**RHODES UNIVERSITY**

**EDUCATION DEPARTMENT**

# The potential use of e-learning to support teaching, learning and assessment in Information Systems at Walter Sisulu University

Submitted by

**Tabisa Sabalele**

In fulfillment of the requirements for the degree Masters in Education
(Information and Communication Technology)

**March 2008**

Supervisor: Prof Cheryl Hodgkinson-Williams

## ABSTRACT

This research is an investigation of the potential means to make the Information Systems (IS) course more accessible to Walter Sisulu University (WSU) students. As some IS students at this institution are unable to attend classes on a regular basis, this study aims to establish if and how the WSU Accounting Department (which offers the IS course) could use e-learning to support the teaching, learning and assessment of IS.

This qualitative study was approached from an interpretive perspective. The study has undergone one cycle of an action research approach. The methods used in the study include surveys, an expert review and focus group interviews. The data was elicited from participants using questionnaires and an interview schedule. A staff questionnaire was used to elicit information from IS staff from four contact universities in South Africa to determine their experience of using Information and Communication Technology (ICT) for e-learning in an IS course. A student questionnaire was used to determine the WSU IS students' reasons for absenteeism, their learning needs, and their current computer access and skills. Data from both of these surveys informed the development of the WSU IS pilot website. An expert review questionnaire ascertained the subject expert's opinions about the newly developed WSU IS pilot website. The website was found to be of good quality with respect to the four aspects that Harvey and Green (1993 cited in Lomas 2002) use to define quality. Some modifications were made to the WSU IS pilot website as a result of the expert's comments. After the website was used by the IS students, two focus group interviews were conducted to determine the students' perceptions of the value of the website. The data was analyzed, interpreted and linked to the literature surveyed.

The main findings indicate that the WSU IS pilot website could be part of a more globalised higher education offering than the paper-based IS course offered before. However, the staff and the student surveys revealed that ICT has opened the gap in equity at the higher education institutions, highlighting that access to a university does not mean equal access to lectures and computers. The WSU IS pilot website endeavoured to capitalise on students' physical access to computers by supporting epistemological access to the curriculum, by encouraging them to exercise control over their learning.

This study has ideally enabled the Accounting Department to deliver its services to students and this in turn will hopefully help WSU retain its part-time students and improve the student pass rates.

## ACKNOWLEDGEMENTS

First, I would like to thank my Heavenly Father for giving me courage through the journey of my research.

Secondly, I wish to express my sincere gratitude to Prof. Cheryl Hodgkinson-Williams, my supervisor for the unfailing support, and her constructive advice and guidance. I am grateful to her for believing in me that I could win this race.

I also acknowledge Ms Ursula van Harmelen and Mr Lorenzo Dalvit for their support and guidance which contributed to the completion of this thesis.

I thank all the participants; they contributed immensely to this research. The participants include the students who responded to the student questionnaire and the interview, the staff who responded to the staff questionnaire and the subject expert who evaluated the WSU IS pilot website.

I am grateful to my husband, Mr Lukhanyo Mayisela and my mother Mrs Georgina Sabalele, who supported me from the beginning to the end of this journey.

My children, Avela and Awongiwe, thanks for understanding when I left you alone at home for several days when I needed to work on my thesis.

I thank Mr Vincent Mtyende and Mrs T. Taole for proofreading my thesis.

# TABLE OF CONTENTS

**ABSTRACT**.....i
**ACKNOWLEDGEMENTS**.....iii
**TABLE OF CONTENTS**.....iv
**ACRONYMS USED IN THIS STUDY**.....viii
**LIST OF TABLES**.....ix
**LIST OF FIGURES**.....x

**CHAPTER 1**.....1
**INTRODUCTION**.....1
1.1 Introduction.....1
1.2 Context of the study.....1
1.2.1 E-learning from an international perspective.....1
1.2.2 E-learning in South Africa.....5
1.3 Research goals.....8
1.4 Methodology.....8
1.4.1 Research orientation.....8
1.4.2 Research approach.....9
1.4.3 Research methods and data gathering instruments.....9
1.4.4 Data analysis.....10
1.5 Ethical issues.....10
1.6 A brief overview of the chapters.....10
1.7 Summary.....11
**CHAPTER 2**.....12
**INFORMATION AND COMMUNICATION TECHNOLOGIES IN**.....12
**HIGHER EDUCATION**.....12
2.1 Introduction.....12
2.2 Challenges faced by higher education.....12
2.2.1 Economic and business dynamics.....13
2.2.2 Social and intellectual developments.....15
2.2.3 Technological developments.....17
2.2.4 Changes in government policy.....19
2.3 Challenges to the former University of Transkei.....23
2.4 Responses to challenges posed to higher education.....24

2.4.1 Curriculum responsiveness and design ..... 24
2.4.2 ICT as a response to challenges ..... 32
2.4.3 Web-based learning ..... 35
2.4.4 *Moodle* ..... 36
2.5 Summary ..... 37
**CHAPTER 3** ..... 39
**RESEARCH DESIGN** ..... 39
3.1 Introduction ..... 39
3.2 Research Orientation ..... 40
3.3 Research approach ..... 41
3.4 Research sites and participants ..... 41
3.4.1 Four higher education institutions ..... 41
3.4.2 Students at WSU ..... 42
3.4.3 Expert reviewer ..... 44
3.5 Research methods and data generating instruments ..... 44
3.5.1 Surveys ..... 44
3.5.2 Expert review ..... 46
3.5.3 Focus group interviews ..... 47
3.6 Data analysis and validity concerns ..... 49
3.6.1 Staff questionnaire: Data analysis and validity concerns ..... 49
3.6.2 Student questionnaire: Data analysis and validity concerns ..... 49
3.6.3 Expert review questionnaire: Data analysis and validity concerns ..... 50
3.6.4 Focus group interviews: Data analysis and validity concerns ..... 50
3.7 Ethical considerations ..... 50
3.8 Research milestones and Activities ..... 51
3.9 Summary ..... 51
**CHAPTER 4** ..... 53
**ANALYSIS AND FINDINGS: STAFF SURVEY** ..... 53
4.1 Introduction ..... 53
4.2 Presentation of data ..... 53
4.2.1 Staff demographics ..... 54
4.2.2 Availability of computers to students ..... 54
4.2.3 The LMS and applications software used by the lecturer ..... 58
4.2.4 The impact of making material available online ..... 62

4.3. Summary ..... 67
**CHAPTER 5** ..... 68
**ANALYSIS AND FINDINGS: STUDENT SURVEY** ..... 68
5.1 Introduction ..... 68
5.2 Presentation of data ..... 68
5.2.1 Students demographics ..... 68
5.2.2 Students' attendance ..... 72
5.2.3. Students' learning needs in the IS course, and computer access and skills ..... 77
5.2.4 Potential benefits for creating an online course ..... 88
5.2.5 Comments/suggestions ..... 98
5.3 Discussion of findings in WSU in relation to the surveyed institutions ..... 99
5.4 Insights provided by the surveys in the development of the WSU IS pilot ..... 100
website ..... 100
5.5 Summary ..... 102
**CHAPTER 6** ..... 104
**COURSE DEVELOPMENT** ..... 104
6.1 Introduction ..... 104
6.2 Insights provided by the surveys in the development of the WSU IS pilot website ..... 105
6.3 The development of the pilot IS website ..... 106
6.4 *Moodle* features ..... 107
6.5 Designing the course interface ..... 108
6.6 The course ..... 109
6.7 Course evaluation ..... 124
6.7.1 Report on expert evaluation ..... 124
6.7.2 Focus group interviews ..... 126
6.8 Summary of the chapter ..... 135
**CHAPTER 7** ..... 137
**SUMMARY, CONCLUSION AND RECOMMENDATIONS** ..... 137
7.1 Introduction ..... 137
7.2 Reflection on the research process ..... 138
7.3 Summary of the main findings ..... 139
7.3.1 Globalization and homogenization ..... 139
7.3.2 Commercialization of university instruction ..... 140

