Learning Perspectives: A Framework for Developing the Use of the Virtual Learning Environment in UK Secondary Education

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Abstract

This paper examines the challenges of developing innovative practice in mainstream secondary education through the use of the virtual learning environment. Factors influencing the take up, the pedagogy and quality of student engagement arising from the connectivity afforded, and the impact upon the curriculum are reported.

1. Introduction

The range of demands made upon schools is enormous, not only in terms of the subjects to be taught, but also in terms of catering for a variety of needs arising from the widely differing backgrounds, ages and abilities of students. In turn, these demands are reflected upon the way technology is used; catering for different needs in differing school contexts is a continual challenge. In the UK for example, despite major investment, the use of innovative technology and e-learning is relatively patchy [1]. While some e-learning technologies may work effectively in one setting this does not guarantee they will work well in another.

The aim of the work that is reported here is twofold: to understand more fully why e-learning technologies may or may not function as anticipated in different teaching contexts and, in the light of this, to develop methods that might help establish ways or working that may take advantage of the distinctive contributions that such technology could make.

This article outlines work being carried out with teachers in secondary schools in the UK and forms part of a two-year project that addresses similar issues with university teaching staff and professional trainers in Spain and Italy through a project funded by the EU Leonardo Da Vinci Life Long Learning Program: 'Teaching to Teach with Technology'. The UK work focuses on the use of Web 2.0 technology and virtual learning environments (VLEs). This was partly in response to a needs analysis that included questionnaires given to a sample of teachers representing a range of curriculum specialisms and teaching experience in the participating schools. The choice of technology also took account of a need for a common digital infrastructure expressed within a UK Governments Strategy Paper for Schools [2] and which encouraged the use of VLEs. Although the current Schools White Paper [3] does not directly refer to the use of any particular technology, the availability of VLEs that have been introduced into the primary and secondary sectors has generated interest regarding their continued use.

VLEs can be characterised in terms of their connectivity. They offer such facilities as e-mail, bulletin boards and newsgroups. They can also be used for storing and disseminating course materials. Each VLE usually remains exclusive to a particular institution and, in view of this, regarded as relatively secure. Well-known systems in the UK schools include Frog, Fronter and SIMS Learning Gateway. Although there are differences between each system most have the facilities noted above and for the purposes of this article VLEs will be treated generically.

While the utilisation of VLEs is more established in some areas of higher education, the uptake by teachers within and across schools is still at an early stage. There is therefore scope for exploring the potential for this technology to be used in ways that meet the wide range of demands within schools in terms of curriculum and approaches to teaching and learning. There is also scope for investigating the dynamics that may underlie successful uptake of such technology.

2. Method

A mixed-method approach that includes surveys in five secondary schools to establish perceived needs of teachers and senior managers has been used. This was followed up by workshop sessions totalling six days with up to four teachers in each school working with a teacher who is highly conversant with the relevant technology. Data have been gathered through field notes of observations, focus groups, recorded interviews, documents and questionnaires. A grounded analysis of the qualitative data has been carried out in order to identify key themes underlying the uptake and sustained use of the technologies.

A principle underlying the design of the workshops is that, regardless of the technology, successful uptake depends ultimately upon the way that it is used by individual teachers. This was reflected in a teacher-centered approach was adopted with teachers involved directly in developing novel IT-based practices. The starting point was that any innovative methods would initially relate to existing curriculum objectives and their assessment. Through this the technology-use could be

regarded as an essential component rather that something of interest but ultimately dispensable when teachers are faced with other pressures. However, strict adherence to such a curriculum-led approach is ultimately conservative in nature and would fail to accommodate any new challenges and practices that arise as a result of the impact of technology itself. In this sense the scope for curriculum transformation is also regarded as important and has been accommodated within the project.

2.1. A theoretical framework

A further consideration with regard to method concerns the quality of student engagement and learning. More traditional approaches to learning have been regarded as associationist; relying on acquisition or repetition of observable elements, or behavioural objectives, assumed to comprise a more complex task. More recently, cognitive and situative perspectives have also been recognised [4]. In these cases learning is not only viewed in terms of the inner mental functioning or cognition of the individual but also in terms of participation in social practice [5].

