E-learning adoption: Bridging the chasm

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Abstract

Despite the wide use of Information and Communication Technology (ICT) in university teaching, research on e-learning adoption suggests that it has not reached its full potential. This paper considers possible reasons for this seeming contradiction, using models of adoption of innovations and relating them to recent studies of e-learning adoption. It also puts forward an original explanation of the e-learning 'paradox'. The main focus of the paper is on the university teacher as a practitioner, whose decisions underpin effective implementation of e-learning.

Keywords

e-learning, innovation, adoption

Introduction and background

The ideas discussed in this paper came out of the Flexible Learning Leaders in New Zealand (FLLinNZ) 2004–2005 project. The aim of this project was to consider how staff development programmes and approaches could facilitate effective adoption of ICT for learning and teaching. The literature review for the project revealed what appears to be a mismatch between the findings of research in diffusion of innovations (Rogers, 1995; Moore, 1999) and evidence provided by empirical studies of e-learning adoption (e.g., Zemsky & Massy, 2004; Mitchell, et al., 2005). In particular, the diffusion of innovations theory suggests that adoption of an innovation progresses along the timeline from the earlier to the later adoption phases, as a result of a higher proportion of people within an organisation making the adoption decision at each next phase of adoption. Research on e-learning adoption, on the other hand, indicates that although the numbers of courses that incorporate ICT have increased dramatically in the last three to five years, e-learning as such has not reached its potential (Zemsky et al., 2004; Marshall, 2005; Mitchell et al., 2005).

Adoption of e-learning in the university context is influenced by a number of factors, including organisational, socio-cultural, intra- and interpersonal factors, to mention a few. However, my particular interest as an academic developer is in the personal decisions made by teaching practitioners and how they influence the adoption of e-learning. In this paper I will consider theories of diffusion of innovations and studies of e-learning adoption, propose reasons for the lag in e-learning realising its potential and suggest ways of facilitating this process through the means of professional development.

Models of adoption of innovations

Rogers' model of diffusion of innovations

The first approach considered here is the seminal model of diffusion of innovations developed by Rogers (1995). This widely used model demonstrates that adopter distribution over time can be represented by a normal, bell-shaped (frequency) curve, where the first segment (2.5%) represents innovators, the second segment (13.5%) represents early adopters, followed by the early majority (34%), located between the mean date of adoption and the mean minus one standard deviation, and late majority (34%), the segment between the mean date of adoption and the mean plus one standard deviation. The last 16% are described by Rogers as 'laggards', and include those who resist change (see Figure 1). These adopter categories are conceptualisations based on empirical observation.

Adopters within each category have particular dominant characteristics and values. Thus, innovators are usually intrinsically motivated to use new technologies and tolerate ambiguity and setbacks well. Early adopters are opinion leaders or role models, and have extrinsic reasons to adopt innovations. The early majority are well respected by their peers, but not leaders, while the late majority group includes followers and sceptics. This group may adopt an innovation as a result of the peer pressure.

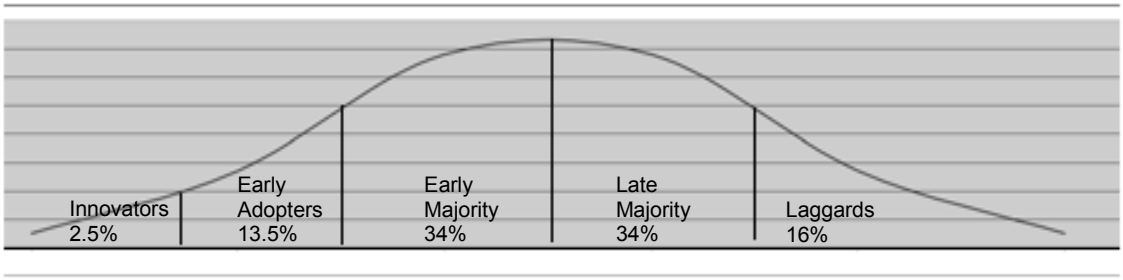

Figure 1: Rogers' adopter categories

(Source: based on Rogers, 1995, p. 262)