7.3.3 Equity among South African Higher Education Institutions ..... 141
7.3.4 Gender and diversity ..... 141
7.3.5 Physical access to Higher Education Institutions ..... 142
7.3.6 Epistemological access ..... 143
7.3.7 Quality ..... 144
7.4 The lessons learnt from the research ..... 146
7.5 Recommendations for the delivery of the Information Systems (IS) course ..... 147
7.6 Limitations of the study ..... 148
7.7 Suggestions for further research ..... 149
7.8 Summary ..... 149
**REFERENCES** ..... 151
**APPENDICES** ..... 157
Appendix A ..... 157
Appendix B ..... 162
Appendix C ..... 166
Appendix D ..... 168
Appendix E ..... 170
Appendix F ..... 172

## ACRONYMS USED IN THIS STUDY

| | |
|---|---|
| CAA | Computer Aided Assessment |
| CAA | Computer Assisted Assessment |
| CAI | Computer Aided Instruction |
| CFC | Computer-Facilitated Communication |
| CMS | Course Management System |
| DoE | Department of Education |
| FET | Further Education and Training |
| HBU | Historically Black Universities |
| HE | Higher Education |
| HEI | Higher Education Institutions |
| HEQC | Higher Education Quality Committee |
| HWU | Historically White Universities |
| ICT | Information and Communication Technology |
| ID | Instructional Design |
| IP | Internet Protocol |
| IS | Information Systems |
| KEWL | Knowledge, Education and Web-based Learning |
| LMS | Learning Management System |
| Moodle | Modular Object-Oriented Dynamic Learning Environment |
| NQF | National Qualifications Framework |
| RPL | Recognition of Prior Learning |
| SDLC | Systems Development Life Cycle |
| SPSS | Statistical Package for Social Sciences |
| TAM | Technology Acceptance Model |
| TPS | Transaction Processing System |
| UB | University of Botswana |
| UCT | University of Cape Town |
| Unitra | University of Transkei |
| WBL | Web-based Learning |
| WSU | Walter Sisulu University |

## LIST OF TABLES

**Table 2.1:** Instructional development methodology for the development and evaluation of e-learning content.....29

**Table 2.2**: Comparison of Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) Instructional development methodology .....30

**Table 3.1:** Research sites.....42

**Table 3.2:** WSU students.....43

**Table 3.3:** Research design.....48

**Table 4.1:** Number of students doing IS as a major course.....54

**Table 4.2:** Number of students doing IS a service course.....55

**Table 4.3:** Full-time/Part-time students.....55

**Table 4.4:** Departments that require the service course.....56

**Table 4.5:** Number of computer laboratories and number of computers available to the IS students in the respective institutions .....57

**Table 4.6:** Material available online.....60

**Table 4.7:** The applications software used and the purpose for which the software is used.....61

**Table 4.8:** Learning Management System.....62

**Table 5.1:** Time of attendance vs Reason for time of attendance .....73

**Table 5.2:** How often the students are able to attend class vs Reasons for non-attendance .....75

**Table 5.3:** Time of attendance, how often is the students able to attend and the reason for non-attendance.....76

**Table 5.4:** The location of the computer vs Students' access to the Internet.....79

**Table 5.5:** The location of the computer vs Students' access to E-mail.....80

**Table 5.6:** How well can students use a computer vs What they can do best.....83

**Table 5.7:** School where matriculated vs How well can one use a computer..... .85

**Table 5.8:** Test yourself exercises vs Reason for exercise .....93

**Table 6.1:** Course content.....115

**Table 6.2:** Formative evaluation: Expert review.....125

**Table 6.3:** Results of students' computer competence and familiarity with the use of the Internet.....127

## LIST OF FIGURES

**Figure 2.1:** Designing a programme (Adapted from Geyser 2004).....25

**Figure 2.2:** Gustafson and Tillman's (1991:10) instructional design sequence.....29

**Figure 2.3:** The six-stage instructional design model (adapted from Geyser's (2004) programme design, Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology).....31

**Figure 5.1:** Gender of students.....69

**Figure 5.2:** Age of students.....70

**Figure 5.3:** School where matriculated.....71

**Figure 5.4:** Time of attendance.....72

**Figure 5.5:** Time of attendance vs. Reason for time of attendance.....73

**Figure 5.6:** How often students attend classes.....74

**Figure 5.7:** How often students attend classes vs reasons for non-attendance.....75

**Figure 5.8:** Availability of computers for studies.....77

**Figure 5.9:** Location of computers.....78

**Figure 5.10** Internet access.....79

**Figure 5.11:** E-mail access.....80

**Figure 5.12:** Frequency of accessing computers.....81

**Figure 5.13:** Reasons for accessing a computer.....82

**Figure 5.14:** Students' computer competency vs what they can do best.....84

**Figure 5.15** Delivery preference.....86

**Figure 5.16:** Reasons for preference or non-preference.....87

**Figure 5.17:** The Internet motivates students to read notes.....89

**Figure 5.18:** The Internet boosts learning skills.....90

**Figure 5.19:** The Internet enables one to access related topics.....91

**Figure 5.20:** The Internet can be accessed anytime.....92

**Figure 5.21:** Preference of Test yourself exercises vs reasons for preference.....93

**Figure 5.22:** E-mail can help one ask questions he/she never thought of in class.....95

**Figure 5.23:** E-mail can help one ask questions he/she was shy to ask in class.....96

**Figure 5.24:** E-mail can help one ask questions that generated from a group discussion .....97

**Figure 5.25:** E-mail can help one ask questions that he/she would like the lecturer to respond in writing.....98

**Figure 5.26:** Comments/suggestions.....99
**Figure 6.1:** Log on history for user.....110
**Figure 6.2:** Course Main page.....111
**Figure 6.3:** Course Main page with the general features.....112
**Figure 6.4:** Content of the first topic.....113
**Figure 6.5:** Guide to the section.....116
**Figure 6.6:** Objectives, outcomes and assessment criteria.....117
**Figure 6.7:** Notes on How the Internet works.....118
**Figure 6.8:** Links to visit.....119
**Figure 6.9:** Design view for a quiz.....120
**Figure 6.10:** Task on Topic 1.....121
**Figure 6.11:** Design view for a Forum.....123
**Figure 6.12:** Design view for a Chat facility.....124
**Figure 6.13:** Technical support.....129
**Figure 6.14:** Usefulness of the LMS.....130
**Figure 6.15:** Ease of use of LMS.....132
**Figure 6.16:** Attitude and intention to use the LMS.....133
**Figure 6.17:** Changes and additions to course content.....134

# CHAPTER 1

# INTRODUCTION

## 1.1 Introduction

In this chapter, I introduce the study by explaining the potential need for the research and presenting the specific goals of the study. The focus on the use of Information and Communication Technology (ICT) for e-learning is explained in the light of the research context. This chapter also provides a brief outline of the research methodology used in the study, the ethical considerations and an overview of the forthcoming chapters.

## 1.2 Context of the study

This section describes the use of ICT for e-learning from an international and national perspective. It also describes the potential need for e-learning at Walter Sisulu University (WSU).

### 1.2.1 E-learning from an international perspective

The Internet has brought about many changes in our lives and has allowed people with Internet connectivity to access information from anywhere in the world. One potential benefit for those wanting to study is that "computer networks (for example Internet) make it possible for learners to access information from data sources throughout the world, and they enable educators to interact with individual learners on campus or in remote locations" (Broere, Geyser & Kruger 2002:7). The use of the Internet to support teaching and learning has been loosely defined as "electronic learning" and abbreviated to "e-learning".

