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ACADEMIC PAPER

Towards a Theory of e-Learning: Experiential e-Learning

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Abstract

E-learning is frequently technology-led rather than theory-led. In order to provide a deeper theoretical foundation for the development of e-learning, this case study uses a model developed from experiential learning theory as the practical basis for the design of an induction CD-Rom for students. In moving from a face-to-face experience to an electronic experience, video content was added to text-based induction handouts, with film and text carefully used to simulate a 'real experience' to engage the learners. An experiential model informed the filming sequences and script development, which was then evaluated through the use of questionnaires, interviews and reflective writing with postgraduate students. This action research, concerned with 'what works', had the central question: is it possible to transfer a successful face-to-face experience into an e-learning format? While the results point to the need for further research, the CD-Rom was well received by learners and was significantly advantageous to them. The experiential model provided a solid application to the design of the e-learning experience. Experiential learning closely involves the person,

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whereas e-learning, through its very nature, is an electronically mediated interaction. To bridge these differences, the two forms of learning are combined to introduce the concept of experiential e-learning (E² learning). While these e-learning materials were initially developed for distance learning students who were unable to experience the face-to-face event, the e-material is now being used by: 1) distance learning students; 2) on-site students as a reinforcement of seminars and lectures; and 3) other universities and HE institutions.

Keywords: Experiential learning; E-learning; Experiential e-learning; Higher education; Multi-media; Pedagogic modelling.

Introduction

The intention of this paper is to explore the application of experiential learning theory to the design and development of a virtual postgraduate induction programme that took the form of a CD-Rom, to briefly examine its impact, and to assess its applicability to e-learning. E-learning possesses a limited number of underpinning theories and is frequently technology-led rather than theory-led. In order to provide a deeper theoretical foundation for the development of e-learning, a model developed from experiential learning theory and called the 'learning combination lock' (Beard and Wilson, 2002; 2006) is used in this case study as the practical basis for the design of the CD-Rom. In essence, what developed was a fusion between experiential learning and e-learning. We have termed this E² learning.

Over a number of years, data from student feedback showed consistent success with an induction programme for postgraduate students at Sheffield Hallam University. However, overseas distance learning students were unable to participate in this induction. To resolve the situation, a CD-Rom combining text and video was developed using funding provided from an internal teaching fellowship (additional audio files were subsequently made available for students). During the development of the CD-Rom, a number of activities from the induction programme were developed further and added to, so as to form a core module for all postgraduate students. The core module was titled 'Critical thinking and investigation methods'. The CD-Rom became a fundamental teaching tool for the first half of the module, during which higher level thinking skills, writing skills, reflection skills and literature reviewing techniques were introduced, with a focus on creative, critical and conceptual abilities. The second half of the module focused on the research skills needed for completing a dissertation. A small-scale research project involving more than 100 students and some staff members was then undertaken to assess the impact of the CD-Rom.

The need for theoretical underpinnings for e-Learning

There appears to be an overwhelming case for considering how experiential learning can provide a philosophical foundation for e-learning.

It is unlikely that eLearning practice will continue to evolve unless the theoretical underpinnings of eLearning are explored and debated providing a wider platform and a common philosophy for eLearning development (Nichols, 2003: 1).

Nichols' concern about the development and evolution of e-learning is based upon the fact that it has had mixed results. Moreover, he maintained that there was little academic literature concerned with e-learning and that the industry was technology-led rather than theory-led (Ravenscroft, 2001).

One possible solution to the paucity of e-learning theories is for designers to explore closely the repository of existing learning theories. One enduring educational philosophy which may provide a tried and tested foundation for e-learning is experiential learning. This has been investigated and described by many influential writers including Aristotle (1946), Plato (1953) and Locke (1968), and by more recent proponents including Dewey (1938), Revans (1982) and Kolb (1984).

Experiential learning theory offers ...the foundation for an approach to education and learning as a lifelong process that is soundly based in intellectual traditions of social psychology, philosophy, and cognitive psychology (Kolb 1984: 3-4).

The next section will consider how a new experiential learning model was designed and developed, and suggest how it was used to provide the theoretical underpinning for the design of the induction programme.

