

What campus-based students think about the quality and benefits of e-learning

Fiona Concannon, Antoinette Flynn and Mark Campbell

Fiona Concannon is a PhD researcher at the Educational Media Research Centre, at the University of Limerick, Ireland. Her research interests include the optimal design of learning technology using a sociocultural approach, in the domain of higher education. Antoinette Flynn is a lecturer in the Kemmy Business School at the University of Limerick. She has been active in the development and implementation of Information Communication Technology over several years. Her area of specialization lies in the use of technology to enrich students' learning in large groups in accountancy education. Mark Campbell is an interaction designer also based at the University of Limerick. Mr. Campbell is interested in the use of sound, video and 3D animation to create interactive and engaging e-learning content for users. Ms. Concannon, Ms. Flynn and Mr. Campbell combined their interdisciplinary interests to examine the effects of educational media and software in a blended environment. Research is in its third year of iteration. Address for correspondence: Fiona Concannon, Educational Media Research Center, CG050, University of Limerick, Ireland. Tel: (353) 61 213363; email: fiona.concannon@ul.ie

Abstract

There is a trend in Irish universities to utilise the benefits of the e-learning as a mechanism to improve learning performance of campus-based students. Whilst traditional methods, such as face-to-face lectures, tutorials, and mentoring, remain dominant in the educational sector, universities are investing heavily in learning technologies, to facilitate improvements with respect to the quality of learning. The technology to support reuse and sharing of educational resources, or learning objects, is becoming more stable, with interoperability standards maturing. However, debate has raged about what constitutes effective use of learning technology.

This research expands upon a study carried out in 2003 examining students' perceptions of e-learning in a large undergraduate accounting class environment. As a result, improvements were made to the instructional design of the course, to enable students to engage interactively with content. The subsequent study, reported in this paper, adopted a broad range of techniques to understand students' learning experience in depth. The findings of this research provide an insight into how these students really work and learn using technologies, if at all. It is hoped that our findings will improve the experience for both students and lecturers who engage in teaching and learning through this medium.

Introduction

A recent trend in higher education is to create and provide online access to course materials. Over the past two decades academics and institutes of higher education have been diversifying their delivery of instruction through new Internet media such as learning management systems, asynchronous distance learning, and online classrooms amongst a myriad of other burgeoning educational technologies. This combination of traditional face-to-face lectures or tutorials, and web-based course content is better known as “blended learning,” purporting to *blend* the best aspects of real and virtual environments. Many Irish universities have invested in architectures and platforms to support their teaching staff in delivering material to students in a blended manner. Other institutions have adopted a lecturer-driven approach, whereby teaching staff are left to their own devices to supplement their lectures and tutorials with online material, hosted via their own web servers and typically open source, freeware software, or basic web pages.

The reasons behind the drive to incorporate technology into the educational process are threefold. First, pressure to utilise information and communications technology (ICT) at university level comes from changes in the student demography. The rise of “full time part time students” is a phenomenon of recent years, where school leavers take part-time jobs whilst attending university, leaving less time for evening tutorials or weekend study. In addition, there is a drive for what is known as lifelong learning, whereby adults are increasingly returning to institutions of higher education to take supplementary courses whilst in full-time employment, or during short career breaks. In this regard, the Irish government has made a commitment to have 15% of adults in continuing higher education by 2006. The figure currently stands at less than 5% (Department of Education and Science, 2000). This movement to adult continuing education was also reflected in a statement made by Information Commission Society (Ireland): “The issue of integration IT to the teaching process is an important part of future improvements, which it will be crucial to pursue” (Boylan, 2000, p. 31).

Second, changes in the market for delivery of education is also shifting. Private for-profit higher education institutions are offering a wide range of certificate and degree courses. The Irish Open University Initiative “Oscail” and its UK equivalent offer distance learning diploma and degree courses. Many of these courses are delivered through ICT, along with weekend face-to-face tutorials. This distance learning market has also seen the arrival of new entrants, such as the Atlantic University Alliance, a collaboration between National University of Ireland, Galway, University College Cork, and the University of Limerick. Similar undertakings are underway in other institutes of higher education, whereby expertise in delivering blended learning within the institution is being extended towards distance learning courses by using a significant amount of ICT to overcome geographic and time barriers.

