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Exploring eLearning practices across the disciplines in a university environment

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This two-year project used case studies to explore Information and Communications Technology (ICT) and eLearning practices across different tertiary disciplines and with students from diverse backgrounds, instructional levels, and learning experiences. Ongoing, team-based critical discussion and sharing of ideas about the role that ICT and eLearning plays within tertiary teaching enhanced professional knowledge building for lecturers. Creative use of ICT also led to increased opportunities for students to bridge from the conceptual world of the tertiary classroom to real-life experiences in their particular subject areas.

Key findings

ICT and eLearning provide effective means for supporting diverse and changing tertiary cohorts, but these practices need careful curriculum design and monitoring.

The use of ICT and eLearning helps expand and transform students' preconceived notions of legitimate subject-area content and its representation.

ICT and eLearning contribute to, and support, students' developing sense of professional identities within their particular fields of study.

ICT and eLearning tools can help bridge students' conceptual, visual, and spatial thinking from the virtual to the real world.

Not all students enjoy using technology, as it challenges them to conceptualise new and different ways of learning.

Major implications

There needs to be a clear relationship between learning intentions and assessed task outcomes particularly if they include technical (tool-based), product-based (content), and community and process outcomes.

Although ICTs provide tools to develop and represent knowledge, teacher and student understanding of affordances and constraints constitutes an essential pedagogical and research context for realising technological potential.

A cross-disciplinary approach to research draws from a rich pool of knowledge and experience across practitioners and can help all participants develop deeper pedagogical expertise.

The research

Background

This two-year, cross-disciplinary project at the University of Waikato had the overall goal of documenting, developing, and disseminating effective and innovative practice in the use of ICT and eLearning at tertiary level, to contribute to a deeper, research-based understanding of the implementation of technology in diverse instructional contexts.

The project used a case-study approach. In the first year, there were four case studies, with the lecturers involved from the disciplines of Postgraduate Professional Studies in Education, Earth and Ocean Sciences, academic literacy, and Screen and Media Studies respectively. In the second year, three of the first-year case studies continued (Professional Studies in Education (postgraduate), Earth and Ocean Sciences, and Screen and Media Studies) while five other disciplines (History, Professional Studies in Education (undergraduate), Tourism, Engineering, and Applied Linguistics) were added, giving a total of eight case studies. The background ICT and eLearning experience of the lecturers in the five new case studies ranged from relatively inexperienced to very experienced. In both years, students came from a range of backgrounds and were studying at undergraduate and postgraduate levels.

Research questions and methodology

The project was guided by one overall research question: “How are different lecturers/groups exploiting the potential of ICT/eLearning to support tertiary-level student learning?” Qualitative data include key informant interviews with lecturers to obtain their reflections about technology use in their teaching, classroom observation of students’ lab-based use of technology, and student and tutor feedback gathered through facilitated focus group discussions. Quantitative data were gathered from students about their ICT practices related to learning through a common online survey.

The project team, which comprised university researchers, research assistants, and the case study lecturers, followed a constant comparison approach to the data analysis (Lincoln & Guba, 1985), but with key differences. Regardless of who was researching, the entire team met regularly to discuss and share findings and insights across the case studies. In addition, as interview and focus group data were collected, the team leaders and research assistant separately read and re-read the transcripts. Using a process of inductive reasoning, the team identified emergent themes (Braun & Clarke, 2006) and then reported, discussed, and debated at regular project team meetings. Interpretations of, and insights into, particular and general findings were summarised and stored within project management software, accessible to all team members through the university’s website. Finally, at the end of both years of the project, the entire team met for a full-day retreat to reflect and consolidate findings and interpretations.

Key findings

Careful curriculum planning, development, and reflection

In all the case studies, pedagogical approaches were affected by variation in students’ expectations related to learning, their previous experience using technology, their reasons for taking a course, and the mode of delivery for the course. While core concepts of a discipline might evolve slowly over time, student cohorts and ICT and eLearning approaches to teaching change more rapidly and affect teachers’ development of learning activities and assessed tasks. The multi-disciplinary nature of the research team and the fact that the team members met regularly to discuss the positive and challenging nature of the ICT implementations helped lecturers reflect on their pedagogy and to better understand how to refine it in a responsive and ongoing manner.

