

TEACHING WITH TECHNOLOGY – A PILGRIM’S JOURNEY

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ABSTRACT

This paper reflects on the impact of technology on the academic activity of university teachers over the last decade, as seen from within a department in a faculty of science of an Australian university. The paper provides a description of, and reflection on, evolving practice in the use of technology in teaching and learning. Much of that evolution is reflected in the developments, trends and issues documented in the various CBLIS proceedings. The availability of sophisticated computer and communication technologies promised an opportunity for new and more student-centred methods of teaching and learning. The new ways of accessing knowledge and manipulation of information also offered a challenge to shape curricula to the needs of the students who will operate in a highly technologically dependent society. The paper concludes that even though individual adopters have made significant progress in the effective use of educational technologies, and that universities have adopted institution-wide platforms for online supported teaching and learning, on average, the progress in the uptake of educational technologies has been very slow and in most cases old solutions have been applied to new settings. Curricula and teaching methods at traditional universities are still very much the same.

KEYWORDS

Curriculum, Web-based learning, Student profile

INTRODUCTION

I started my academic career when joining an Australian university 14 years ago. In those days I had access to a computer, which I shared with another staff member, but only used it an average of one or two hours per day. Official communication with my colleagues was through paper-based memos. I wrote very few emails, and I wrote them more for fun than anything else. I was experimenting with the new technology, but there were very few colleagues who even knew of the email facilities available to them, so I received very few replies. At home I had a computer that was turned on once a day, with a 2400-baud modem, to keep in touch with my family in my home country. I could do so because there was another technology early adopter at the other end; but my mother did not think that the printed letters she mysteriously received from me through the telephone line were “proper” letters.

Today I spend most of the time at my computer; just about everything I need to carry out my work is accessible online. Every day I am inundated with electronic memos and requests coming from colleagues, university administration and current and prospective students. I am accessible 24 hours a day regardless of my physical location, via email or a mobile phone. At home everybody has their personal computer, we can no longer afford waiting to get our turn. And my 80-year old mother has come around regarding what constitutes a proper letter: she now writes me emails, and complains when I do not reply immediately.

Technology has revolutionised the way we live and operate. As an academic I often ponder on the impact of this changed technological environment has had on our teaching programs, on our students and our graduates and on the curriculum. In this paper I will attempt to describe what has changed

during this time in teaching and learning at universities, as seen from my own perspective of an academic operating within a school (mathematics) in a faculty of science in a traditional but young Australian university. The paper is not written in the standard scientific format, because it is a personal reflection on how my use of computing and information technologies in teaching evolved, and the different forces that shaped this evolution.

EVOLVING TECHNOLOGIES, ISSUES AND TRENDS IN HIGHER EDUCATION

It is difficult to quantify how much of the change I experienced in my working life as academic is a direct consequence of the emergence of new technologies. Technology was certainly a big factor, but not the only one. The call for greater public accountability of the 1990's, as well as the changing government funding models have also contributed to reshaping university activity.

When I started my academic career the jargon of the day was *computer assisted learning* (CAL). I was fortunate enough to work close to my colleague Ron Adlem (Adlem, 1992) who pioneered in my department the development of a suite of modules for review of first year statistics. The modules were seen as an additional resource to support student learning, and were available to students through the Mathematics Learning Centre to work through them in their own time. These modules were developed in the DOS based authoring software AUTHOR and the flow through screens was mostly sequential. This was not cutting-edge use of technology of those days. More adventurous developers were exploring the potential of high-resolution graphics and hypermedia technologies in computer assisted learning.

Although growing steadily, the development and management of CAL was not overseen by institutions but mostly left to the enthusiasm and creativity of individual academics. The use of CAL varied from drill and practice, to simulation and interactive CD-ROMs, and it involved mostly non-assessed add-ons to the traditional teaching and learning activities. Computers were becoming smaller and more powerful, however only a minority of students had one at home. The authoring software became easier to use allowing people with very little knowledge or experience to produce CAL resources. At the same time, leaders in educational development were alerting authors of the consequence of CAL development without the appropriate authoring and educational design skills and knowledge (Farrow, 1992).

