Staff attitudes to the development and delivery of e-learning

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Abstract

Reports the outcome of research conducted as part of a project funded by the Learning and Technology Support Network – Information and Computing Studies Group (LTSN-ICS). The paper deals with the issues perceived as being important "barriers" to using technology in teaching and learning within the academic staff community working in higher education in the UK. Data were gathered from a critical analysis of the literature, the administration of a questionnaire survey and a series of interviews with academic staff. Empirical data are used to verify some of the contentions from the literature review and to contextualise these (mainly US-based publications) in terms of the experience of UK academics. The overall picture which emerges when examining a range of initiatives currently being undertaken across a range of academic institutions is that developments are often led by the enthusiasm of individuals with little extrinsic reward structure to encourage these innovations.

Introduction and background

In higher education over the past few years there has been a substantial growth in interest and activity in the development of "technology-based solutions" to provide effective teaching and learning to an increasingly diverse group of learners. In particular, in the area of computer assisted learning (CAL) and more recently in the development of virtual learning environments (VLEs), a large literature has developed which provides often conflicting claims about the efficacy of these applications and the problems associated with their development. Stimulated by the capability provided by enhanced computing technologies, in particular the use of Web-based technologies, and encouraged by the interest of government and the impetus provided at an institutional level to participate in developing distance programmes, there has been a marked increase in reported applications and developmental work in this field. The benefits of these developments centre on three main areas: improving access to education and training; enhancing the quality of teaching and learning; and the need for higher education institutions to maintain competitive advantage in a changing marketplace for students.

The basic evidence for some of these reasons is questionable (although often not contested) but they are all potentially important when examining the affective or attitudinal considerations of academic staff involved in the development and use of VLEs which is the main concern of this paper.

The importance of examining human factors is based on a perceived deficiency in earlier work which deals with the development and use of technology in higher education. While in the past evaluation of the impact of new technology in education has tended to be based solely on assessing the design of the teaching material itself or on the manner in which students interact with the material, more recently there has been a trend towards strategies for evaluation which give full consideration to the context in which learning materials are introduced. On a very practical level, given past experience of the low usage of externally produced learning materials and poor uptake of opportunities to extend the use of technology in teaching delivery (Newton, 2001), it is particularly

important to evaluate the use of new technology in a manner which takes account of all factors likely to impact on their successful implementation and sustained use as an integral part of the curriculum.

If, as some research appears to suggest (Hartman, Dziuban and Moskal, 2000), academic staff satisfaction and student outcomes are strongly related in virtual learning environments and whilst often considered separately need to be treated as co-linear rather than independent variables, the need to explore staff attitudes is re-inforced.

Despite the growth in application and potential of technology there is a lack of a clear consensus on the attitude and ability of academic staff in higher education to participate in these developments. A number of studies (Olcott and Wright, 1995; Pajo and Wallace, 2001; Fabry and Higgs, 1997; Sellani and Harrington, 2002) identify significant barriers to staff participation in developments of Web-based teaching. However the analysis of the relative importance and permanence of these barriers is problematic because staff attitudes change over the course of time and, it has been hypothesized, at different stages of their career development. It is important, therefore, to identify common themes which are based on a broad consensus in the literature.

A useful starting point for examining some of these concerns is provided in a communication issued following a Microsoft Scholars' meeting in 1997. Based on the experience of leading academics and instructional technologists, the communication noted a large number of factors that potentially militate against uptake of technology (Microsoft Scholars, 1997). Table I summarises a variety of these factors extracted from the Microsoft Scholars' report.

A comprehensive review of the literature undertaken as part of this research seeks to expand on the significance of these factors, categorize them more precisely and provide an assessment of their relative importance. In order to ensure the effective introduction and use of learning technologies it is important to be aware of exactly which of these factors are operational in a particular situation and to identify strategies for eliminating or at least minimizing the effect of these factors.

Table I Major factors which inhibit the accelerated adoption of technology in higher education

1	Inadequate infrastructure for access, support and training for sustaining technology
2	Lack of co-ordinated planning for technology at departmental, institutional and system levels
3	Use of technology is not part of the prestige, recognition or promotion systems currently in place
4	Academic staff have not been taught how to apply technology to teaching
5	Technology is not a financial priority within schools or departments
6	Uncertainty of intellectual property rights in an electronic environment
7	Resistance to changing traditional teaching practices
8	Lack of understanding of application of technology
9	Lack of high level vision in administration about the role of technology
10	Unrealistic expectations of what the technology can do
11	Dismissive attitude because of early inadequate experience (real or perceived)
12	Generational division between older and younger staff in responding to use of technology
13	Resistance to external pressure to change
14	Ideological resistance to technology
15	Claims that technological solutions are pedagogically not appropriate

Source: As identified by Microsoft Scholars (1997)

Methodology

Aim

The aim of the project undertaken here was to identify the critical factors that impinge on the acceptance and use of technology-based teaching.

