Undergraduate Students' Perceptions of Technology-supported Learning: The Case of an Accounting Class

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The aim of this study is to explore students' perceptions of e-learning in a large undergraduate accounting class environment. E-learning technologies are increasingly widespread; however, they are often employed for technology's sake rather than directed by a pedagogic rationale. This study explores e-learning technology from the student's perspective, using surveys, focus groups, and in-depth interviews. From an exploration of emergent themes, a deeper understanding of the learner's experiences online surfaces. These factors are reported as significant to the success of online course components (for large-group learning) and are contextualised within the specific pedagogic model employed.

INTRODUCTION

The purpose of this research is to evaluate the effectiveness of e-learning within the context of the large classes that are now a standard feature of undergraduate education in the university sector. The need to harness the benefits of Web-based education for large class teaching has long been recognised. However, debate has raged over the past 20 years about the most effective use of technology (Noble, 2002). In the accounting classroom, innovative technology is one instrument that can aspire to meet the Accounting Education Change Commission's (AECC) life-long learning objectives (AECC, 1990). This is underscored by the curricula recommendations of the

American Institute of Certified Public Accountants (AICPA) and the European Centre for Higher Education (2003:16). However, a realisation has emerged that it is not the technology itself that is valuable but the means by which it is employed. Indeed, effective technology integration is an issue that has yet to be addressed by accounting educators (Rebele et al., 1998).

This study attempts to counter this deficit in traditional accounting pedagogies. We examine the experiences of students using specific computing technologies; these technologies are aimed at supporting the learning of difficult accounting concepts and at mastering practical skills. We discuss these findings in terms of major themes that emerge, and in the light of current research on this topic. We maintain that the integration of Web-based technology with conventional teaching methodologies is, at this time, a necessity; however, we contend that the design systems need to be flexible to allow teachers to deliver the material in multiple ways. We conclude with suggestions regarding (specific) instructional design and pedagogies that students require in a blended learning module. Using the paradigm of accounting education, we argue that lecturers, technology-design providers, and educational theorists must engage with heterogeneous and complex elements when considering the introduction of e-learning into the university sector.

RESEARCH DESIGN

This study examines a population of Irish university students' perceptions of technology as another delivery and learning mechanism. Our research paradigm posits the learner as central to efforts to explore the effects of technology use in the classroom. There is clearly a need to differentiate between prior perceptions and reflective perceptions of learners. The students' prior perceptions of e-learning are crucial to the success or failure of the endeavor. A negative perception potentially creates barriers to e-learning; conversely, a positive prior perception motivates a student to engage with the learning systems. The increased computer literacy of school leavers and positive associations with computer use in general do have an impact upon students' openness to the concept of blended-delivery modules.

The design of information and computer technology (ICT) instructional media necessitates certain assumptions (on behalf of the instructor) about the students' interaction with and utilisation of that media. An examination of students' reflective perceptions of ICT instructional media provides the key to further development and refinement of those media. In doing so, the ICT media are adjusted and thereby become more student-centered. Ultimately, this optimises student learning and interaction. Thus, in the context of this study, we prioritised student perceptions of their learning experience.

Our choice of methodology was informed by the nature of our research questions. We wished to identify the key issues that encouraged or discour-

aged students to embrace a blended-learning model. Therefore, our priority was the examination of students' perceptions of their learning experience. This required qualitative methodologies. Using a short survey, focus groups, and in-depth interviews, we considered the impact of e-learning on student attitudes. In this context, qualitative research benefited the richness and validity of the gathered data. The survey vehicle had a response rate of 43% (238 students). The other methods applied were three focus groups and four in-depth interviews. A total of 19 students took part in this second method of research. Thematic analysis enabled refined themes to emerge. Survey results were independently analysed and the qualitative commentary was complied without interpretation or editing, later to be analysed by the researchers. Both the interviews and focus group sessions were audio taped, transcribed, and assessed. Field notes were also used to spontaneously identify key themes; these were then reviewed and used in the analysis process. In addition to our qualitative methodology, in the case of the spreadsheet instructional strategy, we employed an empirical analysis of student performance in examinations to ascertain whether the use of a blended-learning model affected actual student performance. Our research design facilitated an investigation of relationships between student perceptions, course design factors, and instructional strategies used.