An experiential learning model

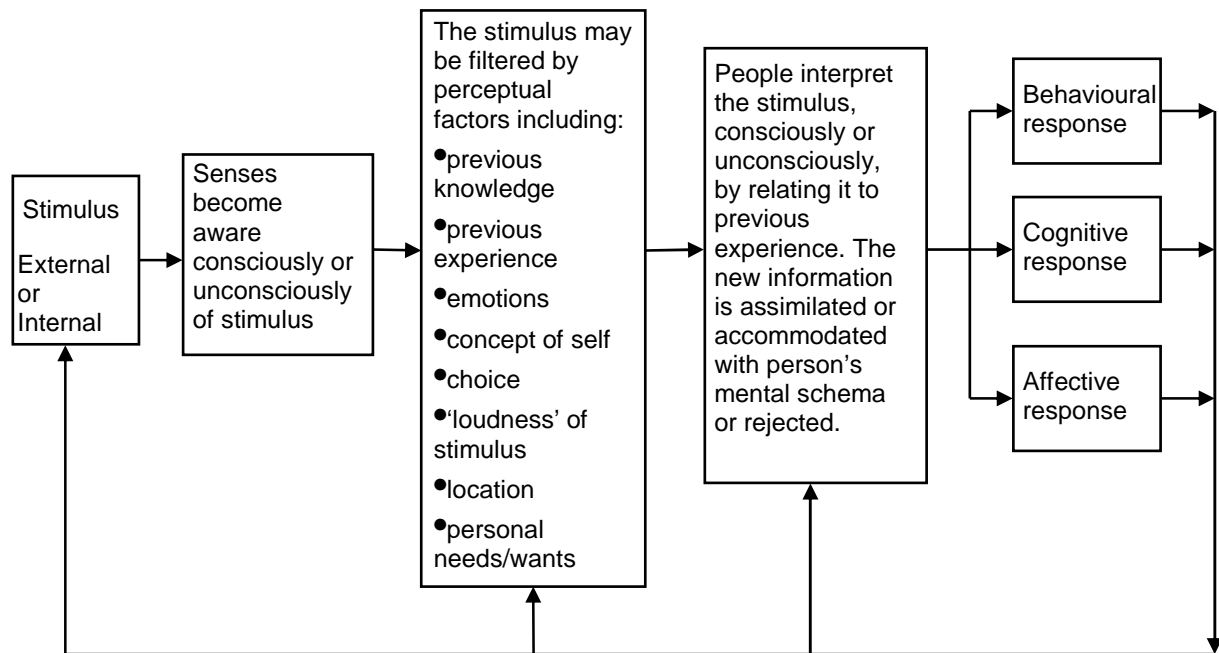


Figure 1: The process of perception and experiential learning

People interact with the world and learn from this experience by processing stimuli received through their senses. Figure 1 presents an experiential learning model which draws upon Gibson *et al.*'s (1985) perception process model and the information processing models of Massaro and Cowan (1993). Working from the left hand side of the model there are five main elements: stimuli; our senses; the filtering process; interpretation; and responses.

The experiential learning model, based upon cognitive processing, provides the conceptual underpinning for the development of a more holistic interpretation of learning. The new model, represented as a visual metaphor and called the 'learning combination lock', responds to calls identified within the literature across a wide range of disciplines (Dillon, 2007) to address a number of 'neglected areas' such as the denigration or denial of the significance of the experience of place and space and the connection between the outer world and inner worlds of the learner (e.g. Pepper, 1984; Friese *et al.*, 1998; Burns, 1998), the role of the body in learning (e.g. Michelson, 1998; Payne, 2002; Fenwick, 2003), and the important role the affective plays in learning (Tennant, 1997; Mortiboys, 2002; Beard *et al.*, 2007). The metaphor of the combination lock is used to illustrate the complexity of the many possible ingredients that may be used to unlock learning potential. A strength of the model is that there is a clear synergy between theory and practice. Pragmatic learning design questions of where (environment), what (activities), how (senses), hearts (affect), minds (cognition), and learning and change, all significantly corresponding to a consideration of learning through *being, doing, sensing, feeling, knowing* and *changing* (Beard, 2007), thus further developing the work of Heron who notes:

The old model of education, going back to classical times, dealt only with the education of the intellect, theoretical and applied. The new model integrates this with emotional, interpersonal and political competence. Nowadays we have people who are learning by *thinking, feeling and doing* – bringing all these to bear on the acquisition of new knowledge and skills. There is also an increasing concern to ground all this in a new kind of spiritual opening (Heron, 2001: 208; italics added).