Third, another pressure on traditional institutions of higher education comes from innovations in new technologies. John Seely Brown and Paul Duguid claim that these technologies “offer new ways to think of producing, distributing and consuming aca-

demical material. As with so many other institutions, new technologies have caused universities to rethink not simply isolated features but their entire mission and how they go about it" (Seely Brown & Duguid, 2000). This sentiment is also being echoed by government policy towards higher education where the Irish State is attempting to set certain parameters of performance covering such areas as equity of access, commitment to e-learning and to ICT, commitment to life-long learning, and outreach to other communities.

In the subject domain of accountancy, the integration of technology into the classroom is also becoming a central issue for accounting educators for an additional reason. Accountancy professionals in industry require competency in accountancy-related information technology (IT) skills. Higher education institutions, in response, have tried to simulate authentic learning scenarios in the accountancy class and incorporate IT topics into their programmes. However, the efficacy of introducing technology in accounting education remains unclear. Positive learning effects associated with IT in accounting education have been noted (Abdolmohammadi *et al*, 1998; Fetters, McKenzie & Callaghan, 1986; Friedman, 1981). Equally, evidence has shown that technology has negatively impacted on learning (Dickens & Harper, 1986; Togo & McNamee, 1997). Indeed, some critics harshly criticise its introduction to educational contexts. Selwyn (2002, p. 172) claims in generic terms that "...in the final analysis educational technology remains a diverting pastime and 'add-on' to the curriculum for some teaching and learners, whilst for most in education its impact has been slight."

This paper hopes to look at some of the issues raised by individual students with regard to the use of technology in the teaching and learning process. Rather than focusing on macro issues, such as the political decisions behind the integration of technology, this research aims to examine individuals' acceptance or rejection of using ICT. Exploring the perspective of the individual student when discussing the use of technology is paramount to beginning to understand the nature of ICT in higher educational settings. This is of importance both to policy makers and education technologists in the debate on the role of ICT in education at an organisational level.

The module and the medium

This research focused on one module of The Principles of Accounting being taught to approximately 600 first-year undergraduate students at the University of Limerick. The module under investigation was part of a wider course, leading to a degree in Business Studies or Law and Accounting. The majority of students were between 17 and 19 years of age, coming from distributed second-level schools in Ireland. A minority were Erasmus students from various European countries, or mature students over the age of 23. For all, except overseas students, this was their first experience in using an e-learning platform, although most had previously informally used the web to gather information, or prepare coursework in second-level education, prior to entering university.

This module was delivered by using a blended learning approach, supplementing weekly lectures, tutorials, and laboratory sessions with online course content, interac-

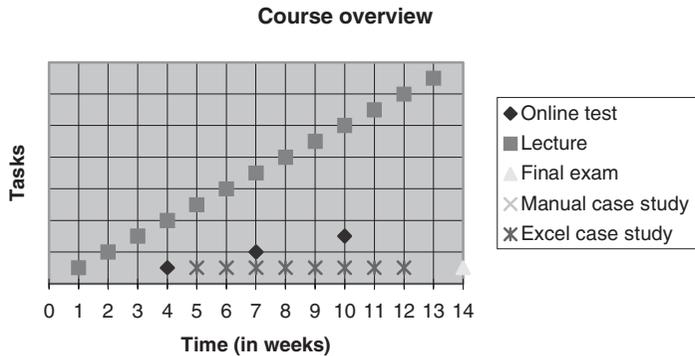


Figure 1: The tasks of the module, including three online tests, weekly lectures, tutorials, two case study tasks, and a final exam

tive quizzes, and Excel tasks. A range of different e-learning assessments complemented the traditional weekly meetings. Students were asked to submit a compulsory paper-based accounting case study, and additionally were offered two optional ICT assignments, a stream of online multiple-choice quizzes, and an Excel project. A module web site provided course details, additional readings, and supplementary links. Employing multiple teaching methods simultaneously is a form of blended learning (Saunders & Werner, 2003). Alternative instructional resources can stimulate positive effects on accounting students' learning experiences, according to (Rebele *et al*, 1998). Furthermore, instructional innovations are desirable to develop accounting students' IT competencies (Albrecht & Sack, 2000). Figure 1 illustrates the staged delivery of both the traditional and online elements of the module.