Moore's model of adoption of innovations

Moore (1999) considered the question of adoption of innovations from the high-tech marketing perspective. He modifies the technology adoption life cycle to include what he refers to as 'cracks in the bell curve' (ibid; p. 17), located between each of the psychographic adopter categories. Moore suggests that, due to their unique characteristics, each of these groups of potential adopters will need different reasons to make the adoption decision, and this necessitates different marketing strategies for each group. Moore claims that there is an opportunity for the adoption of an innovation to lose momentum at each point when a new group of adopters needs to come on board, but particularly in the transition between early adopters and the early majority. Moore refers to this gap as a *dividing chasm*, because of the fundamental differences in the two psychographic groups: while early adopters are inclined to view innovations as an opportunity for a dramatic change (or even revolution) in their industry or field; the early majority are not interested in revolutionary approaches and seek evolutionary ways of improving the productivity of their operations. Unlike early adopters, who are prepared to pay the price of being first and gaining competitive advantage, putting up with bugs and glitches; the early majority want innovations to "work properly and to integrate appropriately with their existing technological base" (ibid; p. 20). The early majority are pragmatics who need to see a reliable reference base to make the adoption decision. Unless new marketing strategies are identified to make an innovation attractive to the early majority, it may never complete the adoption cycle, levelling off after the first two groups of adopters and forever remaining on the fringes of the mainstream practice.

E-learning adoption

In relation to the models of adoption of innovations described above, what then is the current state of adoption of e-learning in the tertiary sector? As part of the FLLinNZ project I visited 22 universities in Australia, NZ and the UK, where I interviewed 59 university staff involved in academic development for e-learning (academic developers, educational and instructional technologists and e-learning researchers). These interviews, while not specifically focused on the stages of ICT adoption, revealed that all of these universities used one or more LMS (learning management system/s) and many, based on the estimates of these e-learning specialists, have completed the early stages of LMS adoption.

Other LMS adoption research supports these findings. A recent UK survey (JISC & UCISA, 2003a and b), for example, indicates that 86% of the 102 Higher Education institutions surveyed used a virtual learning environment (VLE). A NZ study (Mitchell et al., 2005) conducted with 18 Institutes of Technology and Polytechnics (ITP) showed that all surveyed ITPs used an LMS. A similar picture emerges in Australia, where, according to the NCODE LMS Survey (2002), 33 participating universities all used an LMS (either commercially- or in-house-developed).

In addition, a number of FLLinNZ interviewees pointed out that the rate of e-learning adoption in their institutions was, at least to some degree, facilitated by the institutional introduction of an LMS, which appears to reduce the steepness of the learning curve for non-technically-inclined teachers. Mitchell et al. (2005, p. 7) also show that "tutor's utilisation of LMS such as Blackboard, WebCT and Moodle was highly correlated with their levels of adoption of e-learning". In comparison with the 1990s (the age of computer aided learning - CAL), when creating a courseware unit was a time consuming and resource intensive process, which often involved learning a programming language; today, it does not take very long for a teacher to get up to speed with 'putting their course online', using an LMS. This may explain why CAL never crossed the adoption chasm, remaining in the realm of innovators and early adopters, while the use of ICT tools (especially those incorporated in a university LMS), having passed the early adoption stages, is quickly becoming a routine task in many universities. Despite this high rate of adoption, the majority of e-learning specialists I interviewed pointed out that poorly thought through approaches to using LMS were of

serious concern. Thus, the question remains: Does the high levels of adoption of ICT tools in tertiary courses mean that e-learning is close to fulfilling its potential in the tertiary sector? A number of recently published studies suggest that this may not yet be the case.