THE PEDAGOGIC MODEL

The pedagogic model used in this research is a hybrid of the traditional model of classroom teaching and contemporary e-learning. A range of different learning assessments complements the traditional lectures, tutorials, and computer laboratories. Students are asked to submit a compulsory paper-based accounting case study and are also offered two optional ICT assignments: a stream of online multiple-choice quizzes and an Excel project. A module website provided course details, additional readings, and supplementary links. Employing multiple teaching methods simultaneously is a form of blended learning (Saunders & Werner, 2003). According to Rebele et al. (1998), alternative instructional resources can stimulate positive effects on accounting students' learning experiences. Furthermore, instructional innovations are desirable to develop accounting students' IT competencies (Albrecht & Sack, 2000). The Kolb and Fry (1975) experiential learning model best describes the learning intention here. This seminal model makes explicit use of research by Piaget (1926), Dewey (1933), and Lewin (1951).

Four elements of the learning process are suggested and presented in a learning loop (see Figure 1). The creation of assessments that simulate real-world experiences with accounting information is a learning opportunity that facilitates reflection and integration with the more abstract lecture and tutori-

al material. This model is comparable to the problem-based learning approach. Breton (1999) found that problem-based learning activities (in comparison to the traditional learning format) improve student exam performance and also have a positive impact on the long-term perception of learning efficacy.

This approach, and the implementation of e-learning, is necessary as accounting practitioners prefer graduates who have experience in the software solutions that are now standard in the industry. Two types of ICT assignments were considered most appropriate to meeting the requirements of both the experiential model and the desire to equip students with the skills considered desirable in the workplace: the Excel accountancy project and online tests.

The adult learning model put forward by Brockett and Hiemstra (1991) emphasizes the student's personal responsibility in the learning process. In this Personal Responsibility Orientation (PRO) model, self-direction in learning embraces the instructional method processes (self-directed learning) and the student's personality characteristics (learner self-direction). Both the differences and similarities between self-directed learning as an instructional method and learner self-direction as a personality characteristic are explicitly recognised. The key elements of the PRO model are illustrated in Figure 2. The PRO model demonstrates that adult self-directed learning is based on the notion of personal responsibility. The teaching and learning transaction needs to be designed to facilitate and, in some cases,
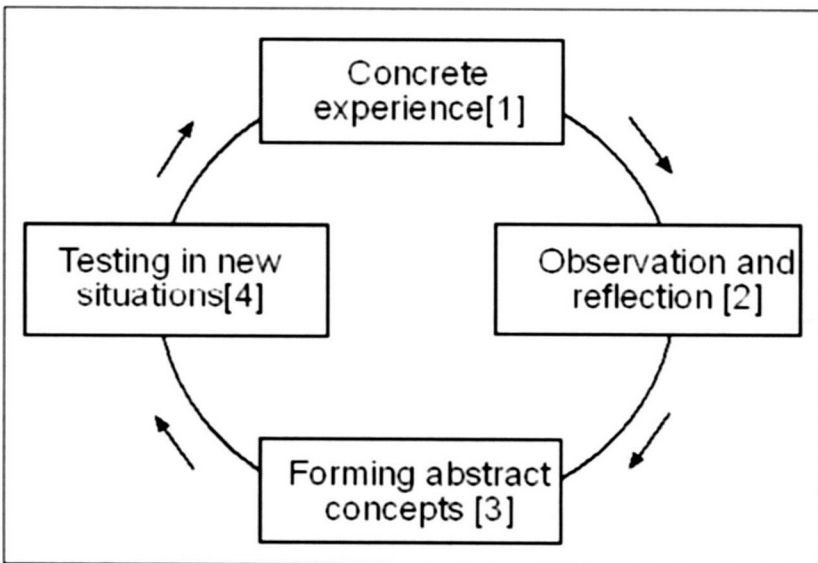

Figure 1. The experiential learning circle
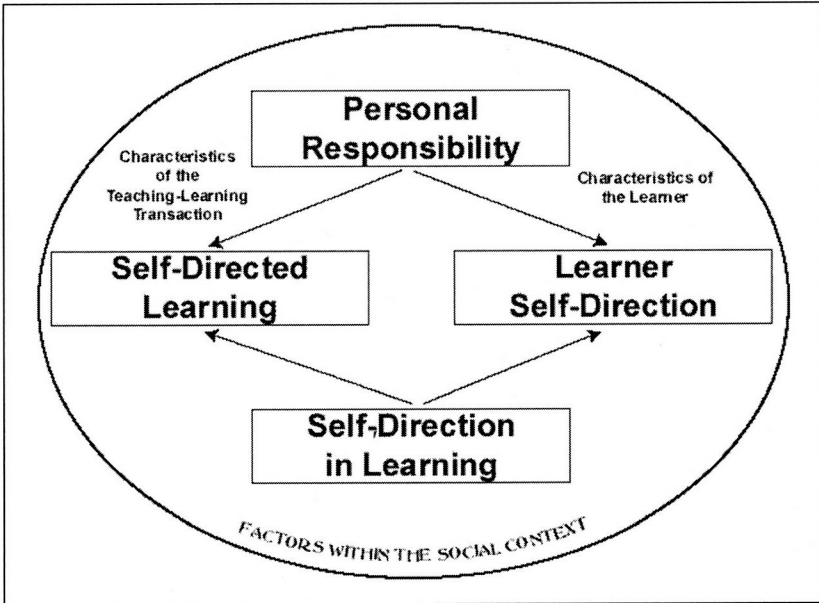(Adapted from Kolb & Fry (1975))