The design of an experiential CD-Rom

A Simple Diagnostic Tool - The Learning Combination Lock

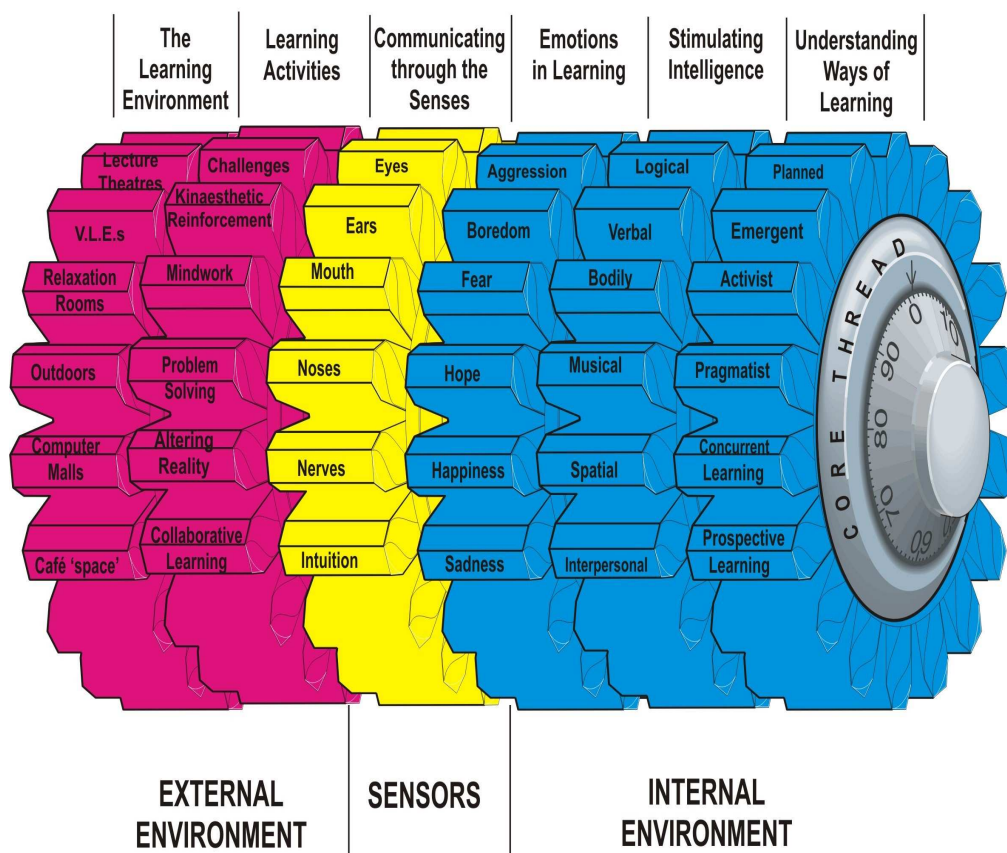


Figure 2: The learning combination lock

The first two tumblers of the model in Figure 2 are concerned with the outer world of the learner. The first tumbler is concerned with the careful design and use of the 'learning environment', the *where* of learning. This may involve the outdoors, lecture theatres, seminar rooms, informal spaces and virtual learning environments, as well as room layouts, etc. Using this concept, the CD-Rom starts by using video filmed in the scenic Peak District National Park. The viewer is then taken on a journey, first into the informal spaces of the university cafe, then into the formal lecture theatres and further into interactive environments of one-to-one seminars.

The adjacent tumbler is concerned with 'learning activities', the *what* of learning. Video clips on the CD-Rom are used to create an atmosphere whereby viewers see and hear the actual lecture or seminar from among the students in the lecture theatre. Simple exercises are used

to develop complex concepts, and learners are advised to try a range of activities. Significantly, the experience can be uploaded and relived a number of times, and navigation of the large range of learning activities is through a screen that simulates a satellite navigation system. A list of learning activities is shown in Figure 3.

A new adventure in life – the journey of learning
Relaxation, confidence and learning
What is mastery? Undergraduate and postgraduate learning
Where to find information
How to write introductions – introducing a peer
Basic writing skills
Literature reviewing – using newspapers and a story called <i>Lecturers as spies</i>
Getting a buzz from study
Developing critical, creative and conceptual thinking – an activity
Referencing skills
Coffee and papers – reading skills – where and when we learn best
Writing conclusions
Plagiarism and feedback
Reflecting on your experiences
Bibliography

Figure 3: The main learning activities used in the design of the CD-Rom

The third tumbler, 'the senses', represents the notion that increasing sensory experiences can reinforce learning. This is important to experiential learning, and has significance to e-learning design because the more sensory inputs used, the more integrated the neural pathway becomes, thereby facilitating enhanced learning (Robertson, 2000). The filming can only capture some of the raw spontaneity of lectures and seminars. However, a range of film techniques was used to recreate the feeling of being involved in the induction programme. Some filming, for example, was conducted looking at the lecturer over the shoulders of students, thus giving the impression of sitting in the lecture theatre, and even allowed the note-taking of the physically present students to be read.

