Chalk, Talk, Technology and the Teacher: Teacher Decisions in Blended Learning

NINA SMALLEY
Cardiff University

ABSTRACT

Much of the hyperbole surrounding technology appears to assume that learners will be able to take control of their own learning and that teachers will be relegated to the position of facilitator. However, this paper argues that, in bringing computers into the classroom, teachers must play a more fundamental role in teaching and learning, in terms of both process and content. So-called 'blended learning' calls for the best elements of traditional classroom-based teaching and learning to be combined with the best elements of technology. This paper considers the decisions that teachers must make in order to blend these approaches, with reference to Sternberg's (1998) developing-expertise model, and concludes that ultimately it is the teacher who must integrate technology into the classroom in the most effective manner.

> The traditional classroom . . . is singularly ill suited to producing lifelong learners: 'Right now, you've got 30 little workers who come into a room, sit in rows, follow instructions from a boss, and can't talk to one another. School is the last time they'll ever see that model.' (Corcoran, 1993, cited in Ogilvy, 1998)

Introduction

The twenty-first century calls for new sets of technological competencies in schools, with the teaching of core skills displaced in favour of the ability to use technology (Law et al., 2002). It is argued that teachers must equip their pupils with the core abilities to exploit information and communications technology (ICT), rather than core skills, so that they may become successful workers and lifelong learners (Bitner and Bitner, 2002). In order to do this, teachers have

been charged with the task of integrating technology into their teaching in order to impact upon learners' experiences (Welsh Office, 1999). Much of the hyperbole surrounding technology therefore appears to assume that learners will take the lead and that teachers will merely enable them to learn. However, this paper argues that, in bringing computers into the classroom, teachers must play a more fundamental role in teaching and learning, both in terms of process and content. So-called 'blended learning' calls for the best elements of traditional classroom-based teaching and learning to be combined with the best elements of technology. This paper considers the decisions that teachers must make in order to blend these approaches, with reference to Sternberg's (1998) developing-expertise model. Ultimately, it is the teacher who must integrate technology into the classroom in the most effective manner, as Mason (2002: 6) asserts, 'a good teacher is a good teacher in any medium'.

Blended learning

How technology is best integrated into the classroom is largely dependent upon how learning is viewed. Technology can be used to support drill and practice-style tuition just as easily as it can be used to provide experiential, learner-centred activities. Whilst 'e-learning is being re-defined as "enhanced" learning or even "experiential" learning' (Mason, 2002: 1), constructivists have criticized current e-learning models[1] for favouring content over context (for example, Linser and Ip, 2002). If the focus is on the 'accumulation, organisation, and delivery of content' (Gilroy, 2001: 1), e-learning is in danger of replacing the traditional teaching and learning paradigm where knowledge is simply transmitted to a passive audience (Fetherston, 2001). As Lytras (2002) states, one of the main difficulties of e-learning lies in the static approaches used in the delivery of materials. To overcome these difficulties, the notion of e-learning must be developed to draw upon constructivist principles, in order to '[knit] together . . . content, pedagogy, and community into a unique learning experience' (Gilroy, 2001: 2). Rather than merely recreating traditional modes of learning and adding social interaction, ICT potentially offers a space whereby teaching and learning materials can be brought to life.

The current trend in linking technology to learning is that of 'blended learning' whereby the best features of traditional teaching and learning are paired with the best features of technology. The aim of blended learning is to enrich education by integrating classroom-based instruction with technology-based resources. Under this rationale, teaching and learning objectives are met

by 'blending' multiple strategies, methods and modes of delivery (Node, 2001). Sometimes referred to as 'integrated learning', 'hybrid learning' or 'multi-method learning', blended learning offers the means by which different combinations of learning activities can be devised (Franks, 2002). For example, literacy lessons may be enriched by encouraging learners to 'write for a purpose' via e-mail communications with employees from local industries (see Harris et al., 2001). As the tenor of this example suggests, technology can be used as a means of extending learner experience beyond the classroom environment. It is this acquisition of skills needed for life performance that Sternberg (1999) believes constitutes intelligence. Sternberg views intelligence as the development of expertise where 'Motivation drives metacognitive skills, which in turn activate learning and thinking skills, which then provide feedback to the metacognitive skills, enabling one's level of expertise to increase'. (Sternberg, 1998: 17). Sternberg's model is based upon the notion that expertise is influenced by purposeful engagement including direct instruction and active participation. Therefore, it is a useful model when considering which blends of class-based instruction and active participation are most conducive to teaching and learning aims. Sternberg provides a useful guide for integrating traditional and virtual teaching with isolated and collaborative learning in order to offer a 'holistic learning experience' (Brunn and Frank, 2002). The decision as to which are the best features in practice appears largely the province of the teacher and so learning perspective plays a fundamental role.