The research was conducted specifically within the cognate group Information and Computer Science and Information Studies and it is recognised that some of the considerations and findings may not reflect developments in other subject areas within higher education.

The report was compiled using data derived from a critical analysis of the literature and the results of questionnaire surveys and interviews with academic staff. Empirical data consisting of 134 responses to a questionnaire designed to elicit information on use of technology and attitude towards its use was supplemented by data gathered from 16 structured interviews and e-mail communications received from 11 academic staff who are actively using Web technologies to design and deliver parts of the curriculum in Information and Computing Studies and Information and Library Studies. The separate strands of the methodology are described in more detail below.

Literature review

Literature was identified using standard database searches on a range of bibliographic databases (facilitated through using DIALOG searching of the EDUCAT group of databases) and through extensive Web-based searching. The International Centre for Distance Learning (at the Open University) was also used. As might be expected, the coverage of this Open University site is extensive and provides a database of over 12,000 items related to distance learning. The LTSN-ICS pages were searched as well as the generic LTSN pages.

It was important that the literature reviewed should be recent in order to ensure that comment was being made on current practice. In fact the bulk of the literature used was less than three years old. This inevitably meant a heavy reliance on Web-based publications and e-journals and again this added a further layer of complexity because of the need to review carefully the source of the publications and be assured of their academic credibility.

Caution was also needed with respect to the national bias of the literature. Much of the material retrieved inevitably reflected current concerns in the USA where the context of design and delivery of virtual learning is considerably different from that pertaining in the UK. However, it was confirmed from the empirical work that many of the concerns were common.

Questionnaire

A questionnaire was designed and piloted and then distributed to 300 academics working within Computing departments or Information Studies departments in the UK. A total of 220 questionnaires were issued to Computing department staff and 80 to Information Studies staff. Staff were identified through using institutional Web sites and care was taken to ensure a balance between gender and seniority. It was decided, however, that the questionnaire should be completely anonymous – particularly because it is important in any survey that is examining affective considerations that potential respondents be encouraged to feel that it is purely their personal views that are being sought rather than their personal attributes. It was also considered that demographic data would not be particularly relevant and it was not envisaged that the data collected would be correlated with demographic data. The only exception to this was that the questionnaires sent to the Information Studies departments were coded to ensure that they could be identified, as it was felt that some of the responses (notably those on development needs and on information skills) might exhibit significant differences. In total, 134 questionnaires were returned.

The questionnaire was divided into three main sections. The first of these sought to elicit general information on staff experience in the use of technology in teaching. The second section invited comments on staff perceptions about the usefulness of the technology and finally the third section allowed staff to provide additional comment and reflection.

Interviews and e-mail discussions

Interviews were conducted with 16 staff – again geographically spread. The interviews were open ended although later analysis of the topics covered showed that the interviewees were generally keen to explore issues which were common to those key factors that had already been identified in the literature. There was considerable scope for interviewees to lead on topics about which they were most concerned and to share experience of their involvement in developments in teaching and learning generally within their particular institution.

In addition, e-mails were received from 11 academics who expressed a particular interest in the topic, five of whom, though initially approached for an interview, could not be personally interviewed because of time constraints on both their part and that of the researcher. The six others were from staff who had become aware of the project through the LTSN-ICS Web site and who were eager to provide their inputs. Of the initial e-mail contacts, four generated quite lengthy discussion of the individual's perception of the subject area in general and a consideration of these was made when analyzing the interview data.

Data analysis

The closed questions which were posed in the questionnaire were analysed using SPSS and the results presented graphically to aid interpretation. The data collected from open questions presented in the questionnaire, from interviews and from e-mail responses

were analyzed to identify recurrent themes that were of concern to academics and also to identify instances where theory and practice converged and diverged (particularly in relation to the pedagogical aspects of support of educational aims and objectives in virtual learning environments). Because of the small size of the sample, powerful tools for analysis of the responses (such as use of NUD-IST software) were not felt to be appropriate. The methodology used to analyze the responses was based on McKernan's work on content analysis. McKernan's procedures are based on an examination of the "communication" to derive potential classification categories, writing definitions of these key categories, analyzing the data and coding it and finally providing a quantitative summary of the categories to highlight the relative importance of different themes (McKernan, 1996). In the event this proved to be a particularly easy exercise as the categories identified were all well defined and had previously been identified in the literature.