The university does not provide institutional support for e-learning on a campus-wide scale, but two other modules in their first year also used a blended learning delivery approach, providing lecture notes online, or sample answers, in the subject area of economics and mathematics. Both of these other modules differ in marking scheme and in the extent to which online supports are provided such as discussion boards, or positive marking schemes for continuous online assessments. As such, blended learning is not yet a norm across modules for first-year students at this current time.

Methods

The research developed on experience gained in a previous study on a prior cohort of students undertaking the same module. In this second iteration, qualitative and quantitative techniques were used to gain an appreciation of the students' experience with ICT as a supporting mechanism, and the blended delivery medium for the module. In particular, three main methods were used, namely, tracking data of time spent online for each student through web server log files; a survey of open and closed questions; and focus groups. Both the survey and focus groups gathered the most relevant data of students' perceptions of the e-learning process and product, and as such, account for

the main data finding reported by this research, supported by the quantitative measures (ie, user time online and closed survey questions) where appropriate. Both the survey and focus group methodology will be elaborated further.

End-of-semester survey

At the end of the semester, students were given a paper questionnaire to measure different aspects of students' experience, including general feedback on their attitudes towards the use of ICT within the module. A Likert-type scale from 1 to 5 (*disagree, disagree somewhat, unsure, agree somewhat, agree*) was used. Questions related to previous computer experience, motivation, time management, isolation, expectations, boredom, quality, and overall impressions. Open-ended questions also attempted to elicit feedback on their overall thoughts of the module and medium.

Focus groups

One of the primary aims of this research was to capture the *learner's* experience. Closed question surveys and log file user tracking data fail to capture the depth and complexity of this experience. Therefore, focus groups were selected as a mechanism to gather these stories and also observe the interaction between students, along with their attitudes, and understandings. Focus-group interviews were carried out with five groups of 3 to 8 students from the module, for 60 minutes. The focus groups were videotaped and transcribed. Analysis of the focus group data elicited a variety of influence on students' engagement with ICT for this module. These can be broadly grouped into individual factors, support factors, module, and course factors.

Findings

We analysed the qualitative data from the focus groups and the open-ended questions of the survey, to identify the major factors that influenced the learning experience, with particular reference to the e-learning tasks, of the three online tests, and the Excel case study. The closed-question responses and log files provided additional data to support these qualitative findings.

The reported influences on students' engagement with ICT in university were broadly grouped into four categories. These include factors unique to the individual, the social support from various sources, and organisational factors relating to the module, and the course as a whole. Figure 2 illustrates graphically these thematic factors in relation to the online learning tasks, and the delivery medium, namely, the web, as supported by the learning environment.

Individual factors

Individual student's acceptance or reflection of using ICT was not as straightforward as may be assumed and, indeed, is not even consistent *within* individuals from context to context. This is primarily due to factors that were unique to each learner. Each of the four main clusters of variables identified are examined in greater depth.

