AFAANZ Conference 2007

An investigation into the use of a blended model of learning in a first year accounting subject

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Acknowledgements: The authors gratefully acknowledge the technical expertise and support provided by Errol Chopping, the developer of SimWalk. The authors also wish to thank the Charles Sturt University Scholarship in Teaching Committee for supporting the project. Finally, we gratefully acknowledge the feedback received on an earlier version of this paper from the participants of the Charles Sturt University, School of Accounting, Research Forum.

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Abstract
The weaknesses of 'traditional' modes of instruction in accounting education have been widely discussed. Many contend that the traditional approach limits the ability to provide opportunities for students to raise their competency level and allow them to apply knowledge and skills in professional problem solving situations. However, the recent body of literature suggests that accounting educators are indeed actively experimenting with 'non-traditional' and 'innovative' instructional approaches, where some authors clearly favour one approach over another. But can one instructional approach alone meet the necessary conditions for different learning objectives? Taking into account the ever changing landscape of not only business environments, but also the higher education sector, the premise guiding the collaborators in this research is that it is perhaps counter productive to promote competing dichotomous views of 'traditional' and 'non-traditional' instructional approaches to accounting education, and that the notion of 'blended learning' might provide a useful framework to enhance the learning and teaching of accounting. This paper reports on the first cycle of a longitudinal study, which explores the possibility of using blended learning in first year accounting at one campus of a large regional university. The critical elements of blended learning which emerged in the study are discussed and, consistent with the design-based research framework, the paper also identifies key design modifications for successive cycles of the research.

Key Words: Accounting Education; Anchored Instruction; Blended Learning; Design Based Research; Introductory Accounting.

1. **Introduction**

There has been much discussion within the accounting education literature about the shortcomings of the traditional approach to accounting education. Specifically, it is argued that the traditional approach results in graduates ill-equipped for today's profession and reinforces the negative stereotypes many students have about the profession. Furthermore, to the extent that the traditional learning environment does not replicate the culture of the accounting profession, there arises the potential problem for students to develop 'inert knowledge'. In response to these criticisms, accounting educators have discussed and experimented with a range of alternative approaches to learning and teaching. One of these alternative approaches has included the use of a blended learning model whereby online learning is integrated with face-to-face teaching. Within the broader educational literature, the adoption of a blended learning model is seen as an attempt to maximise the benefits of different delivery methods used in the physical and technology-based environments, combining best practice approaches from different learning environments. It suggests that such notion directly challenges the dichotomous view that one method is better than another.

This paper explores the possibility of using the blended learning concept in first year accounting at a large multi campus, regional university. The paper outlines the results of the first cycle of the study in which traditional instruction was blended with the non-traditional social constructivist learning approaches in particular anchored instruction. Following the principles of anchored instruction, a computer-mediated learning environment was used to anchor problem cases that mediate a degree of situatedness and authenticity for the student learning experience. The study was guided by the principles of design-based research, where the objective is to identify the critical elements of a blended

learning model for first year accounting. Consistent with the main tenets of design based research, both qualitative and quantitative methods of data collection were employed, with observational, survey and interview data being collected.

The results identified the need to acknowledge and legitimise three functionally different learning spaces in a blended learning model. In doing so, appropriate learning support mechanisms can be established and suitable pedagogical approaches can be identified and integrated in the blend. There were five critical elements of a blended learning model that emerged in the study, all of which provided useful guidelines for design modifications as work in this design-based research continues.

The paper is presented in five sections. Section two reviews the accounting education literature, examining the criticisms of the traditional approach to accounting education and the responses to these criticisms by accounting academics. This section concludes with an introduction to the concept of blended learning and highlights the pedagogy underpinning the design of the first year accounting subject under study. Section three describes the current investigation, in particular, the context and procedure and methods and methodology adopted. The results of the focus group interviews and survey questionnaire are outlined and discussed in Section four. Finally, Section five discusses and summarises the study's findings, outlining the five critical elements of a blended learning model identified in the study. This section also outlines some design modifications for the continuation of this research.

2. **Background to study**

2.1. *Criticisms of the traditional approach to accounting education*

Many authors (see for example, Albrecht & Sach 2001; Carr & Mathews 2002; Catanach, Croll & Grinaker 2000; Saudagaran 1996; Steadman & Green 1995) have characterised the traditional approach to accounting education as:

i. Being focused on rote learning, with textbook readings and lectures, where students act as passive recipients of information, being used as the primary means of disseminating information;
ii. Rules based, focused on technical content knowledge, particularly in relation to bookkeeping;
iii. Being focused on coverage of content at the expense of depth, with few links being made between the different areas of accounting and between accounting and other business functions;
iv. Giving limited time to the application of knowledge and when this does occur, there is a reliance on structured, oversimplified and unrealistic textbook questions with 'only one right answer'; and
v. Giving limited time to the development of students generic skills (i.e. group work; oral and written communication; problem solving; critical thinking; leadership).

Much of the accounting education literature discusses the limitations of this traditional approach to teaching, with many arguing that it results in students being 'trained' rather than 'educated' (Albrecht & Sach 2001; Carr & Mathews 2002; Catanach et al. 2000; Steadman & Green 2001). This discussion has largely followed the influential

commissioned report for the Accounting Education Change Commission, which openly criticised traditional accounting education practices, labelling such approaches as not fitting the needs of the increasingly dynamic and complex business environment (AECC 1992). Accountants have expanded their roles beyond bookkeeping and preparing financial reports to management advisers who view accounting knowledge as tools, rather than as facts and procedures. Although important, technical content knowledge is no longer sufficient (Chen & Chen 1999). Today, greater emphasis is being placed on core generic business skills including the ability to communicate clearly in both oral and written form; solve unstructured problems; work effectively in teams; think critically and innovatively; approach ethical dilemmas confidently; and use technology effectively (Hanno & Turner 1996; Robson, Savage & Schaffer 2003; Roush & Smith 1997).

One of the critical concerns is that such approaches reinforce the negative perceptions about the study of accounting, as well as about the profession (Caldwell, Weishar & Glezen 1996; Friedlan 1995; Mladenovic 2000; Saudagaran 1996). These negative perceptions according to Mladenovic (2000, p. 135) "refer to perceptions that are either inappropriate or unrealistic such as the perception that accounting is, in the main, mechanical and repetitive number crunching...". This sentiment is shared by Saudagaran (1996), who asserts that students' ill-informed perceptions about negative stereotypes of accounting are often confirmed in their introductory accounting subjects because of the heavy emphasis on the mechanical and procedural aspects of accounting. If the negative perceptions of accounting are reinforced under the traditional methods of accounting education, students will be discouraged from considering the profession as a career (Marriott & Marriott 2003; Nelson & Deines 1995; Steadman & Green 2001).

A further issue is the potential problem of 'inert knowledge' which arises to the extent that traditional learning environments do not replicate the culture of the accounting profession with which it intends to acquaint the students. In these types of environments students acquire knowledge in abstract ways because teaching approaches tend to separate knowing from doing. Therefore, students may not perceive this knowledge as being useful in solving real problems beyond their University experience because such knowledge has remained 'inert'. The education literature describes inert knowledge as a type of knowledge that people can recall when prompted but cannot recall in problem solving situations (Bransford et al. 1990; Brown, Collins & Duguid 1989; CTGV 1990; McLellan 1994). It is common for accounting researchers and practitioners alike to identify inert knowledge in graduate accountants, although they do not use this term specifically. For example, Sundem (1994, p.39) argues that "the average graduate accumulates a storehouse of knowledge, but has difficulty applying it to real situations". While Catanach et al. (2000, p. 583) assert that although graduate accountants may be technically proficient, many of them cannot "integrate rule based knowledge with real world problems".

2.2. *Accounting educator's response to criticisms*

As a result of the above concerns, accounting educators have discussed and experimented with a number of instructional approaches to enhance the learning and teaching of accounting. This is illustrated by the numerous descriptive and empirical articles concerning alternative approaches to learning and teaching highlighted by Rebele et al.

