Building on Solid Foundations: establishing criteria for e-learning development

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Abstract
In recent years, advances in technology and changes in the market place for education and learning have resulted in a rapid growth of interest in e-learning. Early experiments in the area have indicated that e-learning may not be the apparent panacea to issues of cost effectiveness and widening participation that was initially mooted. Undoubtedly, e-learning provides the opportunity for wider access to learning at all levels, however, such promise is not always fulfilled. E-learning is often construed as simply putting existing teaching materials ‘on the Web’. A shift towards learning-oriented developments requires a major paradigm shift for learning providers, both at the institutional and individual level. Institutions need to be aware of the commitment required to make e-learning effective, while individuals need to accommodate a shift towards greater learner control and responsiveness to the flexibility requirements. Many of the issues surrounding the effectiveness of e-learning initiatives stem from inadequate consideration of whether e-learning is an appropriate solution to a learning need and insufficient consideration of the design and implementation of the resulting product. This paper proposes a set of criteria for those new to e-learning design to consider when exploring whether and how to implement e-learning. These criteria relate to the appropriateness of an e-learning strategy, the interaction between the proposed market and the design of an e-learning product, the nature of student-faculty interaction within the e-learning environment and issues of evaluation. The relationships between these criteria at a generic level are outlined and guiding principles for the development of e-learning proposed.

1. The Context for e-Learning

Since the turn of the century, the concept of e-learning has been heavily promoted both by industry and education, as well as by Government. While he was UK Secretary of State for Education, David Blunkett announced the launch of a ‘UK e-University’, proposing collaboration between top universities (Thomson, 2000). Around the same time, Pearsons publishers teamed up with an American virtual university (Editorial, 2000) and Henley Management College formed a virtual university partnership with the accountants and consultants Ernst & Young (White, 1999). Overseas, Phoenix University was launched as a private e-university in the USA generating $12 800 000 from on-line and distance learning courses (MacLeod, 2000a).
Various individual UK institutions have tentatively dipped toes in the e-arena. Staffordshire University allowed students to download lecture materials and launched an on-line library (Greenhalgh, 2000) and Huddersfield University launched a £500 000 Learning Innovation Centre offering Internet-based courses, making them more ‘accessible to people whose schedules or geographical location prevent them from studying on traditional courses’ (Burnham, 2000, p.12). Success has been mixed. The Open University found that their use of on-line tutorials affected the nature of group communications; students stopped and thought before responding (Albert, 2000). Over time, however, the students either dropped off or went off the point, and short lines were delivered rather than real debate (Cox et al., 2000). While in this example the nature of the debate has shifted, arguably for the worse, on-line tutorials have helped to overcome the loneliness of being a distance student (Mason & Bacsich, 1998).

Many of the problems stemming from early e-learning experiences centred on the development of the e-learning materials themselves. David Hoyle, head of commissioned learning productions for University for Industry, now renamed as LearnDirect, summed the situation up: “HE institutions and FE colleges have a lot of fantastically good content but in traditional media – print or old-fashioned multi-media. There is a very good opportunity to convert material for Web use. Generally, [institutions] have not been as adept as might have been hoped’ (Goddard, 2000, p.72). Williams (2002) suggests that there are three areas which need to be considered; pedagogy, participation and access, and pedagogy is more than simply putting lecture notes on-line.

Many universities are embracing e-learning in one form or another without really getting to grips with the extent of paradigm shift required to make e-learning a success, and possibly the greatest need for change falls on the academic. This paper is directed at such academics, seeking to highlight for those new to e-learning some of the key issues and criteria to be considered when planning an e-learning intervention. In the process, it will clarify some of these changes in outlook required of the academic who wishes to engage in e-learning design.

Previously, academics have controlled the pace, place, time and style of presentation and interaction. With e-learning, the control of these elements shifts to the learner. As a simple but telling example, Crook and Barrowcliffe (2001) observe that while there is a 60% chance of undergraduate students using their computers from midday to late evening, late evening lectures are rarely popular! Indeed, Miller and Dunn (1996, p.71) define a virtual university as a ‘learning-oriented organisation that provides educational services to adults at the place, time, pace and in the style desired by the learner’. This fundamentally redefines the role of the academic. Williams (2002) describes the role of the tutor as changing to that of a moderator, responding to comments, stimulating debate and asking open questions. Blass (2001) identifies the shift that the ‘residual’ academic will need to make in order to remain employable in the ‘future’ university (see Table I).
Table I  The emergent model of the future academic (Blass, 2001)