The fourth tumbler, 'emotions in learning', concerns the emotions which may be focused on to encourage learning in the participants. Learners are welcomed by their 'lecturer-coach' as he rather informally sits in a café. Learners are encouraged to understand and work with some of the emotions that are associated with starting this new learning adventure in their lives – apprehension, aspirations, etc – and these are raised in video clips.

The fifth tumbler, 'working with intelligence', draws upon Gardner's (1984) forms of intelligence (linguistic, musical, logical-mathematical, spatial, body-kinaesthetic, intrapersonal, interpersonal) and was used to inform filming, text, metaphors and general language used, etc. Working from well-known media that act as concept hooks, students are then introduced to less well-known and more complex ideas. Athletes are filmed to create visually the notion of learners 'getting off to a flying start' and the notion of 'intellectual fitness'. Footage of kite-surfing acts as a visual metaphor and an emotional 'hook' to explain the fact that learners can get a real 'buzz' or 'high' from learning but that they must be prepared to fall off or make mistakes in order to learn.

The final tumbler, 'learning and change', helped to focus on clips about reflection and personal change. Additional scripts were carefully written for the more complex sections of the CD-Rom, such as reflection, and voiceovers enabled the final product to be pieced together.

The advantages of using video to support learning

Sherry (2003), in a study of 1990s literature, maintained that, without two-way communication, distance learning could degenerate into the old correspondence course model of independent study. With experiential learning, the more sensory and real the learning experience, the greater the potential for learning. For this reason it was decided to use video because vision and hearing are two of the dominant senses and can also be used to encourage emotional engagement with the induction process. Research into the benefits and limitations of incorporating video in the development of the induction CD-Rom is described below.

Clark and Mayer (2003) believed that there are a number of advantages to mixing the mediums for learning. They asserted that an important part of active processing is to mentally construct pictorial and verbal representations of the material and to mentally connect these with words and pictures. Their information delivery theory advocated that learning is a process of active sense-making, and that there is consistent evidence to support the view that people learn more deeply from text and pictures than from words alone.

This view is also held by Dale (1969), whose cone of experiences tells us something about the value of human senses and experiences. According to Dale, interaction with our physical environment contributes to the broadest of experiences. It is suggested that there are a total of ten human experiences and 'motion picture' is placed in seventh position (Spencer, 1988).

Visual information supports learning, and 75 per cent of our ability to learn can be attributed to visual perception (Schoenmaker and Stanchev, 2000). Hart and Steven (1995) investigated the potential of integrating brief videos into traditional class instruction for introductory psychology and found that video enhanced comprehension.

Hede (2002) investigated resources that focused on content and deeper processing of information and developed the 'integrated model of multimedia effects on learning'. The model makes connections between cognitive engagement, visual input and audio input.

The JISC/DNER click and go video decision tool (Thornhill *et al.*, 2002) referred to the educational benefit of making a subject more appealing, more fun and engaging through video. Significantly, they stated that there appear to be numerous facets of learning experiences that video can provide or can capture, that cannot be conveyed through text. Video is generally considered a helpful tool in supporting learning; however, there would also appear to be a number of learner and technological challenges that should also be considered when deciding whether or not to use the medium.

During the 1950s and 1960s instructional television in American schools was considered by its users and learners as being a cheap, low-budget and locally produced teaching aid (Cambre, 1991). It continued to suffer from this image a decade later when it was promoted in education as being the 'master teacher'. This also failed because the talents of the expert teacher on television bored and demotivated the teachers and students it was attempting to teach. It was realised then that the 'talking head' format needed to be replaced with a different kind of television product. A window on the world was created when TV crews went out to record real events, which were subsequently broadcast into the classroom. Instructional television was more effective when it did not instruct, but was seen as an extension of the teacher and supported curriculum-related subjects. However, there was a downside in that television had an interruptive dimension as much as a supportive one. It appears then that bringing television into the classroom, or for that matter into the distance-learning environment, also has its challenges.