(1998a), Rebele et al. (1998b), Apostolou et al. (2001) and Watson et al. (2003)[1] in their reviews of articles published in major accounting journals. In reviewing the literature published between 1997 and 1999, Apostolou et al. (2001, pp.44-45) concluded that:

> The state of accounting education research is active and vibrant… Accounting researchers throughout the world are investigating factors of importance to their students and cultures. Accounting educators are collaborating with colleagues at their own and at other institutions. Research designs are becoming more sophisticated, and the inquisitiveness of accounting faculty is leading to meaningful research ideas.

To illustrate the ongoing attempts to enhance the learning and teaching of accounting, Table 2.1 summarises some of the key innovative instructional approaches identified by Rebele et al. (1998a), Rebele et al. (1998b), Apostolou et al. (2001) and Watson et al. (2003). Overall, the results of research into the effectiveness of the alternative approaches to accounting education generally indicate that such approaches can have positive outcomes.

[1] Rebele et al. (1998a) reviewed articles concerning curriculum and instructional approaches published in the *Journal of Accounting Education*, *Issues in Accounting Education*, *The Accounting Educators' Journal*, and *Accounting Education: A Journal of Theory, Practice and Research* for the period 1991-1997. Rebele et al. (1998b) reviewed articles concerning students, educational technology, assessment and faculty issues published in the *Journal of Accounting Education*, *Issues in Accounting Education*, *The Accounting Educators' Journal*, and *Accounting Education: A Journal of Theory Practice and Research* for the period 1991-1997. Apostolous et al. (2001) reviewed articles published in the *Journal of Accounting Education*, *Issues in Accounting Education*, *Accounting Education*, *The Accounting Educators' Journal*, and *Advances in Accounting Education* for the period 1997-1999. Watson et al. (2003) reviewed the *Journal of Accounting Education*, *Accounting Education*, *Advances in Accounting Education*, and *Issues in Accounting Education* for the period 2000-2002.

Table 2.1 *Innovative instructional approaches in accounting education*

Examples of Alternative Approaches	Authors
Case studies and role plays.	(Boyce et al. 2001; Gobeil & Phillips 2001)
Collaborative learning techniques.	(Etter, Burmeister & Edler 2000; Jones & Fields 2001)
Active learning strategies.	(Adler & Milne 1997; Cunningham 1999)
Problem-based learning.	(Breton 1999; Milne & McConnel 2001)
Emphasis on improving specific student generic skill, for example: - Written communication skills. - Oral communication skills. - Ethical reasoning. - Independent thinking. - Research skills. - Career skills. - Internet skills.	 (English et al. 1999; Hirsch & Gabriel 1995) (Ruchala & Hill 1994) (Esmond-Kiger & Stein 1998) (Scheive & Radich 1997) (Hughes & Berry 2000; Simon & Alexander 1997) (Sergenian & Pant 1998) (Bhattachargee and Shaw 2001)
Use of videos to deliver course content and multimedia cases.	(Evans & Foster 1997; Mahoney & Welch 2002)
Computer aided teaching.	(Lane & Porch 2002; McCourt Larres & Radcliffe 2000)
Use of games, for example: - Monopoly. - Games adapted from television shows. - Other.	 (Albrecht 1995; Tanner & Linquist 1998) (Cermignano, Haragon & McMullen 1998; Cook & Hazelwood 2002) (Pillsbury 1993; Hellier et al. 2000)
Incorporation of controversial issues (i.e. environmental and social accounting) into curriculum.	(Grinnell & Hunt 2000; Mathews 2001)
Use of journal articles as readings and the incorporation of empirical research into the curriculum.	(Burilovich 1991; Hoque 2002)
Use of releases from regulatory bodies.	(Licata, Bremser & Rollins 1997; Schoderbek & Slaubaugh 2001)
Use of actual company financial information.	(Christ 2002; Kern 2000)
Manufacturing simulation activities.	(Burns & Mills 1997; Lightbody 1997)
Projects in which students act as accountants for actual client company.	(Barkman 1998; Lambert & Main 1998)
Student developed problems of elaborations.	(Greenstein & Hall 1996; Johnson 1997)
Other: - Adoption of a user approach as opposed to the preparer approach. - Guest speakers. - Open learning approaches.	 (Bernadi & Bean 1999) (Metrejean, Pittman & Zarzeski 2002) (Bashir 2000)

In addition to these innovative instructional approaches, recent articles discuss the use of a blended[2] model where online learning is integrated with face-to-face teaching (see for example, Borthick & Jones 2000; Broad, McDonald & Mathews 2000; Bryant & Hunton 2000; Cottrell & Robinson 2003; Dowling, Godfrey & Gyles 2003). Cottrell and Robinson (2003), for instance, examine the effectiveness of a blended learning approach

[2] Alternative terms utilised in the literature included hybrid, integrated or flexible learning.

whereby students were taught through a combination of multimedia presentations and face-to-face teaching. Dowling et al. (2003) further discusses a hybrid flexible model in which content is delivered through a combination of face-to-face seminars and electronic delivery and communication tools.

2.3. **Blended learning defined**

A number of definitions of blended learning proliferate the broader education literature, one of which refers to "the integrated combination of pedagogical approaches to produce an optimal learning outcome with or without instructional technology" (see Driscoll 2002). Another definition explains that “blended learning arrangements combine technology based learning with face-to-face learning” (Kerres & De Witt 2002, p. 101).

One of the basic conceptualisations for the commonly accepted definitions is that those who embrace blended learning are trying to maximise the benefits of different delivery methods used in the physical and technology-based environments (Graham 2004). As Osguthorpe and Graham (2003, p. 227) advise, “the important consideration is to ensure that the blend involves the strengths of each type of learning environment and none of the weaknesses”. Indeed, Bleed (2001) asserts that an appropriate blended learning environment, combining technology-based learning with other types of learning in the physical learning space, can restore the human moment in the educational process. While access to information is an important part of learning, intellectual development is largely achieved through active engagement and interaction with others (Garrison & Anderson 2003; Laurillard 2000). The general consensus is that an integrated approach of a blended model of education can be used to empower learners by promoting active engagement

(See for example, Graham, Allen & Ure 2003; Young 2002). These ideas, according to Osgothorpe and Graham (2003), guide the design of blended learning environments.

Blended learning challenges the dichotomous view that one approach is more appropriate than another. Indeed, a number of studies reported in the literature appear to privilege non traditional instructional approaches over traditional methods. For example, Friedlan (1995) suggests that case-based learning is more effective in conveying the desired perceptions about accounting. Springer and Borthick (2004, p. 292) advocate to transform "downstream courses to shift them from teachers transmitting knowledge to students constructing their own understandings of the subject matter", postulating that "these constructed understandings will endure far longer than the mechanical, ritualistic computations and vocabulary that have long been the mainstay of introductory accounting courses". However, according to Bonner (1999, p. 11) "an accounting instructor needs to carefully employ a variety of teaching methods to achieve all the learning objectives of a given course, since these objectives likely encompass the full range of types of objectives".

Within the education literature, Molenda (1991) argues that an either or stance seems to gain educators little and that merging the two approaches would be more productive. Sfard (1998) shares a similar view, stating that there are dangers in subscribing to only one metaphor (i.e. acquisition metaphor/traditional or participation metaphor/non-traditional) because one metaphor is not enough to explain how all learning takes place. Neither can one metaphor address all problems inherent in learning (Sfard 1998). Based on these arguments, it is clear that a link between the two approaches must be found in a way that will benefit both learners and teachers.

2.4. **Pedagogical underpinnings**

In the current study, rather than adopting a dichotomous perspective between traditional and non-traditional approaches, the premise taken is that a theoretically-driven 'blended learning' design in first year accounting, which combines traditional instruction with active learning strategies anchored in simulated real-world contexts, may provide a holistic approach to learning accounting. It assumes the placement of such approaches on a continuum, preserving the distinctions while valuing their individual merits. When learners have sufficient exposure of applying abstract concepts to real-world authentic situations, what they learn would become productive knowledge (see for example, Brown et al. 1989; CTGV 1990), regardless of where on the continuum instruction begins.