E-learning, also called 'web-based education' or 'online learning', is used to describe ways of using networked computers to support teaching and learning. There are two main modes of lecturer-student interaction in e-learning, namely synchronous and asynchronous learning. Synchronous, which literally means "at the same time", involves interacting with a lecturer via the web or another form of technology such as the telephone in real time. In contrast, asynchronous, which means "not at the same time", provides learners with the opportunity to complete an area of study in their own time and according to their own pace, without real-time interaction with the lecturer (Kruse

& Kei 2000, cited in Broere *et al* 2002:6). Massy and Zemsky (1995) maintain that e-learning allows lecturers to accommodate for individual differences in student goals, learning styles and abilities, while providing improved convenience for both students and lecturing staff on an "any time, any place" basis. Likewise, students do not have to schedule their participation around the pre-defined times of lectures. Furthermore, Hart and Mason (1999) mention how e-learning or Computer-Facilitated Communication (CFC) can accommodate for varying students' learning abilities and strategies:

> *... unlike the linear flow of the traditional classroom discussion, a CFC environment allows students to continue a discussion for several days, alternating participating and lurking in the background to reflect and read, until they feel comfortable enough with their opinions to add to the discussion* (Hart & Mason 1999:153).

In addition to these opportunities provided by "any time, any place" learning, Broere *et al.* (2002) indicate that e-learning makes provision for the student to access information in non-linear ways.

On the other hand, Cronjé and Clarke (cited in Boere *et al.*2002) emphasize that:

> *The flexibility of asynchronicity, though, can result in procrastination for those students who are too busy to log on regularly, which in turn could lead to their falling behind with respect to deadlines. Essential learning factors such as personalized feedback and interaction is required to break the barriers of learner control* (2002:10).

In addition to accessibility, e-learning provides the possibility of interactivity, which can be used to accommodate students' learning strategies. Weigel (2002) confirms that this interactivity allows students to proceed through the material at their own pace, repeating what was unclear and skipping topics that they already know about. This is more convenient "in the case of adult students, who enter the classroom from widely divergent backgrounds and have different levels of knowledge or anxiety about the subject matter" (Weigel 2002:38). It is at this point that Weigel (2002) makes a clear distinction between reach (access to material from anywhere and at anytime) and richness (for example, currency, accuracy, interactivity, relevance), with the concern that people tend to overlook the richness side of the information technologies.

With e-learning's capacity to provide both 'reach' and 'richness', Van der Perre (1999) sees e-learning (or online learning) as a way to respond to the new demands for education that the 'changing knowledge society' is placing on institutions of higher education in particular. In his study conducted in the European Union, Van der Perre

(1999) identifies the different target groups of university education in relation to particular demands from the 'knowledge society'. He describes a blueprint of an 'online university' that he perceives will be able to meet the demands of the various target groups:

> *The online university is basically a Web site on the Internet. As a learner, you surf into it, get welcomed into the virtual university, get information on programs, conditions, and teachers; you can register, find courses and take part in them, consult libraries, participate in question-and-answer and problem-solving sessions, interact with peers and teachers, take tests and exams, and so forth* (Van der Perre 1999: 119).

In considering the need for e-learning in tertiary education Bates (1997) identified full-time employees as being the prime target group, as they are working, have families, and cannot afford or do not want to be full-time students. He talks of an "international multimedia network infrastructure" that allows institutions to access, create and deliver educational multimedia services in a variety of formats and in a variety of modes. Bates (1997) writes that:

> *Basically, learning materials can be accessed and/or created in any format (video, audio, text, graphics, or any combination), and stored digitally. Course designers can access this material, store them and export this learning material in a variety of formats (print, CD-ROM, or down-loaded to local work-stations), depending on the learners' needs* (Bates 1997:240).

Tertiary institutions that make use of ICT have classified their courses into the broad categories; fully online, mixed mode (Web and face-to-face) and Web enhanced courses. A study carried out at the University of Central Florida evaluating the university's use of Web-enhanced face-to-face classes, mixed-mode Web classes and fully online classes, had the following results:

- *Mixed-mode courses had marginally higher course completion than Web-enhanced face-to-face classes or fully online courses.*
- *Faculty considered that mixed-mode courses required more time to develop and administer than face-to-face courses but less time to deliver.*
- *Faculty considered that mixed-mode courses increased the amount and quality of interaction* [when] *compared with standard face-to-face classes, but the Web-enhanced face-to-face classes or fully online courses had even higher ratings than mixed-mode Web courses for amount and quality of interaction.*
- *Faculty satisfaction with Web-enhanced face-to-face courses was higher compared with standard face-to-face teaching, but mixed-mode courses and fully online courses had even higher faculty satisfaction ratings than*

> *Web-enhanced face-to-face courses* (Dziuban & Moskal 2001 cited in Bates & Poole 2003:119).

These results imply that the faculty at this university was more satisfied with the mixed-mode delivered course as compared to the standard face-to-face mode of delivery. The use of e-learning by tertiary institutions in most international countries is made possible by the necessary technological infrastructure that is in place both for university lecturers and students (Bates 1997). Furthermore, some faculties provide specific training on the use of technology in education as part of a regular baccalaureate or post-doctoral course of study (Bates 1997). On the other hand, Hart and Mason (1999) in their study of the Australian higher education setting, mention that many staff members have difficulty in accepting the legitimacy of CFC or e-learning. "Many suffer from time zone inertia, preferring to wait and see just a little bit longer before accepting the real challenge that the digital revolution presents" (Hart & Mason 1999:154).

While the potential benefits of e-learning are well-documented, there are those who caution against a "blind faith in the necessity and ultimate beneficence of technological innovation" (Noble 2002:x). As Murphy, Walker and Webb (2001) point out; the problem in the educational use of technology is that people tend to use technology because it is available. "The user is then placed in a position of adapting to the demands (or functionalities) of the technology. The technology becomes the leading actor" (Murphy *et al* 2001:3). We need to be mindful that technologies such as the ICTs that make e-learning possible, do not remove the focus on teaching and learning in education. Lankshear, Peters and Knobel warn that:

> *"...as educationists we neglect investigating the possible epistemological significance and implications of practices involving new Information and Communications Technologies (ICTs) at our peril. This would be to hand the game over completely to the 'visions' of neo-liberal policymakers, techno-scientists and corporations who stand to gain from technologising educational provision in the image of computing hardware and software"* (Lankshear, Peters & Knobel 2000: 21).

So, while e-learning can possibly be a way to meet the demands of today's students, we need to bear in mind that our technological choices do not occur within a socio-political, epistemological or pedagogic vacuum.

### 1.2.2 E-learning in South Africa

The use of ICT in tertiary education is also evolving in South Africa. Kennedy (2001) emphasizes the need to make "exclusive use" of digital media as one of the top priorities in education. He writes that: "Our next generation of students and our distance education students will all have computers at home and will require digital media" (Kennedy 2001:1). He further outlines how the digital media is especially suited for teaching, learning and assessment at the Higher Education Institutions (HEIs). He talks of updating material, students accessing references hyperlinked to the world wide web, digital book-marking, colour and attractive fonts to enhance students' learning, spell-checking and grammar checking, incorporating illustrations and interactivity, indexes to content, assessment, setting, marking assignments via e-mail (Kennedy 2001). How realistic Kennedy's claim will be is still to be determined, as the ICT infrastructure needed for the next generation of students to have computers at home is not yet in place.