Figure 2. The Personal Responsibility Orientation Learning Model
(Adapted from Brockett & Hiemstra (1991))

motivate self-directed learning. The circle encompassing all these elements suggests the influence of the social context of the PRO model.

While the individual learner is central to the idea of self-direction, such learning activities are influenced by the social context in which they occur. Adult learners often function as a fellowship of learning (Brockett & Hiemstra, 1991). Therefore, it is crucial to recognize the social environment in which such learning occurs.

INSTRUCTIONAL DESIGN STRATEGIES

Instructional Strategy: Problem-Based Learning

The **Excel project** is a problem-based activity that simulates accounting software. Romney et al. (1996) argue that integrating information systems into core accounting modules facilitates the assimilation of accounting concepts and the accounting framework, and further assists with the comprehension of other accounting material. The students are asked to create interactive daybooks, ledgers, and a trial balance (albeit simplified); these relate to a similar offline compulsory case study. Worth 10 percent, this assignment is supported by evening labs. The tutors use short practical problems to

revise previously known Excel functions and then later to introduce new,
complicated functions (for example, cell referencing). Once the review is
completed, the remaining lab time in the semester is devoted to working on
the Excel project . The students are expected to observe and reflect on the
mutual nature of the Excel project and the manual case study, and recipro-
cally apply that learning (the final exam also contains similar questions, but
in a limited manner). This assignment is submitted on disk with the manual
case study; feedback is given with the manual case study.

Instructional Strategy: Drill and Practice

Three elective online multiple-choice quizzes were offered to students
during the semester; these constituted 10 percent of the final grade. These
short, timed quizzes were introduced as an alternative learning device; they
offered students the opportunity to drill and practice multiple-choice ques-
tions, a sometimes difficult task for students. These quizzes are automati-
cally graded and feedback is available online to each individual student once
the quiz period is finished. These elective quizzes followed the lecture mate-
rial and access was limited to 1 week. The question order of each quiz was
automatically randomised for each student, thereby attempting to mitigate
the potential for dishonesty. Students were further motivated to participate
in these quizzes by guaranteeing that the online results would be discounted
should they have a negative impact on the final grade'. For this reason, the
assessment resource is categorised as predominately formative. The option-
al nature of these assessments allowed students autonomy and is intended to
motivate students towards self-directed learning.

Instructional Design Strategy: Website

The website (www.staff.ul.ie flynna) was designed to fulfill three func-
tions. Firstly, it was used as an additional means of information delivery; for
example, weekly lecture notes, tutorial solutions, lab assignments, and class
announcements were posted on the site. The second function of the website
was to host the ICT multiple-choice online tests. The technology facilitated
the registration of each student for the various on-line tests; furthermore, it
enabled the delivery of immediate personalized feedback for each student.
Thirdly, the website included interactive links to the core text and addition-
al links to optional further reading material. These additional links assisted
the students in their self-directed learning journey.

RESULTS AND DISCUSSION

Experiences of the success of e-learning are as varied as the range of dif-
ferent learners that are learning through the online tasks. Principally, the
learning technologies employed in the delivery of this accountancy module

appear to have promoted study. This was achieved through the use of its marking structure, staged nature of assessments, and the perceived difficulty of the tasks. We present our finding under the following headings: (a) the instructional strategy: drill and practice, (b) the instructional strategy: problem-based learning, (c) content/module website, (d) the cognitive load, (e) the availability of help, (f) the blended delivery methods, (g) motivation, (h) social factors and (i) access issues. They are shown graphically in Figure 3. The reasons for these findings are postulated and conclusions are drawn, with particular reference to related research.