<table>
<thead>
<tr>
<th>New role for academic</th>
<th>New skill/knowledge needed to fulfil new role</th>
<th>Old skill/knowledge being replaced</th>
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<tr>
<td>New forms of conversation with students</td>
<td>New language, syntax and mode of conversing</td>
<td>Lecture and tutorial systems</td>
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<tr>
<td>ICT usage</td>
<td>Use of technology as a means of communication</td>
<td>Use of technology to help produce aids to communication</td>
</tr>
<tr>
<td>Monitoring of performance</td>
<td>‘Policing’ students in terms of tracking log-ins, contact, and electronic assessments</td>
<td>Mass marking of student assessments will disappear as assessment goes on-line</td>
</tr>
<tr>
<td>Increased visibility</td>
<td>Recorded and broadcast delivery</td>
<td>Lectures in one place only to one group of students</td>
</tr>
<tr>
<td>Creative and innovative</td>
<td>Continuous capacity to learn to keep ahead of pace of change</td>
<td>Knowledge base will change quickly over time, so previous knowledge becomes obsolete.</td>
</tr>
<tr>
<td>Ability to deliver key skills plus cognitive skills plus development of reason</td>
<td>Addition of key skills to curriculum which adds the development of abilities as well as development of processes and knowledge</td>
<td>Narrow delivery according to learning outcomes will be superseded by broader development outcomes and generic learning outcomes</td>
</tr>
<tr>
<td>Cyberthinkers</td>
<td>Development of cyberthought processes including rapid information processing and thought processes</td>
<td>Specific narrow academic focus with limited application, or any retro-thought process contributors</td>
</tr>
<tr>
<td>Global appreciation</td>
<td>Increased knowledge of international contexts and application and development of comparative analysts</td>
<td>Specific comparative field will disappear as everyone becomes a comparative analyst</td>
</tr>
<tr>
<td>Role of change agent</td>
<td>Organisational development skills</td>
<td></td>
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<tr>
<td>Delivery of workplace education</td>
<td>Ability to balance corporate goals with educational values and standards</td>
<td>Isolation of academics from ‘real’ world</td>
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Skolnik (1998) identified principal themes emerging from the literature regarding HE in the twenty-first century and highlights the pressure for both institutional and employee survival as universities will be economically or efficiency driven. However, it needs to be recognised that e-learning may not be the cheap, efficient cash cow some senior academic managers may have hoped. Sally Brown, in her role as Deputy Principal at Stirling University, found that ‘the notion that new technologies allowed teaching to be improved more cheaply was fundamentally misconceived’ (Woljas, 2000, p.1) and many of the American universities started to find that the anticipated financial returns may have been exaggerated (Marcus, 2000). Professor O’Shea, Provost of Gresham College, highlighted the nature of the task and the implications for academics of changing to an e-learning delivery mode. He found it could take 200 hours to design a one-hour-long learning experience on the Web (MacLeod, 2000b), although hopefully as academics become more skilled in this form of delivery the design time will reduce.

The transition from the teaching paradigm to a learning paradigm emerges as extensive use of information technology leads to learning networks and consumer-centrism. Given these emerging views of the future for universities, it is understandable that most universities are embracing some e-learning ideas and entering the virtual marketplace. E-learning does offer a unique selling point (USP) consistent with expressed national priorities of widening participation and increasing commercialisation of the education sector. That USP is accessibility.

Accessibility here has two strands. First, the physical flexibility of e-learning in terms of time, place, etc. allows for the participation in learning of those who would otherwise be unable to access learning experiences. The learners may be able to access the e-learning materials from home, work or wherever they choose, at the time of day or night that they choose, and they control the pace at which they progress through the materials. Canning (2002) found that students created learning spaces in their own homes rather than using any official space allocated to them by their employing organisation.

This flexibility of access is not meant to imply that the e-learning experience should be entirely unconstrained, rather that the control of pace, place, time and style of presentation and interaction shifts more towards the learner. Some time constraints may be put on e-learning discussions without jeopardising their success. For example, Glasgow and Lancaster Universities run some on-line seminars which are time-bound but not to the extent of a one-hour class (Steeples et al., 1996).