The South African Department of Education (DoE) comments that:

> *The use of ICTs in Africa recorded a 20% increase in 2002, mostly due to increased usage in urban areas with a GDP per capita. However, while 72,7% of Americans currently use the Internet, only 6.4% of South Africans have access to and use the Internet* (Department of Education 2003 September:1)

In a survey carried out by Blewett and Singh (2003) investigating the IT Departments' perception of the role of educational technology tools in tertiary institutions in South Africa, a number of benefits of using educational technology tools were identified. These included improved accessibility of learning material from nearly anywhere, interactive learning by students, improved communication between the lecturer and students facilitated through various electronic means, improved availability of material outside normal hours, flexibility in terms of time, place, pacing (speed of learner) and repetition. Furthermore, a study carried out at Rhodes University by Mallinson and Sewry (2004) shows that the Information Systems (IS) department has been at the forefront of e-learning initiatives at this university and has been used primarily because of its benefits in terms of accessibility and interactivity.

From the above discussion, one may notice that the distinction between the two modes of course delivery, that is, contact classes and distance education is fading away as ICTs are used to help the student access information anytime and anywhere. According to

Boere *et al* (2002), with the use of ICTs, HEIs are now trying to move away from the instructor-oriented approach to the student-oriented approach.

> *A growing number of institutions, worldwide and in South Africa, that used to be focused on either contact or distance education, are adapting their modes in order to meet the needs of the new clientele. The shift from subject- and lecturer-centred to learner- and learning-centred approaches is supported by the use of integrated technologies* (Broere *et al*, 2002:8).

In addition, HEIs in South Africa have also realized the usefulness of ICT as Broere *et al* (2002) state that South Africa's higher education institutions have already progressed to the next generation of ICT use in education, so-called mixed mode, in which a new dynamic interaction is negotiated between the electronic information technologies and a face-to-face lecturing.

### 1.2.3 Potential need for e-learning at Walter Sisulu University

As a HEI situated in a rural area in the Eastern Cape, WSU has part-time students who are unable to attend contact classes on a regular basis, which seems to be contributing to an increasing failure rate. The main challenges faced by WSU include ways to supplement contact classes.

In the past years, all faculties in the university duplicated their classes in the evenings to accommodate part-time students as well as those full-time students who were working, usually in the towns surrounding the university, and could not attend during the day. Even when given the chance to attend, students seemed to be exhausted from work and could not engage fully in class. This duplication of classes was terminated because an audit carried out at the university revealed that there was a waste of teaching resources and this has subsequently limited the contact of these two sets of students with their lecturers or peers.

This situation has had a detrimental influence on pass rates and lecturer satisfaction across the whole university, and in the Accounting Department where IS is offered to approximately 200 second year BComm students, of which about 40 are considered part-time each year. This number includes those students who are registered as part-time and those who are registered as full-time but have other commitments during the day that make them unable to attend classes on a regular basis. The course usually has two

lecturers who share their teaching load in blocks, but I was the only lecturer in 2003. Fortunately another lecturer joined me in 2004.

In order to support my students I have placed printed IS lecture notes in the university library. However, these have not been properly managed; students take the notes and never return them, so other students forfeit the chance to read the notes. As my students are IS students, I anticipated that I could use some e-learning strategies to support them in their studies. It is the particular focus of this research to investigate how Information System departments in South African HEIs are using e-learning to support teaching, learning and assessment with the express view to develop a set of recommendations for WSU on how to make the IS course at WSU more accessible to students, more especially keeping those students who are unable to attend lectures regularly, up-to-date with the lecture notes, assignments and also looking at a way of assessing this group of students, as the full-time students would have carried out such assessment activities in the classroom.

As these students are adults, the underlying assumptions of andragogy mentioned by Knowles (1978 cited in Knowles and Associates 1985) need to be kept in mind. He emphasizes the learner's increasing self-direction; the learner's experience as a rich resource of learning; the learner's readiness to learn stemming from his or her tasks or problems; learning itself focusing on tasks, or being problem centred; and the learner's motivation being derived from internal incentives or curiosity. This is why I feel that the IS students need to be supported; they must have a thorough understanding of the technological concepts as well as the use of technology. With this basic understanding, a mixed mode course is envisaged to help WSU IS students to access lecture material, have hands-on activities which will help them to know the course better, and to access further information from other websites linked to the IS course webpage.

### 1.3 Research goals

The main research question that guided this study is:

How could Walter Sisulu University use e-learning to support the teaching, learning and assessment of IS?

In order to answer the main question, responses to the following subsidiary questions have been sought:

- How are IS departments in South African contact universities using ICT for e-learning?
- What strategies for including ICT to support teaching, learning and assessment of IS are recommended for WSU?
- How could the WSU IS pilot website be developed and implemented?
- How do students at WSU respond to the newly developed pilot IS website?

### 1.4 Methodology

This section reviews the research orientation, the methodology, research methods, and the data collection and analysis techniques adopted in this study.

#### 1.4.1 Research orientation

The research is approached from an interpretive perspective. Janse van Rensburg (2001) describes the ontology of the interpretive approach as an internal reality of personal and subjective experience. From the interpretive perspective human actions are preceded by intentions and may be accompanied by reflection (Connole 1998). Meanings of these actions are constructed by interacting with individuals and groups and are shared through language and other forms of symbolism (Janse van Rensburg 2001).

In this approach, the researcher generates or produces data and constructs knowledge through communication with the actors (individual or group). In the research carried out, I felt that with a better understanding of the lecturers' and students' views on the implementation of ICT in a university course, I would be able to better meet the learning needs of IS students at WSU.

### 1.4.2 Research approach

The research approach can be broadly construed as action research. According to Zuber-Skerritt (1992), action research is a type of research conducted by Higher Education (HE) lecturers into their own teaching practice, with the aim of social change and of improving the HE learning, teaching and the curriculum. One of the key features of action research that she identifies is a spiral of cycles of planning, acting, observing and reflecting. This study forms one cycle of such an action research process. The four steps of the cycle endeavoured to address the main research question.

### 1.4.3 Research methods and data gathering instruments

Research methods for data collection include surveys, an expert review and focus group interviews. A staff survey was conducted in the IS departments of four contact South African universities. A questionnaire was used to elicit the experience of the staff members in these institutions about the use of ICT for e-learning. The questionnaire was sent by e-mail to and from the staff members (one staff member per university). This questionnaire was piloted at one institution in the Eastern Cape and was adapted accordingly. The data from the survey provided insight to the development of the WSU IS pilot website.

Another survey was conducted with WSU IS students. A questionnaire was used to ascertain the IS students' reasons for missing classes, their learning needs, and their current computer access and skills. The questionnaire was piloted at a lecture and subsequently adapted. The final student questionnaire was then distributed to 198 IS students in an examination room with the intention of particularly including those students who were unable to attend classes on a regular basis. One hundred and forty nine students responded to the questionnaire.

A pilot website was developed and then evaluated by a subject expert. The website was then used by WSU IS students and subsequently focus group interviews were conducted to elicit these students' perceptions of the newly developed IS pilot website. Two focus groups composed of 12 WSU IS students each, were interviewed.

### 1.4.4 Data analysis

The staff responses to both the closed-ended and open-ended questions were analyzed manually and then presented in the form of tables. The students' responses to both the open-ended and closed-ended questions were analyzed using the *Statistical Package for Social Sciences* (SPSS). The qualitative data was summarized in the form of tables and graphs. The responses from the expert reviewer were analyzed manually and presented in a table. The responses from the focus group interviews were analyzed using an open source software package, *Freemind*. The data was presented in mindmaps.

## 1.5 Ethical issues

Ethical issues were addressed when I was working with the respondents to elicit information. I explained the purpose of the research to the staff, subject expert and students and asked them to voluntarily participate in answering the questionnaires and in the focus group interviews respectively. I also explained to the students how this research is intended to benefit them.