Following the blended learning concepts, traditional instruction is 'blended' with social constructivist learning approaches, based on the principles of anchored instruction, where a computer-mediated learning environment is used to 'anchor' problem cases that mediate a degree of situatedness and authenticity for the student learning experience. Anchored instruction is a model of learning that highlights the development of an anchor or theme around which various learning activities can take place (CTGV 1990). Proponents of anchored learning assert that anchoring learning in real-world experiences enhances the likelihood for transfer and for discovering the relevance of how and why knowledge is useful (see for example, Bransford et al. 1990; CTGV 1990; McClellan 1994; Spiro et al. 1987). The instructional design of anchored instruction is based on problem solving around an anchor where the aim is to situate instruction in the context of meaningful problem-solving environments that allow teachers to simulate in the classroom some of the 'in-context' apprenticeship training (CTGV 1992, pp. 293-294). It emphasises the notion that the learning process cannot be divorced from the context of the problem. The

key instructional objectives are to "promote problem posing, problem solving, reasoning, and effective communication" (CTGV 1992, p. 295). Since relevance and connection to the problem can be more easily visualised and understood in a problem-solving task, information is more likely to be retained by the student and transferred to similar problems.

3. **The investigation**

3.1. *Introduction*

This study is part of a longitudinal research project involving a classroom design experiment, conceptualised as a case of supporting groups of students learning first year accounting in a blended learning environment. It explores the possibility of using blended learning that sufficiently integrates authentic contexts to provide students with situated learning experiences in the classroom, as well as facilitates collaborative construction of knowledge. The goal is to implement a theoretically-driven blended learning design in first year accounting, integrating active learning strategies that are situated in authentic contexts. Thus, this research aims to:

- determine the possibility of applying a model of learning that blends traditional approaches (eg lectures and tutorials) with the principles of anchored instruction; and
- investigate students' responses to that learning experience to identify the usefulness and/or limitations of the blended learning environment.

The question which guided this part of the longitudinal study is as follow:

What are the critical elements of blended learning in accounting?

3.2. ***Context and Procedure***

The sample for the first cycle of the research consisted of students undertaking their first introductory accounting subject at one campus of a large, regional, multi-campus university. The subject targets not only Bachelor of Business (Accounting) students, but is also compulsory for all Bachelor of Business students and students undertaking double degrees with a business component. Because the subject has no pre-requisites it may also be taken as an elective by students completing other degrees. Overall, 157 students were enrolled in the subject with the Bachelor of Business (Marketing) and Bachelor of Business (Accounting) being the most common degrees undertaken by students. Table 3.1 summarises the breakdown of students by course. As outlined in Table 3.2, students were divided relatively equally along gender lines.

Table 3.1 *Student course breakdown*

Course (N 157)	**Frequency**	**Percentage**
BBus(Mkt)	36	22.93%
BBus(Acc)	27	17.20%
BBusStud	22	14.01%
BA(Com-Advert)/BBus(Mkt)	18	11.46%
BBus(Fin)	14	8.92%
BA(Comm-PubRel&OrgComm)/BBusStud	11	7.01%
BBus/BInfoTech	11	7.01%
BHMvt/BBusStud	10	6.37%
BInfoTech	4	2.55%
Other	3	1.91%
BBus(BusMgt)	1	0.64%

Table 3.2 *Student gender breakdown*

Gender (N 157)	Frequency	Percentage
Male	83	52.87%
Female	74	47.13%

Table 3.3 summarises the descriptive statistics for the age of students, with the mean age being 19.27. Students were classified into grouped into mature age students and recent school leavers, with mature age students being defined as those students 21 years or older. As outlined in table 3.4, the large majority of students were recent school leavers.

Table 3.3 *Descriptive statistics: student age*

	Mean	Median	Mode	Minimum	Maximum	SD
Age (years)	19.27	19.00	18.00	17.00	42.00	2.90

Table 3.4 *Recent school leavers and mature age students*

Group (N 157)	Frequency	Percentage
Recent school leavers	134	85.35%
Mature age students	23	14.65%

In Accounting 1, students are introduced to the purpose and nature of accounting. After being introduced to the purpose of accounting, ethical decision making, the regulatory framework, the features and analyses of financial statements and key generally accepted accounting principles, students are taken through the various stages of the accounting cycle, learning how to journalise transactions, prepare adjusting and closing entries and how to prepare basic financial statements. Students are also introduced to principles of control and accounting information systems.

The study was implemented within the normal program of instruction with a particular focus on activities during tutorial sessions. Students were given tutorial work, predominantly from the textbook, which was required to be completed before each

tutorial. Key accounting theory and concepts were delivered in the lecture. Tutors conducted the tutorials using their individual methods and no attempts were made at this point to suggest varying their teaching approaches. Tutorials were held in traditional classrooms, normally following the format of the tutor giving a mini-lecture of the topic's critical points, prompting students to contribute their knowledge, thoughts and problems to the discussion. This was normally followed by going over the pre-tutorial work, focusing on the questions and concepts with which students had the most difficulty.

On a weekly basis, a nominated tutor from the teaching team prepared tutorial activities which were then used by all tutors in their respective classes. These included group work involving extended problems from textbook, textual cases and SimWalk activities, requiring a representative from student groups to present back findings to the class.

To facilitate the integration of the principles of anchored instruction in a blended learning environment, SimWalk[3] learning activities were introduced during tutorials. SimWalk episodes, when combined with the traditional approaches of learning accounting, hope to elicit the processes of conceptualising, visualising and decision-making as students work on business cases that portray authentic practices of the accounting profession. When SimWalk activities were included in the tutorial, laptops were brought into the classroom and students worked in groups of two to five to maximise collaborative interactions. Students assumed the role of an accountant involved in complex situations, required to

[3] SimWalk is a computer software package specifically designed for educators to simulate real-world situations in the classroom. This technology allows lecturers and tutors to deliver 'episodes' which are like acts from a drama or a story. Each episode is composed of digital photographs of real people in real places, doing everyday things. The photographs are collated in such a way that an individual student, or a group of students working collaboratively, can explore an episode as a virtual tour or surrogate walk, moving from photograph to photograph using clickable 'hotspots' within the images and consider both implicit and explicit embedded data. Notes or summaries can be made and recorded by students as they engaged in the computer-mediated learning environment. SimWalk can be hosted either directly on a computer or online.

solve interconnected sub problems in a business environment. Students navigate their way through the episode and progressively explore key concepts, eliciting additional data that may help solve the problem, identifying reasons why such information is relevant and recording and calculating information as required. Through various pathways, students explore a simulated workplace and gather and examine artefacts from SimWalk hotspots. There is a notes pane that provides the accompanying story and case data that students need in order to solve problems and/or apply particular accounting concepts (see Figures 3.1 through 3.4, which illustrate the SimWalk interface). The pictorial scenes provide students with clues to help them interpret the problem and think about the theory and accounting concepts in practical terms.

Three SimWalk episodes were developed during the semester for three topics:

1. Adjusting Entries;
2. Closing Entries; and
3. Internal Control and Managing cash.

All episodes or ‘walks’ revolved around a fictitious Juice Bar franchise.

During the first walk, students were provided with information on different business transactions for the first month of operations (i.e. the months rent, salaries, machinery purchases, supplies purchases, revenues). At each scene students were asked to identify how the transaction would have been initially recorded and identify any relevant adjusting entries needed at the end of the period.

During the second walk students are informed that it is the end of the businesses first month of operations and the owner is keen to know how the business has performed. Students review a worksheet the owner has prepared and correct adjusting entries, complete the worksheet and prepare the financial statements. Following the completion of the worksheet, students complete the closing entries.

In the final walk, students are informed that the owner of the business is worried about his businesses system of internal control. Students navigate their way through the business, observing staff responsibilities and business procedures. As they complete the walk students complete a template by summarising the strengths and weaknesses of the business internal control system and offering suggestions for improvement.