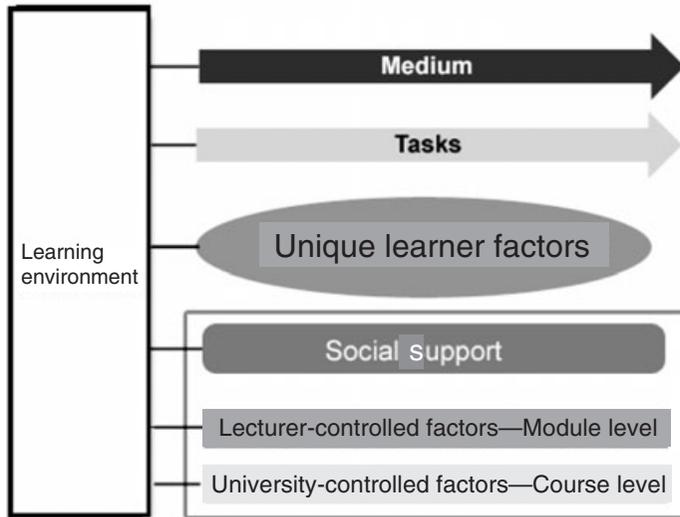


Figure 2: Graphic illustration of factors influencing the learning experience on information and communications technology (ICT) tasks

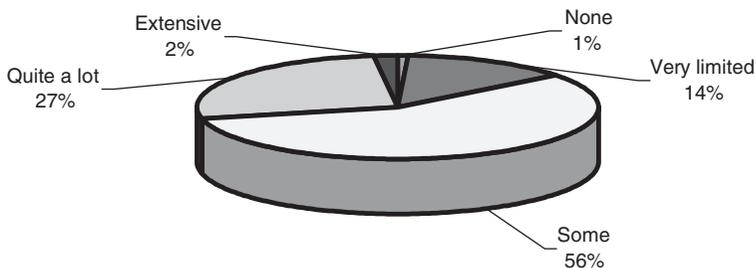


Figure 3: Students' prior experience with computers (N = 466)

Prior knowledge of computers, attitude, and self-efficacy

Only 14% of students in the end-of-year survey had very limited or no previous experience (1%) with computers. The majority claimed to have some prior experience with computers (56%), and almost a third expressed a quite a lot (27%) or extensive prior knowledge (2%) in using computers, as shown in Figure 3.

However, in spite of these results, *none* of the respondents expressed difficulty in accessing the web site, or sitting online tests, based on the previous computer skills, in open-ended questions, or in the focus-group session, suggesting that, because of the inherent usability of these systems, generic computer training is not required, even for students with no prior knowledge of computers.

Rather, it was learner attitudes to computers and awareness of online resources that seemed to be a stronger predictor of a student's likelihood to use these ICT resources. In particular, students varied in their awareness of online resources. Several did not discover a vital resource (the online Thomson Book) in preparing for the online tests. Others had minimal awareness of support for the Excel case study in show-and-tell flash demo files that helped the student through a step-by-step account of how to perform complex functions. One respondent's comment illustrates this:

C: I didn't look at the Excel demo. I couldn't find it. I don't like computers. I only went to one of the labs anyway. (Focus Group 3, week 8)

Therefore, these findings would suggest that using techniques to encourage students to locate and use online resources are more relevant than general computer training, even for novice computer users. New content additions, and tasks need to be clear and immediately obvious to users, either through email notification or by clicking on the site home page. Instructions on how to study, the learning objectives, and how to use the technology as a support tool of the wider task of preparing for the module are also critical.

Time and study patterns

The second major difference between students was the reported time spent studying. Varying comments were made as to what stage during the semester that students began studying. Preferences differed depending on the geographic location of their parents, and part-time jobs, as to whether they studied during the week or weekends. Some students used a "cramming style" of revision, beginning late in the semester. Others worked at a more continuous pace. Those who adopted this second learning strategy of continuous revision were more motivated to access web site resources. Students that adopted a "cramming" style to study and make revisions were less likely to use the practice tests, or supporting flash files for either online task—the online tests—or the Excel manual case study.

However, because of the nature of the three online tests, paced at intervals throughout the semester, all students in the focus groups reported revising on a more continuous basis, in preparation and following feedback from their results, than would otherwise be the case.

M: It's a good way to get you to study early on the semester, and not leave it till the last minute as usual. (Focus Group 1, week 8)

This was true even for students who reported preference for studying late in the semester. It is worth noting that it was the underlying pedagogic design which facilitated this change, rather than the technology per se.