The Thwarted Innovation *report*

Recently Zemsky and Massy (2004) surveyed staff of six colleges and universities and six for-profit corporations in the US over the period of 15 months, in order to address the question of what happened to e-learning and why. In this project e-learning is conceptualised as a major educational innovation. The researchers identify four distinct e-learning adoption cycles, each of which requires a different level of change in the instructional culture. The first cycle is described as "enhancement to traditional course/programme configuration" (Zemsky et al., p. 11) and requires the least change in terms of institutional teaching and learning processes. In the next cycle, new course management systems are introduced. The next cycle involves the use of imported course objects, such as multimedia applications and interactive simulations. Finally, the most challenging e-learning adoption cycle is characterised by new course and/or programme configurations, where "faculty and their institutions re-engineer teaching and learning activities to take full and optimal advantage of the new technology" (ibid). Active learning and new roles for teachers and students are the necessary components of this adoption cycle.

The findings of the Thwarted Innovation report are far from reassuring; they suggest that although both the first and second e-learning adoption cycles are in the early majority stage, cycles three and four remain in the innovators' stage. Zemsky et al. (2004, p. 57) conclude that the problems with e-learning arose as a result of "an attempt to compress the process of innovation itself" and the fact that "e-learning took off before people really knew how to use it". In regard to e-learning as an educational innovation, the researchers point out that even when using e-learning technologies most faculty continue to teach in the way they taught, and that e-learning will fail to realise its full potential until "faculty change how they teach — and not before" (ibid; p. iii).

In fact, a number of those interviewed by the researchers were of an opinion that the rapid introduction of learning management systems "reduced the e-learning's impact on the way most faculty teach" (ibid; p. 53). It appears that by making it almost too trivial to create a course website and transfer existing teaching materials into web-based ones, these systems allow lecturers to adopt a 'surface' approach to e-learning. Ease of use itself, however, is not the cause of surface approaches to e-learning; it simply makes this type of adoption possible. The reason for the way e-learning is adopted in tertiary education lies, most likely, in the adopters' approaches to teaching, in general, which are often the result of their conceptions about teaching and learning (Kember, 1997).

Evidence from other studies

Although Zemsky and Massy's study only considered the US context, a number of NZ studies on e-learning adoption confirm their findings. One example is a recent report on e-learning maturity in the NZ tertiary sector (Marshall, 2005), which is based on the data collected from six of the eight NZ universities and three polytechnics. Marshall's study evaluated the institutional capability to sustain and deliver e-learning. A number of weaknesses revealed in this study are directly related to the teaching and learning aspects of e-learning. For example, learning objectives were used poorly in e-learning papers in most institutions; and even when stated, learning objectives were often "dominated by recall and comprehension rather than by analysis, synthesis and evaluation" (ibid; p. 9). In the area of e-learning *development*, the lack of a clear relationship between e-learning technologies deployed by universities and desired educational outcomes was also identified as a major problem.

Another NZ university research study (Butson, in progress) on the use of web-based technologies suggests that e-learning adoption may be driven by the technology itself as, according to the survey data, teachers see no significant advantage in using web-based technologies and there are no institutional or faculty drivers for web-based teaching. If this hypothesis is correct, and the technology (LMS, in this case) does, in fact, drive e-learning adoption, poor quality of e-learning is to be expected.

Even when institutional incentives are provided, if used in isolation, they do not guarantee success. Rogers (1995; p. 221) indicates that providing incentives for adoption of an innovation may change the patterns of adoption; the use of incentives may lead to adoption by individuals different from those who would have adopted it otherwise, and may negatively affect sustainability of adoption. It may increase the rate of adoption, but lead to a reduction in quality.

My own work with staff in the area of e-learning clearly shows that the e-learning adoption decision is frequently motivated by student pressure. I have been told time and time again that the reason why a lecturer needs to start using the LMS is student requests. Like organisational incentives, student pressure may

facilitate the rate of adoption of e-learning at the expense of its quality, resulting in a 'surface' approach to e-learning. Teachers who upload their lecture notes online simply responding to student pressure, often themselves do not see any value in e-learning.