Literature review

There is little literature which specifically examines staff attitudes to use of virtual learning environments. Thus the starting point in the literature review was to undertake a critical analysis of general studies relating to the use of technology in teaching and of studies which examine distance learning in general. Because virtual learning environments are not well developed in the UK, the overwhelming majority of these surveys represent the situation pertaining in the USA. A list of the main surveys examined is provided in Table II.

Examining the overall picture with work conducted to date specifically in the UK shows a marked degree of commonality in themes although there has been some change in emphasis reflected in the ranking of relative importance of these themes. There have been two major UK surveys (Haywood *et al.*, 2000; Bennett, 2001). Haywood *et al.*'s (2000) comprehensive survey of learning technology in Scottish higher education clearly identified the following main themes:

- lack of time, once high priority tasks have been accounted for, which is the principal limitation for many staff, particularly those in the former SOED HEIs;

- perceptions of the relatively low status, and hence rewards, accorded to teaching compared with research, especially given the pressures of the Research Assessment Exercise with its significant implications for funding;
- lack of reliable and adequate infrastructure, including technical support, to deliver courseware at reasonable cost in terms of academic effort;
- lack of appropriate courseware in some subjects; and
- lack of basic C&IT skills, especially in HEIs where the IT infrastructure is quite new.

The results of large scale surveys are also confirmed by smaller scale research which adopts a grounded approach such as that undertaken by Plewes and Issroff (2002), who used structured interviews to identify key factors which mitigated against adoption of technology. This approach is extended in the research using discourse analysis conducted by Smith and Oliver (2002).

There is thus justification for the approach taken here which bases the investigation on the following list of key factors which are likely to detract from development and integration of new technology in higher education (from analysis of literature):
(1) Increased time commitment (workload) for academic staff:
   - development time; and
   - delivery time.
(2) Lack of extrinsic incentives/rewards.
(3) Lack of strategic planning and visions.
(4) Lack of support:
   - lack of training in technological developments; and
   - lack of support for pedagogical aspects of developments
(5) Philosophical, epistemological and social objections.

Inevitably we find that some of these factors are inextricably interwoven. The first three factors dominate the discussion and are particularly prominent in the literature. The issues concerning support and training (the factors two in (4)) are often not separated out in the literature and the definition of resources required for support is also not clearly defined. Resource requirements often incorporate pedagogical support in how to apply the technology effectively and training

Table II Surveys of academic staff relating to C&IT use

Date of survey	Author	Number of staff surveyed
1998 (Canada)	Anderson, Varnaghan and Campell	557
1998 (US)	Berge	42
1998 (US)	Betts	532
1998 (US)	Daugherty and Funke	76
1998 (US)	Hillesheim	12
1999a (US)	Rockwell	127
2000 (US)	Almeda and Rose	9
2001 (US)	Dooley and Murphey	15
2000 (US)	Hartman, Dziuban and Moskal	38
2000 (UK)	Haywood *et al.*	982
2000 (US)	Hislop and Attwood	19
2000 (UK)	Jones, Asensio and Goodyear	10
2000 (US)	McKenzie *et al.*	31
2001 (US)	Abacus Associates	402 NEA members
2001 (US)	Berge and Muilenburg	1,276
2001 (US)	Dooley and Murphy	263
2001 (S. Africa)	Kotze and Dreyer	12
2001 (US)	Lee	237
2001 (New Zealand)	Pajo and Wallace	250
2001 (UK)	Steel and Hudson	11
2001 (US)	Wilson	687
2001 (US)	American Federation of Teachers	200
2002 (US)	Cho and Berge	32 case study organisations
2002 (US)	Gilmore	218
2002 (US)	Jones	252
2000 (US)	Schifter	263

Note: Full bibliographic citations are provided in the reference section

in use of the technology. Finally the various objections, which are raised on philosophical, epistemological or social grounds, are ones which rarely give rise to a clear consensus of opinion and are often based on little or no empirical data.

1. Increased time commitment

The overwhelming picture which emerges in any study that examines development of new technology is the time-intensive nature of both development and delivery of Web-based learning. This is an issue both for development and delivery but it is the latter – much of which is "hidden" (Beckett and Brine, 2002) – which is of most concern to staff. There is some debate as to the accuracy of the contention that asynchronous learning requires more time. In a single issue of the *American Journal of Distance Education* the reader is presented with two very contradictory views of the implications of running distance learning programmes on staff workload (DiBiase, 2000; Visser, 2000)

as well as with a very informed editorial commentary (Moore, 2000). Visser reports that Web-based teaching of distance learning students requires almost twice as much time as teaching on-campus students, whereas DiBiase contends that on average the teaching time is less (2.7 hours for each student as opposed to 3.2 for on-campus students). The results are of course very much prone to variations in a number of factors relating to the profile of the students themselves and the institutional support provided. Ultimately the debate cannot be resolved without much more rigorous definition of how comparisons are effected.