One of the limitations of this research is that there were no part-time students involved in the focus group interviews.

## 1.6 A brief overview of the chapters

Chapter 2 describes the challenges faced by the HEIs and the responses to these challenges. The responses mainly focus on curriculum responsiveness with particular emphasis on the use of ICT for e-learning. Relevant literature has informed the development of a six-stage instructional design model that has been used in this study to develop, implement and evaluate the WSU IS pilot website.

Chapter 3 describes the design of the study and the methodology used. The chapter describes how I used an interpretive design and how I applied the research methods such as surveys, an expert review and focus group interviews to accomplish a single cycle of an action research approach.

Chapter 4 presents the data elicited by means of the staff survey. This data provides an indication of how IS departments in contact universities in South Africa use ICT for e-learning.

Chapter 5 presents the data elicited from the student survey. This data includes the reasons for students' absenteeism from classes, the students' learning needs and their current computer access and skills. The data from both the fourth and fifth chapter provided guidance for the development of the WSU IS pilot website.

Chapter 6 illustrates how the WSU IS pilot website was developed and explains why I chose *Moodle* as a Learning Management System to manage the IS courseware. The chapter includes screenshots and explains the design choices of the website. The chapter presents data from the expert reviewer and focus group interviews.

Chapter 7 consists of the discussion of results in chapter four, five and six (the expert review and focus group interviews). The chapter reflects on the research process, summary of the main findings, the lessons learnt from the research, recommendations for the delivery of the IS course, the limitations of the study, and provides suggestions for further research.

### 1.7 Summary

In this chapter, I have provided an explanation of the background and context of this study. I have also briefly described the study. The chapter has provided an overview of the different chapters of this research report. In the next chapter, I will review literature related to my study.

# CHAPTER 2

# INFORMATION AND COMMUNICATION TECHNOLOGIES IN HIGHER EDUCATION

## 2.1 Introduction

This chapter attempts to contextualize this study within the broader body of literature and research. It provides an overview of the challenges facing higher education (HE) and some responses to these challenges, most particularly the use of information and communication technologies (ICTs) for e-learning.

The study further aims at exploring how ICTs can be used for the teaching, learning and assessing of the Information Systems course at Walter Sisulu University. This study further explores how the instructional approach can be used to develop, implement and evaluate a web-based course.

## 2.2 Challenges faced by higher education

Higher education institutions (HEIs) face challenges of change in the 21st century. Middlehurst (2001:4) clarifies the drivers of change in four broad categories, namely "economic and business dynamics; social and intellectual developments; technological developments; and changes in government policy". I will be using Middlehurst's categories to describe the challenges facing HEIs. It is important to note, though, that each category is inter-related to the others.

These categories describe change at different levels. According to Czerniewicz (2004), transformation (a social and intellectual development) in higher education in South Africa, appears at three interrelated levels. The macro-level deals with the merging and restructuring of institutions and the new funding formulae for students which are already being put into place by the government. The meso-level addresses changes in demographics of both students and staff in and across institutions. Finally, the micro-level is concerned with the curriculum and matters that are closely associated with the curriculum, such as access, equity, participation and throughput (Czerniewicz 2004). In the literature I have separated restructuring (as an economic issue) and transformation (as a social issue). I believe that one of the factors that influence the government to restructure HEI is the economic factor while transformation is driven by the social needs.

### 2.2.1 Economic and business dynamics

HEIs are faced with a number of 'economic and business' challenges. One of these challenges is *globalisation*. The worldwide drive of globalising the economic, political, cultural and technological issues is referred to as globalisation. Castells (2001:4) notes that "at the heart of the process of globalisation is the emergence of global financial markets, the integration of capital markets and money markets, in a system which works as a unit in realtime". He clarifies that: "Globalisation is not only economic. It also refers to media, to information systems, to international institutions, and to the networking of states" (Castells 2001:3).

According to Scott (2000), the university is fundamentally challenged by globalisation in three main ways. The first concerns the tension between serving the world and the interests of a single country. Scott (2000) notes that in the middle ages, a university was created for a nation state of Europe with the main functions of serving the professional needs and ideological requirements of that particular nation state and later, of the world. Since globalisation breaks through boundaries and borders, it has become difficult for each country to have total control over its universities hence a university may be required to serve any part of the world. The second challenge arises from the homogenisation of teaching through the use of ICT, and the emergence of global research cultures and networks (Scott 2000). To achieve this homogenisation, common curricula should be delivered by different institutions in different countries (Middlehurst 2001). The third challenge is that globalisation tends to undermine the welfare states on which the public as well as the private universities depend for their well-being (Scott 2000). It is in this context that Moja and Cloete (2001) further explain the impact of globalising higher education.

They emphasise that:

> *Nation- states have limited or no control over policies regulating higher education. The private sector offers free higher education programmes in countries where there is no free higher education, the shape and size of the system are determined by partnerships between business and institutions, and quality assurance is determined and monitored by third party agents* (Moja & Cloete 2001:244-245).

From the above, it is clear that the globalisation of information has begun to reshape HE. Middlehurst (2001) associates globalisation with what she terms 'borderless

education', where developments have the potential to cross the traditional borders of HE. She talks of traditional borders such as national, organizations and sector boundaries, borders of time and space and private/public boundaries. As these borders or boundaries have been eroded by globalisation, "what we mean by university, a course or a degree may all require re-definition, along with the role of the lecturers, administrators or librarians" (Middlehurst 2001:4). Hence, globalisation in the South African context is expected to result in massification, institutional transformation, profound shifts in research, curriculum construction and teaching (Geyser 2004).

Noble (2002) has a critical view of the *commercialization* that is often associated with globalisation. Commercialization, according to Noble, entails "transforming courses into courseware, the activity of instruction itself into commercially viable proprietary products that can be owned and bought and sold in the market[1]" (Noble 2002:27). Technology is used as a carrier for this and students are able to access information from websites, on CD-ROMs and in the form of courseware (Noble 2002). There is little thought given to pedagogy, and all that is important for commodification of university instruction is the production and marketing of commodities (Noble 2002). This reminds us that when developing courseware, the pedagogical purpose should be considered and we should not take it for granted that technology is a solution to all our university problems; it should be used as a considered response to the students' needs.

African HEIs are also faced by the challenge of funding. Teferra and Altbach (2004), stress the fact that virtually all universities in Africa suffer from the effect of scarce financial resources. In South Africa, this is particularly true for the Historically Black Institutions (such as the one where I carried out my research). Teferra and Altbach (2004) note that this may result in the serious shortage of published material (books and journals), the lack of basic resources for teaching, absence of simple laboratory equipment and supplies (such as chemicals) to undertake research and teaching and in some countries, delays of salary payments for months. The situation is made worse by "the constant decline of direct and indirect resources allocated for higher education by governments" (Teferra & Altbach 2004:29).

The economic drive is a contributory factor in the restructuring of South African HEIs. The Department of Education (1997) emphasizes that effort needs to be made to

[1] Products that can be owned, bought and sold in the market are referred to as commodities

implement system-wide and institutional reform that will reduce wasteful expenditure of financial resources. The three institutional types, that is, the universities, technikons and colleges will no longer continue to function as discrete sectors with mutually exclusive missions and programmes (Department of Education 1997, Section 2.40). The South African Ministry of Education has outlined the following measures in the White Paper (*Ibid*, page 45, Section 4.2):

- Reducing unit costs through an open and transparent allocation of public funds based on normative costs and performance criteria.
- Reducing duplication and overlap in institutional, programme and service provision.
- Broadening the use of high quality but less labour-intensive teaching and learning strategies, including distance education and resource-based learning.

These measures have been carried out, resulting in some institutions being amalgamated, others being downgraded, for instance, into Further Education and Training (FET) colleges and others being closed down, although the process may still be in the initial stages for some institutions. The institution under study has been amalgamated with two former technikons.