This was the environment in which I embarked in multimedia development. Comments from students who used the statistics modules encouraged me to set on the road of producing a CDROM based mathematics tutorial (Varsavsky, 1997). At that time I also started using the web for discussion forums and to publish lecture notes, assignments and subject information. These developments led me to attend my first CBLIS conference in Leicester (Chapman, 1997). About half of the papers in that meeting reported on packages, which like mine, were developed by individuals, for a specific purpose in the context of a particular discipline. The majority of these were CDROM based, but there were also a few examples of online delivery using the internet.

In the following two years internet became more widely available to students, and *flexible learning* became the new buzz word on campus. There was a long struggle with the definition of this new term, which meant different things to different academics. Many of my colleagues took it as a threat to university activity, and to their job security. By then, the university has recognized that the implementation of flexible learning needs to be managed at institutional level, and started moving from funding development focused on projects ran by individuals to institutional-wide approaches that involved inter-faculty collaboration. However, the uptake was very slow. In my faculty, even though there was support available to make effective use of the internet for enhancing teaching and learning, its use was mostly limited to supporting a subject delivery with a website with static materials such as lecture notes, solutions to problem sets, and past exam papers. Strong resistance was felt from a significant number of academics who either saw this inappropriate and conducive to spoiling students and cheapening the education process, or in the way of their research. Personally, I was still struggling

to enthruse my colleagues to use the CDROM resources developed for first year students, with no success. I learned the lesson that it is much harder to convince your colleagues to adopt new materials than developing the materials. Conference presentations and discussions at the next CBLIS conference in Enschede also indicated a move from CDROM to online applications, and an increased number of papers on evaluation and monitoring also reflected a generally recognized need to assess the effectiveness of these programs (Chapman, 1999).

By the turn of the century the debate shifted from flexible-learning to *student centred learning*. Universities were called to rethink their models of education, and we saw the emergence of various models for institutional approaches to support online learning and multimedia production, some of these presented at the CBLIS conference in Brno (Chapman, 2001). At other forums there was debate on who should be involved in online development, and a warning that given the complexity of the development of online learning environments and the costs and risks involved, this kind of activity should require a credential for practice (Sims, Dobbs & Hand, 2001). The shortage on studies into the use of educational technologies and their effectiveness in enhancing learning was still a concern. Some argued that academics were pushed to use web delivery even though there were disappointing conclusions reached which showed that there was no significant difference in learning outcomes (Reeves, 2002), disregarding previous criticisms on the appropriateness of the research questions being asked and the insistence with using traditional methods that presumably have predictable acceptable results (Ehrmann, 1995).

In this climate I enrolled in postgraduate studies which had a large online component, and had a first hand experience on what it means to be supported online, and what worked and didn't work, as seen from the student perspective. This was the trigger to become involved in a university-wide development of an online framework for collaborative learning, which I also implemented in one of my subjects (Varsavsky, 2003). By then my university, like many other universities in Australia and around the world, had adopted a learning management system, and had made strategic moves to ensure that it was used widely (Weaver, Button & Guilding, 2002). The discussions at CBLIS in Cyprus also reflected this trend of institutional wide frameworks for supporting studies online, and the different ways these frameworks were used (Constantinou & Zacharias, 2003).

My teaching related activity has certainly changed since I became an academic. My focus changed from producing materials to designing activities that would keep all students engaged with the subject matter. Nowadays I am exploring ways of using WebCT and the seven principles of good practice (Chickering & Ehrmann, 1996) that might provide better and timely support to my students with the aim of enhancing learning outcomes. It is not a system I particularly like, but it is the system I have access to. The message I get from central administration is that I should not worry about the technology and concentrate on my teaching. I am still very much a pioneer in my department but no longer feel alone; because of the common platform used, there are many other colleagues around the university with whom I can exchange experiences. Every now and then the old debate on whether we should have lectures available online comes back again, this still seems to be the main issue. My daily routine has changed enormously. Although I still deliver the subjects I teach in the traditional format of lectures and tutorials, I support student learning with weekly online quizzes. My teaching workload has increased significantly, in addition to giving the traditional face-face classes, I spend many hours on preparing online materials, monitoring student online activity, and interacting electronically with them; I often feel like the "24-hour professor" (Young, 2002). I still attend university seminars and symposia where uses of technology are discussed and showcased, but I notice that attendance has dropped over the years, and that academics who are at the cold face of teaching are a minority amongst the participants, and worry of the a growing lack of interest in these matters.