Turgeon *et al.* (2000) contend that "despite anecdotal evidence and tabulations of perceived effort, no-one really knows yet whether distance teaching is more work or less".

However, the anecdotal evidence and reports from academics involved in teaching distance learning courses is extremely strong. A vivid account of the pattern of working for

those involved in online teaching is provided by Young's article entitled "The 24-hour professor" which provides a mini "case study" of the schedules and patterns of working of an American professor (Young, 2002). In a similar vein Attewell (1999) voices concern that:

> If more of our college programmes are offered at a distance, or outside traditional college hours and terms, will levels of unsocial hours work and therefore levels of stress for teaching and technical staff become unacceptably high?

Messing (2002) concentrates on one single aspect of workload associated with delivering distance learning – e-mail correspondence – in order to illustrate a steep rise in time spent dealing with distance learning students. Concluding his survey he gives his own very personal view on the matter, and there is no doubt from his final statement that he is speaking very much from the heart:

> Can we afford to implement online strategies by concentrating on the supposed pedagogical and administrative improvements they might bring without considering the workload for both academics and students? It is highly unlikely that such an approach would be successful. Even if such issues were allowed for, unanticipated workload shifts may still happen as this study of e-mail has demonstrated. Just how much extra time an individual is prepared to sacrifice in order to receive the benefits of the use of such tools is debatable. From a personal perspective, the limit has been reached.

His experience is not unique and ample evidence that staff are increasingly concerned about workloads is evident in a large number of publications which base their conclusion on extensive surveys of academic staff.

It is apparent also that increased workload is not a self-imposed problem for staff who wish to engage fully in distance learning but a problem of how the activity has to be engaged in, and those who plan to get involved in this activity must take cognisance of the significant workload involved.

2. Lack of incentives or rewards

Linked to the question of workload inevitably there is the question of incentives and rewards.

In terms of personal reward structure there is a wealth of evidence that this is an issue which causes concern amongst academic staff but there is virtually no engagement in higher education with the question of how staff are rewarded for participating in online teaching.

In a survey of staff involved in Web-based teaching, Kotze and Dreyer (2001) found that more than half of the lecturers involved indicated that there were no incentives involved in telematic learning courses, though noted some intrinsic personal rewards. Kotze and Dreyer (2001) suggested strongly that a modification of the reward system (to formally include incentives for special efforts required for distance learning teaching) was required. There are of course intrinsic rewards associated with distance delivery and it is evident in the research of a number of writers that these are important motivators (Csikszentmihalyi, 1997; Woolcott and Betts, 1999). Indeed Wilson reports in one study that the academic staff rated intrinsic factors consistently above extrinsic rewards and reported that staff were intrinsically motivated to participate in distance education, irrespective of financial incentives (Wilson, 2001).

The principal intrinsic reward experienced by staff is the ability to extend teaching to students off campus, which results in a cultural and geographic blend which cannot be achieved on campus (Dooley and Murphey, 2000). Other intrinsic rewards include the motivation of staff to use technology because of a personal interest in the technology itself or a commitment to the technology as an important area for pedagogical study and development.

Lee (2001) quotes Thach and Murphy who in 1994 stated that:

> ... the sad fact remains that institutional reward systems are often established in such a way that even the most devoted distance learning instructors can become frustrated by the lack of recognition and understanding for what they do.

Unfortunately there appears to have been no real move made to resolve this situation in the nine years since this study was produced.

3. Lack of strategic planning and vision

Issues relating to strategic planning for distance learning are linked closely to the establishment of reward strategies and workload identified above but they go further than this. The introduction of new technology into teaching and learning goes to the heart of challenging some of the assumptions on which "traditional" higher education has operated. This tradition has been one in which unmediated classroom instruction has largely been the norm and the career structure

of academics has been based firmly around research outputs. Despite the introduction of quality assurance and quality enhancement mechanisms the view that this is still the predominant culture in UK higher education institutions is prevalent.

Referring to the reason for non-involvement in technology-based delivery of distance learning in the USA (but equally applicable to the UK) Lee (2001) notes that:

> One important factor behind this research is the university culture in the US under which excellence in scholarly activity, such as journal publications, is rewarded, and excellence in teaching is assumed but often overlooked in promotion, tenure and salary decisions.

Cho and Berge (2002) see organisational culture as the main barrier to those developing virtual learning teaching. Moore (1994) goes even further and as far back as 1994 he asserted that:

> . . . the barriers impeding the development of distance education are not technological, nor even pedagogical. We have plenty of technology and we have a fair knowledge of how to use it. The major problems are associated with the organizational change, change of faculty roles and change in the administrative structures. Here we desperately need all the ideas and all the leadership that can be assembled.