Applying Sternberg's approach to learning

According to Sternberg (1998), there are five elements to learning; meta-cognition, selective attention, thinking, knowledge and motivation. First, metacognition refers to the learner's ability to recognize that a problem exists and that, in order to solve it, it must first be defined. Learning is not viewed as the regurgitation of facts and figures, but rather an active process of problem solving. It is these active learning skills that are seen as relevant to the twenty-first century (Bitner and Bitner, 2002). In order to apply knowledge, learners must form a mental representation of the problem, formulate a strategy and allocate the necessary resources needed successfully to resolve the problem. As Ruben (1999: 502) argues, 'the ultimate test of the knowledge and skills gained is usually not in the knowing but in the ability to use knowledge and skill sets appropriately'. The ultimate aim of education and training is to foster expertise within the learners so that they may apply what they have learnt.

From this perspective, technology provides the vehicle with which learners can be introduced to different kinds of problems, even when there is little likelihood that they will ever be faced by them. Technology provides student-centred learning where participants are able to work at their own pace and have ample opportunity to consider their actions, reflect upon alternative approaches and ponder over the possible consequences of these actions. Within this environment, learners are able to modify their behaviour and so learn by trial and error.

Second, in contrast to the teaching and learning paradigm, Sternberg (1997) stresses that learning skills call for selective attention. Unlike traditional methods of teaching and learning, which assume that learners absorb all of the information with which they are presented, Sternberg offers the notion of selective attention as the second element. Learning skills encompass the active process of sifting through information in order to identify relevant pieces of data that are to be retained before discarding the irrelevant information. Learning skills require learners to take an active stance so that they are able to collate and relate new information to the knowledge already stored within the memory. As Schanks (1997) states, people learn about things in which they are interested. Attention is heightened when the relevance of new information to the learner is made clear. Moreover, information presented in a more interesting manner may also be given more attention and processing time. The use of screen-based and telecommunications mediums provides teachers with more appealing methods of information delivery (Russell, 2000). E-learning therefore has the potential to provide access to vast amounts of diverse learning materials that teachers may select to support their lessons (Stephenson, 2001).

Third, in order to identify and use knowledge in meaningful ways, learners must adopt critical, creative and practical thinking strategies (Sternberg, 1997). Indeed, for skills to be transferable, creative thought is a necessary ingredient. However, it is worthwhile stressing at this point that these arguments do not culminate in an 'either/or' situation between traditional teaching methods and technology use. Technology can act as a complement to traditional methods as it can be used to reinforce learning or to demonstrate how their knowledge can be applied. Technology can signify the relevance of learning particular concepts to real-world situations or, indeed, to other subjects. In this manner, information that has been selectively chosen and retained can be evaluated critically, used creatively and applied practically to a variety of problems. Real learning cannot take place until the learner can adequately employ different thinking strategies.

Fourth, the ability both to 'know that' and 'know how' is necessary for the application of knowledge. As Sternberg (1998) emphasizes, knowledge may be divided into declarative facts, figures and principles and procedural strategies. This division perhaps encapsulates the association between classroom learning and technology integration in that learners may be taught facts and figures via more traditional teaching and learning approaches before technology enables them to apply this knowledge. In addition, Russell (2000) suggests that learners must be taught the abilities of integration, synthesis and relevance in order successfully to negotiate Internet-based information. Whilst technology can provide a wealth of information to support learning it can also hinder learning as learners are bombarded with material that they do not understand. Technology is non-linear and so does not support the traditional sequential pedagogical approach (cf. Cilliers, 1999). Learners must select relevant data, summarize it and integrate it into meaningful knowledge.

