

The Future of Learning Technology: Some Tentative Predictions

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ABSTRACT

This paper is a snapshot of an evolving vision of what the future may hold for learning technology. It offers three personal visions of the future and raises many questions that need to be explored if learning technology is to realise its full potential.

Keywords

Future trends, History, Innovation, Technology life cycle, Visions

Introduction

Some twenty one years ago I quoted an old Chinese proverb that “Prophecy is dangerous—especially when it concerns the future” and noted that it was “not so very long ago that those who claimed to be able to see into the future were given a show trial and then burned at the stake” (Rushby, 1990). These days it is only the expert’s reputation that is burned.

I am even more hesitant to make prophecies when I read Philip Tetlock’s award winning research on expert political judgement (Tetlock, 2005) which concluded that the “experts” were only slightly better than straight chance in their predictions about the future. For those of you who do not know this work, Tetlock asked 284 experts to make 28,000 predictions. The experts were drawn from many different fields. They ranged from university professors to journalists and had widely different beliefs from Marxists to free-marketeers. The predictions were followed up over a twenty year period and were—on average—dismally inaccurate. Interestingly, the most inaccurate were those experts who were certain in their predictions: those who spoke in terms of probabilities did rather better.

The lesson we should take from this, is that the rest of this paper and the companion papers from other editors, should be treated with great caution. You may do better by rolling dice!

I should also add that the thoughts which are set out in this paper are a work in process. I set out to write what, in an abbreviated form, is the first part of the paper. In conversations with myself and with colleagues, I began to realise that the traditional vision (now Vision 1) was flawed. As you read on, I hope you will understand why.

First however, let me deal with the question of why a journal such as the British Journal of Educational Technology (BJET) needs to be interested in what the future may hold for learning technology. It is more than idle curiosity! Journals have a complex relationship with the future: They are trying to predict the future so that, from the papers that are submitted for publication, they can select those that are likely to be of interest to readers in the future, and conversely, by their choice of papers they shape what people read and thus influence the future direction of research in their field.

The past forty years

It happens that 2011 marks my 40th Anniversary in the learning technology business. My postgraduate research in 1971 was on the use of artificial intelligence techniques in computer assisted instruction. Contrary to current popular belief, the use of computers for learning was already well established and we had no doubt that CAI was going to revolutionise education and training.

Over the following years, artificial intelligence grew and diminished in importance. It continues to support some learning systems, but the promise of intelligent tutoring systems has never quite been realised on any significant scale.

Around 1977 the first personal computers appeared and it was clear that these were going to revolutionise education. The UK Government set a target of equipping every school with at least one microcomputer so that every child could access to the latest technology.

This in what now seems very quick succession, came interactive videodiscs, CDi, compact disks, artificial intelligence (again!), the WorldWideWeb and mobile communications and ever more capable hand-held devices (I have omitted a number of other technologies in the interests of time and space). Each attracted its own enthusiasts, research projects in the classroom and initial trials, and some limited use—and then (with the exception of the WorldWideWeb) was superseded by a new technology with new enthusiasts. Thus we had a succession of sparkling innovations, but only a marginal impact on education and training.

In 2007 a colleague and I carried out a review of learning technology projects carried out in the UK during the period 1980-2000, and mapped their findings onto the research agenda of the British Educational Communications and Technology Agency (Becta). We found that almost all of the research questions that were being asked at that time had been answered, at least in part, by research carried out years before, but that those findings had never been examined by the current generation of researchers (Rushby & Seabrook, 2008). In large part this was because the reports pre-dated the internet. Contemporary practice is to use the internet as the primary source of research data and so the early projects were invisible. It is as if they had never happened. The consequence was that large amounts of funding were being used to rediscover what was already known.

In part, as educational technologists we have ourselves to blame. We focus too much on the technology and not enough on the learning. The problem is that we work in a field that is now dominated by information and communication technologies (ICT) that are very charismatic. The product lifecycle of the latest handheld devices for example, is very short and the functionality is ever increasing. We tend to start by looking at the functionality and wondering what we can do with it, rather than focussing on the problems of learning. So, as new technologies emerge, a new generation of researchers starts to explore what they can do, projects emerge and then, after a short while, interest fades as an even newer technology emerges.

Key issues 2011

Each year, The British Journal of Educational Technology carries out a survey of the key issues in educational technology as perceived by a sample of learning technologists. This takes the form of a simple questionnaire asking respondents to select their five top issues from a list of about 40 alternatives. Some of these are technologies, others are techniques. The survey goes to the members of the BJET board and the reviewer panel, to those who have submitted papers to the Journal, and to several educational technology online fora, such as ITForum. The simplified results are shown in figure 1 overleaf.