Second, e-learning offers the opportunity of being accessible in the sense of recognising learners’ needs and designing an experience to address them. E-learning should be a learning experience, not a reading experience. Simply putting existing teaching materials, notes or PowerPoint slides on the Web does not amount to e-learning; it is not accessible in the sense of learners being able to extract relevant meaning. The learner is left guessing as to what the faculty meant in their materials without the opportunity for explanation and clarification that occurs in face-to-face interaction. Feedback in an e-learning environment may be delayed or text-mediated or simply too context-dependent to be able to recreate through a telephone call or e-mail two days later. In addition, electronically mediated communication typically loses the nuances of speech and dialogue present in face-to-face conversation. All of this points to the content and style of the materials being critical.
While it has already been indicated that both faculty and institution need to ‘do things differently’ to operate successfully in a virtual environment, consensus on what this new modus operandi looks like has yet to emerge. In particular, with patchy staff development on e-learning authoring and management, nobody seems quite sure yet what the quality standards for a good e-learning resource should be. A number of studies (for example Steeples et al., 1996; Athanason, 1998; Sambrook, 2001; Canning, 2002) have been carried out to evaluate particular e-learning experiences or products. The present paper draws on experience and literature in an attempt to provide guidance regarding the development of e-learning materials. It presents a framework of principles and criteria for consideration by the prospective e-learning developer.

2. The Framework

Eight generic areas have been identified which can form the basis of both design parameters and evaluation tools for e-learning. This paper explores these eight areas in terms of guiding principles that can be tailored to the needs of the particular student group and faculty. They are identified in Table II, grouped into four higher order groupings or criteria, with the central concerns of each of these criteria identified.

Table II Guiding principles and higher order criteria for e-learning development

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<thead>
<tr>
<th>Guiding principles</th>
<th>Higher order criteria</th>
<th>Central concerns</th>
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<tbody>
<tr>
<td>1. Appropriateness of staff and content</td>
<td>Appropriateness</td>
<td>Is e-learning appropriate and sustainable?</td>
</tr>
<tr>
<td>2. Appropriateness of market and students</td>
<td>Design</td>
<td>What is the target population and what should the e-learning feel like</td>
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<tr>
<td>3. Learning aspirations</td>
<td>Interaction</td>
<td>How will students and faculty interact?</td>
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<tr>
<td>4. Cognitive ergonomics</td>
<td>Evaluation</td>
<td>How are both student learning and product effectiveness assessed?</td>
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<tr>
<td>5. Faculty-student interaction</td>
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<tr>
<td>6. Student-student interaction</td>
<td></td>
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<tr>
<td>7. Reinforcement strategy</td>
<td></td>
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<tr>
<td>8. Achievement of purpose</td>
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The appropriateness principles are different in nature from the others. These represent in effect a pass/fail test. The e-learning proposal must be able to pass this test, otherwise it would be inappropriate to proceed. Many e-learning projects may not make it past this first criterion, meaning that e-learning is not appropriate from this starting point. The remaining criteria influence the shape and tone of the tool and are a matter of choice shaped by the provider, the students and the technology.

The relationships between the criteria and guiding principles are shown in the flow chart in Figure 1.
2.1. Appropriateness Criteria

There are a number of questions regarding the aims and purpose of e-learning which need to be answered in the affirmative before considering developing an e-learning tool. If these criteria cannot be met, the outcome will be unsatisfactory as a misfit exists between the requirements of the learning experience and the resources available to achieve them.

2.1.1. Appropriateness of strategy: staff and content

When considering the ‘provider’ of the e-learning experience, there are a number of factors that need consideration; some human, some technical and some relating to the proposed content.

Probably the most difficult question to address relates to the content. Put simply, is the nature, context and desired outcomes of the proposed intervention suitable for provision via
e-learning? For example, while doctors may learn anatomy through e-learning, they cannot easily learn surgical skills and patient care skills without practical hands-on experience. Similarly, while geologists can learn about stone formations through e-learning, they cannot feel or experience rock formations in the same way that they can on a field trip. However, this appropriateness test does not apply solely to practical subjects. Subjects that are heavily dependent on text and reading can be put into an e-learning format but care needs to be taken in considering whether it should. We would not consider requiring learners to read entire books on screen as part of an English literature programme, the drawbacks are too numerous to discuss here (eye strain and copyright issues being the two most obvious). However, many more applied subjects retain a considerable text-based content, particularly in relation to critique. Reading off a screen can be uncomfortable, although it clearly has advantages for certain client groups (partially sighted students, for example, might benefit from the ability to adjust font size), and as such a balance between e-based and other forms of learning support materials must be considered.

Appropriateness in terms of the technical issues is perhaps more easily determined. Is there an appropriate technical platform to support the e-learning? This relates both to the robustness of the technological solution and also its ability to support the type of content required by the particular e-learning intervention. For example, it may be very helpful for the learner to have direct links to certain web sites. However, not all e-learning software facilitates this, and web sites are prone to unannounced changes in both location and content. A further issue here is whether the provider has the necessary technical expertise to support the platform. Relationships between authors, designers and technical support need to be good. All three roles are necessary.