Fifth, for any of these preceding four elements to take place the learner must be motivated to learn. Without the desire to retain and apply knowledge the learner will simply not attend to the information given. As Ruben (1999) argues, traditional teaching methods within the classroom can become unchallenging and, as such, boring to the learner. That is not to say that the teaching and learning paradigm should be discarded. If technology use was the only teaching method employed that too could become tiresome for learners constantly expected to apply themselves to endless technology-based information and problems: 'The role of the teacher is not likely to be eliminated by technology, although technology will surely affect the roles of both teachers and learners. The role of teaching in technology-intensive settings is more difficult and more crucial than ever before' (Spector, 2001: 14).

In addition to Sternberg's five elements to learning, a sixth element can also be proposed: that of social interaction (Smalley, 2002). This perspective acknowledges that learning does not occur in a vacuum but takes place within a larger social environment. Learning is not simply the acquisition of concepts but goes further by including behaviour, values and identity (McCormick and Scrimshaw, 2001). Technology can therefore provide the basis for collaborative learning with peers and teachers within the same classroom, as well as those based elsewhere. Learners who have been encouraged to discuss and interact with each other have shown that active learning techniques can aid both the retention and application of knowledge (McKeachie, 1980). Once reception, acquisition and internalization (cf. Piaget's notions of assimilation and accommodation) have taken place, learning as interaction

becomes possible as the learner is ready to embark upon an 'apprenticeship in thinking' (Rogoff, 1990, cited in Klabbers, 2000). Or, as Mead (1934) puts it, learners become able to shape reality *out there* on the basis of learning *in here*. In this respect, traditional methods and technology use are able to work together in order to enable learners both to learn new things and to apply this knowledge. As Ravenscroft (2002: 792) acknowledges, very 'few citizens want to or can learn alone', and so current developments in e-learning have been focused upon providing engaging and social learning environments which encompass a blend of both face-to-face and on-line learning (for example, Linser and Ip, 2002; Mahadevan et al., 2002; Lytras, 2002; Mason, 2002).

Achieving a blend of technology and the traditional teaching and learning paradigm

In this way blended learning provides a toolbox of methods and modes of delivery that teachers can use to address these six elements. In order to develop expertise in learners, the teacher's role is one of matching the teaching and learning objectives to the most appropriate blend of classroom-based teaching and technological resources. The introduction of technology into the classroom has brought with it the tendency to assume that teachers will take on more supportive and, consequently, reduced roles. Within the classroom of the future, it has been suggested that teachers will no longer be expected to 'teach' but rather they will be 'facilitators' (Rudd, 2001) as learners become able 'to direct their studies, with the teacher acting as a guider, or motivator rather than as a director' (Forsyth, 1996: 31). When technology is integrated into the classroom traditional teaching and learning must be deconstructed so that new combinations of learning activities can be designed. Ultimately it is the teachers or designers of on-line courses who must determine which medium or learning process is most conducive to the desired learning outcomes. As Ehrmann (cited in Node, 2001) argues, 'If you're headed in the wrong direction, technology won't help you get to the right place'.

From this perspective the introduction and integration of ICT into the school curriculum offers the potential to move away from the traditional teaching and learning paradigm. Yet many teachers in the UK still lack confidence in using ICT, despite the National Curriculum, increased teacher ICT training, and school policies on using ICT. Where ICT training has not yet started, or has failed to meet teacher needs, there is underdeveloped integration of ICT resources (OFSTED, 2002). Whilst this has led some to question whether networked computers will ever be accepted within the