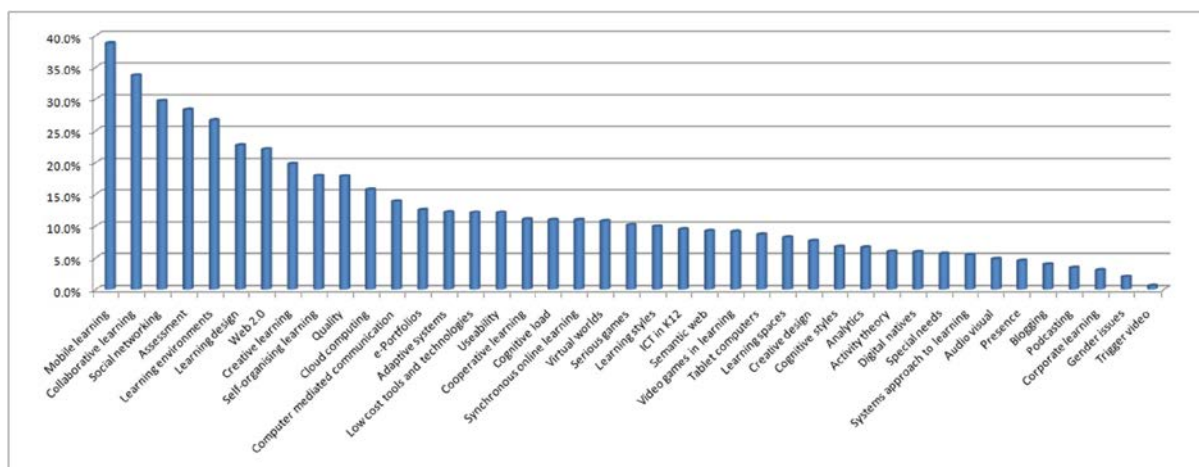


Figure 1. Key issues in educational technology – 2011 (n = 1139)

The top ten in the 2011 survey were (in descending order):

- Mobile learning
- Creative learning
- Social Networking.
- Assessment
- Learning environments
- Learning design
- Web 2.0
- Creative learning
- Self-organising learning and
- Quality

For comparison, the top six in 2010 (again in descending order) were (Rushby, 2010):

- Collaborative learning
- Web 2.0
- Learning design
- Mobile learning
- Social networking
- Assessment
- Learning environments
- Computer mediated communication
- Virtual worlds and
- Self-organising learning

We should take note that these are the topics which have been identified by this sample as the most important: They are not necessarily the topics that these same people are researching—or writing about!

So much effort - so little success

Do these key issues point the way to the future? Those who cannot remember the past are condemned to repeat it (Santayana, 1905). Given that I think we in learning the learning technology community are very bad at learning the lessons of history, one view of the future is that we shall be repeating the mistakes we have made in the past. History will repeat itself with new technologies. Even worse than an inability to learn the lessons, is the fact that we often do not even know the lessons. We have a strong tendency to ignore everything that has gone before in our excitement to get on with what we have now.

We now need to think very carefully about why it is that some much effort by so many enthusiastic people has led to such little real change. From within the educational technology community, reading the optimistic literature and talking to our friends at conferences, we seem to be on the brink of a breakthrough. The problems that prevent widespread adoption of ICT in education we have identified through our work will surely be overcome by the latest technology and we will move forward into a golden age in which education and training are transformed. The world will be a better place.

I suggest that we are deluding ourselves. It is easy to do so when we are gathered together in conferences such as this, where everyone is optimistically committed to new technologies in learning. We are among those who think like we do and this fosters our belief that everyone in education shares our view. But, with a few exceptions, technology has made little real impact on education. Our learners make extensive use of the new technologies—but less so for their formal education. The majority of exciting projects using handheld devices and mobile communications wither and die when their funding comes to an end. The greater part of formal learning continues to follow the traditional lecture-based model and is only slowly responding to the innovations of the past twenty years. Technology is neither the problem nor the answer.

We should look at the way in which innovations are taken up by the user community. Figure 2 illustrates the life cycle of a typical successful innovation. Initially the new idea or technology is used by a very few enthusiasts but, as

the news spreads, more early adopters come on board and the number of users grows. Then, more people get involved and finally the conservative late adopters take it up.

