Berkshire: SRHE & Open University Press.

Booth, P, Luckett, P. & Mladenovic, R. (1999). The quality of learning in accounting education: the impact of approaches to learning on academic performance. *Accounting Education* 8(4), 277-300.

Boyce, G., Williams, S., Kelly, A. & Yee, H. (2001). Fostering deep and elaborative learning and generic (soft) skill development: the strategic use of case studies in accounting education. *Accounting Education 10*(1), 37-60.

Brown, J. S., Collins, A. & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42.

Chickering, A. W. & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin,* 39(7), 3-7.

Collins, A. Brown, J.S. & Newman, S.E. (1989). Cognitive apprenticeship: Teaching the crafts of reading, writing and mathermatics. In L.B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser*. Hillsdale, NJ: Erlbaum.

Dieterle, E. & Clarke, J. (2007). *Multi-user virtual environments for teaching and learning.* Retrieved July 30, 2008. http://muve.gse.harvard.edu/rivercityproject/documents/MUVE-for-TandL-Dieterle-Clarke.pdf

Hargis, J. (2008). A second life for distance learning. *Turkish Online Journal of Distance Education-TOJDE*, 9(2), 1.

Herrington, J., & Oliver, R. (2000). An instructional design framework for authentic learning environments. *Educational Technology Research & Development*, 48(3), 23-48.

Joseph, D. (2004). The practice of design-based research: Uncovering the interplay between design, research, and the real-world context. *Educational Psychologist,* 39(4).

Kern, B.B. (2002). Enhancing accounting students' problem-solving skills: the use of hands-on conceptual model in an active learning environment. *Accounting Education* 11(3), 235-256.

Mathews, M.R. (1994). An examination of the work of the Accounting Education Change Commission 1989-1992. *Accounting Education* 3(3), 193-204.

McLellan, H. (1996). *Situated learning perspectives.* Englewood Cliffs, New Jersey: Educational Technology Publications.

Merino, P. (2004). *The wonderful world of machinima.* http://www.g4tv.com/screensavers/features/49874/The_ Wonderful_World_of_Machinima.html Retrieved July 23, 2008.

Muldoon, N., Pawsey, N. & Palm, C. (2007). *An investigation into the use of a blended model of learning in a first year accounting subject.* Paper presented at AFAANZ Conference, Gold Coast, Australia, July 1-3.

Pollock, E., Chandler, P., & Sweller, J. (2002). Assimilating complex information. *Learning and Instruction,* 12, 61-86.

Tempone, I. & Martin, E. (1999). Accounting students' approaches to group-work. *Accounting Education* 8(3), 177-186.

Contact author: Nona Muldoon, Lecturer, eLearning, Division of Teaching and Learning Services, Central Queensland University, RockhamptonQld 4702. Email: n.muldoon@cqu.edu.au

Please cite as: Muldoon, N., Jones, D., Kofoed, J. & Beer, C. (2008). Bringing 'second life' to a tough undergraduate course: Cognitive apprenticeship through machinimas. In *Hello! Where are you in the landscape of educational technology. Proceedings ascilite Melbourne 2008*. http://www.ascilite.org.au/conferences/melbourne08/procs/muldoon.pdf