In 1971 The Open University saw the potential of television broadcasts for distance learning and exploited the synergy between educational television and materials in print form (Bates, 1983). At that time, television producers were unable to foresee the limitations of television

programmes for their learners, which included control, pace, time of broadcast and an inability to interact with the material. Sophistication has grown over the years, but there is often a tension between the requirements of the individual and those of the large numbers of students needed for economic broadcasting.

Long video sequences are sometimes hard to comprehend and it is now considered that it is not essential to have a complete television programme. One of the most obvious differences in recent times is the use of small chunks or short segments of video. Millar (1996) suggested that memory overloads and that our ability to receive information is not as great as was originally thought. For these reasons it was decided to use video chunks on the CD-Rom, consisting of a combination of clips of lectures and seminars, clips of coaching and walking and talking about emotions by a lake, and talking quietly to viewers in the university cafe in a talking heads type clip.

Although video is generally considered to be an attractive medium for communication, it is not without challenges. For instance, Cennamo (1993) suggested that only certain skills could be learnt from television. Additional effort was required in order to understand complex narration and visual elements and this could lead to breakdowns in comprehension. Therefore, marrying the video narration and the supporting text document took careful balancing in order to gain the attention of students while not presenting a clash between the channels of communication.

There is also a tension between video versus text. Many learners perceive that video requires a different amount of invested mental effort (AIME), and that learners tend not to attribute deep learning to video. Salomon (1984) studied the learning attitudes of young students and the AIME expended when learning, and found that children considered television as 'easy' and print as 'tough'. The view is that learners, when confronted with video, look for familiarity in the structure, and that this can lead to 'mindlessness' in learning behaviour, as opposed to 'mindfulness' learning behaviour when reading text.

There is also evidence to suggest that undeveloped techniques for the live lecture presentation can affect learners. In a pilot study of three lecturers using a satellite broadcast to reach distance learners, the feedback from teacher trainee students attending distance learning teaching training courses was critical of the teaching style of the three lecturers (Schuttloffel, 1998). In the analysis, the teachers' anxieties about classroom dynamics and relationships were realised, and the overriding feeling was that they needed to adjust their teaching style for the medium and find an effective pedagogy for the technology. In their final reflections, it appears that even in a live event they wondered if any authentic interaction could take place in a distance learning setting.

In addition to the individual issues of learning, there are also technological ones. Asynchronous video technology and streamed presentations for distance learning have become a feature of e-learning, and delivery across the web gives added incentive to those who wish to improve access for learners, with obvious gains in economies of scale. However, the delivery of images across the web produces a television picture that is degraded as a result of the compression. The outcome is an image size that tends to be 340 by 260 pixels in order for it to be downloaded or streamed across low bandwidth.

Moreno *et al.* (2001) conducted research with instructional multimedia and felt that social communication between teacher and student was often missing, thus reducing learning engagement. They analysed the presence of an animated 'pedagogical agent' or a video of a human face and concluded that social communication rather than on-screen text improved the interaction of the student with the material and so enhanced learning. For this reason the 'lecturer as a coach' role was introduced in the induction CD-Rom and used as a key design process.

Even with the effect of bringing elements of interaction and integration into learning materials, multimedia can fall victim to poorly designed learning strategies when text materials are transferred from paper to the CD-Rom or web. Stemler (1997) argued that people tend to read more slowly from a screen, and that comprehension is lower than from print. Also, the concept of 'Shovelware' has been borne from this kind of low-level design and pedagogical approach. Littlejohn and Stephani (1999) explained that tutors and developers tended to ignore the principles for packaging learning resources effectively. They indicated that CD-Rom multimedia applications have not been received well by teachers, partly due to a poor pedagogical understanding of the way the media and application has adapted the learning contents. Further problems of design were identified by Collis and Moonen (2001), and others, who stated that not all information and communication technologies in learning were effective, and that ease of use is more compelling than potential learning effectiveness.

It is clear from the above discussion that there are numerous difficulties in the use of video within learning environments and also with multimedia. Many of these factors were taken into account in the design of the induction CD-Rom in order to bring it closer to the actual experience of the in-house induction programme. The evaluation of its impact is described below.