Assuming that the technical support is available and the discipline is appropriate for e-learning development, the spotlight should then turn to the potential authors of the material. Are they competent at developing e-learning materials (both in terms of subject discipline and e-authoring skills; see later) and do they have the necessary time available to support them? From the institutional viewpoint, can the staff input be sustained? Is it sometimes assumed that developing e-learning is a ‘once and for all’ activity and therefore cost effective, although with significant up-front costs. However, evidence already points to e-learning being a time-consuming teaching strategy (Alexander, 2001). The continuous updating and refining of materials, coupled with the need for staff to support their students, places more unpredictable demands on the e-tutor. Canning (2002) investigated ‘dropouts’ from an e-learning supported vocational qualification and found that 35% said that more extensive support from the tutor would have helped them complete the course, with 22% stating lack of support and guidance from the tutor as a specific reason for dropping out.

To summarise, three questions need to be answered in the affirmative before beginning to design an e-learning intervention:

- Is the subject material suitable for e-learning (amount of reading, practical content, likely needs of the e-student)?
- Is there an appropriate technical environment (robust platform, developments pedagogically rather than technologically driven, effective interaction and understanding between technical and academic staff)?
- Do academic staff have the resources to implement e-learning (time to develop resources, relevant authoring skills, ongoing space for updating and interaction with e-students)?
If the answer to any of the above is ‘no’ then the e-learning development should not proceed beyond this point as it will at best be unsatisfactory and potentially fail entirely. Any e-learning development that is unsupported either financially, technically or academically will be of poor quality and will not attract students. Any e-learning investment money at this stage will be best spent in developing the provision such that the answers to the above questions become ‘yes’.

2.1.2. Appropriateness of strategy: market and students
Not surprisingly, the second area to be scrutinised is that of the market or students. Again, this is a category that can put a stop to the whole e-learning development, because if the students will not engage with e-learning then the dropout rate will be high. Some of the issues relating to student requirements are addressed in the point Appropriateness of strategy: staff and content (2.1.1.), and learning aspirations of potential students will be dealt with later (see 2.2.1. below). Here we address the practical aspects of the student environment.

First, the students’ ICT skills need to be assessed. If they do not know how to use a mouse they are not going to find their way around e-learning materials, no matter how simple the navigation. Of Canning’s (2002) dropouts 15% claimed they needed more training in technology, 10% needed better technical advice and 12% simply found the technology too difficult. This may not be an insurmountable obstacle; ICT skills can be improved and may need an extra boost prior to starting the e-learning. Even so, there might be concerns regarding the extent to which students can use ICT as opposed to whether they are comfortable using ICT. In the traditional environment, we are all aware of students who have the potential to contribute but do not because they fear speaking up in public. It is likely that similar cautious responses might occur in relation to ICT-based learning experiences. Williams (2002) suggests that some students may be intimidated by the permanence of contributions as opposed to easily forgotten and fleeting face-to-face comments and are uneasy about having their thoughts publicly exposed for all to see and criticise. Even if this is the case, McConnell (2002, p.87) claims ‘students say that even if they are not “participating” they learn a great deal by reading others’ comments and responses’.

Still, over time we should probably expect an improvement in students’ ICT facility. The current school population is far more skilled at ICT usage than the current working population, and even the current academics. There could be a period of time when the skills of the students are ahead of the skills of the providers! (Indeed this may become the norm rather than the exception.) However, at this point it is simply a case of establishing whether your potential students will be able to navigate round the e-learning with confidence.

Second, it is important to understand the students’ work environment, home environment and social context. Will they have time to put aside for e-learning? Will their work support their engagement in e-learning by, for example, making a quiet space/terminal available for e-learning use during work hours? One of the fundamental contradictions of the e-learning experience to date is that while flexibility (anytime, anyplace) is held up as the USP for e-learning, the success of e-learning tends to be dependent on dedicated facilities and time (Moshinskje, 2001).

Third, we must consider the e-student’s motivation. E-learning is student-centred in that the student has to take responsibility for their own learning. If they view it solely as an outcome rather than a process, they will not be motivated to complete. Their values and motives have
to commit them to the e-learning, as they will not have the pressure of attending a class and
being marked present on a register. One e-learning dropout confessed ‘when not confronted
with a learning deadline I postpone the learning experience’ (Kerker, 2001, p.3). This student
had started many courses but never finished any. The learners need to have a goal and need
to be prepared to engage in dialogue with faculty members (albeit electronically).