The data reported below is drawn from the three major elements of the online instructional design. While this subset does not capture all of the comments made in the interviews and discussion groups, it does manage to capture the main elements of what the students had to say. Hence, this forms the framework for this study. Major themes subsequently emerge and will be discussed.

a) Instructional Strategy: Drill-and-Practise

The instructional strategies behind the technical tasks were varied. The term 'instructional strategy' is used to cover sequencing and organizing of content, specifying the learning activities, and deciding how to deliver the content and activities. In this case, two main ICT strategies were used to promote student activities. These were the drill-and-practise strategy and the problem-solving strategy.
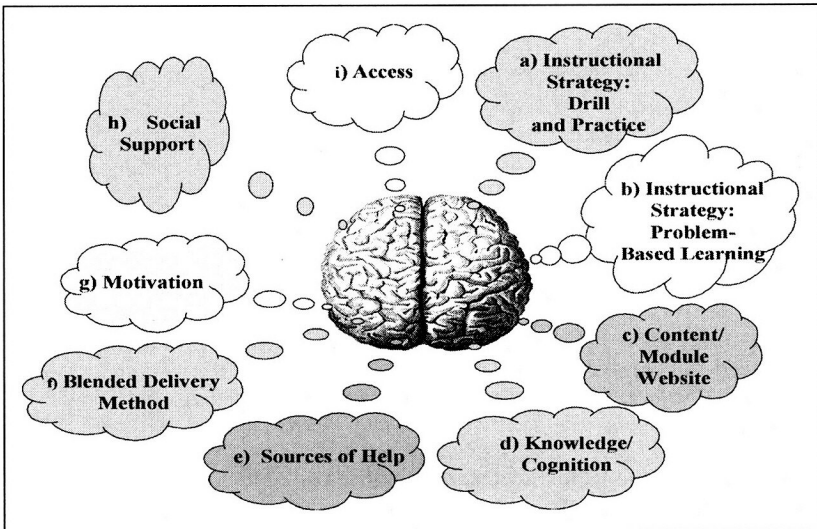

Figure 3. Reported bundle of factors affecting pedagogical use of ICT, as perceived by learners

The multiple-choice online tests represent a drill-and-practise type of instructional strategy. This was generally found to be a useful task, and was attempted by most students (80%). It was noted that students enjoyed the staged nature of the three online tests. It provided them with an opportunity to reassure themselves of their progress throughout the semester. There were mixed views on how much this study contributed to the final exam. However, many students used this type of teaching strategy to their advantage; they used the questions to promote debate and deeper processing when studying in groups for the final exam. All students reported that the online tests simulated the pressure and time constraints of the final paper exam well. The marking scheme for the online tests was identified as a key advantage. Because no marks were lost if they performed badly, students had an incentive to complete all three of the tests.

M: It could be a handy percentage for the exam. It's great you know that, if you did badly, it could be disallowed.

The fact that students could practise and potentially gain a better grade, without a concurrent risk of losing marks, provided motivation to utilise this online resource. Voluntary uptake by the majority of students and their positive attitudes to this learning process suggests the strategy was a successful one. For the most part, the online tests were found to be a very beneficial mechanism to get feedback and practice on the course content.

b) Instructional Strategy: Problem-based Learning

The Excel task is a problem-solving task; it requires an integration of known material and methods into solving a particular task: in this case, creating a set of accounts. This was found to be more difficult by all students; in particular, the inability to access support and to have results validated as the task progressed was perceived to be a significant disadvantage. Students struggled with the concept that the Excel project paralleled the manual case study. Student feedback illustrated the lack of understanding that both tasks supported each other. Indeed, only one student seemed to understand how the Excel worksheets linked together.

C: You could see the whole project, and you could see how all the worksheets link in, so it was better than just doing it on paper. So I understood it a bit better... If I went into an accountancy practice, it would be a big help in allowing you to see how the accounts work.

Most students saw the Excel task as a means of understanding calculations, and were confused by the multiple ways the task could be completed. Such students generally reported they would prefer to use an accountancy package, rather than understand the logic behind the development of these systems.

> *P: I was just doing general Excel functions, and couldn't really apply it to the whole accountancy side of things – why you were supposed to do things. So, it was a bit confusing.*

Contrary to student opinion, when tested, the correlations between the case study and the Excel project results are positive and significant. Indeed, those that completed the Excel project scored significantly higher on the case study than students that did not. In order to increase uptake of this voluntary assessment, students must be informed of the benefits of completing the project. Students, in general, require prompting and specific tasks from the tutor and lecturer. Where tasks were less structured, some students had difficulty. Students have a tendency to overlook even the most explicit instructions: they can do the surprising, unexpected, and forbidden (Spitzer 2002). A short tutorial or lecture on positive e-learning habits collected from students in previous courses may be helpful in ensuring that students have the prerequisites to succeed.

c) Content/Module Website

Lectures and tutorials were major sources of information for the students. Content delivered through the Web was printed and read in paper version, in preference to on the screen. The website was successfully used by some students as a mechanism to briefly check for assignments, test announcements, and lecture notes. However, little additional material (such as supplementary links and additional readings) was viewed online or printed out. Our qualitative research suggested that students were overwhelmed with the amount of information and actively disliked the presence of links to additional material:

> *M: I didn't like the articles [the online links to additional articles], as I didn't like having them to read. It didn't interest me. I didn't read them at all.*

This comment clearly identifies the reluctance of students to risk what they perceive to be a danger of 'information overload'. However, several students suggested additional features that they would like to have seen on the website including a search function to retrieve all documents on a particular topic, such as those relating to the case study. In general, the website served a useful purpose in obtaining information but was not a primary learning channel. Most students were indifferent to its existence and did not interact with the content online in any meaningful way. This suggests that learning is in some way related to the interaction of the learner, with the content or with others in this process. An emphasis on *learning by doing* was reiterated repeatedly by all, with more interactive content requested online rather than passive text.

d) Knowledge/Cognition

Computer confidence did not seem to detract from student learning in the case of the online tests and the website. However, the students reported less confidence with the greater IT knowledge required for the problem-based Excel task and this project had a much higher drop-out rate. All participants in the study commented on this issue although it constituted only one facet of the abandonment decision. Prior knowledge of the subject matter was perceived to be an advantage. However, this factor was not as relevant for the final exam performance.

Despite the difficulty some students had with new material and technology, our research suggests this experience necessitates deep processing provided that students did not opt out early. Koh & Koh (1999) also reported similar findings pertaining to the impact of prior knowledge on academic achievement in accounting courses. They found that although its influence was considerable, academic ability was reported to be of greater significance. With that said, some students with no prior knowledge felt under a good deal of extra stress; the knowledge that other students had covered this material to a high level for a previous state exam heightened this anxiety.

> *L: You really have to start from scratch. It really helped people who had done Leaving Cert accountancy.*

> *Anon. Survey Response: I felt that not having done accounting to Leaving Certificate was a huge disadvantage, which was not acknowledged as much as it should be. Unfair to students in courses other than Business Studies students in that they are assessed to the same degree.*

These responses indicate that the degree of difficulty of the course material for absolute beginners is pitched at a high level. The survey response from students who had prior knowledge of accounting signifies that the course material did not noticeably challenge them.

> *S: I did accounting for Leaving Certificate. This module was not a big step up for Leaving Certificate accounting at all. Of course, the lecturer had to start from scratch. However, I found it to be very boring at the beginning.*

While research (Koh & Koh 1999) indicates that prior knowledge does not guarantee better academic results, it is clear that students believe otherwise. Due to large class sizes and uneven background knowledge, it is inevitable that some students believe they are at a disadvantage. Lecturers and tutors should counter this perception as it results in unproductive stress for students. Further research into the development of alternative and mutually reinforcing support mechanisms is desirable.

e) Sources of Help

The importance of the social context as key to the learning experience emerged from discussions. Friends and fellow classmates were the primary source of support.

> E: I thought the Excel v-lookup was very confusing. You needed a group to figure it out. I had to go home and ask old school friends. I hadn't a notion [how to figure it out alone].

This finding confirms research into the utilisation of sources of academic support by Moncada & Sanders (1998). Among 12 alternative sources of support, accounting students ranked friend/classmate as the most significant source of help, with instructor meetings before and/or after class as the next source. Tutors also answered queries relating to the Excel case study. However, textbooks, and the website were not used as a source of support. It is unclear whether this was due to a desire for face-to-face support, as opposed to paper or electronic help. Some students reported a desire for step-by-step procedures to answer questions, or discussion boards, but as to whether this would be used in reality is unclear. This deserves further in-depth investigation.

There was no online mechanism to ask questions in a public manner; neither was there access to online frequently asked questions. Queries were dealt with in tutorials in real-time and email queries were addressed anonymously in lectures, later in the week. However, most relied on friends or attempted to solve it on their own. There was little evidence of familiarity with the online resources that were provided. While these services were infrequently used, students generally found them unhelpful. When experiencing difficulty, students were confused about which support route to access: tutors, specific Web material, lecturers, or their social circle.

f) Blended Delivery Method

The use of the technology as an exclusive course delivery method was considered insufficient. Face-to-face tutorials and group learning were central to both student confidence and the learning process. A number of students mentioned that the large size of the class acted as a deterrent to their participation in lectures and negatively affected their learning experience.

> Anon. from survey: The only problem I have with the accounting module was that as the module size is so large it is impossible to ask questions.

> Anon. from survey: The numbers of the students are too many, so that the classroom is too big, it is harder to concentrate or listen to the lecture.

However, due to the large class size the blended delivery channel did offer some benefits.