Figure 3.1 *Scene 1*

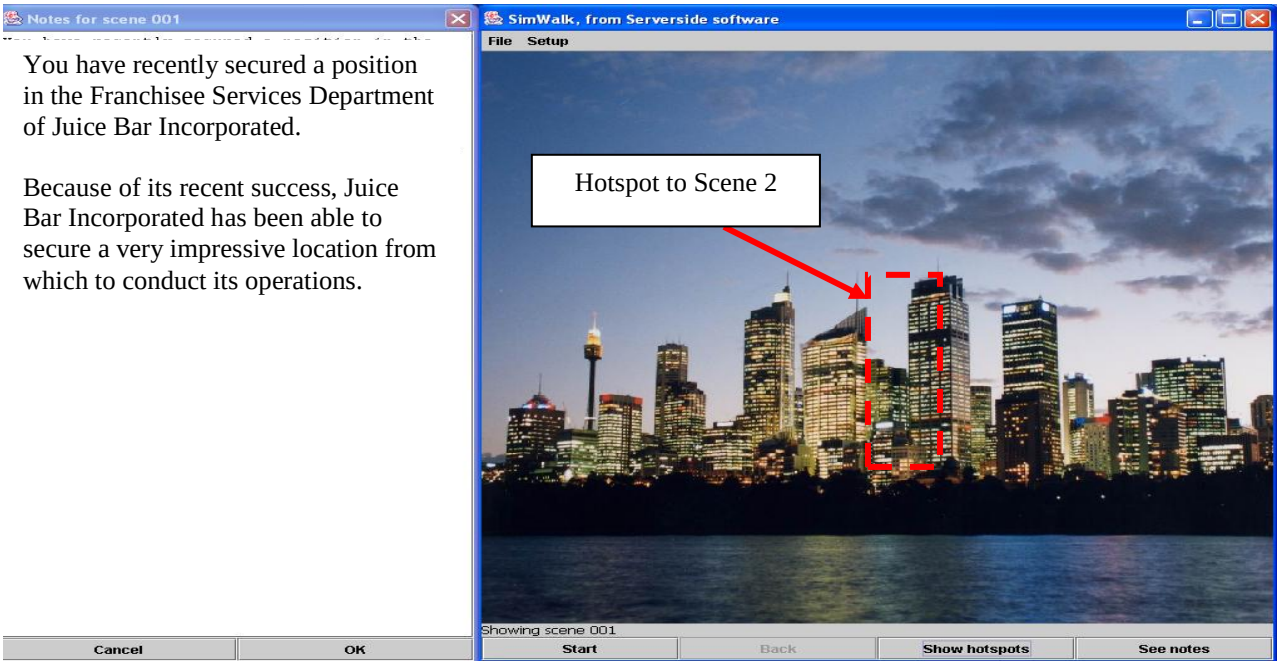


Figure 3.2 *Scene 2*

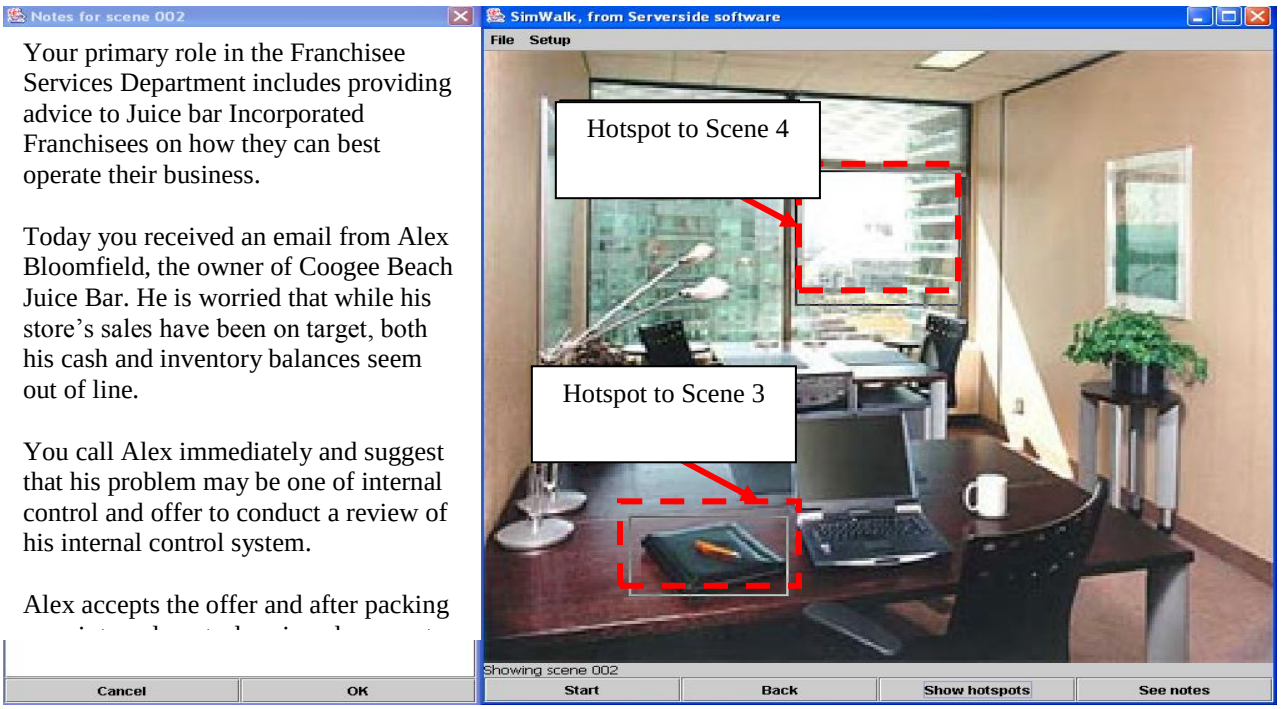


Figure 3.3 *Scene 3*

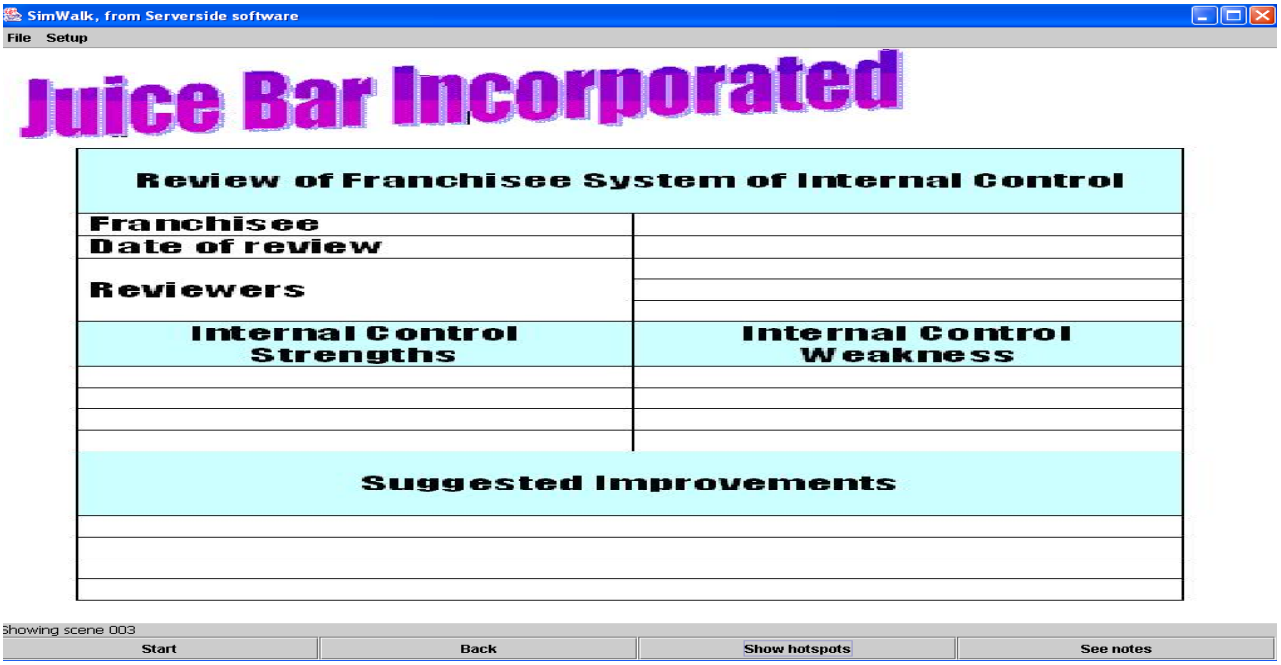
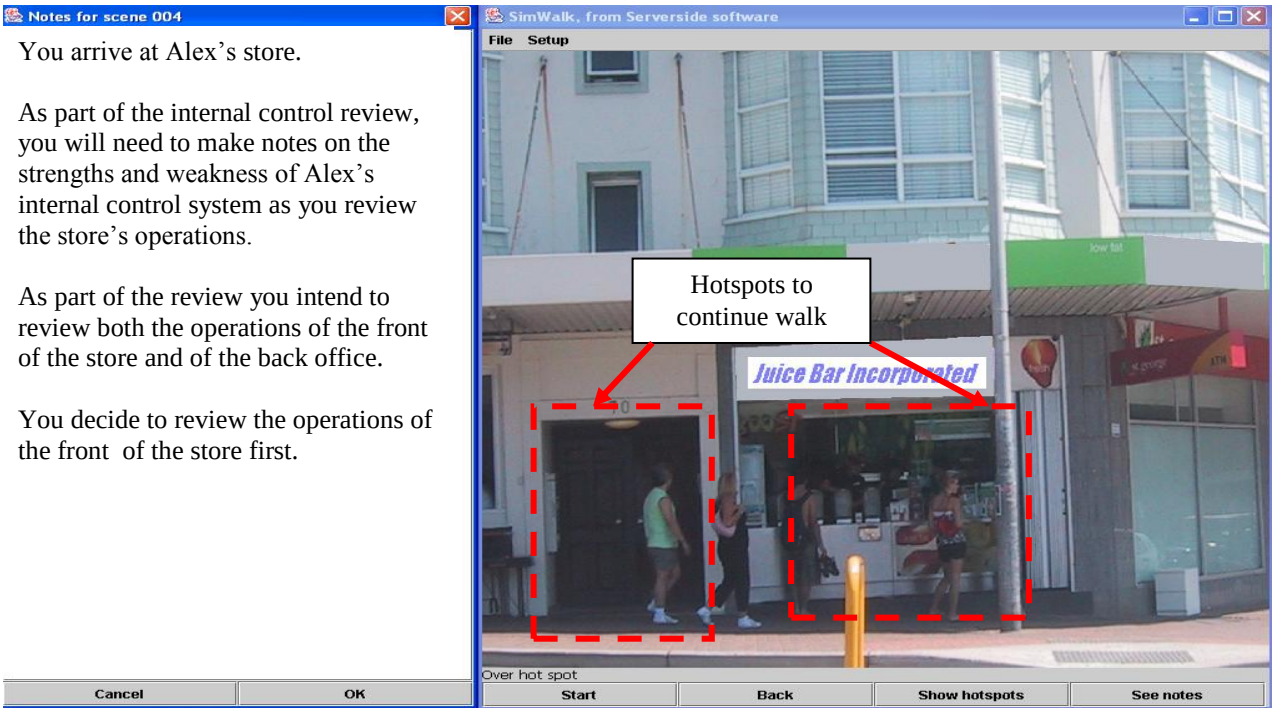


Figure 3.4 *Scene 4*



Two tutors who were also involved in the study were the content experts for this design-based research and developed the SimWalk activities. In all, there were six tutors who were involved in this study but only three provided data in the evaluation. The study was conducted with the head researcher in the role of 'observer-as-participant' and was introduced to the class as a researcher with no involvement in the activities in the classroom other than to observe and collect data.

3.3. *Methods and methodology*

3.3.1. Design-based research

While the study is still in its infancy, the development of the blended learning model and artefacts used in the investigation is being guided by an experimental framework known as 'design-based research' (Brown 1992; Collins 1992). Collins, Joseph and Bielaczyz (2004, p.4) noted that design experiments are "developed as a way to carry out formative research to test and refine educational designs based on principles derived from prior research". Such research "blends empirical educational research with the theory-driven design of learning environments [thereby shaping] an important methodology for understanding how, when and why educational innovations work in practice" (The Design-Based Research Collective 2003, p.5).

Design experiments are an effective way of studying new learning environments in the context of the classroom as it involves designing an intervention that reifies new form of learning to articulate and advance a particular form of learning. It follows an iterative cycle of design, implementation, analysis and modification (Tabak 2004). Because a successful educational design should operate as an integrated system, the critical elements of the design are identified while the enactment in the educational setting is analysed. If the elements are not working in the anticipated manner, then the design is modified based on the findings and a revised prototype is implemented and the iterative cycle begins again until predictable outcomes have been achieved. The study leads to a theory that communicates pertinent implications to practitioners, other designers and policy makers (Joseph 2004).

3.3.2. Data collection

Following the main tenets of design-based research, both quantitative and qualitative approaches have been employed in the investigation. In design-based research, the process requires generation of multiple forms of data to adequately document the evolution of the design and its impacts on learning and teaching (Design-Based Research Collective 2003). Accordingly, evaluation was carried out using multiple strategies in the data collection, namely, observations, video recording of classroom episodes, survey questionnaire and focus group interviews. Both these data sources were designed to elicit students' perceptions of the learning environment, with particular reference to their specific engagements in the activities.