Preferred educational resources

All of the students used similar strategies and resources in studying for the module. Typically, they would revise lecture notes and tutorial notes, relying on the web site as

a centralised resource for extra readings and missed information. Few students claimed to purchase the course textbook, preferring to rely on second-level education texts, or photocopying extracts from the textbook in the library. Attendance at the lectures as a key variable was a common denominator amongst focus group participants. Eighty-one per cent of survey responses claimed that traditional lectures and tutorial groups result in more effective student learning than a pure e-learning environment. An interesting comment in one of the focus groups was the following:

L: Most students do spend time on computers in college. It is easier and not as drawn out, than having to look up books. I expect [e-learning materials] for all my courses. (Focus Group 1, week 8)

Future career plans

One final factor that varied across individuals learning on ICT tasks was that of future job preferences. Students with long-term career goals in accountancy were more likely to report positive feelings towards using technology to learn. This was primarily related to their view of computers as an essential skill for professional accountants.

L: I just want the experience in excel. I think it's important for a job afterwards. I don't know if I will finish it yet, but I'm going to try. (Focus Group 2, week 8)

Those who had less clear career plans did not always see the link between the excel case study in particular, with commercial accountancy packages, and were therefore less motivated by the authentic nature of the task.

Support factors

Support through peer encouragement, perceived tutor and lecturer support were crucial in predicting the students' motivation to use the ICT supports provided in this course. The peer group was a major influence in determining whether or not students attended the evening laboratory tutorial sessions, and therefore, subsequently attempt the optional excel based case study task for 10% of the modules total marks.

Q: Did you attempt to do the excel case study project?

E: No.

Q: Did any of your friends attempt to try it?

E: No, none of my friends are doing it.

Q: Do you think you might try it, if some of your friends were also doing the project?

E: Maybe, yeah. If there were a few of us doing it, I might give it a go.

(Focus Group 3, Week 8)

In addition, students used their peer group support to attempt the online tests. Currently, the students can access and sit the online test at any time convenient to them during a set week-long period. Many groups of students reported converging in the same computer lab, at the same time, on their own initiative, to undertake the online tests, illustrating a novel and unintended use of the technology.

Another interesting observation of the effect of the social group on the student uptake of the online tasks occurred during the focus group itself. During the course of the

sessions several students underwent a change in attitude on listening to other students undertaking the various assessments, vowing to attempt the tasks themselves. As other students praised the use of various educational technology supports, and gave accounts of their immediate friends also using it, those who had not attempted these tasks, or with close friends who had used them, changed their minds and left the focus group with the intention to use the next ICT support.

Again, the lecturer enthusiasm for the ICT components and tasks was an important initial motivator for the students to access the online material. It took several weeks for the students to become accustomed to using the web site as a resource, but once the momentum gathered after week 3 of the module, it was self-perpetuating.

The online discussion board was used as a means to communicate with tutor and lecturer on task deadlines, requirements, and difficult questions that students could not find an answer to by asking their classmates. However, asking tutors during the lab sessions, or emailing the lecturer was a preferred method of getting answers to more difficult and critical questions. Questions posted on the discussion board tended to be organisational rather than related to course content, suggesting that more needs to be done to create a space for dialogue on cognitively complex tasks in the online environment.

Students made suggestions to the lecturer to allow for a set instructor-organised time in which students could do the test, with a tutor present. The open, flexible nature of taking the assessments anytime, anyplace was not widely appreciated by all students, and they expressed a desire to have tutor support during these activities.

Lecturer—module factors

The category of factors that are under the direct control and manipulation of the lecturer include the marking scheme, the time of lectures and scheduled lab tutorials, the localisation of online content, and the instructional design of the materials on the web site, including the content's interactivity, navigation, and appearance.

One of the most frequently mentioned of these lecturer-controlled factors is that of the marking scheme. The most prevalent theme from the focus group sessions was the importance of a reward structure that encouraged students to rely on the online resources, without negatively punishing them if they chose not to use them. Again and again learners emphasised the role of the marking scheme in their decision to use ICT resources. Without adequate reward structures, students were unlikely to access the online resources or tasks, despite recognising that they would assist their preparation for the final exam at the end of the semester.