> *Anon. from survey: The [online] continuous assessment - found it very useful as it kept you on your toes.*

This comment illustrates a key point. By undertaking the online continuous assessment, students were encouraged to stay intellectually involved with the module; this is a significant benefit as it counters the potential for alienation that can manifest itself in a large-class context. Combined with the teamwork initiated by the various ICT instructional strategies, the blended-delivery model prevented students from feeling isolated and de-motivated. While this finding was not unexpected, it is clear that more could be done to fully exploit the potential for increased learning collaboration through ICT instructional strategies that have teamwork at the heart of their design.

g) Motivation

Motivation is highlighted as an issue that significantly impacts better exam performance for students (Wooten 1998). Several factors were influential in motivating students to perform the e-learning tasks of this module. These include the marking scheme, the nature of the learner, the peer group, and the need to prepare for the final exam. The marking structure needed to encourage students to attempt the technology-supported tasks, without negatively affecting the final grade. The workload of the tasks also needs to be aligned with this marking scheme, to reward effort and invested time. A minority of students expressed concern that the marks awarded for the Excel project were not high enough:

> *A: The Excel project was a lot for just 10%. I have other projects for 12% and 20% that might not be as much work.*

This comment illustrates the influence the marking scheme has on the adoption of e-learning as another learning channel. In this case, the learner felt that a higher proportion of marks needed to be awarded for her to consider using this method, even though it offered another mechanism to gain knowledge, practice, and feedback. The comment is an indication of student reluctance to learn without clear grade incentives. The trade off appears to be short-term in nature: time and effort are exchanged for an immediate 'fair' percentage of the grade. This is contrary to the syllabus design that has as its fulcrum 'learning by doing': time and effort are traded for long-term learning and understanding. This implies that it is necessary to explicitly align the objectives of the students with that of the module, without compromising the quality of the educational experience.

Anecdotal evidence suggests that intrinsically motivated students enjoyed the e-learning sections of the module to a greater extent; it appears this was due to the lack of emphasis on group work and the flexibility of how participation was rewarded. As also opined by Bryant and Hunton

(2000), this is a rich area for future research. The peer group was a huge influence on the decision to start or continue to study through the online sections of the course. Whether or not students undertook the technology-supported learning assignment was directly correlated with whether their friends also carried out both assignments. This finding again confirms research by Moncada and Sanders (1998). Interestingly, preparation for the final exam was not a major motivating factor for students in undertaking the Excel project. However, several students reported retrospectively that they thought the online tests and the Excel project assisted with the attainment of a good grade.

h) Social Support

It was been found that the need for interaction is a student objective that often overshadows the content-orientated goals for the course (Palloff & Pratt 1999). This social nature of the learning process was reflected in how students engaged with the learning technology. The blended nature of the course allowed for social interaction: student-instructor and student-student. Students did not request that this interaction be replicated online. In fact, more student-instructor interaction was cited as being of great benefit. However, with limited university resources, it is significant that most students would prefer some form of online instructor moderation. Indeed, students made it clear that tutorials and lectures were essential. Typically, students met through attendance at lectures or by living in the same student accommodation as fellow classmates. Current research supports this finding. Mason (1994) argues that social and pedagogical issues play by far the bigger part in the creation of a successful [online] learning environment.

i) Access

While it was impossible to ensure that unlimited computer access was available for students on-campus, it seems that access was not a key concern for students. When questioned about whether lack of access to computers could have deterred some students from undertaking the on-line assessments, students dismissed this possibility:

> C: No! There are so many computers around the place [that this isn't an issue].

In order to assist students, the system was designed to allow students entry from their home computers. Thus, in the context of this study, it is clear that access did not play a decisive role in whether students availed of the blended model of delivery.

j) Self-directed learning

Another dimension is the degree to which the delivery method promotes self-directed learning and group learning. While there were individual preferences for individual learning, in all cases some type of informal collaborative learning was reported. Students reported having a preference for study-group learning or individual self-guided learning; they tended to use one or the other as their dominant method of study, along with a mixture of supporting approaches as specifically required by the task. Most importantly, students agreed that lectures and tutorials were essential learning media, in conjunction with group and individual study on all of the course tasks.

The flexibility of e-learning works well for students who are motivated, self-directed, and well organized (Brockett & Hiemestra 1991). However, it is less effective for those who require more support and direction. Those that chose to work on the Excel project tended to be motivated individuals who were comfortable with attempting tasks on their own even when their peers had rejected the same tasks as either too difficult or too time-consuming:

> A: It [Excel project] even helped me for the final exams. Most of my friends didn't do it and they were lost but I found from working on the Excel, it all came together.

Indeed, it is clear that the open entry and self-pacing did not motivate all students in the same manner. Rather than setting their own individual goals, some students preferred to work as a group, despite the individual nature of the ICT assessments. The interaction and peer support tended to enhance motivation and increase completion rates:

> P: Usually, I would decide to do the test and sit down with friends to study for it. Or pick out questions we think would be asked.