While the study was implemented involving all tutorials, limited resources rendered observing all tutorial groups impractical. Therefore three groups were nominated for observation, however, due to unforseen circumstances only two tutorial groups were observed. The qualitative data gained from observing the students in class was expanded on and consolidated with the focus group interview data. The focus group interview involved five participants. However, an individual interview was also carried out with a student who volunteered to take part but was unable to attend the focus group interview. There were 30 questions prepared for the interview schedule (see sample in Appendix 1), which focused predominantly on experiences, opinions and feelings about the learning environment and specific learning events (Herrington & Oliver 2000; Patton 1990). Interviews were recorded on video tapes and transcribed for analysis. As outlined in Tables 3.5 and 3.6 interview participants were predominantly female and most likely were completing the BBus (Acc) degree.

Table 3.5 *Interview participant gender*

Gender (N 6)	Frequency	Percentage
Male	2	33.33%
Female	4	66.67%

Table 3.6 *Interview participant degree*

Course (N 6)	Frequency	Percentage
BBus(Acc)	3	50.00%
BA(Comm-PubRel&OrgComm)/BBusStud	2	33.33%
BBus(Fin)	1	16.67%

A survey instrument was also administered and, as with the interviews, questions focused mostly on opinions and feelings. Some demographic and experience questions were also included in the questionnaire. Survey data were tabulated and analysed using statistical software, SPSS. The survey utilised a seven point Likert scale, where Almost Always was coded as 5, Often coded as 4, Sometimes coded as 3, Seldom coded as 2, and Almost Never coded as 1.

A total of 66 useable survey responses were obtained, producing a useable response rate of 42.04% (66/157). Tables 3.7 through 3.10 outline the demographic details of the survey respondents.

Table 3.7 *Survey respondent gender*

Gender (N 66)	Frequency	Percentage
Male	27	40.90%
Female	39	59.10%

Table 3.8 *Survey respondent degree*

Course (N 157)	Frequency	Percentage
BBus(Mkt)	14	21.21%
BBus(Acc)	13	19.70%
BA(Comm-PubRel&OrgComm)/BBusStud	13	19.70%
BBusStud	8	12.12%
BHMvt/BBusStud	7	10.61%

BA(Com-Advert)/BBus(Mkt)	5	7.58%
BBus(Fin)	3	4.55%
BBus/BInfoTech	3	4.55%

Table 3.9 *Survey respondent age*

(N 65)	Mean	Median	Mode	Minimum	Maximum	SD
Age (years)	20.25	20	19	18	36	2.40

Table 3.10 *Recent school leaver verus mature age survey respondents*

Group (N 65)	Frequency	Percentage
Recent school leavers	46	70.77%
Mature age students	19	29.23%

Among the many features of design-based research, the most useful for the current study is the explicit reference made for the need to investigate not only the intervention developed for the purposes of the research (*exogenous design*), but also the need to evaluate existing practices and set of materials already in place in the local setting *(endogenous design)* (Tabak 2004). This framework facilitated a holistic and indiscriminate treatment of learning environments in the evaluation of learning events, rather than focusing only on students' reactions to the new instructional material and activity structures in the computer-based learning environment. Data from the transcripts were coded into categories based on their relevance to the *a priori* categories for analysis (Herrington & Oliver, 2000) – learning activities or in the face-to-face and online environments, together with other learning environments which emerged in this study. The process of coding the data was guided by the three-step process of data reduction, data display and conclusion drawing, and verification suggested by Miles and Huberman (1994).

