How best to learn about and apply technologies for learning? Early stage action research.

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ABSTRACT

While the theoretical literature about Web 2.0 and the affordances of the technology available to university teachers and students can be wildly exciting, the reality is patchy. University teachers, whether new to the profession or experienced in classroom teaching but not up to speed with, or keen on, current technology, can find it hard to take first steps into pedagogic design incorporating technology tools for learning. Drent and Meelissen advocate personal entrepreneurship for adopting new technologies, but for most teachers there is little time to experiment and learn to redesign. This paper discusses the early stages of an action research project which focuses on two university teachers, one experienced with learning design incorporating technology and the other beginning that journey. By focussing on specific cases, we hope to understand better the process by which teachers learn about technology tools along with pedagogic development and consider adoption of these tools into their teaching and learning strategies. The specific cases are set in the context of recent literature on staff adoption of e-learning (Garrison 2000; Ham and Davey 2005; Drent and Meelissen 2008; Hossain and Brooks 2008; including Liao and Lu 2008). The authors explore psychological and sociological resistance and drivers towards the adoption of technology in education. This is of interest both from the perspective of the actual results and from the perspective of staff skills development and the subsequent adoption of e-learning in universities.

INTRODUCTION

In some senses, adopting technology for the enhancement of learning in Higher Education is an age-old story. A picture-book perhaps, in which we see Roger's model categories (1962) of innovators, early adopters, early majority, late majority and laggards trudging or skipping their way through whiteboards, overhead projectors, emails, presentation software, video and audio recordings, virtual learning environments and the like. To try to enhance learning through technology is a norm for teachers in any institution, and as that technology changes, teachers face up to
the challenges of learning how to use it, why they should use it and whether they should use it, or whether it is passing fad or institutionally imposed white elephant.

So why should we revisit this old story? Simply a concern for the pace of change at present, as Web 2.0 is rampant in our own as well as our students’ lives, bringing changes of behaviour and learning leaps every few weeks, plus the rapid spread of Virtual Learning Environments (VLEs) across every university campus, which entails step changes in the way university teachers adapt or redesign learning materials and use communication channels with students.

In the University of Brighton, we have used a Blackboard™ based VLE for several years and, more recently, have extended this VLE with more Web 2.0 capability through ELGG™ software. In all we now have not just an online learning space for every module and course plus online meeting places for every unit of learning and group of learners, but also a community space which can be used by every university member at every level of granularity from private blogging and file or video storage to web-wide communication.

Many academic staff in Brighton Business School have led the way in pioneering pedagogic thinking with these technologies, but that doesn’t mean this behaviour is universal. Not just existing staff who are slower to move to new technology adoption, but in particular new members of staff who are new to VLEs, are faced with a steep process of learning which, until recently, was a much smaller part of the job. Not only do these new members of staff have to negotiate the professional journey of gaining confidence in the classroom and examination board, they are also expected to find out about and begin to experiment with technologies which may be very new to them. It is this journey which we discuss in our paper, as one experienced member of staff continues to find out about and attempt to innovate pedagogically in a VLE context and one new member of staff explores available technologies and tries them out with students. We work together for part of our time and have treated our responses to technology experiment and adoption as an action research project, both for our own benefit, and to see whether our experience matches up to or differs from the currently available advice in the literature.

PURPOSE

The authors’ primary focus is on how teachers find their way towards a practical understanding, not simply of how to find out about and use learning technologies, although this is implied, but also of how such technological tools complement and add value to traditional tools, and to what extent their use produces effective learning and teaching strategies for undergraduates. The context is a campus-based Foundation degree business course, where both a standard Learning Content Management System (Blackboard™) and Web 2.0 software (ELGG™) are offered to staff and students. The course is taught in four institutions and lessons from this project can be quickly disseminated across the institutions through the teaching team.

The project implies the following research questions:
• How do new teachers and experienced teachers learn about the technology systems available?
• How do new teachers think about technology in teaching and learning? What understanding of pedagogy is needed to consider its application?
• How do teachers prepare students for using technologies in their learning?
• What are the implications for staff induction?
• What are the drivers and barriers to implementing e-learning in a university context?