Student and staff surveys: results and findings

A small-scale research project exploring the impact of visual and textual material in the CD-Rom was conducted as part of a multimedia MSc thesis by the media technician. The technician carried out the filming of the lecturer and assisted the lecturer in developing the CD-Rom scripts. The technician used survey techniques to gather opinions from students and staff to measure the impact of the learning material. Questionnaires, interviews and reflective critiques from the postgraduate students were analysed. The students were all studying hospitality, leisure and tourism on site. All students were given a copy of the CD-Rom while they were studying the compulsory 'Critical thinking and investigation methods' module, which uses many of the activities seen on the CD-Rom. Only 32 postal questionnaires were collected from the cohort of postgraduate students early in their studies. However, all 73 students were required to provide a reflective critique of their learning experience during the first few months on the module, which provided further information. Although marks were available for 'critical reflection', such reflective assignment work can produce 'what the lecturer wants to hear' and is therefore potentially open to bias. Towards the end of the semester, seven students were selected for an in-depth interview by the technician in order to conduct a final and more detailed investigation into the interpretation of their information acquired from the questionnaires and reflective critiques.

The results of this small-scale initial survey indicated that the integration of video and text did have a positive effect on learning, with text having a deeper impact on learning. It appears that video stimulated 50 per cent of the learners to engage with the learning and, more crucially, that video is the most valued medium for information consolidation: it draws learners towards the text and encourages learners to attempt exercises and tasks. The effect of interactivity and learning and the balance between video and text were not so highly rated.

The data extracted from 73 reflective critiques overwhelmingly show the positive effect of the CD-Rom on learning and the influence of video on learning behaviour. Some students saw the role of video and text as valuable and considered the interactive nature of the CD-Rom as having a positive influence on study skills practice.

Owing to limitations of space, the following serves only to illustrate the rich picture emerging from this small survey. Some of the selected positive responses are shown, as well as some of the themes emerging, and the type of questions asked of the students. A full account of the research is to be found in McCarter (2005).

Generally speaking I found videos very appealing as well as easier to follow and understand than the text files. *I. K. (international)*

The format that incorporates text with video clips is effective as not only did I learn from the initial reading, but also the information was mirrored through the video. *S. D. (UK)*

The video clips are related to the texts that can be found on the CD-Rom. The texts gave me the background information about the subject discussed in the video clips ...Still the video clips and the text encouraged me to do more research myself and to do the exercises provided on the CD-Rom. *E. G. (international)*

The findings from the interviews tended to reflect the general findings from the questionnaires and reflective critiques:

Q: And what had the biggest impact in that chapter? Was it the visual element or the text?

A: Again the combination of the two. I think that's the key thing with the CD-Rom, if it had been just the video – looking at video I don't think it would have worked as well as if there was text. The text definitely complemented, and then the ability to go back to the film again and re-listen having looked at some new angle that's in the text, then going back to the actual video helped. *Participant L*

A: Text doesn't do it – so I can't remember any of that text I looked at. *Participant K*

Q: In terms of being a learner, what is your preference – text or visual material?

A: I'd have to say first the text – I think with the text the ability to highlight – to section things off – cut and paste or whatever – whereas with film its hard to take a little clip and edit with text, its easier to look at ...With film I think it is a bit more difficult to remember where a scene was and you have to go back through the whole of the film again to be able to find a section you are interested in or try and make sure you remembered it – or misinterpreted it. *Participant An2*

Q: Out of the seven chapters using video – which ones are most memorable?

A: There was a particular scene with Colin around a lake and he was giving – through his own personal experience – and I think – because he'd gone into education and sort of done his masters degree later (in life) – so he was discussing that on the film. I think there was perhaps a relationship sort of thing – not a personal but a sort of relationship or bond sort of attached to that and I think that made me want to go on and read the CD-Rom more. If I'd seen one of the other texts where it went into writing styles – perhaps one of the other chapters on the CD-Rom – if I'd seen one of those first I might not have gone through the whole CD-Rom. *Participant An2*

The results of the in-depth interviews confirmed the overall positive impact of the CD-Rom and highlighted the need for a synergy of video and text. Four participants expressed a bias towards a visual medium and strongly favoured video in their learning, and three felt that text was a preferred learning medium. Also, two of the interviewees expressed a positive personal impression of the on-screen presenter/tutor who, they suggested, added to the learning experience. In addition, the research appears to illustrate the potential of the video element for recall and the process of reviewing their learning in the research interview unlocked images in their memory. All the learners placed a value on video in their learning and when asked to highlight their most memorable experience or a learning peak, they consistently referred to the content that is cognitively challenging in 'What is mastery?' and the revelation factor in 'Coffee and papers' (students get a drink and, taking several

academic papers, find some personal space to read the papers in depth, and then report back on what they have learned regarding the content of the papers and the process of using mind states of 'relaxed alertness' and personal space to study texts). While learning spaces such as personal spaces, cafes and the national park receive specific mention in a positive light, they require further research in order to assess their impact on learning.