Note that due to limited space in this paper, the results below pertained only to the perspectives of the students. Data collected from tutors have not been included in the analysis.

4. **Results**

4.1. *Introduction*

The discussion in this section is based on the findings of students' perceptions of their engagement in various learning environments, identified in this research as personal learning space; physical collaborative learning space; and virtual collaborative learning space, with respect to learning activities that were used in the blending, categorised as self-directed; teacher-led; and collaborative learning activities.

4.2. *Self-directed learning activities*

Students were required to engage in pre-tutorial activities in their personal learning space on a weekly basis. Interview respondents placed significant value on these learning activities which involved reading text and completing exercises mostly from the textbook. This normally occurred at home or in the library for those living on campus. Students' perceptions of these activities were that they were valuable as the process provided a way for ongoing active engagement in the subject, as these comments indicate:

- *I think it's a really good way as you do have to do stuff at home, you can't go and sit in the lecture and can't absorb the lecture and expect to go to the tutorial and know everything. You do have to do a little bit at home. [Student_6]*
- *I use the homework questions, I try them again to see if I still understood. [Student_4}*

- *At the moment, the homework cements the things that we are doing, so the other activities in tut complement what we are doing. [Student_2]*

Two items in the survey questionnaire provide evidence on student's actual and preferred level of autonomy. The first item related to the level at which students make decisions about their own learning, and the second item related to the level at which students work at times convenient to them. Table 4.1 summarises the mean responses to these questions and the results of paired samples T-test for differences between the means of the preferred and actual responses. Students involved displayed a high degree of autonomy but would prefer a significantly higher level of autonomy (at the 0.05 level).

Table 4.1 Level of student autonomy

Item	Actual Mean	Preferred Mean	T	Sig. (2-tailed)
I make decisions about my learning.	3.85 (N 65)	4.34 (N 53)	-4.674	0.000
I work during times I find convenient.	4.14 (N 63)	4.47 (N 51)	-2.455	0.018

Key: Almost Always (5), Often (4), Sometimes (3), Seldom (2), and Almost Never (1).

4.3. *Teacher-led learning activities*

Lectures were conducted solely as a teacher-led activity where accounting principles and procedures were explained to students during lecture presentations. When asked about what they think of lectures, one interview respondent's reply was immediate: "All lectures are fine" [Student_6]. Some students perceived the activities during lectures in the physical collaborative learning space as useful, particularly in support of self-directed

learning, as this comment implies: “I can’t do the homework until I have been to the lecture as I don’t understand it just by reading it” [Student_3].

The results reveal that access to lecturer as expert, explaining concepts and modelling processes, was highly valued by students, which suggests that students’ progress in the learning process rely predominantly on the lecturer.

However, there was mixed reactions from students regarding their experience of tutorials. Activities for the best part of most tutorials were based on tutorial homework, consisted of tutors delivering mini-lectures, demonstrations, working on short numerical problems on the white board, going over short objective questions, and analysing worked-out problems with students. Students’ reactions to these activities during focus group interviews were consistent with the data collected from classroom observations, i.e. most students appeared bored and disinterested while others watched and listened to the tutor attentively. When students were asked about their perceptions of the first part of the tutorial, mixed reactions were evident:

- *Going through the homework questions is good and it’s helpful to everyone but I also find it very boring because most of the time they are cases that I don’t need help with. So I’m sitting there maybe like 40 minutes out of 2 hours listening to stuff that I already knew that I didn’t want to go over again and like we have already done it.[Student_1]*
- *I think going over our homework is the best bit because I don’t know with accounting I kind of need to sit down and understand the question and then have someone show me. [Student_3]*

- *It is helpful, but it is boring. Two hours of it, that's a killer.[Student_2]*

The results suggest that the tensions within the physical collaborative learning space reported by interview respondents pertained to varying learning needs, as the following comments also indicate:

> *The real ones are really good but there is really not enough time at the end, like we are all kind of rushed or we only have 20 minutes left, so we kind of have to rush so you got to do them as fast as you can. [Student_2]*
>
> >> What do you mean by the 'real ones'? <<
>
> *Like the end one, the practical ones where you get sheets and you fill them out for the case study or, you know, [the tutor] says 'oh, here is an interactive one where you get in groups and you actually take part in it', [and] there is not enough time for that. That's my choice and it's a lot more valuable to me. It could be really valuable if you had the time to complete them, whereas at the moment I think the time is scarce. You're kind of in there and rush it and get everything that you could out of it. There just needs to be more time [for practical activities]… It [tutorial time] does have to be evenly shared between people that don't understand and the people that do understand and want to go further with the ideas because that's how you move on. [Student_2]*

It is clear from these comments that the notion of 'pedagogical richness' (Osgothorpe & Graham 2003) needs to be explored further in the design of the physical collaborative learning space, particularly in regard to finding a balance between self-directed, teacher-led and collaborative learning activities within this space.

4.4. *Collaborative learning activities*

Likewise mixed results were achieved in bringing a level of authenticity and collaborative construction of knowledge to the classroom experience, through SimWalk activities.

Data from the two classes observed indicate increased active participation in this particular learning event, in contrast with homework-based activities at the beginning of each tutorial. Most groups appeared to engage collaboratively in SimWalk and also showed interest as group members discussed and worked on the task. Their level of engagement was validated during class discussions where students reported their findings after completing the SimWalk activity. Based on the class discussions that ensued, and based on the learning artefacts collected by one of the tutors, it appeared that most students worked on the problems quite well, while some also identified interconnected problems which were not made explicit in the case. Overall it was observed that students were generally actively involved in problem solving and generating outcomes for the task. However, comparatively the manner in which these activities were facilitated in class varied and there are observation data to suggest that the level within which students actively participated was influenced by the facilitation approach used by the tutor. The observation notes suggest that the differences included timing when the SimWalk activities were held, the time allowed to complete the task, interaction of the tutor with groups during the activity, and the strategy used for reporting outcomes by students.

As outlined in table 4.2, when students were asked in the questionnaire about their perceptions of whether or not they found the computer-based learning activities to stimulate their interest, a mean of 3.42 was achieved, which translates roughly to 'sometimes'. This was somewhat below the researchers expectations, particularly when compared to the data from classroom observations and interview results, but it does show some support for the position that the SimWalk has stimulated interest.

Table 4.2 CBL activities stimulate interest

Item	N	Mean	SD
Computer based learning activities stimulate my interest	65	3.42	1.144

Key: Almost Always (5), Often (4), Sometimes (3), Seldom (2), and Almost Never (1).

Similarly, when students were asked if they perceived activities in SimWalk as helpful in understanding accounting concepts, results provided some support for the position that students view the activities as helping their understanding of the concepts as illustrated in Table 4.3.

Table 4.3 CBL activities help to understand concepts

Item	N	Mean	SD
The computer based activities help me to understand the concepts	65	3.43	1.250

Key: Almost Always (5), Often (4), Sometimes (3), Seldom (2), and Almost Never (1).