Researching the personal professional experience of university teachers cannot lead to generalisable conclusions. However the authors use the literature to understand the broader context of options and advice on technology adoption and seek to apply this. The intention is not simply to learn as individuals, but to discover limitations as well as opportunities from prevailing advice and practice and develop proposals for testing these findings in a wider context. This project provides a springboard for conceptualising technology adoption strategies in a transitional educational context, as teachers adopt technologies at varying speeds and with distinctly varying enthusiasm. Findings from the research project are intended to support induction of new teachers as well as offering suggestions for institutional policy on technology adoption from an academic perspective.

LITERATURE

In their study of Dutch schools and teacher education institutions (2008), Drent and Meelissen discuss factors which in their findings are associated with adoption of technology. They find that a student-centred pedagogical approach and a positive attitude to ICT are associated with such innovation, the former argument also supported in Greener’s study of university teachers pioneering technology adoption (Greener 2008), where a student-centred approach is contrasted with knowledge-centred and teaching-centred approaches. Notably an earlier finding (Heaton-Shrestha et al. 2005) had not found that teachers used VLEs actively to develop more student-centred approaches; this more recent research clarifies the point by bringing student-centred approaches to be a predicted driver of pedagogic reflection along with engagement with VLEs and other innovative technologies, rather than a predicted outcome.

“By reflecting on the quality of their education, teacher educators are stimulated to develop a more student-oriented pedagogical approach and the matching use of ICT. Consequently, innovative use of ICT is partly the result of a teacher’s conscious choice to integrate ICT into their (more student-oriented) education.” (Drent & Meelissen 2008 p195)

Such an interconnected approach to technology use is also said to be built on a certain ICT competence but not necessarily a strong competence; rather one which is likely to develop as a result of pedagogic and student-focused goals. In proposing the “personal entrepreneurship” they find is necessary for such innovation with ICT, the authors build on the work of Spillane and Fullan who both identify this approach with the academic’s focus on continuing professional development, the desire to discuss problems and innovations with colleagues and a focus on personal reflection and research. Personal entrepreneurship is seen as an active attitude which predisposes teachers to take advantage of opportunities offered by institutions for
research and innovation, while the latter opportunities alone are insufficient to trigger such innovation.

Hossain and Brooks (2008) seem to conclude in their study through Fuzzy Cognitive Mapping that access to and availability of hardware and software are critical in staff adoption of technology, though they do also feature the software’s ability to meet learning and teaching requirements. However, these seem necessary rather than sufficient conditions for adoption. Other studies such as that of Liao and Lu (2008) consider the issue of technology adoption in an e-learning context drawing on the work of Rogers and of Moore and Benbasat, as well as Davis (Technology Acceptance Model) to suggest the key factors of “relative advantage”, similar to TAM’s “perceived usefulness”, i.e. the degree to which the innovation is considered to be an improvement on what is currently done, and “compatibility” i.e. the degree to which the innovation is compatible with their existing beliefs and values. This analysis suggests that in considering how teachers, both new and experienced, approach the possibility of technological innovation, we should look not only at their pedagogy but also at their understanding of potential benefits and disadvantages of such an innovation, and at the degree to which such innovation may be consistent with their pedagogy, student-centred or otherwise. The Heaton-Shresta et al study (2005) suggested disadvantages or hindrances to technology innovation in a VLE context included the greater explicitness and visibility implicated in VLE use, the perception of possible student abuse, i.e. decreasing attendance at lectures if material was made available online, and reaction against a sense of top-down institutional imposition of VLE use.

Ham and Davey (2005) chose an action research approach to explore two teaching projects involving technological innovation and found, in line with many others, that learning online requires some rethinking of pedagogy, particularly in the facilitation of asynchronous exchange and the planning required to do what was intended to be informal and as needed by students “just in time”. These ideas are now becoming generally accepted and we are trying to see the extent to which this extra learning, questioning of assumptions and planning may be off-putting to teachers, particularly those who are still developing a sense of their own pedagogic values.