We recognise that out of our first-year classes of 140, we may get 40–50 going on to second year. So we want to avoid teaching things that are too complicated that students will never use again but at the same time, making sure that students who go on have a grounding so then in 2nd or 3rd year when we use GIS, they can pick it up faster.

(Lecturer, Case Study 1) [Earth and Ocean Sciences]

... podcasting assignment There were no students asking why we are doing this, and only one asking what should we put in. The idea is not to talk exhaustively [for] 3 mins but the power comes from being succinct. Prioritise what you want to say, tell me what sort of teacher you want to be in 3 minutes. Podcasting has been a powerful tool, a good fit with tasks existing in paper, and encouraged reflection...

(Lecturer, Case Study 6) [Professional Studies in Education (undergraduate)]

Changing notions of legitimate subject-area content

Students often enter tertiary study with an incomplete understanding of what constitutes legitimate academic content in their intended discipline, or their ideas can be overly conservative. ICTs can provide opportunities for teachers to challenge and extend students’ understandings. For example, through the use of digital media, history as a discipline was transformed for students and they *became* historians. In tourism, students’ use of technology helped them understand the “current” nature of their discipline and its relation to real-world events.

Some students have feedback that there is a practical outcome—that there are world outcomes, for the real world.... For instance, some students could use this [digital histories] in the community setting, taking it and melding it for other cultural purposes. It brings history into the living, breathing world.

(Lecturer, Case Study 5) [History]

I also liked the fact that [the lecturer] didn't have just merely read journals, write up and submit hardcopy as in a traditional course. In [lecturer]'s course, students got to go on a fieldtrip, do the research and create the website—feel it's related to the present, communicate with actual people in the field and then share with peers in the class. [It's] really world related, I feel I am doing something in real-life.
(Student, Case Study 8) [Tourism]

Students' development of professional identity; learning the "tools of the trade"

In a number of case studies (earth and ocean sciences, engineering, screen and media studies, and both levels of professional studies in education), students were using the same types of software and instructional approaches that they would use in their professional lives. Thus while students were learning *about* particular software, they were using it in assessed work in much the same way that they would after graduation.

I like the fact we are using tools that we're going to use in the real world after we graduate. Lots of jobs that I'm likely to apply for have it that GIS is a bonus, if you know how to operate it.
(Student, Case Study 1) [Earth and Ocean Sciences]

The thing they [students] said was it was good to have the tools we were talking about modelled in use. ... Unlike lecturing where pedagogy doesn't necessarily match what you are saying, using the tool and illustrating it in practice was better than talking about it.
(Lecturer, Case Study 3) [Professional Studies in Education (postgraduate)]

ICT as a tool to develop students' visual spatial thinking

In a number of cases, lecturers sought to exploit the potential of ICT to contribute to the development of students' visual spatial thinking. For example, in screen and media studies, students need to understand the complexity of layering visual content to produce sophisticated and textured digital images. In engineering, students need to visualise and rotate objects in three-dimensional space and to pictorially represent complex ideas. Across both disciplines, students needed to use imagery and narrative to design, develop, and express abstract concepts such as visual depth, energy, and space (Edelson, 2001).