Teaching the use of technology needs to be perceived as a core part of a university's activities. However, most surveys of academic staff do not report positively in this respect. Indeed the opposite perception is often given, and staff report that they feel that their efforts are peripheral or overlooked altogether. Even in institutions where distance learning using virtual learning environments is well developed, there is evidence that integration is not taking place (Betts, 1998; Wilson, 2001).

Haywood et al. (2000) note, rather pessimistically, the view of academic staff with respect to integrating technology into teaching as follows:

> Whilst there was a positive view of the value of learning technology there are still significant barriers to its uptake by staff, the most important being lack of time, infrastructure, software and training, plus a failure (perceived or actual) of institutions to value teaching.

4. Lack of support

The issue of resources is endemic to virtually any survey of any activity in higher education. In the area of technology-based learning interventions and the high costs involved in investing in the technology, it may be

expected that this issue is seen to be more critical. Beckett and Brine (2002), commenting on the development of virtual learning, note that:

> To make the best pedagogic use of the environment, resources must be made available to support those involved. Higher education in the US is currently more progressive in the implementation of VLEs but large amounts of funding have been made available to enable the virtual delivery of teaching and learning.

However, whilst the literature supports the view that investment in specific "high end" technologies needs to be given more of a priority generally, the overall impression is that the hardware and software platforms for delivering virtual learning are adequately supported. The issue of resourcing centres mainly on training in the use of the technology and in appropriate application of the technology.

Lack of training in use of the technology
The issue of basic academic staff training in computer skills is one that has been well rehearsed in the literature. Specific problems with technological skills are noted by Olcott and Wright (1995) and Rockwell et al. (1999b). However, it can be argued that the issue is not simply one of providing adequate training opportunities but in providing time for staff to engage in these. In Pajo and Wallace's (2001) study, based at Massey University in New Zealand, a survey to which 250 staff responded, it was shown that the time required to learn how to use the technology was the most significant factor in inhibiting use and was reflected in the survey returns of 70 per cent of the respondents.

Thus to a large extent the issues of training and development for virtual learning environments are inextricably bound up in the need for institutions to overtly recognise the importance of this activity and to support staff who wish to engage in it.

Lack of support for pedagogical aspects of developments
Jones et al. (2000) stress the fact that the development needs of staff are significantly more than staff training in use of technology (Jones et al., 2000). The following comment from the report of their study should raise considerable concerns for anyone working in the field of instructional design and support:

> Practitioners generally expressed a concern that they did not fully understand the relationship between their educational design and their

outcomes. It may be that there is not yet sufficient common agreement or a common sense view of educational practice in a networked learning environment.

Further evidence of the need for this is provided by Lee in her study of faculty motivation, commitment and satisfaction. Following Northrup's suggestion that a lack of instructional support may keep academics from teaching using distance learning modes (Northrup, 1997), she designed a study to examine whether there was a relationship. Her conclusion that academic staff motivation and commitment were higher in institutions which provided a higher level of support confirms the view of organisational theorists that there is a reciprocal relationship between care and support of organisations and employee effectiveness.

5. Philosophical, epistemological and social objections

Finally, in addition to the "barriers" noted above, it is worth examining the literature which cites a range of these broader issues. It may seem odd that these should be left until last before being considered as they are obviously critical issues which go to the heart of how teaching and learning is viewed. However, these issues are not reflected as strongly in the literature in terms of published research on barriers to academic staff engagement with VLEs. It is also important to note that sometimes these concerns are not always based on rigorous empirical studies and some are biased towards anecdotal evidence and frequently based on rhetoric that generally questions the whole rationale for distance learning.

The background to concerns is important. Briefly stated in an environment of increasing numbers in higher education, networked multimedia technology has been seen as offering a solution to some of the problems that presently face universities in delivering their current courses to a wider and more varied student audience. It has been viewed as a significant tool to assist in preparing academic establishments to adapt to a new social context in which they will deliver education to a mass market.

However, Mayes (1993) points to a significant dichotomy of purpose in development and application of C&IT in the UK as follows:

The overall context in which the debate about education and training are both currently being conducted is one in which strong forces are pulling in opposite directions. One of these is the over-riding need to make advanced education and training more cost effective, and thus to deliver it to a far higher proportion of the population than at present. The other is the need to raise its quality and relevance to work.

In addition, given past failures, there is a certain amount of healthy scepticism regarding claims that technology will revolutionise and enhance teaching and learning and there is certainly considerable debate which arises out of a concern that institutions see C&IT purely as a means to effect economies in the teaching and learning process.

Several authors, concentrating on the "economic agenda," have raised issues. These are at times very emotive. Thus, for example Noble (quoted by Young (1998)) asserts that:

Whatever the rhetoric of the institution the unspoken agenda is to eliminate direct labor.