Another issue that arose was the scheduling time of labs. Whilst this may seem like a trivial issue, the time of tutorial session during the evening was a major deterrent to many students. Evening sport, or socialising or fatigue were all cited as reasons for not attending laboratory sessions from 6–8 p.m. twice a week. Consultation with learners

may be a necessary step before scheduling tutorials in hours outside of 9–5. Whilst it is unlikely that all students can be accommodated, it may be possible to come to a compromise between available lab times and those that students prefer.

Finally, the last factor influencing the learner experience with ICT, under the lecturer's control is that of the instructional design of materials. This is a topic with much written about it of late. The main feedback from students on their impressions of the content's interactivity was that the navigation of the materials was the most important. Being able to find resources quickly and easily, along with recognising new additions to the site, at a glance was stressed as key. Interactive quizzes should be able to provide instant feedback, along with comments on questions that were not answered correctly. To support this goal, staff training, supportive communities of practice, or development of a specialised unit to guide staff in designing pedagogically sound content for web delivery may be necessary.

University—course factors

Factors under the control of the university at course level that influenced the students' experience with the learning technology involved two main variables. These are: the provision of access to computers and the technical support available to both staff and students. Eighty-six per cent of the class reported that they had access to a computer when not in college. Mixed comments were made in the focus groups on the availability of computers on campus. As the semester progresses computer access became more restricted, as the demand for computers across the campus is increased.

The more critical issue for students, however, was the availability of technical support. Network outage and problems printing PowerPoint slides from various computer suites on campus were major issues and caused a great deal of stress and inconvenience to students during the semester. Ongoing issues such as gaining support for laptops, or home computers were commonly cited as problematic. Frequently, this issue of the provision of technical support for students escapes consideration by academic committees and administrators in implementing e-learning strategies. This brings into question issues around cost models for implementing ICT in education that is beyond the scope of this paper. Suffice to say, it is critical to have adequate technical support for students, and clear channels through which to seek resolution to problems.

Discussion

It is clear from this research that to look only at the positive and negative factors of technology, is to miss the wider factors impinging on students' use of it as a support mechanism. Age-old problems of students' motivation, peer influence, and study strategy are all as important to the learning process, as are access to technology and computer skills. This research answered two important questions in relation to learning with, and through, the medium of technology, namely how students really used this medium, and the overall impact of the ICT.

Based on the finding of our research, a distinct picture emerged of a campus-based full-time student, struggling to meet the course demands through the set tasks and medium provided by the lecturer and institution. Several of the key factors impinging on their use of ICT were apparent. Some generic patterns of a student studying in higher education included their preferred educational resources, their attitudes to computers, their study patterns, and future career plans. Factors under lecturer and university control that also influenced the learners' experience include the reward structures, the lab times, the instructional design of the content, access to computers, and technical support. However, of primary importance to the process were peer encouragement and perceived lecturer and tutor support.

It is interesting to note that students approach the study process in much the same way as they might have, prior to the introduction of technology. The major difference is that students are using the Internet as a secondary resource, along with textbooks, to supplement the lecture and tutorial notes. In addition, the medium is also changing their learning strategies, moving towards continuous revision for the online tests, in a manner that could not have been facilitated by a lecturer correcting 600 exam scripts three times during the semester. Finally, the medium was also allowing students to go through material with the flash demos, at their own pace, either in tutorials (preferred location), or at a later time. With large lab sessions, it was difficult to ask questions, and as students had varying prior experience with Excel, it was difficult for the tutor to give the necessary individualised instruction.

Students saw e-learning as an expected and integral part of the learning process within higher education. Major benefits noted included the ease of access to resources, given the limited books in the library, and the provision of central area for students to access to find information or comprehensive resources pertaining to each module. Over 70% of the students in the end-of-semester survey commented that they were happy overall with the e-learning aspect of the module.