But because of the software, it enabled you to actually create that image to what you're thinking. ... The most difficult thing to get into your mind is that it works on layers, transparent layers. So if you are going to alter something, you must have the top layer selected because then you are altering the very front thing. That was the biggest issue for me, just understanding how the layers worked. Once you understood that, then you can manipulate your images as much as you like.
(Student, Case Study 2) [Screen and Media]

ICT and eLearning supports, but also can constrain, teaching and learning processes

In spite of the many positive findings from this project, and the potential of technology to transform education, not all students liked using ICT and eLearning. For example, from the quantitative survey data, we found considerable student ambivalence about the use of ICT. We cannot determine whether students have so thoroughly internalised ICT that new technologies raise no particular concerns for them, or whether students are in fact reluctant users of ICT. However, data across both years of the project do indicate that between 7 percent and 33 percent of students in individual cases, or 15 percent of students overall, were either sceptical or late adopters of technology. From the qualitative data, it is clear that some students believed that ICTs distracted them from a focus on course content, while others believed that their use contributed to increased stress levels. Still others became "side-tracked" into a focus on technology, at the expense of mastering content (Englander, Terregrossa, & Wang, 2010). These findings, while not unexpected, have important implications for curriculum and assessment design, which links the findings to the first key finding in this report. All findings have implications for instructional practice within tertiary settings.

[It was a] balancing act between learning the value of the digital storytelling process in history and the learning of the tools using Windows Media Maker. Some students tend to focus on the technical aspects to finish their story and hand in their assignment on time rather than appreciating their story telling processes.
(Tutor, Case Study 5) [History]

Students tend to be caught up with actual use of software rather than actual designing of the boat.
(Lecturer, Case Study 7) [Engineering]

Major implications

The findings illustrate that teachers need to reflect on and plan how ICT and eLearning can be integrated into teaching in ways that extend learning opportunities, facilitate the transformation of student identity from learner to professional practitioner, shift students' understanding of legitimate disciplinary content and expertise, and complement the development of conceptual, visual, and spatial understandings. Further, reflection and planning need to be carefully managed through the design of complementary curriculum and assessment activities that provide students multiple opportunities (and time) to master the tools that can assist their learning.

Another key implication relates to the nature of technology itself and teacher and students' needs in order to exploit its potential. Although there were many positive outcomes identified in this research, not all students liked using ICTs in their own learning and several of the lecturers struggled with it. In particular, when students experienced technical problems, they wanted to communicate with a real person—regardless of how clearly and thoroughly documented the eLearning environment was. Within the context of this research project, it was possible to include additional human support (both for the students and lecturers), but as technology is routinely integrated into tertiary teaching, there are fundamental resourcing implications. Major challenges are how best to facilitate lecturers' use of technology in integrated and transparent ways to support learning, to develop students' understanding of, and willingness to use, ICTs, and to provide timely, appropriate, and affordable support. There are major pedagogical, professional development, training, and resourcing implications emerging from this research.

The findings also illustrate that the change is complex, intellectually demanding, and takes time. On several occasions during our project meetings, team members remarked that it was primarily their determination to make the eLearning approaches succeed that helped them maintain motivation, as eLearning was not the main focus of their work. However, they also agreed that it was the presence and encouragement of the larger research group that inspired and encouraged them to persevere. More broadly, it can be argued that gaining deeper understanding of the range of literacies, skills, and experiences needed to shift from the deeply engrained, paper-bound, face-to-face environment of higher education to one focused on digital collaboration, sharing, and cultural identity formation will require profound changes to educators' thinking and their academic expectations of students (Blin & Munro, 2008; Garrison & Akyol, 2009). As was found in this research, along with access to and collaborative use of powerful computing tools, team members needed multiple opportunities to reflect on and share their teaching experiences within a supportive collegial environment.

It will be a challenge for tertiary institutions to create teaching and learning environments that encourage, support (with appropriate levels of resourcing), and reward research that focuses on enhancing pedagogical change and improved learning outcomes regardless of the discipline. In addition, there must be support for innovative ICT and eLearning pedagogy so that it is not considered a time-consuming "add-on" to lecturers' work, but is a valued component of tertiary pedagogy. Although tertiary institutions expect staff to be active researchers within their particular subject-area contexts, there often appears to be less encouragement or value assigned to research that explicitly relates to deeper knowledge of pedagogy *in its own right*. Developing institutional structures within which cross-disciplinary conversations can flourish will extend and deepen tertiary pedagogy and contribute to the scholarship of teaching and learning (Shulman, 1999; Whitworth, 2006).

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