Lest we focus too much here on the teacher’s perceptions and disciplines, we should also consider the ways in which students may be encouraged to use what is provided by the teacher, it is a common enough experience that prospective innovations planned with meticulous care are not taken up by students (see for example Cole 2009), voting with their feet or cursors. Deursen and Dyk (2009) discuss a series of skills required for using the Internet, looking particularly at the effect of age group of user on skill-related problems. They find little difficulty with operational and formal skills (like navigation) among young users (18-29 in this study) but all age groups experienced information (search and evaluation) and strategic (relating ICT use to an overall goal) skill-related problems. Wu et al (2008) discuss a range of e-learning and technical capabilities which must be acquired by both teachers and learners to access the benefits of online learning environments. Greener’s review of the impact of role modelling (2009) learning with technology in front of students in the classroom proposed a range of learning behaviours implied by online learning, which tended to be assumed present in traditional students of the net generation, a false assumption. The suggestion in this paper was of a need for
openness on the part of a teacher to learning and to mistakes to encourage students to see a learning process as part of e-learning, not just a knowledge acquisition process.

In summary this brief initial literature review has suggested that, on the part of teachers, perceptions, active entrepreneurial attitudes and pedagogical approaches are likely to play a considerable part in the decision to try innovation with technology in learning design and delivery, with student-centredness, perceived usefulness and compatibility with values and beliefs as well as relevance to learning needs playing a part. We have also looked at differing accounts of the skills required both by learners and by teachers in order to make effective use of Internet technologies, particularly Web 2.0, in learning. Finally, there has been a suggestion that action research may be a particularly effective method through which to explore technology experiment and adoption and that as teachers seeking to improve learning experiences for students, attention should be paid to our reflections and experiences in order to distill helpful ideas.

METHOD

Action research is more of an attitude and methodology than a specific research method. Lewin’s principles of action research fit this project well as the authors conduct a systematic study into the problem of how best to learn about and apply technologies for learning, at the same time trying to solve the problem by applying and experimenting with these technologies and documenting the outcomes of that learning. This learning and research is undertaken in a professional context in which there is an ongoing dynamic interaction between the researchers and other colleagues and their students, affording the opportunity for “a spiral process of data collection” (Bargal 2006 p369) and emphasizing the development of the change agents. The authors are indebted to Tina Cook’s article “The purpose of mess in action research: building rigour through a messy turn” (Cook 2009) for a comforting sense that the messy area “between the known and the nearly known” is worthy of reflection and exploration through this methodology.

The action research project is expected to continue for at least the period of two academic years and the early stages of this research are reported here through the systematic reflective frames offered by Bourner (2003) and Bolman and Deal (1997). Bourner offers searching reflective questions allowing the researchers to understand better their personal perspectives in approaching learning technologies, while the Bolman and Deal frames stimulate a reflective understanding of the structural, human, symbolic and political context of this research.

We have chosen not to include extracts from our reflective commentaries in this paper but have contrasted them briefly and extracted issues of technology adoption and experimentation which seem relevant at this stage. It is important to remember that this is an early stage in our action research, so we are at present reacting to just one cohort’s activity and our responses to this; as the research continues, we expect to deepen our study in response to several cohorts and different technologies as well as benchmarking our experience against contemporary literature, thus aiming to achieve the adaptive teaching and learning transaction which Garrison discusses as the core difference of 21st century distance learning (Garrison 2000).
The main focus for the new teacher during this year has been her undergraduate module on Business Environment and a new technology trial on a group project. The main focus for the experienced teacher, working with the same cohort of first year FdA Business students on a different module, has been the incorporation of e-lectures into a new learning and teaching design. Research journals have been kept, students have been asked for feedback and evaluation of the technologies used and discussions and reading have been shared both between us and with other colleagues as the momentum of this action research has grown.

DISCUSSION OF INITIAL MESSY FINDINGS

A comparative review of the personal journals and commentaries the authors prepared this year has led us to some general findings:

1. Both teachers share values of constructivist learning and facilitative practice. However in both cases we have been focussing on modules with first year FdA students, who had a great deal of new knowledge to acquire as well as study skills, which in most cases were lacking. In such situations it is not uncommon for teachers to relapse into didactic mode and revisit behaviourist teaching practices. This happened in both cases although in one module the timetable and unfamiliarity with a new module left little opportunity for facilitative approaches; in the other, a detailed plan for delivery had already built in some constructivist approaches, which tended to minimise chances for simply presenting information. However the latter was effective, when underpinned with technology to help students listen more than once to what was said in the classroom. This raises questions about constructivism and curriculum which we need to pursue as the research continues.