A variety of other commentators have been anxious about the potential for staff redundancies. Turgeon *et al.*, 2000 dramatically sum up the question by asking "Will faculty become roadkill on the information superhighway?"

Linked to this often are concerns about the "commercialization of education" (Noble, 1998). These issues are also linked to problems that are foreseen as relating to intellectual property and ownership of material that is provided in virtual learning environments.

Because of such trends, Heterick and Twigg (2000) envisage the "Hollywoodization of academia" and foresee a scenario in which popular courses are delivered by "celebrity academics" and a devaluation and reduction of the status of academics inevitably follows.

It should be said that there is not a great deal of support in the literature for such extreme views but there is a concern about virtual learning environments that is bred out of concern that the consequent changes they may force on higher education staff are not fully understood. These concerns include:

(1) Lack of confidence in dealing with students at a distance (Arnone, 2002; Almeda and Rose, 2000).

(2) Suspicion about the motivation of "management" for introducing virtual learning (Davies, 1999) with respect to

monitoring academic performance, but it should also be noted that some commentators see this as a positive benefit (Jaffee, 1998).

(3) Concern about the issue of independent learning skills and access to library resources which are features of campus-based instruction, in turn part of a general concern about integrating students into the virtual learning environment. That this is an issue is evident in the fact that it is beginning to be dealt with in some codes of practice now being advocated for teaching Web-based distance learners that are concerned with ensuring an adequate level of support for students and refer to issues such as:

- advance information relating to course requirements;
- close personal interaction;
- equivalent library materials and research opportunities;
- assessment to be equally rigorous as campus-based assessment;
- academic counselling and advice; and
- plagiarism and authentication and online academic misconduct.

These are all issues that are important and need to be fully explored in order to ensure that quality procedures are applied and that virtual learners are given parity of treatment with on-campus students.

Survey responses

Questionnaire survey

Of the 300 questionnaires issued, 134 were returned (response rate of 45 per cent). Of these, only 12 were returned from Information and Library Studies departments. This does not reflect the rate of return given the proportions that were distributed but does reflect the fact that the preponderance of staff in the LTSN-ICS are employed in Computing departments. An examination of the returned questionnaires did not reveal any significant differences in overall attitude to learning using technology but did highlight the fact that the development of VLEs for delivering ILS programmes is considerably less than in Computing courses. (Only three staff from ILS departments reported that they were using technology to support off-campus learners.)

In this section the quantitative responses are presented to questions relating to type of material being developed, systems used, extent of involvement in either managed learning environments or virtual learning environments, and perceptions of whether this would increase or decrease. Because of space constraints there is only scope in this paper to discuss some of the issues which were explored in the questionnaire. Additional work on the attitude of staff to information skills and resources required to support distance learning has been conducted and will be reported on in a separate publication.

1. Types of material being developed/used
A range of material was being developed and used by academic staff, the bulk of this being Web-based material within the institutional Intranet or on the Web itself. Of those surveyed, 55 per cent reported that they were using learning technologies to support off-campus students. (This figure appears high and may reflect that staff are recording development of teaching materials to support full time students learning when they are off campus as development of virtual learning materials). Figure 1 shows the systems that were being used. This appears to be consistent with other studies which show the dominance of Blackboard and WebCT as platforms for providing materials for virtual learners.

2. Extent of involvement in using technology to support e-learning
Staff were questioned about the extent of their development and use of IT-based learning materials on a five-point Likert scale. As can be seen in Figure 2, most staff rated their involvement towards the upper end of the scale.

A number of writers have used Rogers' innovation diffusion characteristics to describe the development process by which