Discovering the e-learning chasm

If the adoption of ICT in tertiary teaching has passed the early adopters' threshold (at least as far as the use of LMS is concerned), avoiding falling into Moore's chasm, why is there an overwhelming agreement among e-learning researchers that e-learning has not realised its potential as an educational innovation? The explanation I am proposing below seems to take care of this seeming 'paradox'.

I suggest approaching the e-learning innovation as a *multidimensional process* located in two planes: the plane of technology and the plane of pedagogy (or teaching and learning). Conflating these two separate aspects when evaluating the progress of e-learning adoption is counter-productive. At any given point in time both individual and institutional adoption of e-learning can be undergoing different adoption cycles; and it appears that currently the adoption of e-learning technologies, especially LMS, is located at a more advanced adoption stages compared to the teaching and learning innovation. This is why research in e-learning adoption discussed above indicates that the roots of the problems with e-learning are primarily associated with teaching and learning processes, rather than with the use of technology per se. This can be referred to as the *e-learning chasm*. The chasm, in this case, is not located within a linear adoption process but between the two interrelated but distinct components of e-learning: adoption of the e-learning technology innovation and adoption of the e-learning pedagogy innovation.

Professional development for e-learning

In order to explain this lag between the two sets of adoption cycles within e-learning, we need to turn to research on teaching theories and teachers' values and beliefs, addressed widely in the empirical studies in the 1990s (for overviews, see Kember, 1997; Ramsden, 2003). This research shows that people form their personal theories about teaching and learning reasonably early in their lives, mostly implicitly, and do not change them easily when they become university teachers themselves. Recent research by Robertson (2004) also indicates that university teachers use ICT tools only if they are aligned with their beliefs about teaching and learning, and in the way that aligns with these beliefs.

This evidence offers an explanation for the finding that teachers continue to teach in the way they always taught, whether in the context of e-learning or not (cf. Zemsky et al., 2004). Thus, if a lecturer believes in the information transmission approach, this lecturer will use e-learning to facilitate this mode of learning, and any tools that do not align with this approach will be either ignored or 'misused'. Yet, effective e-learning viewed as an educational innovation requires reconceptualisation of traditional teaching and learning paradigms, especially in relation to the roles of teacher and learner. For e-learning to realise its potential, teachers need to be able to construct effective environments that facilitate learning. Rogers (1995, p. 225–226) underscores the importance for an innovation to be compatible with socio-cultural values and beliefs of adopters, as well as with previously introduced ideas, but also warns that past experiences can result in 'misadoption'. The use of traditional teaching approaches in the context of e-learning fits well with such examples of past experiences as the use of chemical fertilisers in a Colombian peasant community or introduction of tractors in the Punjab, when incorrect utilization of innovations was caused by conceptualising an innovation in terms of established methods and experiences (ibid).

To overcome the e-learning chasm it is important, therefore, for university teachers to articulate their personal theories and beliefs about teaching. Making these theories explicit is a necessary step before they can be critically evaluated by the teachers. This is a process that can be triggered by staff development interventions. A recent review of research in the area of professional development (Prebble et al., 2005, p. 60) indicates that staff development programmes "can be effective in transforming teachers' beliefs about teaching and learning and their teaching practice".

Another factor that, according to Rogers (1995), influences adoption of innovations is whether or not the innovation meets a perceived need (cf. adoption motivated by student pressure). If potential adopters do not realise that they have a need for e-learning, the role of professional developers, as change agents, is to help them evaluate and assess their needs. McNaught (in press, p. 16), for example, argues that academic development can build "awareness in teachers about a wider range of strengths, weaknesses, potentials, and strategies of eLearning" and enable them to "construct better eLearning environments". This task should be given high priority by academic developers who work in the area of e-learning.

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