### 2.2.2 Social and intellectual developments

Worldwide, universities are composed of students of all age groups; students who have just completed matriculation and older students who are interested in improving their qualifications or who have not yet had the opportunity to obtain even a basic qualification. According to Middlehurst:

> *A growing demand comes from the 'working adult' population, including people who failed to qualify or participate in higher education at earlier stages in their lives, and those who seek further credentials or training. New professions and vocations are also fuelling demand. Pressures for lifelong, relevant, 'just in time', and flexible approaches to learning argue for diversified provision. Increasingly, institutions are having to make strategic choices about the markets that they can and wish to serve* (2001:4).

Following on the international trend, HEIs in Africa, including South Africa, face a significant challenge in providing access to higher education in order to satisfy the

demand of populations that are eager for opportunities to study. This group of people has achieved their secondary education that qualifies them for postsecondary study (Teferra & Altbach 2004). In most cases, the 'working adults' are full-time employees who have families, and cannot afford or do not want to be full-time students (Bates 1997). Hence these people register as part-time students (such as in the institution under study).

South African HEIs are undergoing transformation in response to changing social realities. In the South African context, "Transformation is usually a process by which the form, shape and/or nature of institutions are completely altered" (Fourie 1999:277). The Department of Education (1997; see also Moja and Cloete 2001) emphasizes that the main challenge for South Africa is to address and redress the past inequalities within a new framework of democratic participation. This entails transforming the higher education system to serve a new social order, to meet pressing national needs, and to respond to new realities and opportunities. There has been a dramatic change in equity in South Africa, for instance,

> *The enrolments of black students increased by 61% between 1993 and 1999, i.e. from 249 000 (or 53%) to 414 000 (or 71%) of the total head count enrolments. The change is even more dramatic in the case of African student enrolments. African student enrolments increased from 191 000 to 343 000 between 1993 and 1999, i.e. by 152 000 (or 80%). Thus in 1999, African students constituted 59% of the total head count enrolments in higher education (DoE 2001: Section 3.1.2).*

The DoE (1997) is particularly concerned about the access of black and female students to fields such as science, engineering and technology programmes. A study carried out in 1999 by Cloete and Bunting (2000) illustrates the proportion of the total enrollment in HEI in the three broad fields of humanities, business/commerce and science/technology as 49%, 26% and 25% respectively. However, the Department of Education has implemented a number of strategies to overcome this inequality, by for instance, sending over 200 black students to Cuba to be trained as medical doctors (DoE 1997). In the National Plan (DoE 2001), the government acknowledges the fact that there is still much to be done: the redress of imbalances in the enrolment of students in different programmes, field of specialization and qualifications, in particular postgraduate programmes, and success and graduation rate of students in different programmes. It has already been noted that enrolments of masters and doctoral students have increased from 28 700 in 1995 to 32 600 in 1999 (Cloete & Bunting, 2000). The

plan is also to ensure that teaching/learning processes are sensitive to the needs of the different students.

The transformation mentioned above has given rise to another challenge for South African Higher education, namely diversity. Thomas and de Villiers (2000) identify language, culture, gender, age, physical abilities or learning styles as the sources of diversity. "Students come to tertiary institutions with a wide range of experiences and backgrounds" (Thomas & de Villiers 2000:231). This is a complex issue that cannot be solved at once but "students, staff and curricula need to be prepared for working in a diverse world" (Thomas & de Villiers 2000:236). Moja and Cloete (2001) feel that higher education has to produce medium-skill level professional graduates for the professional and service sector, and highly skilled knowledge producers for high-level innovations. Universities, therefore need to redevelop their curricula to respond to these needs and I believe some universities already do this.

### 2.2.3 Technological developments

Worldwide, HEIs are making use of information and communication technologies to deliver their courses to students, although it may still be at the initial stages in the developing countries. The revolution of information and communication technology has brought about changes in social, cultural and economic relations in South Africa (DoE 2001). The challenge that arises worldwide is the digital divide. "Because the digital domain has become so dominant and is changing how the world works, it is creating new realms of exclusion for students without access to computers" (Czerniewicz 2004:149). Broekman, Enslin and Pendlebury (2002), carried out a survey on the first and second year flexi-BEd students at the University of Witwatersrand. This survey revealed that 26 out of 34 second year students who answered the question had no access to computers when they were not on the university campus, 8 said they had access. The same questionnaire was administered to first-year students and out of the 50 students who answered the questionnaire, 28 said they had no access to computers when they were off campus, while 22 said they did have access (Broekman *et al* 2002). This indicates that a large proportion of the students are unable to access information delivered online when they are not on campus. Broekman *et al* (2002) say the contributing factor to the problem of access is the lack of telephony and electricity infrastructure in South Africa and "even when the infrastructure is available, the

affordability of computers and the costs of connectivity are serious obstacles" (Broekman *et al* 2002:31).

On the other hand, Czerniewicz (2004) makes it clear that having access to technology is a necessary but insufficient condition for social inclusion. "With access to the Internet, you still need the capacity to know what information you want, where to find it and then what to do with it - and education bridges this gap between information and knowledge" (Hall 2001:238). Broekman *et al* (2002) also make note of the fact that "even students who have material access to the required technology may nevertheless not have epistemological access" (Morrow 1993/4 cited in Broekman *et al* 2002:31). They write:

> *A certain level of computer literacy, confidence and informed judgement is required for students to work online. The more confident users can explore and take risks, but the less confident would need support, both technically and epistemologically* (Broekman *et al.* 2002:31).

Gumede elaborates on epistemological access as being the ability to critically appraise "who provides knowledge, what kind of knowledge is made accessible, what kind of knowledge is valued, who is being taught and what time [is] allocated to the topic and the language of learning and teaching as well as various teaching styles employed by ... teachers" (2005:9). Gumede (2005) also links the concept of epistemological access to the call by the South African Department of Education to:

> *... encourage independent and critical thought, the capacity to question, enquire, reason, weigh evidence and form judgements, achieve understanding, recognise the provisional and incomplete nature of most human knowledge, and communicate clearly* (DoE, 1995:22 cited in Gumede 2005:22).

As Eriksen notes:

> *Unlike in other kinds of society, life in the information society is characterised by redundancy and noise; there is far too much information around, and there is certainly enough for everybody, unlike in the industrial and other kinds of society, where people experienced real information shortages (as witnessed in the common metaphors such as 'thirst for knowledge', etc* (2001:19).

He suggests that "... the overarching aim for educated individuals in the new information societies in the world's rich countries must now be to make the **filtering of information** a main priority" (Eriksen 2001:19) [Emphasis added]. A challenge to lecturers and tutors who grew up in a 'print world', is to understand the new

possibilities educational technologies can offer their own disciplines and to learn how to use these technologies to support their curriculum outcomes and assist their students.

As far as access to and use of the Internet are concerned, the figures are difficult to compare. Moja and Cloete (2001:252) report that the "overall Internet use in South Africa increased in 1998 by 86 percent, by 53 percent in 1999 and is predicted to increase by about 40 percent in 2000". According to the NationMaster website[2], in 2002, South Africa was ranked as the 31st country in the whole world in access, with 3.068 million users. The Department of Education (2003) has also noted that only 6.4% of South Africans have access to and use the Internet. According to Czerniewicz (2004), "about one-sixth of South African users are in the academic sector, but only 57% of students and staff in higher education were Internet users in 2002" (Czerniewicz 2004:147). It is expected that these numbers will increase as more HEIs begin to use ICT for their course delivery. However, this increase is being slowed down by the fact that in South Africa, like in other countries, online education is being confused with distance education (Burbules & Callister, 2000).