The current buzz word is *graduate attributes*; the debate is on what sort of programs will better prepare students for their needs and the needs of the society. These needs are dictated by the technological environment in which our students will operate. And technology should also play a key role on how students acquire and learn these attributes (Ehrmann, 2004).

THE IMPACT ON CURRICULUM AND ON STUDENT LEARNING

My daily academic activity has changed over the last fourteen years, and so has the jargon: from computer assisted learning, to flexible learning, to student centred learning and graduate attributes. But what has changed for the students?

My students are still expected to attend traditional lectures and tutorials, but their attendance patterns have changed. In my classes, I observe that a core group of students attend regularly, while there is a growing number who seem to attend randomly. This is a common phenomenon across the university, and from conversation had with students at student-staff meetings the attendance does not seem to be determined by the material covered on the particular lecture, but rather by their own personal life commitments. The availability of materials online seems to give them the confidence that they will be able to learn the subject material in time for the required assessment, disregarding all warnings from teaching staff. Their expectations from the university system have changed significantly; they now communicate with me by email, and expect a quick answer regardless of the time of the day or day of the week.

Most of my students now enter university with at least a working knowledge of communication and information technologies; I no longer need to teach basic keyboard skills as I had to sometimes, nor I need to produce detailed tutorials for the use of computer software. I am now teaching students who grew up with technology. They think and operate differently, they can work with different media, they bring different skills, and often we ignore this.

Technology has had a dramatic impact on the administrative aspect of students' lives, changing the way they enroll, learn about their marks and course progression. Their learning activities have also changed: they spend more time at the computer typing assignments, searching the web, or completing online assessment.

But what about learning outcomes? On my darker days I tend to think that despite the enormous effort put into improving university programs, the "dramatic changes in the ways the curriculum is created and implemented and in the ways students acquire the knowledge and skill they seek" as predicted by Farmer (Farmer, 1997) have not occurred, at least not from my perspective. The science curriculum is still pretty much the same. Some emerging areas of science such as biotechnology and bioinformatics have been added as a choice, but the curriculum of traditional science disciplines has not changed. Teaching methods have been massaged, but not changed significantly. Leaving some isolated examples aside, we are still very much replicating traditional approaches online. We are still very much treating students as if they were all the same. We have not yet moved to truly student-centred learning, towards thinking "more creatively about how to develop course designs that respond to a greater variety of learning styles rather than concluding that online learning is more suitable for one type of student than another" (Twigg, 2001).

But I also have more optimistic days, particularly when I see that something new I tried had an impact on students' learning. It might be a small step, but it should not be ignored. On those days I tend to think, like Ehrmann, that if educational strategies emerge from independent choices made by academics, there will be a significant cumulative effect on student learning (Ehrmann, 1995). I also see that, despite strong resistance from academics who persist with delivering subjects using traditional methods, student study patterns are blurring the distinction between on-campus and off-campus learning. This gives me hope that we are slowly moving towards student-centred learning.

CONCLUSION

During my life as academic the World Wide Web has opened doors and access to resources never imagined before. Computer and information technologies not only had an impact on what students should be learning to prepare themselves to operate in the constantly changing technological

environment, but also on how they learn and interact with teaching staff. As a consequence, much has changed at universities, but also much has remained the same, particularly in the traditional sciences. Within my own department, most of our current students grew up with technology, however the curriculum is being shaped by academics who completed their degrees using slide rules and tables of logarithms. This is perhaps typical of many departments in science faculties of traditional universities, and also the main cause for the tension between tradition and innovation.

I often wonder what will be the changes I will be experiencing in the next fifteen years. What will be the technology then and how will they change university activity? What will our students look like? What will be the major concerns in higher education? What kind of programs will we be offering? If the changes are paced as in the past fifteen years, then we are not likely to see significant differences in learning outcomes. But if the past fifteen years are considered as a transition period to bridge the generational technological gap, then the changes are likely to be more significant. I look forward to reporting these changes at the 2010 CBLIS conference.

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