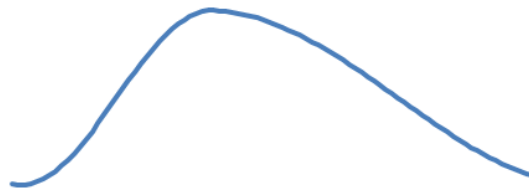


Figure 2. The innovation curve

As time passes the innovation is superseded by newer, perhaps better, ideas and its use gradually decreases. So we get a series of innovation curves as shown in figure 3.

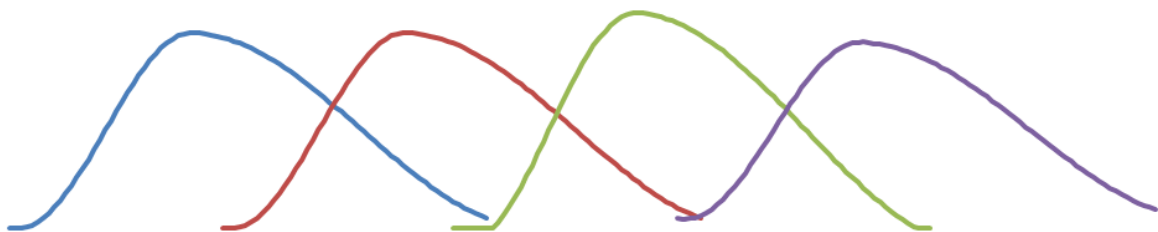


Figure 3. Successive innovations

However, this is an over-simplification of what happens in practice. Many innovations never make it past the involvement of the early adopters. Something prevents the majority of potential users from adopting the technology. In his book *Crossing the Chasm*, Geoffrey Moore (1991) suggests that there is a break point—the Chasm—dividing the early adopters from the cautious majority. The decision makers in that majority group are doing well in the existing system; they are, after all, senior figures who have prospered with the way things are, and there is little reason for them to change.

This is particularly true in education which is, by its nature, conservative. One of the purposes of the education system is to guard society's culture and pass it on to the next generation.

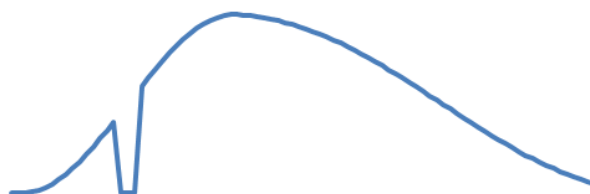


Figure 4. The Chasm

Before this cautious majority will adopt the innovation they look for other people like them to go first, to try it out, and report back on their success. But, given that they are all on the same side of the Chasm, it is difficult to get a critical mass of these decision makers who will endorse the innovation. Geoffrey Moore's book is concerned with the techniques that help innovators to cross the Chasm. Although it is written for the marketer and focussed mainly on commercial innovations, there is much of relevance to education and I commend it to you.

My first vision of the future is one that is technology led. As new technology becomes available, the researchers explore the new affordances, the early adopters trial it with their students and report the results of technology acceptance studies—but the overall impact on education and training is at the margins and the Chasm is not crossed. Most of the system continues as before with slow diffusion of the more cost-effective technologies. The exceptions may be in areas where there are pressing needs that cannot easily be met by conventional means. For example, the use of e-learning in the finance sector to deal with compliance legislation has resulted in companies in those sectors crossing the Chasm. In education, the political pressures to achieve higher student numbers and progression rates into higher education, coupled with a demand to reduced per capita resources are starting to result in ICT being used as a prosthetic to help teachers and administrators deal with an ever worsening situation. They are being forced to jump the Chasm.

The challenge and research direction for this first vision is focused on the technology: How rapidly will these technologies emerge and how can they be deployed in education and training. See for example, the New Media Consortium Horizon report (Johnson, Smith, Willis, Levine, and Haywood, 2011).

We need to be better at innovation

A recent paper by Xie, Sreenivasan, Korniss et al. (2011) uses computer modelling to show that a committed minority of around 10% is required to reverse the prevailing majority opinion. In terms of the context in which educational technologists work, that is a far larger minority than we currently have. It would mean that in given institution one in ten of the staff, randomly distributed through the institution, would be constantly advocating the use of ICT to their uncommitted colleagues and would be immune to any adverse influence that might cause them to lose their belief in the advantages of educational technology. Once that tipping point of 10% is reached, the model indicates that there is a dramatic decrease in the time taken for the entire population to become believers and to adopt the innovation. So we have to increase the size of the committed—evangelical—minority.