### 2.2.4 Changes in government policy

The changes in government policy have impacted heavily on HE. As a result, HEIs are faced with challenges such as massification.

#### *Massification*

*Massification* is the transition from an elite university to a mass university (Trow 2001). Scott (1995 as cited in Lomas 2002), uses the term massification to describe the development of mass higher education in the late twentieth century in Europe and North America. According to Lomas (2002), there were 125 000 students at 25 universities in the United Kingdom in 1962, and in 1996 there were more than a million students at just over 100 universities. Lomas (2002) believes that this trend has been assisted by an increase in the proportion of non-standard-entry (which in many cases equates with unprepared) students. This may raise concerns about quality, as massification and quality could be seen as inversely proportional. The question is whether these unprepared students are able to cope with the university standards, or if the standards

---

2 http://www.nationmaster.com/index.php

should be redefined in order to suit these students? As Lomas (2002:77) puts it: "whether massification has led to the end of quality higher education provision depends on how quality is defined". Harvey and Green (1993 cited in Lomas 2002) define quality by viewing it as excellence, as transformation, as fitness for purpose and as value for money.

***Excellence***

Excellence can be equated to a standard of provision. The two notions: "more means worse" and "more means different" apply in the definition of excellence (Lomas 2002). Those academics who say that, "more means worse", claim that massification leads to poorer quality provision (Radford 1997 cited in Lomas 2002). Such academics believe that education institutions introduce a number of new degrees that are of poor quality with the intention of accommodating everybody in society. On the other hand, advocates of the notion "more means different" claim that the higher education curriculum should be relevant to all groups in society (Lomas 2002). They believe that the high student drop out rate in the UK that was most significant between 1994 and 1997, was caused by the intake of less prepared students (Lomas 2002) and not the curriculum. This means that the curriculum needs to be diverse without lowering standards.

However, South African universities have also experienced high drop out rates, although massification may still be at the initial stage in South Africa. Cloete and Bunting (2000) note that the retention rates in the HE dropped particularly between 1998 and 1999. The Department of Education (2005) also highlights the following:

> *The total of graduates and diplomates produced by the higher education system was 94 000 in 2000 and 109 000 in 2003. This represented a total increase of 15 000 (or 17%) over the four-year period. Graduates/diplomates as a proportion of the headcount enrolment total averaged 15% over the period 2000-2003. This low ratio indicates that unacceptably large proportions of any cohort of students entering the higher education system during these years would have dropped out without completing their qualifications, and that fewer than 50% of any cohort eventually graduate* (DoE, *Ibid*, Section 2.3.1.).

The Student Enrolment Planning (*Ibid*, Section 2.3.3), shows that, of the 120 000 students that registered for their first time in 2000, 36 000 dropped out at the end of their first year of study and that a further 24, 000 dropped out after either their second or

third year of study. They have huge learning problems, and as a result need tutoring, supplementary instruction and personal guidance (Fourie, 1999). The above student needs bring about a considerable challenge for academic staff, as many of the academic staff members are used to the formal learning mode and do not feel competent or ready for these services (Fourie 1999). As a result, some HEIs seem to have the tendency of providing easier access, but offering less provision for success.

***Fitness for purpose***

"Fitness for purpose requires that the product or service fulfils a customer's needs, requirements or desires" (Lomas 2002:72). In this context the customer is the society. However, in the UK, there are initiatives such as the formation of the Quality Assurance Agency, National Qualifications Framework (NQF), subject benchmarks, programme specifications and numerous codes of practice with clearly stated precepts (Lomas 2002) to ensure that HEIs meet the needs of the society.

Following initiatives in other parts of the world, South Africa has developed the NQF in an attempt to meet the challenges facing HEIs. The NQF is a structure on which all qualifications, regardless of their origin need to be registered, albeit in formal education, in workplace or community-based training initiatives. The objectives of the NQF as indicated by the South African Qualifications Authority (SAQA) Act, 1995 are to:

- Create an integrated national framework for learning achievements;
- Facilitate access to, and mobility and progression within education, training and career paths;
- Enhance the quality of education and training;
- Accelerate the redress of past unfair discrimination in education, training and employment opportunities;
- Contribute to the full personal development of each learner and the social and economic development of the nation at large (SAQA, 1995 Section 2).

In summing up the above, the registration of qualifications with the NQF can contribute to lifelong learning and the recognition of prior learning (RPL) as some people may have learnt and gained experience from their workplaces and not through formal education. Once the students have attained a qualification, it should be portable from

one institution to the other. The NQF also endeavours to ensure quality through the Higher Education Quality Committee (HEQC) which has the brief to monitor quality. Registration of qualifications with the NQF also addresses the issues of past inequality and inefficiency in an attempt to ensure that the graduates produced by HEIs are competent and have acquired the relevant "knowledge, skills, values and attitudes" (Geyser 2004:148).

### *Transformation*

From the international perspective, transformation in education is 'doing something to the customer rather than doing something for the customer' (Harvey & Green 1993:24 cited in Lomas 2002:75). In this context it is difficult to measure transformation in higher education because learning is a process and it is sometimes difficult to know when and how knowledge has been developed (Lomas 2002). According to Lomas (2002), the lecturer is usually subject to criticism by the student. It is important to note though that a barrier to transformation may also be from the student's side and yet we generally only measure the lecturer's performance. For instance, a student may come from a poor educational background and may find it difficult to cope with the teaching styles such as formal lectures and with study skills such as private reading, note taking, time management, asking questions in large groups, team/project work and IT competence (Lowe & Cook 2003).

### *Value for money*

Concerning quality as value for money, the student pays fees in order to attain a particular award (Lomas 2002). It should be ensured that by the time the student graduates, he/she should have been equipped with the appropriate knowledge and attitude to contribute to society in a meaningful manner. HEIs have to be accountable to the society for all the money paid to the institution by students as well as external funders such as the government.

Apart from pressure from potential students, HEIs are increasing student enrolment due to government demands and economic pressures. The problem is that large numbers of students are admitted to institutions designed for fewer students whereas the financial

resources do not increase at the same pace (Teferra & Altbach 2004), which can impact upon the quality of tuition. This tension may be exacerbated by the funding formula used by the government. For instance in South Africa, HEIs are funded according to the planned enrolments (full-time equivalents or FTEs) in different fields and levels of study (DoE 1997). With massification, therefore, we deal with quantity as well as quality. However, all HEIs are faced with the challenge: how to arrange access as well as ensure success.

### 2.3 Challenges to the former University of Transkei

The University of Transkei (UNITRA) merged with the Eastern Cape and Border Technikons in July 2005 to form a comprehensive university: the Walter Sisulu University. The former UNITRA is faced with challenges such as: globalisation, funding, massification, transformation, student diversity, part-time students, ill-prepared students, producing skilled professional and the digital divide. The former UNITRA has part-time students who are unable to attend classes, as well as some who do attend but are tired from work and have other responsibilities that prevent them from engaging fully in the classroom. Since HEIs, including WSU, are increasing their student numbers, the former UNITRA is faced with the problem of admitting many ill-prepared students. In spite of this, the former UNITRA has to face the challenge of producing competent graduates.

The course that will be investigated in this study is the Information Systems (IS) course which is a discipline within the Department of Accounting. Some students admitted by the Department of Accounting are ill-prepared. The department has a shortage of resources such as teaching laboratory space because of the large numbers of students. The part-time students have little time for their studies, therefore contributing to the failure rate. Some students have financial problems; hence, they are unable to purchase textbooks, which also seems to contribute to the failure rate.