> R: The reason I did it [online tests] was because I could work in groups. It worked that way. And I might remember and have a chance of picking it up.

These two responses are more representative of those surveyed. Students that are not self-motivated to study and learn are likely to adapt their study habits to facilitate working in teams. They thereby generate the needed reassurance and motivation from their peers. However, while this peer support was generally helpful, it could be a negative influence as it alleviated concerns about not attempting worthwhile assessments. When asked whether she made the right choice about not selecting to do the Excel project, one student (M) replied:

> I think so, but I really don't know cause I don't know anyone who did the Excel.

It is evident that peer-group norms have a decisive impact on the decision making of the majority of students.

RECOMMENDATIONS FOR TEACHING AND LEARNING USING ICT

Website: The information presented must be carefully selected. Web-based learning should be more than automatic page turning or scrolling down endless pages of text material. A handout of readings should be supplied, rather than requiring students to read text online. It should also be noted that reading does not constitute learning. Deep processing of the material, as dictated by the task methods and goal, is needed.

Online tests: Online tests need to be clearly paced with course material. The tests may also need to be localised for regional differences, such as excluding Americanised terms; however, this issue can be outside the control of the instructor. Providing gradated practice tests could lessen anxiety for students without prior accountancy knowledge; it would also alleviate some of the perceived difficulties facing students who find the course pitched at too high a level. Similarly, some non self-directed students require more practice tests to support their learning.

The Excel project requires both good computer skills, and an understanding of accountancy concepts and information flow. Where one-to-one instruction is impossible due to resource constraints, a personalised online tutorial may offer a suitable solution. Equally, preparation before tutorials is also an important supplement to the learning process. Tutorials are crucial to the learning process as the large lecture sizes inhibits students and prevents them from asking questions; this on-going problem is identified in the survey commentary.

Varieties of factors combine to make it difficult to provide a base level of IT proficiency for students: the size and heterogeneity of the student body, the diversity of the computing environment, and large differences in students' computing skills. One suggestion is to have an online resource for people with no prior knowledge enabling them to become familiar with the terms and language used. It does seem clear that more can and should be done to educate students about the e-learning resources available and how to use those resources effectively.

CONCLUSIONS: LESSONS FROM THE RESEARCH

The use of e-learning technologies in large-class teaching can produce perceived benefits. This research examines the issues highlighted and offers insights into benefits and difficulties in using ICT to enhance the teaching and learning experience. Contrary to the belief that e-learning is a panacea

for all ills, it is clear that blended teaching requires more resources than tra-
ditional teaching: ICT can ameliorate some of the difficulties associated
with large class sizes but module-providers require additional support.

Cross-faculty collaboration is essential in order to align course objectives
with online instructional strategies. The university sector should explore the
possibility of providing a service for lecturers that meets key needs: advice
on suitable instructional strategies, technological training and support, and
software design. The necessary technological and administrative support to
generate ICT instructional strategies is usually organised as a centralised
function within the university. This often limits the software medium of
choice, clusters the technological skills in the hands of non-academic users,
and creates barriers for the ease of ICT adoption in the modern lecture hall.

In order to cultivate bespoke, appropriate strategies for individual teach-
ers, an alternative organisational structure is suggested. Dynamic decen-
tralised collaborations of teachers and technology design providers would
result in a fruitful exchange of ideas and skills. Furthermore, it would enable
the creation and evolution of tailored ICT strategies that has the student as
their fulcrum. Information technology is an important part of contemporary
accountancy practice. The literature consistently stresses the need for
accountancy students to be skilled in computing and to understand clearly
the accountancy practice it seeks to emulate. However, the most appropriate
and effective means of incorporating ICT into the accounting classroom
remains ambiguous. This research has raised questions regarding what con-
stitutes effective use. Marshall comments that "our failure to consider what
we want student to learn from working with technology often leads us to
accept activity for the sake of activity" (1997:37). As we have argued, there
are several possibilities for lecturers to engage students in new ways of
learning using ICT.

In summary, factors that were reported to have considerable effect on the
success or failure of the social use of technology included:

- Lack of peer-to-tutor interaction online,
- Attitudes and actions of peer group in class,
- Marking scheme.

Factors that were reported to have considerable effect on the success or
failure of the cognitive support provided by the technology included:

- Prior experience of both the subject matter and the technology,
- Flexibility to have students learn without the tutor or lecturer being present,
- Allowing practice and feedback using online tests, and delivery of lec-
  ture notes,
- Access to help and support.