Taxonomies derived from the work of those such as Bloom [6] have distinguished types of learning that vary from remembering and understanding through to engaging in more creative processes. These are represented along the horizontal axis of Figure 1. In turn these types of learning have been associated with particular technologies [7]. However, when developing a theoretical framework that takes account of different perspectives of learning, a key feature that must be accommodated is that a given technology can be used in many different ways. In other words it can be argued that it is the 'technology-use' rather than the technology itself that ultimately is mapped into any theoretical framework.

Although a digital or virtual environment may be designed with the intention of actively involving the student as an individual, alternative uses could also be devised which bring in a collaborative or social dimension to the learning context. The role of social context in individual development has been attributed to those such as Vygotsky [8] where a more experienced other play a 'scaffolding' role in supporting someone less experienced. Through relating to others, thinking is mediated [9] and in this process symbolic tools such as language play a central role. Thus far, this process can be seen as asymmetric: the learner taking a relatively passive role. More recently, a more evenly balanced relationship within learning through social interaction has been expressed through Mikhail Bakhtin's [10] work on dialogism. Here, meaning is promoted through social interaction but no one contributor is regarded as superior or authoritative; meaning is negotiated and in this process language plays a key role. The challenge is to promote the notion of dialogue within learning as purposeful and cumulative [11]. This conjoint development of ideas is reminiscent of the Lave and Wenger's [12] notion of a 'community of practice' where there is learning can take place through authentic activity with a commonly understood purpose.

The implications of a dialogic approach with regard to the role of the teacher and that of the learner are profound. Although technological advances such as the VLE may take place with rapidity, a corresponding pedagogical shift involves a cultural inheritance and change at this level may be less rapid.

Introducing a framework with an easily accessible summary of different learning perspectives was therefore regarded as an important factor that could encourage different ways of using the VLE within the school setting. The theoretical framework summarised in the form shown in Figure 1 was designed to be used with teachers in order to draw attention to the learning perspectives outlined above.

Such a theoretical framework must make provision for an important additional feature of technologies available in schools these days; their capacity for connectivity as exemplified, for example, through Web 2.0. This has the capacity to raise the profile for the social and collaborative dimension into learning. In the context of the present work this was formally reflected in the vertical axis of the framework shown in Figure 1. The two axes, in effect, mark out a space within which the use of a given technology to be mapped. A given technology can be mapped anywhere within the social and paradigmatic space according to how it is used; there is no 'right' or 'wrong' place for any one technology.

In the same way that a digital environment designed for individual use can be stretched to include a social dimension, it is also possible that a Web 2.0 environment thought of as inherently social could merely involve the learner as an individual. This may not necessarily be a shortcoming but in view of a possible inheritance of more traditional models of learning that are either associative or cognitive the shift and the benefits for learning arising from social participation may not occur automatically, even though the technology provides scope for this.

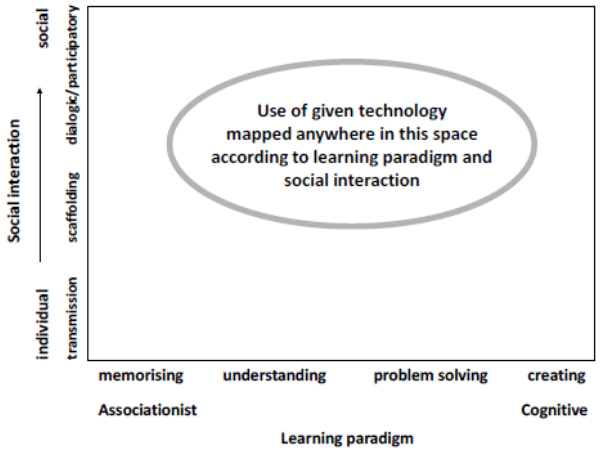

Figure 1. A framework for mapping technology-use according to learning perspective

3. Preliminary Findings

Initial analysis of interview data suggested that innovation in the UK school settings studied is a

potentially complex process. Schools have a variety of responsibilities that must be concurrently accommodated; there is the need to maintain high performance figures such as those reflected in exam results and student achievement is seen as depending on continuity and stability of experienced teachers. This presents a challenge regarding the release of such teachers for blocks of time needed for development. Extended time for staff development has to be negotiated and is subject to unanticipated demands. The dilemma arising from the development of new teaching methods and the costs in terms of time, stability and student achievement means a training model needs to be negotiated and flexible.