The ‘ownership’ of a PC may or may not be a significant factor. In their study of
undergraduate students, Crook and Barrowcliff (2001) found that those with PCs in their
rooms were no more likely to use them for studying than those who did not have them in their
rooms. Only 20-30% of their on-line time was being used for studying purposes, with the
remainder being recreational.

Again then, the core issues can be summarised:

- Do the students have sufficient technical competence (can they navigate the materials,
  are they sufficiently comfortable with technology)?
- Do the students have an appropriate learning environment (suitable time and space,
  appropriate abilities to cut off from distractions)?
- Are the students likely to be effectively motivated to complete (the lack of public
  commitment to activity can result in a lack of engagement)?

If the students are not motivated to complete the course, do not really have the time or space,
or don’t know how to operate a PC, then e-learning is not an appropriate strategy to use for
them. Again, if the answers to the questions are no, the e-learning development should be
abandoned at this point.

2.2. **Design Criteria**

Having identified two sets of ‘stop-go’ criteria, we next move on to considering the design of
the e-learning experience. The aspiration is that this is shaped primarily by the learning
objectives; what should the course achieve, what should the students know or be able to do
on completing it and what should the experience be like for the student (and indeed the tutor).
However, as with many technological innovations, it is often shaped more by the
functionality of the technology, its limitations and opportunities, than by pedagogy. It is
argued here that the two sides of the equation need to be addressed simultaneously, although
for ease of presentation they are taken as separate sets of criteria.

2.2.1. **Learning aspirations**

Given that the provider resources are appropriate (point 1.1 above) and the student population
is appropriate (point 1.2), the question then arises as to what would we like the learning
experience to be like? Is deep or surface learning required, how much understanding do the
students have to gain and do they need to engage in some form of inquiry? The big issues are
how are you going to engage the students, what sort of risks will they have to take and how
will you incorporate fun (Moshinskie, 2001)? How will the interaction be managed? What
sort of problem solving will students engage in?

The issue of accessibility that was raised earlier returns for consideration at this point. If the
population consist of returners to learning or experienced learners who are unfamiliar with
ICT, then the system needs to support their unfamiliarity. E-learners may not require the
amount of flexibility that is possible within e-learning platforms. It is not unusual to find that
those returning to learning, for example, require more rather than less structure than experienced learners. A common problem with technological innovation is that wide-ranging functionality is built into systems, not because the user needs it, but because it is possible with the technology. Mason and Bacsich (1998) draw on ten years’ experience at the Open University and stress the importance of any on-line element of a course being structured and guided.

While addressing all these issues, how do you ensure that you are providing educational development rather than simply entertainment, so that the two become merged into ‘edutainment’ (Dupuis, 1998)? Here we are concerned with the learning design. What may previously have been delivered in a lecture format will need to be redesigned to allow the student to learn the content but by undertaking a different learning experience; how will they be inspired?

This is perhaps the area where the least is known and best practice is hard to define. What may work for one student may not for another. Thirty-five students recently completed a self-development CD-ROM and evaluated it as a learning tool for their assignment. There was not a single element that was universally disliked by all 35 students and, likewise, there was no single element that all 35 students thought was excellent. Each student appreciated different elements and had different suggestions for improvements. Ideally, the learning experience will consist of a range of learning experiences so that the student has some element of choice or variety in how they learn. Again this poses a difficult task for the academic: not only do they have to design a learning experience for what would previously have been a lecture (non-interactive), but they actually could do with designing three or four learning experiences for the same knowledge/skill content. Mazone (1998) claims that learning is not dependent on exposure to the technology, it needs to involve meaningful utilisation, which is very difficult to achieve.

In addition, there is the issue of timing. The Computer-Mediated Communication in Higher Education project is founded on an interest driven from ‘the pedagogical benefits of reflection and flexibility that asynchronous tools afford’ (Steeples et al., 1996, p.71). However, Mason and Bacsich (1998) are quick to point out that while the medium may practically be asynchronous it may not be in terms of the student experience; some students may get lost by missing something.

So, to summarise the points arising from the learning aspirations criteria.

- What are the educational objectives for the e-learning intervention (deep or surface learning, education or edutainment)?
- Who is going to structure the path through the e-learning environment (do the learners want as much information as possible to browse or is structure and sequence more important)?
- How is enquiry and problem solving to be managed (is the student experience to be mainly passive or active, what alternatives are to be built in to overcome blocks to achievement and how will time be managed)?