However, Selwyn argues for more pessimism in educational technology (Selwyn, 2011). He suggests that most people working in the field are “driven by an underlying belief that digital technologies are, in some way, capable of improving education” and that there is “a desire among most educational technologists to make education (and it follows, the world) a better place.” I agree with his suggestion that this optimistic view of the potential of education and technology is not supported by reality. And that this “optimism and positivity has ... served to limit the credibility and usefulness of educational technology within the wider social sciences.” When those that we are trying to convince can see that there is only limited adoption of these technologies, it is difficult for us to maintain credibility. He quotes Dienstag (2006) that:

“Pessimists do not deny the existence of ‘progress’ in certain areas – they do not deny that technologies have improved or that the powers of science have increased. Instead, they ask whether these improvements are inseparably related to a greater set of costs that often go unperceived. Or they ask whether these changes have really resulted in a fundamental melioration of the human condition.”

I must confess that, in my earlier years, I have been guilty of unfounded optimism. My closest friends who have now gained the courage to tell me how they perceived me twenty or thirty years ago, report that I was quite insufferable in my unswerving belief that educational technology—or more specifically, ICT—would revolutionise education within a few years. All that was required was for everyone else to share my vision. Alas, they did not!

Perhaps it takes the perspective of a few decades to realise that educational technology is not a universal panacea and that uncritical euphoria is not the best way of converting the sceptics. Innovation is much more complicated, and takes much longer, than is immediately apparent.

In my second vision of the future, educational technologists have learned about innovation. They have amassed the evidence that will convince the cautious majority and have developed the social networking skills that enable them to pass the 10% tipping point. However, the education system as a whole is not transformed. With some exceptions, schools and universities look much as they have looked in the past although there is a growing emphasis on distance learning enabled by technology. The exceptions do not serve to prove the rule: rather they illustrate the distance that some institutions still have to travel. There is an emphasis on reducing the unit costs of learning so that education

budgets can cope with a larger number of students. Because ICT has become embedded in the mainstream as a means of doing the same things in a different way (in contrast to doing different things), there is a pronounced digital divide between learners in technology-rich and technology-impooverished environments.

The research focus is now on education and innovation. Research evidence is reported from a critical (pessimistic; realistic) perspective and this gives it the credibility that has been lacking in the past.

Transforming education

Personally, I find both of these visions unsatisfactory and depressing. More advanced technology and more of it. Is that all there is? It doesn't seem much of an ambition for the future!

In her book *Learning Futures*, Keri Facer (2011) supports the concern that the orthodox vision of the future is no longer robust and sustainable. It is no longer sufficient to have schools that are “future-proof”; we must look instead to ‘future-building’ schools. She argues that we need educational institutions that can:

- “help us to work out what intelligence and wisdom mean in an age of digital and cognitive augmentation;
- “teach us how to create, draw upon and steward collective knowledge resources;
- “build intergenerational solidarity in a time of unsettled relationships between generations;
- “help us to figure out how to deal with our new and dangerous knowledge;
- “act as midwives to sustainable economic practices that strengthen ... local communities across the globe;
- “nurture the capacity for democracy and debate that will allow us to ensure that social and political justice are at the heart of the socio-technical futures we are building;

And can “act as pre-figurative spaces, as environments in which communities can model today how they might want to live with each other in the future” (Facer, 2011, pp. 102-103).

In Keri Facer's future the educational goal of qualifications and other traditional measures of academic success are inadequate if we are to discharge our duty of care towards our students. The role of educational technology as we currently envisage it, in helping learners towards those goals then becomes highly questionable.

Yet technology is both a driver and an enabler. It is the rapid advances in information and communication technologies that are driving these changes in society and making it imperative that we rethink the future of learning. And it is technology that will help us to realise the future-building school—in whatever form it evolves.

The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man (George Bernard Shaw).

The third vision of the future of educational technology is one in where the technology and techniques that we have learned over the years are used to support a transformed education system (which may look like Keri Facer's future, or may take some other form). There is more capable technology, and there is more of it, but it is less obtrusive. Our focus will be on the evolving institution which will increasingly be an integral part of the community it serves. In this third vision, the grand challenge and research direction focuses on the sociology of education and of educational technology.

The approach of the reasonable educational technologist is to apply ICT to the educational system in an attempt to help colleagues make the best of the current, out-dated, system. What we need now are educational technologists who will work with those who are designing the schools of the future to make them fit for purpose.

Acknowledgements

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