Another theme that emerged is that innovative development often needs to be timed in relation to other demands, circumstances or initiatives. Points of entry for innovative practice that were voiced by senior personnel and echoed by teachers ranged from those driven by national or local policy, by impending crises, pressing social or pastoral needs and changes of staff. In other words a programme of training does not occur in isolation. A key issue that was voiced within all schools is that the learning objectives specified within the curriculum and their assessment should be clearly addressed; without this any the status of any developments would be undermined.

3.1. Workshop sessions with teachers

Two areas that were explored were English and Mathematics. As well as being regarded as central components of the school curriculum, they were also of interest in that they were thought to make very different demands upon learners and would present different challenges when using a VLE.

Table 1. Sequence of key components used in the generic course programme

START
Learning perspectives framework
Non-technical Introduction to new technology
Idea-raising in relation to a given curriculum
Filtering ideas in relation to learning outcomes
Considering assessment of learning
Producing basic resources
Testing resources and methods with students
Refining resources and methods of use
Reappraising the role of the teacher
Reappraising the role of the student
Further refining resources and methods of use
Evaluation of methods and materials
Discussion of methods of dissemination
Self-perpetuating and sustainability
END

Separate workshop sessions for teachers specialising in English and Mathematics were arranged. These took a common general pattern which is summarised in Table 1. The workshops began with a very brief introduction to different learning perspectives using the theoretical framework shown in Figure 1, drawing attention to the associationist, cognitive and social aspects of learning. The ways that different technologies could be used was also discussed in relation to the framework. This was followed by an introduction to the VLE technology that was already available in the school. The emphasis was on the more general underlying concepts and examples of its use. Importantly, precise operational details were not covered at this stage; the initial focus was on identifying possible curriculum and learning areas where the technology could be used. To this end the teachers worked as an idea-raising group, firstly noting as wide a range of ideas as possible before filtering these in terms of appropriateness and practicality. The technology was then introduced in more detail with the teachers producing basic resources with on-hand assistance from the teacher who was already familiar with the technology. Ways of using the resources with students as well as methods of assessment were also discussed and trials were undertaken with the classes that the teachers normally worked with.

Although for the purposes of the project, six one-day workshops were held, with regard to continued use of this model, the essential features were the more general nature and sequence of activities used. The idea being that this could be adapted according to institutional demands and resources.

3.2. Curriculum activities

Within the English curriculum the VLE was to be used with Year 8 (12-13 year old) students in the production of a radio news podcast. This related to the Functional Skills Levels 1 and 2 for Writing, Speaking and Listening of the English Curriculum. Hand-held recording microphones were used and files downloaded into Audacity for sound editing. In this particular case the innovation was the use of the school's VLE not only for disseminating the podcast but, importantly, as a means of production planning by the students.

Initially teacher-perception of the VLE was in terms of a repository for resources. Typical comments were: "Just like a classroom, there are resources in there.", or, "Children are allowed to upload work that they've done so that they can hand in work for the teachers to mark." In this regard the framework was used to draw attention to different approaches to learning and response from the teachers develop resources and methods of using then that might encourage more interactive participation among peers.

One way this was achieved was through setting up editorial discussions within the VLE. Here, students could reach decisions on what constitutes a news story, where source material might be found and how stories might be sequenced. One topic in this instance was the

school sports day. Although the students were seated at adjacent computers in the same classroom a 'no talking rule' was established so that all communication took place via a discussion forum on the VLE. Through this, students could respond to each others' ideas and, later on, listen to and comment upon the recordings that they had gathered. From a teaching perspective this was also of interest in how language was used and what kind of thinking and language might be promoted in this virtual modality. With regard to learning models, the activity was regarded as involving a social dimension where dialogue was shared and the students worked together and learnt through participation (see Figure 1). Here, the teacher was instrumental in setting up the forum, the main aims and the kinds of discussion to be generated but the students also had control over their ideas and the way these were discussed. As one teacher put it: "You can establish and set up a framework for the discussion but then you give them a bit of freedom as to what to discuss and the idea is that with that sense of freedom they might come up with some more interesting ideas, or they might be prepared to take more risks, or they might feed off each other." Dissemination through the VLE meant that the students' work was widely available thereby introducing an element of authenticity and regarded as a central tenet within a community of practice.