There was no indication that international students' learning behaviour was different from that of UK-based learners. Furthermore, UK-based learners with a good standard of written English appear to value the video element in their learning as much as international learners. However, a significant limitation in the research assessment was that it was tested with on-site learners, who were in effect also experiencing the 'real' lectures and seminars from the tutor seen on the CD-Rom, using some of the techniques also seen on the CD-Rom: thus, they were using the CD-Rom as a form of reinforcement of their learning experiences, as the experience could then be uploaded and re-experienced several times. Further research to elicit feedback from students who do not receive the 'live' support of the on-site lecturer would prove useful, given that a fundamental tenet of experiential learning theory is that experiencing the 'real thing' is said to be most effective in learning (e.g. Dale, 1969).

Feedback from students and staff has led to refinements being made to the induction CD-Rom. The University Enterprise Unit recognised its wider applicability, a considerable amount of re-filming was undertaken, and the CD-Rom 'Mastering University' (Beard and McCarter, 2005) was modified for use by undergraduates and postgraduates. It has now been commercially published, with a licence for use by higher education institutions serving as a measure of professional endorsement.

Conclusion

In essence, experiential learning is the integration of theory with practice. The two are regarded not as independent but as a continuous process of interaction between the development of theoretical frameworks and their testing in reality. Theory underpins practice and the practical application identifies strengths and limitations, which guide the development of a more applicable theory.

This case study illustrates how the video and the supporting text provided on the CD-Rom have been used to create a more lifelike experience for distance learning students. The process of designing and developing the CD-Rom was based upon the various elements of experiential learning depicted in the detail of the learning combination lock. Thus, the first cog (the learning environment) helped in the design of spaces and places for filming the experiences, as it takes the students from the outdoors of the Peak District into special spaces for quiet reflection, the large lecture theatres, informal cafe spaces and seminar rooms. The second cog (learning activities) informed the design of activities that the students were required to do, such as a simple technique called 'how to get to university', an experiential activity designed to teach the ability to develop higher levels of cognitive processing and shown on the film as a one-to-one tutorial. The third cog (communication through the senses) uses video (visual and auditory) to enhance the traditional text-based medium. The fourth cog (feelings) was used to guide the acknowledgement, awareness and empathy towards the rollercoaster of student feelings that research has shown to emerge at the beginning of a new study period at university (Beard *et al.*, 2007). The design of cognitive activity has been particularly informed by multiple intelligence theory (Gardner, 1984), as represented in the fifth design cog, with the study skills activities designed to engage a broad student profile of learning preferences.

Following a preliminary research evaluation by the development team, the 'Mastering university' CD-Rom was very positively regarded by users, and indications are that the learning combination lock model could be used as a diagnostic tool for the design of learning experiences, enabling a more holistic approach to the learning process. Although the induction CD-Rom was originally intended for use only by distance learning students, 'on-

campus' students benefited from the development of these e-learning materials. The research suggests that the synergy between visual and textual material requires careful design, with video drawing learners into the experience and text developing deeper insight. The findings pose many areas for further research, not least the problematic links between design and learning outcomes, and the difference between those who have experienced the real lecture and are using the CD-Rom to relive the experiences.

It can be argued that e-learning attempts to imitate or complement genuine learning experiences whether from the real world or the classroom. Thus e-learning, by definition, will always be a mediated form of real experience and therefore might never be fully equivalent to direct experiential learning. For this reason e-learning is, in certain respects, a quest for the 'Grail' – always an objective, but unlikely to be fully achieved.

Yet, by drawing upon the elements of environment, learning activities, multisensory exposure, emotions and forms of intelligence depicted in the learning combination lock, it appears that e-learning design is aided so as to offer learners more holistic learning support. Initial results suggest that a potentially deeper level of learning might result, though much more research is now required as a follow up. The fusion of e-learning, underpinned by the theories of experiential learning, should enhance the integration of pedagogy and technology. Carefully applied, experiential e-learning (E² learning) offers multiple permutations for stimulating and deepening learning.

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