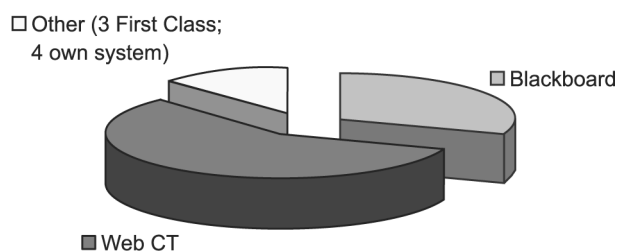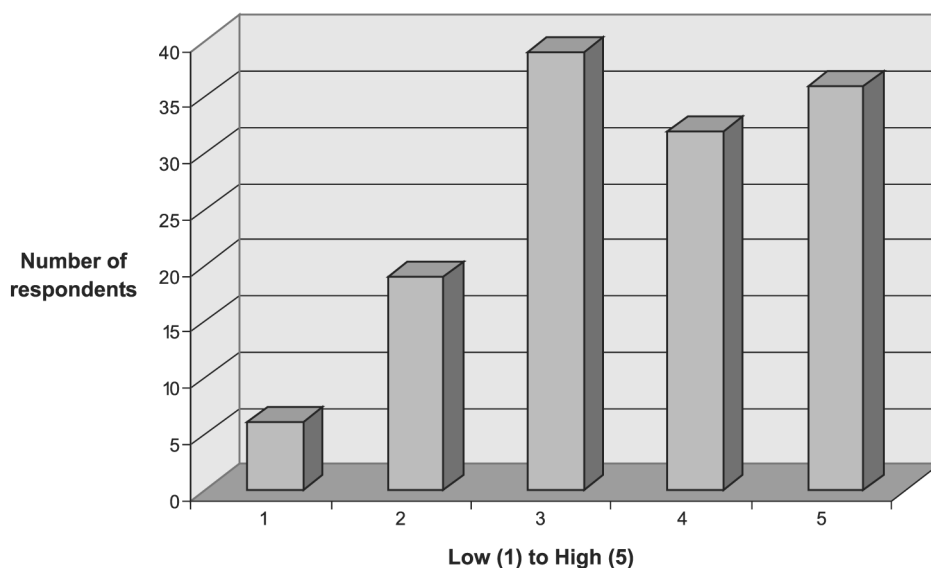**Figure 1** Systems used for development

Figure 2 Extent of involvement in using technology

new innovations are accepted (Rogers, 1995). This characterises the stages of diffusion chronologically in which adoption rates are normally distributed. The extent of the involvement of academics in the use of technology and the breadth of experience in the use of Intranets and a variety of virtual learning environments to deliver teaching would appear to suggest that we are at a fairly mature stage in the adoption of innovative uses of technology in teaching. The majority of staff surveyed (81 per cent) felt that they were involved in delivering teaching using technology extensively.

The nature of subject area taught by the academics being surveyed would lead us to expect that this may be higher than average across the academic sector.

3. Future involvement
Staff were asked to comment on the manner in which they foresaw their involvement in using technology in the development and delivery of distance learning programmes. In addition they were then prompted to comment on whether this was a trend which they personally welcomed. In reply, 82 staff (62 per cent) stated that their involvement would increase and of these the majority (78 per cent) had also rated their involvement as being high.

Only two staff (fewer than 2 per cent) stated that their involvement would decrease. These staff had previously rated their involvement as high and comments made elsewhere on the questionnaire

revealed that the staff had a high level of dissatisfaction because the workload in which they were involved was not appreciated by the management of their institutions.

A total of 38 staff (29 per cent) stated that their involvement would not change. Significantly, however, 78 per cent of this category had previously intimated in the questionnaire that their involvement with learning technologies was low or below average. This potentially has implications for future development. The figures would seem to suggest that staff who are not currently heavily involved in the use of new technologies in managed or virtual learning environments do not perceive that this is an area into which they will develop.

A total of nine staff (7 per cent) did not feel that they were in a position to know the extent of future involvement with the technology.

Overall the results of the questionnaire survey would appear to back up the contentions in the literature that staff are generally willing to get involved in teaching and learning developments using new technology. However, there are some important considerations which need to be addressed with respect to ensuring that these technology-assisted teaching and learning initiatives are recognised as important throughout institutions and that all staff consider that they should be involved in developments.

Questionnaire open questions/interview and e-mail responses

Inevitably in a survey of staff attitudes, open comment and interviews provide a richer picture than can be garnered from closed questions. The comments made are broadly in line with the general attitudes and concerns that have been identified in the literature.

The question of having time to develop comes through very strongly as an issue. It is fed back as an open comment in response in 37 of the questionnaires in response to a question concerning what staff found most frustrating about their involvement in using technology in teaching (representing 39 per cent of those questionnaires where a response to this question was given). This is very significant in terms of comment in an open question. In addition, all 16 staff interviewed noted this as a concern. Even those staff who, in the questionnaire survey, gave the most enthusiastic ratings for usefulness and potential of the technology, demonstrated frustration at the lack of time available and lack of recognition of what they were doing. In addition, staff reporting through the questionnaire showed concern that the time needed for ongoing development and updating of learning resources did not get any attention, and four academics felt that once the basic development work was completed there was no consideration given as to how the initiative could be sustained.