Negative experiences that were verbalised focused predominately on technical problems. However, the prevalent positive feedback of students to the use of ICT in the learning process reported in this study conflicts with some other research in the literature, particularly that of David Noble (Noble, 2002). Noble notes the experience at the Canadian University of British Columbia in which students voted in a referendum 4-to-1 against an initiative for lecturers to use more web site technology in their courses (Noble, 2002 p. 35), despite a lengthy administrative campaign promising them a more secure place in the high-tech future. The positive comments from this research's investigations would suggest that the difference is less because Irish students are uncritical in their acceptance of ICT in education, and more because they experienced a real improvement in the quality of their education experience. Part of this may be due to the large class size ($N = 600$), and the differences between American and Irish higher educational experiences, but these questions go beyond the scope of this study. Most participants agreed that the ICT was an expected and necessary part of their university experience and for future career prospects.

We need to examine the role that educators expect ICT to play in the educational process. It is clear from this research that students consider it a valuable support to the learning process. They see it as an additional reinforcement to the traditional face-to-face delivery mediums, and they make regular use of the medium's flexible access, and the incentive it provides for ongoing study and continuous assessment, in preparation for the final exams. Whilst there is room for technical improvements such as customising feedback and adapting the material to the learner's profile, the e-learning component is a welcome and expected improvement, particularly for large class groups such as this. Its impact falls far short of the radical visions of the virtual university, but neither is it seen as an ineffective, misplaced support to student learning at university level. Instead, e-learning, based on a solid pedagogic rationale, providing feedback, interaction, and access to course materials, is seen as both a benefit, and an improvement in teaching quality.

References

- Abdalmohammadi, M. J., Brown, C. D., Feldman, D. A., Gujarathi, M. R. & Haselkorn, M. (1998). Designing and implementing an AECC complying introductory accounting course: a four-year perspective. *Advances in Accounting Education* 1, 147–162.
- Albrecht, S. W. & Sack, R. (2000). *Accounting education: charting the course through a perilous future*. Sarasota, FL: The American Accounting Association.
- Boylan, B. (2000). *Living conditions, working conditions and industrial relations in the knowledge society*. Dublin, European Foundation for the Improvement of Living and Working Conditions. Retrieved 30 September 2004, from <http://www.eurofound.eu.int/publications/files/EF0123EN.pdf>.
- Department of Education and Science (2000). *Learning for life: white paper on adult education*. Dublin, July 2000.
- Dickens, T. L. & Harper, R. M. (1986). The use of microcomputers in intermediate accounting: effect on student achievement and attitudes. *Journal of Accounting Education* 4, 127–145.
- Fetters, M., McKenzie, J. & Callaghan, D. (1986). Does the computer hinder accounting education? An analysis of some empirical data. *Issues in Accounting Education* 1, 76–85.
- Friedman, M. E. (1981). The effect on achievement of using the computer as a problem solving tool in the intermediate accounting course. *The Accounting Review* 56, 137–143.
- Noble, D. (2002). *Digital diploma mills: the automation of higher education*. New York: Monthly Review Press.
- Rebele, J. E., Apostolou, B. A., Buckless, F. A., Hassell, J. M., Paquette, L. R. & Stout, D. E. (1998). Accounting education literature review (1991–1997), part II: students, educational technology, assessment and faculty issues. *Journal of Accounting Education* 16, 179–245.
- Saunders, P. & Werner, K. (2003). *Finding the right blend for effective learning*. Retrieved 11th July 2004, from <http://www.wmich.edu/teachlearn/new/blended.htm>.
- Seely Brown, J. & Duiguid, P. (2000). *The social life of information*. Boston, MA: Harvard Business School Press.
- Selwyn, N. (2002). *Telling tales on technology. Qualitative studies of technology and education. Cardiff papers in qualitative research*. Hampshire, England: Ashgate Publishing Limited.
- Togo, D. F. & McNamee, A. H. (1997). Computer integration in accounting education: guidelines and pitfalls. *Accounting Forum* 20, 381–397.