2.2.2. Cognitive ergonomics

Once the learning aspirations have been designed, the more refined detail of what could broadly be termed cognitive ergonomics come into play. The process of identifying content
cannot take place in isolation of thought about how to present the content. Visuals, graphics, presentation, colour, use of video and audio all contribute in different ways to the learning environment and it is important to appreciate the relative value of different forms of stimulation. Indeed, Crook and Barrowcliff (2001) found it common for undergraduate students to have sound and video players active in the background of other applications. If reading critique off a screen is tedious, perhaps a video debate might be more stimulating. However, for how long should this continue? It is more than simply a question of colour palates; it is also concern for structure, text quality and quantity and how the information will be chunked, reinforced and structured.

Choice of language needs attention. If the e-learning materials may be used outside the local context, then use of jargon and colloquial terms need to be managed, as does the inclusion of definitions and the ease of reading of the text (Sambrook, 2001). Here e-learning perhaps has a significant advantage over more traditional forms. The ‘hypertext’ environment allows links between ideas, definitions and problems to be built in, providing a less linear structure to the learning environment.

Essentially, the cognitive ergonomics element is concerned with the interface design, the visual engagement and the management of information. It is generic and context free. For example, the choice of navigation buttons to include ‘back a screen’, ‘forward a screen’, a ‘help’ button, a ‘return to main menu’ button, a ‘save and continue at another time’ facility, etc. Again the element of fun needs to be considered, as do interactivity and edutainment.

Many e-learning materials simply get printed out by students and read as hard copy. Good ergonomic design would move the student away from this pattern of behaviour; they should not become tired of looking at the screen.

This discussion therefore identifies the following considerations.

- What is the most appropriate balance between modalities of presentation and interaction (e.g. text, graphic, audio, video, email, text messaging, telephone, etc.)?
- What navigational aids are needed (e.g. enable the learner to track their progress through the material, tools for annotating or linking between ideas, etc.)?
- What is the ‘look and feel’ of the interface as a whole (e.g. choice of layout, design, colour, balance of electronic and other types of media to support the learning)?

2.3. Interactional Criteria

E-learning does not mean learning entirely in isolation, interacting only with a computer. Building forms of interaction into an e-learning tool, either with faculty members, other students or practical experiments that need to be completed before progressing, should not be viewed as a failure of the technology. Even in a classroom environment, we recognise the value of multimedia presentation, of using video as well as OHPs, of asking questions of the students and, indeed, simply of observing students’ body language to see if we are able to engage their interest. Students also learn a lot from each other; group work, informal interactions and problem sharing are key features of a learning environment. There is no reason why e-learning should not include either real or virtual learning environments to facilitate interaction, whether or not the tutor is involved in the interaction.

2.3.1. Faculty-student interaction
Ask most academics about their experiences of trying to interact with students during the e-learning process and they will tell you that they cannot get the students to use the discussion boards. Most of them sound disappointed as if they expected students to log in and raise issues in such a public forum for no set reason. Why should they? It is unusual for a student to raise their hand and ask a question in a lecture theatre of 250 students, so why should they engage in the e-learning equivalent? (See also 2.1.2. above.)

For discussion boards to work effectively they need to be managed and driven by the member of faculty. The academic should start the discussion and then the students can give their views and ask questions accordingly. If partaking in the discussion is part of the assessment or a requirement of completion then engagement will be even greater. Experiences gained from ‘location-free working’ (homeworking, telecommuting, etc.) (for a review see Konradt et al., 2001) identify that a goal-oriented (rather than task-oriented) management style tends to be most effective. Applying this to ‘location-free learning’, the purpose of the interaction needs to be clear; what will the students gain (either credit or understanding) as a result of taking part in the interaction?

It is also worth noting that the literature on location-free working has paid much attention to the issue of social isolation. The employee may not feel part of a working community, particularly if they are of a relatively low status in the organisation. While the goal orientation identified by Konradt et al., (2001) may be beneficial for performance, it may limit the development of a sense of community that develops through the ‘chit-chat’ that occurs naturally in a workplace. E-learners’ exclusion from the day-to-day interactions that comprise the social organisation of learning can lead to a sense of isolation and can undermine any sense of a learning community, further distancing the learner from the original intention. In the e-learning context, the role of developing a sense of social inclusion falls to the e-tutor.

Discussion boards are not the only means by which faculty can interact with students. At certain points in the materials or course duration, the computer could alert the academic to a student’s progress (or lack thereof) to allow the academic to send a personal e-mail to that student. Students like milestones to help them keep pace (Lawther & Walker, 2001) and they require the ‘human touch’ even though they are engaged in e-learning (Moshinskie, 2001).