2. Neither of us found it easy to write about and reflect on our experiences with technology alone. In both cases, we have sought to understand why we developed the pedagogical approaches we did, and reflected in detail about the face-to-face elements of the design as much as those which involved technology. The innovations involving technology have not been the only innovations we have attempted, and it is hard to isolate the effects purely of technology on learning.

3. We were both intrigued by student feedback, despite the fact that the students were not reporting unusual responses. For the new teacher, students found practical difficulties with a newly trialled technology (Brighton Voices) and it was hard to identify differences between the group of students who used it extensively and the group who didn’t use it at all. Where students persevered with technology for project communication, dependence on the teacher seemed less pronounced and peer support more effective. For the experienced teacher, a transferred technology from another course (e-lectures) was welcomed and subject to strong demand from students, particularly as a revision aid. This was found a little surprising as there had been considerable delays in uploading the e-lectures and they dealt with a less
practical and more academic side of the course. There were elements of this innovation which particularly suited an inexperienced cohort of learners who needed repetition and security in learning new terminology and ideas.

4. For the experienced teacher, links were already strong with learning technologists in the university, and reasonable understanding of software was already in place. For the new teacher, a research trial of new technologies gave an opportunity to try something new and was the way in to a relationship with the technology team. Additionally this start of this action research project has involved both of us in developing discussions on pedagogy and sharing new idea from conferences and reading. In both cases it would be reasonable to say that opportunities were actively sought and turned into action – this suggests that we both tend towards the “personal entrepreneurship” described in the literature, which was not present in the rest of the course team. Both teachers spent considerable time discussing with others the potential and impact of the new technologies, partly looking for reassurance during experimentation, partly wishing to test out acceptance for these technologies by other teachers.

5. In using Bolman and Deal’s symbolic frame, we can question the values of the FdA course as a whole and note that we are dealing with learners who may face many additional difficulties in adapting to an HE study approach. The live, real-time face of the web can be an attraction here, and the long-term vocational needs of these learners can be well served by developing sound analytical skills in relation to web content. Increasingly, learners bring their own high expectations of what universities can offer them in terms of access and technology, driving us forward to develop our own learning as teachers. However we also struggle to develop traditional analytical, critical and reflective skills in our students as they face apparent riches of information and ready-made answers and have to learn how to sift and apply them.

6. In both cases, reflective journals have produced considerable plans for change for the next cohort, taking into account the first time round learning and accepting a need to be flexible and open to improvement. However we recognise a need for caution as each cohort is likely to bring different issues, experience and attitudes to technology enhanced learning, so we have to avoid a series of “knee-jerk” reactions to feedback from one group of students, as experience suggests the next group will have different needs, likes and dislikes and learning styles and approaches.

7. On this particular FdA course, we have three other institutions offering the same course and assessments, so any changes we make have to be discussed across the four institutions and made available for sharing. We have had mixed experience of collaboration across the institutions this year, with some module groups very receptive and enthusiastic to innovations, and others much less so. However there are institutional constraints as two of the institutions do not have direct access for students to the VLE, we can only enable their tutors to come in and download items for upload to their own VLE environments. Inspiration and persuasion remain our most powerful tools here as we have little knowledge from year to year of the technology experience,
perceptions and values of teachers from other institutions, so cannot predict their response to technology adoption.

8. Perhaps inevitably, time management has been an issue for both teachers. The difference has been in the intention. For the experienced teacher, time was tightly scheduled for weekly workshops with students, perhaps too tightly in an attempt to introduce considerable variation in activity and to include much student interaction within the sessions. This led to a lack of clear focus on assessment as other activities were enjoyed more by the students. For the new teacher, the straightforward needs of the wide curriculum have driven the time usage in class, and the drive to innovate comes from a desire to find sufficient time to enable much more student participation. In both cases we see technology as offering the possibility of freeing time in class for discussion, experimentation and interaction, but this will only work if the materials online are simply to navigate and analyse, and we can encourage students to engage fully with them.