The results of this research will facilitate the work of theorists, educators, and system designers. We argue that that systems need to be much more flexible to allow teachers to deliver material in multiple ways. Variables such as the marking scheme, the need for collaboration, the delivery, and the reward structure must be adjusted to suit course objectives, class size, and academic level. It is vital that we self-consciously interrogate and assess the technological learning environments we are developing for our students. Furthermore, blended delivery should be exactly that: educators must constantly emphasise to students that the suite of delivery channels are part of a unified strategy to promote optimal learning.

Blended learning is particularly important in the accountancy classroom but little research has been published in this field. Future research should attempt to develop a theory of learning for this educational setting, taking ICT into account. The value of e-learning is critical as education theorists have argued, in other contexts, that learning is a process optimised by action and reinforcement. With ever-increasing class sizes a feature of undergraduate education, e-learning is becoming an invaluable resource in providing forums for students to practise and receive feedback. However, educators must approach the new medium without being unduly shackled by traditional pedagogical norms. There is the possibility of new metaphors of learning. Above all, integrating collaborative learning and constructivist models could prove useful.

This study offered insight into the factors that affect the success of e-learning. In particular, student perceptions, course design factors, and instructional strategies illustrate the many ways the technology can be improved as an effective medium for teaching and learning in large class settings with practical course material. The identification of the above factors can help improve the experience of using online learning to enhance educational delivery and to facilitate the shared learning experience. By acknowledging the challenges presented in providing effective learning technologies, educators and students can work together to improve learning environments for the benefit of all.

References

Accounting Education Change Commission (AECC) (1990). Objectives of education for accountants: Position statement number one. *Issues in Accounting Education, 5*(3), 307-312.

Albrecht, W. S., & Sach, R. J. (2000). Accounting education: Charting the course through a perilous future. *Accounting Education Series, 16.* Sarasota, FL: American Accounting Association.

American Institute of Certified Public Accountants (AICPA) (1996). *Information technology competencies in the accounting profession: AICPA implementation strategies for IFAC International Education Guideline No. 11.* New York: AICPA.

Breton, G. (1999). Some empirical evidence on the superiority of the problem-based learning (PBL) method. *Accounting Education, 8*(1), 1-12

Brockett, R.G., & Hiemstra, R. (1991). Self-direction in adult learning. Perspectives on theory, research, and practice. London and New York. Routledge

Bryant, S. M., & Hunton, J. E. (2000). The use of technology in the delivery of instruction: Implications for accounting education researchers. *Issues in Accounting Education, 15*(1), 129-162

Dewey, J. (1933). *How we think* (2nd edition). New York. D. C. Heath

Koh, H. C., & Koh, M. Y. (1999). The determinants of performance in an accountancy degree programme. *Accounting Education, 8*(1), 13-29

Kolb, D. A., & Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.), *Theories of group process*. London. John Wiley

Lewin, K. (1951). Field theory in social science. Selected theoretical papers. New York. Harper and Row

Marshall, G. (1997). Time for change: critical issues for teacher educators. In D. Passey & B. Samways (Eds.), *Information Technology: Supporting change through teacher education* (pp. 35-39). Chapman & Hall, London

Mason, R. (1994). *Using communications media in open flexible learning*. London. Kogan Page.

Moncada, S. M., & Sanders, J. C. (1998). An assessment of the academic support system available to principles of accounting students. *The Accounting Educator's Journal, 10*(2), 44-55

Noble, D. F. (2002). *Digital diploma mills. The automation of higher education*. New York. Monthly Review Press

Palloff, R., & Pratt, K. (1999). *Building learning communities in cyberspace*. San Francisco. Jossey-Bass

Piaget, J. (1926). *The child's conception of the world*. London. Routledge and Kegan Paul

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*(2), 179-245

Romney, M. B., Cherrington, J. O., & Denna, E. L. (1996). Using information systems as a basis for teaching accounting. *Journal of Accounting Education, 14*(1), 57-68

Saunders, P., & Werner, K. (2003). Finding the right blend for effective learning. Retrieved March 3, 2004, from http://www.wmich.edu/teachlearn/new/blended.htm

Spitzer, D. R. (2002). Don't forget the high-touch with the high-tech in distance learning. In A. Rossell (Ed.), *The ASTD elearning handbook* (pp. 165-174). McGraw-Hill. New York.

Wooten, T. C. (1998). Factors influencing students learning in introductory accounting classes: a comparison of traditional and non-traditional students. *Issues in Accounting Education, 13*(2), 357-373

Notes

The Excel assignments are all available online, as are additional Excel help notes

The allotted 10 percent would then revert back to the final exam. This feature gave students additional online confidence and greatly increased the participation rate for this assessment resource, from 20 percent to 80 percent of the class in comparison to the previous year