The idea of the discussion forum was also put into practice within the Mathematics Curriculum. Here, the topic was interest rates and percentages. The teaching resource that was developed was an animation (using BB Flashback as a screen recorder) of two different methods of working out percentages. This was embedded in the VLE along with a spreadsheet with problems based on the techniques and also providing students with immediate feedback. With regard to encouraging participation in learning, the move that was regarded as innovative was to also use the VLE to set up a voting system through which the students could show which method they liked best but also give a reason for their choice. The act of contributing a reason to the forum, however, was only regarded as the first stage within a participatory network. Equally important is that students should read each others' contributions and respond. To this end a further caveat was introduced, namely, that each of the students should read all of the contributions and then post a further comment saying which contribution they thought was most helpful and why.

4. Conclusion

In the above outline, the attempt was to generate some initial ideas aimed at using the VLE to promote learning in the secondary school classroom.

A number of key principles emerged from monitoring the sessions. These include a curriculum-led or embeddedness where the technology was 'linked-in' to existing learning objectives together with the use of existing teaching materials and learning resources. In relation to this a significant time element was found to be necessary for generating ideas, finding and adapting and creating further resources. A principle of ownership was important in that innovation is regarded by the teachers as "something you develop yourself and have control over rather than have thrust upon you". In relation to this it was suggested that innovation needs to happen in context with development occurring on site. A project such as the one reported can be seen as a discrete entity and some attention was given to how technology-use could be shared and sustained.

Although any claims in regard to this are difficult to substantiate at the outset one attempt to address this was for teachers to note regularly any points regarding the technology and its use that they would wish to pass on. Here, the links with the curriculum and existing resources were noted as important driving forces. The choice of the VLE as a focus technology, its availability and potential use across different curriculum areas were also regarded as contributory factors. At senior management level, it was also thought that linking the use of the VLE to school improvement plans could underline its status.

Although the teachers who were setting up the workshops could be seen as having an expertise (or familiarity with the VLE) that was different to the other teachers taking part, they were not the only experts; all of the teachers were bringing their own expertise into what was a mutual learning situation.

The theoretical framework, introduced as part of the workshop sessions, was found to have a discourse-setting function in that it provided an easily apprehended conceptual frame and basic vocabulary from which technology-use could be discussed. One outcome of this was that a shift was found from a prevalent view and usage of the VLE as a non-participatory storage and dissemination device to one where active participation among students in learning was encouraged. The method of use became important, not just the existence of the technology.

A principle of enrichment in learning was also seen to arise with regard to connectivity and the social and collaborative aspects of learning. Apart from alerts to a variety of external resources, the potential for knowledge and learning being constructed by students and teachers through forums or blogs was acknowledged as enriching and is being incorporated within the technology-use.

From the work that has been reported, one of the main challenges facing teachers is not just one of developing discrete skills related to the operation of new technologies. It is also a matter of recognising opportunities for the application of a technology within a given curriculum and finding ways the technology can be managed alongside the many other competing demands arising from a school classroom setting. In regard to this, a 'whole to part' principle was identified where, rather than beginning with details concerning the operation of the technology a conceptual approach on what the technology allowed provided a meaningful frame where through 'situated technical support' gaps in proficiency could be filled. With a VLE there is the challenge of understanding how the system operates as a whole and

the added potential it may offer when used across an institution.

Although the use of the VLE was initially intended to subserve and enhance a given curriculum, it could also be argued that through its use, new accomplishments arising from the way learning is approached could lead to a transformation of the curriculum. The workshops provided an opportunity for creating new ways of engaging students through which they learn, new forms of material resources, new ways of working with students, new ways of learning and new ways of assessing learning.

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