9. In both cases, things went seriously wrong with the technology we were trying to use. Contrary to our worries, in both cases students did not change their mind about the technology on this basis. If they had decided they liked a technology, they would wait for it or continue to use it when available, if they did not, nothing would induce them to use it. As teachers we tended to over-emphasise the problems which technology brings; our students seemed more resilient and relaxed about this than we did.

10. A new teacher can feel inadequately prepared for the number of tasks ahead, and as a result can feel at a disadvantage with the students. However it soon becomes clear that new students feel the same, and that sharing that sense of experimentation and taking risks with technology, can lead to a shared sense of purpose and learning.

11. As innovators, we were using a large proportion of the time of our learning technologist team. If all teachers were to adopt new technologies, clearly the capacity to support them would not be available. Does this suggest that there is a vested interest in slow adoption of technology?

CONCLUSIONS

We began with a number of questions and will indicate how far we have reached in answering them:

- How do new teachers and experienced teachers learn about the technology systems available?

There is some sense in the literature that if hardware, software and models are available to teachers, they are likely to use them. This isn't supported by our research to date as we are finding reluctance to use a number of options available without clear pedagogic understanding of what can be improved through them, and this choosiness seems sound. What we could suggest was that teachers who profess student-centred values are likely to be active in taking up opportunities for innovation when offered, if compatibility with values is present.
- How do new teachers think about technology in teaching and learning? What understanding of pedagogy is needed to consider its application?

New teachers may or may not have a deep understanding of pedagogy from earlier experience, training and/or research; but this is not always necessary for experimentation. There does seem to need to be a deeply held conviction that things need to change or improve and this may be enough to take advantage of a new technology. The pedagogical understanding may well come with reflection on its deployment.

- How do teachers prepare students for using technologies in their learning?

We have done insufficient research as yet to understand this question and propose answers. What we do know is that assumptions must not be made about student capabilities around a wide range of study skills and learning approaches with technology, which may still have to be taught to the most ICT-knowledgeable students.

- What are the implications for staff induction?

It does not seem necessary to provide a new teacher with a huge staff directory and many guidelines for making things happen. A better focus may be on recruitment and selection of new teachers, to ensure they are driven to improve the student experience of learning and are at least supported through induction by making connections with experienced teachers.

- What are the drivers and barriers to implementing e-learning in a university context?

Again it is too early to offer many conclusions here, although lack of resource to give all the possibility of personal learning about new technologies will be an obstacle. That personal approach, has worked especially well for us, as we feel reasonably well supported by experts in the technologies, but that would not be possible for everyone on the academic staff, should they choose to take advantage of such an offer. One of the main barriers we have experienced so far is our own hesitancy in adopting new ideas, when we know a considerable amount of time and energy will be expended in the implementation. The opportunity to discuss this through action learning has been providing some incentives here and this could be available to all academic staff if meaningful staff development review and peer mentoring were widely adopted.

McNiff and Whitehead (2006) state that action research is conducted by practitioners who want to make changes which will influence others, by questioning their own practices and those around them. The methodology is open ended and developmental and Mellor (1998 cited in McNiff & Whitehead 2006) claims that:

“In action research the process itself is the methodology and is experimental, requiring a certain degree of entrepreneurialism as the practitioner will need to try multiple innovative ways until they find one that is suitable.“

It is clear that this project has a long way to go to distill ideas which work and to begin to understand better why and how new and experienced teachers might adopt
technology to enhance learning. However at this early stage, we are encouraged that new ideas have been tried out and much reflective and discursive attention has resulted in sound ideas for the next cohort. We have explored some related literature and found that ideas such as personal entrepreneurship have value in our understanding of technology adoption, as do concepts of perceived usefulness (relative advantage) and compatibility with our beliefs (however inconsistent they really are!). We need to explore further the range of skills we must encourage in our students in order for them to get the best out of their online learning, not adopting new technology for its own sake but always trying to ground its use in sound pedagogy. Most importantly we have found that good teaching always involves feeling like a new teacher, experimenting and feeling our way towards an understanding of learning for ourselves and our students. Just as a new teacher must find her way around a building, an administration and an academic infrastructure, so, with increasing change in technologies supporting learning, must experienced teachers find their way among new software and affordances for learning from technologies. Neither journey happens without collegial openness and discussion.

REFERENCES


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