In contrast, four of the six interview respondents indicated that activities in SimWalk made accounting more enjoyable and that they understood the usefulness of accounting

better, relating and linking their understanding directly to the application in real life. The following comments are representative of the positive experience:

- *Well, I like that you can see how things relate to different areas of the business. Like with the hot spot on the computer all the spreadsheets and the staff and about salaries, different things, working time, its different the way its done and bit of variety is always good. [Student_1]*
- *The SimWalk, we have used it twice I believe, and I love it and enjoy it as you can definitely relate how things are meant to work in a business environment so I liked it and enjoyed it. It is something completely different as well, so a bit of variety makes it more interesting. [Student_6]*

When the interview discussion focused on the value of SimWalk and students were questioned how it helped them understand accounting concepts better, the responses were favourable and the results appeared to match the instructional objective of facilitating in context application of knowledge, as the following comments suggest:

- *Because you can visualize things it makes it easier. Its like when another picture went into the office and pieces of paper and files all over the place and it was so disorganized, you just got this over whelming feeling that they needed to do something to get the business organized, it does make it better. [Student_2]*

- *I think it's good as you can see how all aspects of accounting relate to just one company and that's what we are going to have to be able to see when we get a real job and go out into the real world. Like its going to be that oh only one company deals with that like internal control and one company deals with something else, all companies have to deal with all aspects of accounting. [Student_6]*

Two students in the interview found SimWalk a distraction, however, as these comments indicate:

- *I think when you do the SimWalk you can go oh yeah I can relate this to real life like its easier to relate to real life with the visuals, but just find its really distracting in terms of doing the work because basically we both do the double degree in PR and Business we are not really interested in doing accounting so we just want to get in there and do the work learn a bit about accounting and pass the subject whereas other people may want to go oh look you know maybe I will own a Boost Juice some day or you know I can relate this to the business I want to buy. [Student_3]*
- *I find the SIMwalk really distracting like I just find it like I rather sit down and go through things one-on-one… I rather have a sheet of paper and this is the example this is what we have to do.[Student_4]*

These results suggest that interview respondents who valued going beyond technical aspects and preferred collaborative activities in the classroom appeared to identify the

relevance of accounting lessons in their degree and future profession. In contrast, respondents who appeared to not recognise this relevance preferred greater focus on procedural aspects of accounting. Table 4.4 from the survey data below show the comparison of Accounting/Finance majors' actual responses with other majors, and results of independent sample T-tests for difference between means. The results show that accounting/finance students are significantly more likely to be able to link the relevance of the lessons to their chosen profession. This finding is consistent with the assertion made by Pincus (1997) that content based on the 'preparer' approach is problematic in classes where the majority of students will not become accountants.

Table 4.4 Lesson relevance link to the profession

Item	**Accounting / Finance**		**Non-Accounting / Finance**		**T**	**Sig. (2-Tailed)**
	N	**Mean**	**N**	**Mean**		
I am able to link the relevance of the lessons to my chosen profession.	15	3.733	49	2.939	2.503	0.015**

Key: Almost Always (5), Often (4), Sometimes (3), Seldom (2), and Almost Never (1).

4.5. *Learning support*

During the implementation, the virtual collaborative learning space was used predominantly for learning support purposes, such as providing flexible access to weekly tutorial solutions and lecture materials, as well as providing a space for asynchronous conversation between students and lecturer/tutors. In addition to individual consultations, tutors also provided support during tutorials. Table 4.5 summarises the results of survey items in relation to student's current level and preferred level of computer usage and tutor support.

With mean items for the students current level of computer usage ranging from 1.6242 (translating to seldom) to 3.296 (translating to sometimes), it would appear that students currently only use computers for their learning only to a limited extent. This is particularly true in relation to accessing computers to ask teachers questions, to take part in online discussions about general issues and about the lessons. The results of paired T-tests, however, identify that students would prefer to use computers significantly more.

The items in relation to students' current level of tutor support reveal that currently students receive a relatively high level of tutor support. However, the results of a paired T-test reveal that students would prefer significantly more tutor support.

Table 4.5 Computer usage and tutor support

Item	Actual		Preferred		T	Sig. (2-tailed)
	N	Mean	N	Mean		
Computer Usage I use the computer to ask the teacher questions.	54	2.019	54	2.815	-5.214	0.000
I use the computer to find out information about the subject.	54	3.296	54	3.815	-5.109	0.000
I use the computer to access learning resources prepared by the lecturer/tutor.	53	2.755	53	3.717	-5.269	0.000
I use the computer to find out information about how my work will be assessed.	54	2.537	54	3.370	-6.469	0.000
I use the computer to take part in online discussions with other students about general issues.	53	2.019	53	2.736	-4.296	0.000
I use the computer to take part in online discussions with other students about the lessons.	53	1.642	53	2.528	-5.364	0.000
Tutor Support The tutor helps me identify problem areas in my study.	55	3.782	55	4.473	-5.972	0.000
The tutor adequately addresses my questions.	54	4.296	54	4.870	-3.863	0.000
The tutor encourages my participation.	54	4.370	54	4.611	-3.738	0.000
The tutor provides me with useful feedback on my work.	54	3.981	54	4.685	-5.364	0.000

Key: Almost Always (5), Often (4), Sometimes (3), Seldom (2), and Almost Never (1).

Moreover, in a survey carried out in the virtual collaborative learning space, it was found that support for assignment related issues dominated the topic of conversation on the subject forum (60%), followed by tutorial homework related postings (25%), while exam related postings (15%) completed the common topics discussed on the forum. Because a small percentage of the final grade was attributed to homework activities, a conclusion can be drawn that conversation on the forum focused solely on assessment related topics.

These results clearly suggest the importance of maintaining appropriate learning support mechanisms in both physical and virtual collaborative spaces to enable continuing dialogue amongst students and teachers on matters of pedagogical importance.

4.6. *Discussion*

One of the critical aspects contained in the different definitions of blended learning discussed in the literature is the explicit reference to the duality of the learning environment, i.e. face-to-face and online (see Driscoll 2002; Oliver & Trigwell 2005; Reay 2001; Sands 2002). However, this investigation identified that such a reference is limited and problematic as it makes an assumption that students' learning engagements only occur in these environments or that learning aids and support are only available in these forms. The study found three functionally different learning spaces in which students were actively engaged, namely:

1. Personal learning space (i.e. home, library).
2. Physical collaborative learning space (i.e. lecture hall, tutorial room).
3. Virtual collaborative learning space (i.e. online forum).

As highlighted below, the usefulness of recognising the distinctions between different types of learning spaces pertained to identifying appropriate pedagogical approaches in a given environment, and to establishing specific support mechanisms that better serve student learning. Indeed, one of the most interesting findings in this study was the important role self-directed learning activities played in a blended learning model. Theorists like Malcolm Knowles (1978) and Jack Mezirow (1991) have spoken about the importance of learner control, offering to students a means for directing their own learning. If students are to develop a sense of autonomy and self-direction in their learning, they need support in their personal learning space and they need to be given opportunities to make choices. It is therefore important to recognise that personal learning

space is also a legitimate part of the blend, rather than simply adopting the notion of the dual instructional system of face-to-face and online learning. Such an acknowledgement should trigger and facilitate the establishment of appropriate and timely support mechanisms specific for self-directed learning. Graham (2004) notes that learning support can come in many forms using a range of learning media, such as print, CD-ROM/Multimedia, and/or online. Because the needs differ in different learning environments, understanding these needs should guide the design of the environment and choice of learning media.

While it is acknowledged that individual construction of knowledge plays an important part in learning accounting, the results suggest that collaborative learning, where the role of teachers as experts in leading and guiding students in the learning process, is equally important, if not more. Indeed, the need to provide access to expert performances (Brown et al. 1989; Lave & Wenger 1991) is evident in the findings. Students valued the opportunity to access modelling and guidance in the physical learning space, which enabled them to progress in the learning process through teacher-led activities. As Herrington and Oliver (2000) suggest, modelling processes and observation of expert performances mediate accumulation of narratives and strategies that use the social environment as a resource. The implication for the subsequent cycles of this research is that adequate and timely access to expert performances needs to be included in the notion of blending, i.e. 1) to enable the provision of appropriate scaffolding and guidance for other learning events that lie ahead; and 2) allow multiple and flexible access to further support self-directed learning. However, the results of this study suggest that currently there are limitations in enabling students to progress on their own, which raises another critical question for design (Brown 1990): *What support mechanisms can be established*

in the virtual learning space to allow students' multiple and flexible access to expert performances, as opposed to allowing access only during face-to-face contact?