Similarly the issue of "value of teaching" comes through very strongly and appears in 30 questionnaire responses (32 per cent of those in which a response was given). It is seen very much to be an issue related to institutional culture/policy. As one interviewee commented: "We need an academic/business model and it must lead to a change in the way we work". There is a marked view that whilst institutions appear to state that they recognise the importance of virtual and managed learning environments they refuse to give recognition to staff who participate fully in them. Staff comment that there is a "lack of respect" and state that this is because development of materials is "not research" and thus does not get the status accorded to publications of papers and research reports. Phrases such as a need for focus and direction and co-ordination of effort clearly indicate a need for more robust policies by institutions. A need was expressed for a system that accurately measures and gives credit to time devoted to student support via virtual learning environments. On a positive note, the evidence of institutional policy and support came through in the comments from one member of staff who noted that: "my own university is committed to use of technology. We have a pro-vice-chancellor with such a remit. This is essential."

Significantly also there is a view that staff who do not participate are not encouraged to do so. A feeling of frustration is evident in the comments of some staff as they often referred to themselves as acting as "pioneers", and several expressed resentment that there was no compunction by staff to develop in what they see as a critical activity.

There were relatively fewer comments made on extrinsic rewards for staff and this is a point at which the survey results diverge significantly from the findings in the literature review. Only eight staff commented explicitly on this in the questionnaire (8 per cent of those who gave comments). However, in the interviews, ten of the 16 staff commented directly on this and were very strongly of the opinion that rewards in the form of reduction in face to face contact time and flexible support to fund equipment (which staff required for development work should be put in place).

In terms of training support for use of technology, the overwhelming response showed a need for Web design and Web authoring skills. Other comments concerned support for development of very specific skills such as video editing and construction of simulations. This is not a surprising result given the fact that the survey was targeted at a group of staff whom one would expect to have a high degree of computing skills.

The issue of basic skills which students require to make best use of technology-based instruction was pursued in the interviews. The questionnaire response indicated that these skills were highly valued and the interviews pursued in more detail the question of how these should be developed and supported. This produced some interesting comment on skills development, which ranged from "Our students have the skills (I hope!)" and (with respect to information literacy) "students are given all the material they need to study

effectively and learn about my subject", to comments which indicated that support for development of these skills to a high level had to be fully integrated in the learning environment. This area of research (relating to development of generic and transferable skills) deserves more detailed treatment but this was outwith the scope of this project.

With respect to barriers to use of VLEs by staff, the issues can be seen in the context of a general debate on pedagogy and virtual and managed learning environments. The need for support relating to the pedagogical principles and practice when using ICT in teaching and learning comes through very strongly. Staff were concerned about the paradox in terms of flexible "sequencing" of students through a programme of learning and the need to keep the cohort working at a consistent pace (8 per cent of questionnaire responses and noted in seven interviews and twice in e-mail correspondence). Staff expressed the wish to get help to translate their ideas for virtual learning into a working system and felt that they needed examples of good practice to support this.

The issue of liaison and assistance from learning support departments was not dealt with in the questionnaire, but in the interviews this was explored in more detail. Significantly, interviewees wanted to stress that they were not critical of support departments but felt that more resources needed to be spent in this area and more specific contextualised support offered to developers. During interviews, staff were asked how they fed back their requirements and took part in disseminating good practice, but responses were consistently vague indicating that staff did not feel that they had a good mechanism to allow them to do this.

It was heartening to see that, in commenting on the positive aspects of using virtual learning environments, academic staff saw the support and appreciation of students as being one of the primary motivators. Of the responses given as open comments in the questionnaire, 17 per cent specifically mentioned student feedback as being positive and encouraging. There is a general consensus that the main issue which staff see as a positive aspect of virtual teaching concerns improved student learning and support of students.

There was little engagement in the wider issue of epistemological, social or economic validity of developments in virtual learning environments.

Overall the picture that emerges is of a group of academics who are committed to use of ICT but are finding themselves increasingly frustrated at the lack of commitment at an institutional level.

Conclusions

Faculty are not recalcitrant Luddites. Many have simply been disillusioned by previous technologies touted as innovations that would alter the course of education. Faculty are exhibiting healthy scepticism when they resist the call to jump on the latest educational bandwagon before assessing how this new technology will help students learn (Bower, 2001).

Several studies that have been reviewed in this paper and the findings of the empirical study note that the reluctance of academic staff to get involved in distance learning using virtual learning environments does not necessarily mean that they do not feel these initiatives are important.

Indeed there is a great deal of evidence that, despite the uncertainty expressed by many academics about the lack of clarity regarding a rationale for being involved in distance learning there is a willingness to participate in the activity and this willingness appears to be almost entirely due to intrinsic values which academic staff place on teaching and learning. This is confirmed by the survey undertaken and reported here. Despite the existence of a number of significant problems associated with institutional support for staff engaged on working with VLEs, organisational barriers do not appear to have been significant in determining uptake decisions. However, it is important to note that they will certainly be important in the progression of any innovation. It would seem common sense that if academic institutions wish to develop Web-based distance learning initiatives, they must be receptive to putting in place effective strategies to support this.

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