classroom (for example, Russell, 2000), Desforgés (1995) suggests that the ultimate decision lies with the teacher; if teachers do not perceive the need to use ICT, they will not incorporate it within their teaching. Using unfamiliar technology can lead to uncertainty as to when and how to use ICT. Fullan (1991) supports this notion, arguing that teachers must understand the reasons for change before change will occur. In many respects, technology provides a new way of doing old things (Tyler, 2002): 'It would appear that the conditions of classroom learning can be improved by information technology tool. But, equally teachers can use information technology to create a new set of mundane tasks which negate the opportunities for quality learning' (Davis et al., 1997: 15). This is hardly surprising when the majority of teacher training courses have, in the past, focused upon overcoming technical problems as opposed to technology-focused pedagogical practices (Cox et al., 1999). Teachers have been equipped with the skills to open software or troubleshoot printing problems, rather than to integrate technology into the National Curriculum in a meaningful manner (Bitner and Bitner, 2002). Teachers have moved away from being the 'knowledgeable person' at the front of the classroom, as computers often involve failure. Whether it is a hardware or software problem to a lost Internet link, teachers have become open to making mistakes in front of their pupils. As Bitner and Bitner (2002: 2) suggest: 'for teachers to suffer this unease and pain, they must be motivated. Often the intrinsic motivation will come as they see the possibilities that technology can offer their students.'

One such possibility is the development of blended learning in the form of independent enquiry and active problem-solving. As the previous section has demonstrated, Sternberg's model aims to develop expertise so that learners can move from being novices to being experts. Blended learning approaches provide the means to do this so that teaching is viewed as both the transmission and application of knowledge. Integrating technology into the classroom provides for trial-and-error learning using a wide range of diverse materials. Learners are able to evaluate the strategies that they adopt as they apply what they have learnt. In turn, teachers are able to select the most appealing teaching and learning tools, whether traditional or technology-driven. To achieve this, the weaknesses outlined within OFSTED's 2002 progress review need to be addressed. Namely, teachers must receive training that equips them with the skills to relate ICT tasks to lesson objectives, understand when and how to use ICT and have the confidence to guide, intervene and recognize pupil expertise. Rather than a reduced role, this requires teachers to think creatively about which 'blends' to use. If we accept

that learning is learner-centred, learners move beyond retention of facts and figures towards hypothesis testing, decision-making and the discovery of new principles (Kearsley, 1994). We should also remember that it is the environment which creates the necessary conditions and supports that enable learning to occur (Nathan and Robinson, 2001). Learning agency lies with the learner, yet the teacher forms part of the environment and often remains responsible for utilizing different media, resources and enablers for his or her pupils. Without teachers, it is likely that pupils will be presented with vast amounts of information with little in-depth understanding taking place.

For teaching and learning purposes, technology therefore enables background knowledge to be taken forward and applied to realistic settings in order to enable the development of new skill and knowledge (Stretch, 2000). The interactive use of ICT can enable learners to develop new skills and to practise them in order to make the transition from having the potential to learn to having the actual ability or skill (cf. Vygotsky's zone of proximal development). Thus, a teaching and learning environment is a tool that enables learners to access the reality of the course subject; without a teacher to guide, inform and instruct it is unlikely that good-quality learning will occur.

Conclusion

In order to integrate technology into their teaching, teachers must now seek ways of blending elements of traditional teaching and learning with elements of technology. The teachers role remains pivotal as they must equip learners with the knowledge and skills required for the twenty-first century. Rather than being mere 'facilitators', teachers have been charged with the difficult task of changing long-standing teaching practices in order to exploit technologies that can, and often do, fail. Despite claims that teachers will no longer be the knowledgeable person at the front of the classroom, this paper suggests that teachers will still be expected to impart knowledge and skills to their pupils. As Spender asserts (1995), they must move from being 'sage on the stage' to the 'guide on the side'. The teacher's role has been extended beyond knowledge-givers to knowledge-givers *and* –enablers. Following Sternberg's approach, teachers must equip learners with metacognitive skills, capture their attention, encourage them to think and use existing and new knowledge. All of this requires motivated learners who are able to communicate effectively. By blending traditional with technological approaches to teaching and learning, teachers are now being expected to produce knowledgeable learners who are

able to work effectively in a technology-driven labour market. It is widely accepted that technology will be integrated within schools, yet few are acknowledging that it is the teacher who must ensure that technology is used to support good-quality learning experiences that can be used in the real world.

Note

[1] Where e-learning is defined as the use of electronic technology to deliver, support and enhance teaching and learning. E-learning includes a broad spectrum of activities, from distance learning using web-based materials to blended learning which uses e-learning alongside other traditional forms of teaching (DfES, 2002: 32).

Acknowledgements

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