The main rationale for introducing the notions of collaborative physical learning space and collaborative virtual physical learning space, in place of 'face-to-face' and 'online' as identified in the literature (see for example, Bleed 2001; Graham 2004; Kerres & De Witt 2002), is to describe their specific functionality. If 'learning is a social act' (Meiklejohn, 1882 cited in Osgathorpe & Graham 2005, p. 231), these environments should then promote a culture of student engagement in social activities. Thus, it is fair to assert that the function of both these environments should focus on generating dialogue and eliciting collaboration amongst the players within them. Indeed, another interesting finding in this study is that students have different expectations between lectures and tutorials in the physical learning space. Where dissatisfactions were reported by some students about being exposed to only limited collaborative learning activities during tutorials, students made no mention of the lack of this type of activity during lectures but reported that they were satisfied with the way lectures were facilitated. It suggests that students had specific expectations in different learning environments, i.e. teacher-led for lectures while tutorials need to include a degree of collaboration. However, the affordances of blended learning can attempt to shift this thinking (Graham 2004). For example, by releasing the restrictions to when and where students can access expert performances, resources developed for this purpose can complement transmission with systematically fostering a culture of three-way dialogue in the collaborative physical learning space. This is consistent with the findings reported by Cottrell and Reid (2003) who found that by 'walking' the students through each lecture in the virtual environment before the class it facilitated a more meaningful dialogue during face-to-face contact.

The findings on collaborative learning activities were inconclusive and warrant further exploration. However, the qualitative feedback about the value that students placed on SimWalk is certainly productive for exploring a number of variables to facilitate increased impact on student learning. The findings do suggest, however, that some students benefit from the opportunity to apply knowledge in context with real life situations. It is clear from the results that these students, particularly those from the accounting/finance groups have specific needs of being able to apply the theory in authentic contexts. As Herrington and Oliver (2000) assert, students appreciate the blurring of theory and practice in this type of activity. If this research were to address one of the critical weaknesses in accounting education, which pertains to graduates inability to solve complex problems (AECC 1992; Catanach et al. 2000; Sundem 1994), the need to continually explore blended learning that integrates a degree of situated learning opportunities is a necessity. McLellan (1994) contends that while knowledge must be learned in context, that context can be actual work setting, a highly realistic or virtual surrogate of the actual work environment, or an anchoring context such as a video or multimedia program. Multimedia programs like SimWalk can therefore mediate authentic learning opportunities in a blended learning model. Indeed, the findings indicate that pictorial representations in SimWalk make complex accounting problem solving accessible to students who may have difficulties imagining complex situations through simply reading about them. As Najjar points out, "information that is processed through both verbal and pictorial channels appears to be learned better than information that is processed through just the verbal channel or just the pictorial channel" (1998, p.312).

The findings confirm that the design of blended learning tested in this investigation fostered collaboration. Several results point to the need for collaborative construction of knowledge in a blended learning model, for example, some students have indicated the importance of collaborative learning activities, identifying the need for a better balance between teacher-led and collaborative learning activities during tutorials. These students, mostly from the accounting/finance group, embraced collaborative work and saw many benefits, particularly in regard to authentic problem-solving processes. However, the degree to which the affordances of collaborative construction of knowledge, particularly when using SimWalk, are realised depends on the teaching model that the tutor adopts in the physical collaborative learning space. As the CTGV points out, "theorists who emphasize the constructive nature of learning argue for the need to change the nature of the teaching and learning process that occurs much of the time in many classrooms" (1992, p. 292). For example, rather than the tutor spending a considerable amount of time during tutorials going through homework, this activity could be simulated in the virtual environment. In this way more time can be spent in the physical collaborative learning space doing precisely the activities for which this space is designed in a blended learning model, such as generating three-way dialogue and promoting collaborative construction of knowledge. This line of reasoning suggests that there is an immediate need to tap into the affordances of the virtual collaborative learning space more widely to facilitate meaningful engagements in authentic learning activities during face-to-face contact.

One of the other interesting findings in this investigation pertains to access to a range of learning support for students. Results suggest that while currently both the physical and virtual collaborative learning spaces are serving the students well in the provision of learning support, students expressed the need for more of similar services currently being

provided. Certainly, in considering the findings discussed thus far, they all point to the provision of a particular approach to learning support for different situations and different learning spaces. Based on the results one can, in essence, draw a conclusion that there are many affordances in a blended learning model for facilitating learning and providing learning support that are difficult or impossible to achieve by adopting one pedagogical position, from either traditional or non traditional perspective. As Sfard maintains, "each has something to offer that the other cannot provide" (1998, p. 10).

4.7. *Critical elements of a blended learning model in first year accounting*

While aspects of the preliminary findings in this investigation appear inconclusive at this stage, a central theme emerged, which pertained to the competing curricular demands, most apparent in the physical collaborative learning space. There is evidence to suggest that in order to accommodate varying curricular needs from the students' perspective, the model of blended learning in first year accounting should include the following critical elements:

- Promote learner control and self-direction
- Provide multiple and flexible access to expert performances
- Promote meaningful in-context application of knowledge
- Provide opportunities for collaborative construction of knowledge
- Promote multiple and flexible access to learning support

Based on these findings, aspects of the learning design have to be modified for the next cycle of implementation and need to focus on the following:

Table 4.6 Design modifications

Aspect	Strategy	Rationale
Wider use of the personal learning space.	Develop learning support mechanisms within the personal learning space.	To promote student autonomy and further encourage active engagement and self-direction.
Facilitate the generation of three-way dialogue in the physical collaborative learning space.	Explore technology tools that can be used to complement face-to-face delivery.	To enable students to access expert performances, review the material before class and come prepared for discussion. This approach also provides a point of reference for future revisions.
Reinforce active learning in physical collaborative learning space.	Continue to use SimWalk and develop learning events that promote meaningful engagement for in-context application of knowledge, eg assessment related activities.	To provide a better balance between self-directed, teacher-led and collaborative learning activities.
Establish a culture of engagement in both physical and virtual collaborative learning spaces and facilitate access to learning support.	Develop learning events that constructively aligns with other components of the curriculum.	To promote collaboration and sharing of learning artefacts as a way of facilitating dialogue.

It is important to note, however, that these modifications have a direct impact on the professional development of teaching staff, focused on facilitation strategies for blended learning and integration of educational technologies in learning and teaching. As Glazer, Hannafin and Song (2005) suggest, teaching staff need to be empowered to explore how technology tools can be used in different capacities to serve different instructional approaches.

5. **Conclusion**

This cycle of design-based research was undertaken primarily for the purpose of identifying what constitute the critical elements of a blended learning model for first year accounting, to be used as a theoretical framework within which the next cycle of the research will be tested and analysed. Results were not intended to be generalised to wider accounting education settings. Therefore for this cycle, the small sample size for the qualitative component of the investigation is not perceived to be a limitation. Rather, the

primary limitation of this research stems from the challenges and difficulties to implement control groups for experimental purposes, which would allow the researchers to undertake comparative study on the impacts of a blended learning model. Institutional constraints rendered this approach to the investigation unfeasible. Indeed, the interview findings highlight the difficulties of accommodating the varying needs of students, so apparent even in a blended learning approach. Nevertheless, research findings provide an interesting insight into how educational technologies within the blended learning model may be used to improve pedagogy and accommodate these varying needs.

Further research is certainly needed to develop both theoretical and practical models of learning in first year accounting that can be tested and refined more widely across the discipline, eg learning models that maximise the affordances of mixing both traditional and non traditional pedagogical traditions. However, the effectiveness of any pedagogical endeavour relies on the active participation of all involved where relevant parties are genuinely supporting and engaging with the process.

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Appendix 1

Example of schedule, classification and rationale of interview questions

Example question	Type of question				Rationale
	Exp	Opin	Feel	Dem	
How much time do you normally give ACC100 to study and where does this take place?	✓				Ascertain level of engagement with the subject and identify specific learning environments where activities are taking place.
Do you do your assigned work prior to each tutorial?	✓				Experience question to explore the value respondents place on this learning event
How did you feel about doing this activity?			✓		Feeling question to determine how students responded to the requirement of engaging with the task.
Which aspect of tutorial activities you find most interesting and/or motivating?		✓			Presupposition questions (questions assume the design of learning events include interesting and motivating elements.
What did you think of SimWalk		✓			Open-ended question to encourage respondents to describe their perceptions in more depth than simply providing short answers.
What kind of benefits do computer-based activities give you?		✓			Opinion question to elicit the value of computer-based activities to learning accounting.
How does computer-based activity help your understanding?	✓				Experience question to gain insight on the strengths or limitations of the resource.

(Adapted from Herrington & Oliver, 2000)