Crook (1998) suggests productive collaborations are likely to depend upon the quality of interpersonal relations already in place at the time that on-line discussion is initiated. This may be particularly true for a younger cohort who is geographically local. The works of McConnell (2002) and Steeples et al., (1996) both allude to larger audiences for the students’ work/thoughts, stimulating the students to better quality contributions.

Indeed, does e-learning have to replace face-to-face learning or can it complement it (Morgan, 2001)? There is no reason why all e-learning has to be at a distance. It can be supported by one-to-one or group tutorials or occasional sessions as required or desired. This is not a measure of ‘failure’. When the Open University first offered its distance learning courses, it took the success of the residential summer schools as a measure of failure of the distance learning model unnecessarily (Morgan & Thorpe, 1993). Indeed, this is a key feature in the critical appraisal of an e-learning intervention. As mentioned earlier, it is easy to build in electronic functionality because it is possible rather than because it is appropriate for the learning. Developing the right balance between e-presentation, electronically mediated interaction and more traditional forms of communication requires consideration of
the students, the tutor, the technical support team and, indeed, those responsible for managing the e-learning initiative, as it is likely to have resource implications.

To summarise, therefore, key concerns for faculty-student interaction include the following.

- Are there mechanisms that require the student to interact with faculty (are such interactions ‘safe’, are students able to understand the importance of such interaction, should they be able to avoid interaction and is real or virtual attendance at tutorials required)?
- Is the student drawn into the learning environment (can the student develop a sense of belongingness with the e-learning provider and can the tutor develop this social organisation)?
- Has the balance between electronic and other forms of interaction been addressed (are we designing usable and acceptable interaction mechanisms rather than simply functional ones)?

It may be, of course, that the e-learning experience is entirely distant, that there is no requirement or possibility for other forms of interaction. However, even within the electronic medium, engagement and the sense of interacting with people rather than just with computers can, and should, still be an objective.

2.3.2. Student-student interaction

People learn by talking and interacting with each other, discussing issues and sharing ideas, in short, through dialogue. This does not need to be excluded in the e-learning environment. While the same issues with discussion boards and chat arise as were mentioned above, again they can be managed by being programmed into the e-learning experience. In addition, students can communicate with each other by telephone or meeting each other outside the e-learning environment.

Facilitating group working through e-learning is a challenge that few have yet to address, but it is not beyond the realms of the technology. A group worked e-learning assignment would be high risk, but less so in a bespoke company programme rather than an open access e-learning environment. This said, the University of Glasgow ran a series of successful on-line seminars where the students presented on-line papers, which were read and commented on or discussed through the e-mail system. Staff felt the seminars had been interesting, informed and provocative when compared with face-to-face seminars, and there was an increase in both the quantity and quality of contributions (Steeples et al., 1996).

Essentially it is important to design in student-student interaction in the e-learning process. Students like to meet and talk to new people, work collaboratively and actively participate in group activities. How this interaction is designed and managed needs careful consideration and on-going attention.

- Are students to interact with each other and, if so, how (e.g. public or anonymous chat rooms and discussion groups, conference calling, tutorial or peer-assisted learning groups, etc.)?
- Are assessments to be completed on a group basis and, if so, how will issues of individual contribution be addressed (e.g. plagiarism and copying concerns, collaboration versus collusion, freeloading, individual domination of the activity and do these issues matter)?
2.4. **Evaluation Criteria**

In terms of evaluation, there are issues of evaluating the students and also evaluation of the e-learning environment. The former are perhaps better understood than the latter, as the following discussion illustrates.

2.4.1. **Reinforcement strategy**

This area includes the setting of milestones, giving of feedback, maintenance of deadlines, spoon-feeding and assessment. If this area is found lacking, the student dropout rate will be high. Many of the issues overlap with those of faculty-student interaction discussed in 2.3.1 above and indeed student-student interaction (2.3.2.).

As Honey (2001) suggests, often the spirit is willing but the flesh is weak, so unless there is a clear reason for doing the e-learning by a certain point in time, it will become a ‘maybe later’ activity. Mason and Baasich (1998) found that the use of on-line conferencing works well when it is linked with the assessment of the course.

Some e-learning institutions are taking a very strict line on ‘attendance’. The University of Phoenix will not allow a student to continue with their studies if they miss two classes from a programme, and their fees are not refunded (Goddard, 2002). There is of course an underlying tension between the flexibility offered by e-learning and the perceived need on the part of the tutor for establishing control over performance and the achievement of objectives. It could be argued that the University of Phoenix’s approach errs on the side of excessive control.

Reinforcement strategies help students to progress and continue with their studies. They should be a mixture of ‘carrot and stock’; the carrot being the feedback and recognition or qualification for passing the assessment or completing the learning and the stick the deadline and assessment process. It is important that rewards are included and that success is celebrated, particularly when the e-learning occurs in the workplace.

Unfortunately, assessment seems to be a driving force behind completion of studies. Alexander (2001) found that many students would not complete e-learning courses if they were not assessed, but the assessment needs to be modified to suit the e-learning process. Simply transferring the assessment from a traditionally taught module to an e-learning module will not suffice. The assessment needs to reflect the learning experiences. McConnell (2002) even suggests on-line peer review and assessment of each other’s work. The course for which this was proposed is an Med in collaborative e-learning and this therefore provided an example of the reinforcement of content and method. However, the idea merits wider consideration. Peer assessment generally can be of significant benefit on a number of levels.

Again, therefore, we can identify a range of key concerns in relation to reinforcement strategies.

- What is the balance needed between the flexibility of the medium and the need for control over performance (who has control, why are deadlines necessary for these
particular students and whose needs are being addressed in the design of control mechanisms)?

- What are the benefits or penalties to the students of completing learning to deadlines (how is feedback to be provided, in what time frame, how many assessments are to be included, how does it contribute to the achievement of the overall objectives of the programme and how is success celebrated)?
- What is the appropriate form of reinforcement/assessment (will it be completed on-line, on paper, on video or through any other mechanism, what support will be available for students completing assignments, from students or tutor and are there arrangements for resubmitting assignments)?

2.4.2. **Achievement of purpose**

The final guiding principle links closely with assessment as it is concerned with evaluation, and a valid and reliable assessment strategy may be one form of evaluation. Here the question of primary concern is whether or not the e-learning initiative has achieved its purpose? An holistic approach needs to be taken; it is not simply a question of the amount of time that the student has been exposed to the e-learning, but have they utilised what they have learned. What is the net effect? Has the initiative met its objectives, and have the perspectives and interests of all stakeholders been considered (Athanason, 1998)?

As with all models of any form of training evaluation (see, for example, Hamblin, 1974; Kirkpatrick, 1994), there are various levels at which e-learning can be evaluated, and in various ways. At the learner level, did they actually learn anything? Assessment may be a valid measure of this. At the workplace level, has their behaviour changed? At an organisational level, is the organisation functioning more efficiently or effectively as a result of the e-learning initiative? And for the learning provider, what can be done to improve the experience for future students?

In essence, what we are looking for here is a measure of quality. As yet there are no quality standards in e-learning. However, the issue has been raised in an international forum (Leon, 2002). The matter was raised at the Open and Distance Learning Quality Council in London in June, and should be discussed at the meeting of the World Education Market to be held in Portugal in 2003.

The issues arising here, therefore, remain those that pertain to any learning experience. What are the objectives that were identified for the programme and have they been achieved for the individual, the organisation and the e-learning provider? This does suggest that feedback from the learners will be a key issue in developing more effective e-learning. The lack of agreed criteria as to what makes a ‘good’ e-learning experience implies that there is a lot to be learned from all parties involved; the learner, the academic, the system maintainers and the customers.

Despite this vagueness, consideration of the appropriateness, design and interaction criteria described earlier in this paper should give the developer of the e-learning experience a clear set of aims to achieve. These therefore form the particular criteria for evaluation of each tool. Against this background we can again suggest three general questions.

- To what extent is the assessment a valid and reliable measure of evaluation (is passing more important than learning and are we enabling people to do assessments or to think)?
• Has the e-learning met the expectations of all its stakeholders (managers, students, tutors, shareholders, professional bodies, etc.)?
• Was the e-learning experience of quality (did it meet its objectives and perform as required)?

3. Conclusions

The most exciting aspect of engaging in e-learning initiatives now is that the whole area is so new that there is yet to be a clear and unconflicting body of evidence as to what works and what does not. As the field evolves and materials are developed by different sources (universities, organisations, publishers, etc.) and used by different student bodies (employees, part-time and full-time students, lifelong learners, etc.), the opportunity to draw some concrete conclusions and pedagogical guidelines will emerge. This paper presents the eight areas that are emerging as key in the e-learning process at the moment, but it merely raises the questions rather than gives any answers. Time and the engagement of the ‘n-geners’ (Internet generation) will no doubt broaden our understanding further and push the boundaries of e-learning beyond the limits we see at the moment.

References


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