The IS course is divided into theory and practical sessions. The practical sessions in particular have to respond to the following challenge: the students use common laboratories used by all university students. One laboratory is strictly used for teaching purposes, while the other two laboratories are walk-in laboratories. A timetable is designed at the beginning of each year for use of the teaching laboratory. In order to be

able to conduct classes, the IS class is split into manageable groups of about twenty to thirty students. Each practical session takes two hours. The free time slots in this laboratory are used for tutorials. Tutors help students during the tutorial sessions and each student has a one-hour tutorial per week. Each student books a time slot in the walk-in laboratory to use the computer in his or her own spare time. The Internet connection is slow, most especially during the day when there are many students accessing the Internet.

## 2.4 Responses to challenges posed to higher education

This section provides some responses to the challenges described in the previous section and describes how ICT can help to address these challenges. In order to elaborate upon this area, a broader picture of curriculum responsiveness (in particular how ICT can be integrated into it) and curriculum and instructional design is considered. The section also provides examples of universities worldwide, including those in South Africa, that have successfully used ICT for teaching and learning. The section further describes how Web-based learning can be implemented by making use of a Learning Management System such as *Moodle*[3] (Modular Object-Oriented Dynamic Learning Environment).

### 2.4.1 Curriculum responsiveness and design

This subsection considers curriculum responsiveness in general, and curriculum design at three levels: programme, course and classroom practice. The subsection also explains how pedagogy needs to inform the use of ICT for teaching and learning.

Moja (2004) emphasizes that the main challenge for South African HEIs is not only constructing an equitable society but also a *knowledge society*. "The knowledge society is a learning society" (Hargreaves 2003:10). According to Hargreaves (2003), a knowledge society has three dimensions. Firstly, it comprises an expanded scientific, technical and educational sphere. Secondly, it involves complex ways of processing and circulating knowledge and information in a service-based economy. Thirdly, it entails basic changes in the manner corporate organizations function so that they enhance continuous innovation in products and services, by creating systems, teams and cultures that maximize the opportunities for mutual, spontaneous learning (Hargreaves 2003). Hence teaching for the knowledge society involves equipping the students with a

[3] http:www.moodle.org

number of skills. Hargreaves (2003) places emphasis on skills such as the development of cognitive learning, creativity and ingenuity among students; and promoting problem solving, risk-taking, trust in the collaborative process, ability to cope with change and commitment to continuous improvement. This means that a student must be equipped with the aforementioned skills instead of being taught through a standardized curriculum that is conventionally tested. Some countries in the West as well as in Asia have reduced the quantity of the prescribed curriculum content in order to make space for new ways of learning (Hargreaves 2003).

A curriculum can be defined as the dynamic interaction between the principles of design, namely situation analysis; aims, goals and objectives; learning content; learning experiences; teaching opportunities and evaluation (Kruger 1980 cited in Geyser 2004). A student at any HEI acquires knowledge as he/she goes through a programme. "A programme is the umbrella concept which defines a learner's academic experience" (HEQC 2002 cited in Geyser 2004:139).

Geyser (2004) illustrates the interaction of design principles when designing a programme based curriculum (Figure 2.1).

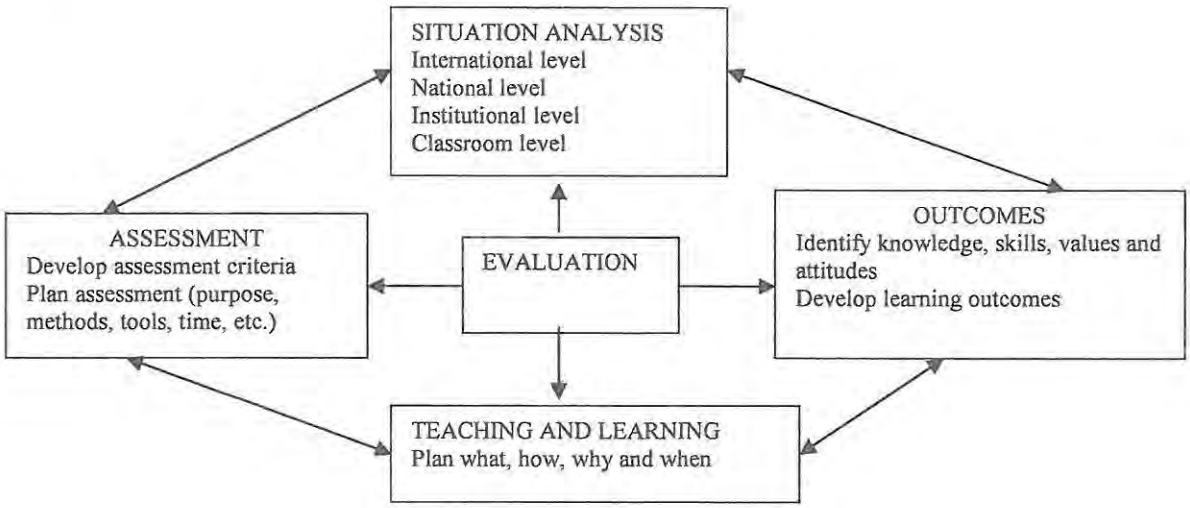


**Figure 2.1: Designing a programme (Adapted from Geyser 2004)**

The coherence of the designed curriculum depends on the extent of the interaction between the principles of design (Geyser 2004). Having analysed Gustafson and Tillman's (1991) instructional design model, I feel that, while Geyser's (2004) model is useful, the "Evaluation" aspect is missing. I have added it at the centre of the principles of design. Gustafson and Tillman's (1991) instructional design model is illustrated in

Figure 2.2. Formative evaluation should be conducted during the development of the curriculum in order to locate the strengths and the weaknesses in the curriculum and for prescribing revisions if necessary while summative evaluation looks at the quality of the whole curriculum (Gustafson and Tillman 1991). There are four types of formative evaluation. These are the expert review, one-to-one evaluation, small group evaluation and field tests/trials (Tessmer 1993). This study has used the expert review to evaluate the newly developed course. Tessmer's (1993) expert review focuses on areas such as content, clarity, environment, style, interest, technical aspects, and general and specific revision (see Tessmer 1993:58). Shelly, Cashman, Gunter and Gunter (2004) have designed a software evaluation rubric for evaluating educational technology and integration strategies. Tessmer (1993) and Shelly *et al* (2004) have guided the development of the expert review questionnaire in this study. Summative evaluation has two types; expert judgement and learners' field trials (Dick & Carey 1991). The learners' field trials method has been used in this study to test the effectiveness of the newly developed WSU IS pilot website.

Moll (2004:3) emphasizes that "curriculum responsiveness promises that there are some positively formulated benchmarks against which we might be able to judge whether our education programmes are meeting the needs of a transforming society". Ensor (2002 cited in Moja 2004:30) summarizes her understanding of contributing factors of curriculum responsiveness as follows:

- A need for flexible approaches to higher education curriculum;
- Qualification restructuring;
- A suggested shift from courses to credits;
- A shift to modules and away from year long courses;
- A shift from departments to programmes; and
- A shift from subject based to learner centred learning.

According to Ensor (2002 cited in Moja 2004:30), the curriculum should be student-based and there should be flexible entry and exit points to higher education. In order to make this possible, there should be recognition of prior learning (RPL) and credits should be portable from one institution to the other. For instance, students coming from other HEIs to the former UNITRA, who have already passed either one or both modules

of any course, are credited with the module(s) provided that the curriculum is the same. Again, according to the Ensor (2002 cited in Moja 2004), a student should register for a programme and no longer in a department as some of the programme modules may be interdisciplinary (Ensor 2004). According to Moore and Lewis (2004), curriculum responsiveness could work in two directions; the change in knowledge content of the curriculum or the change in the mode of transmission from lecturer-oriented to student-oriented.

This study attempts to find a way of changing from the lecturer-oriented to the student-oriented approach. The study further investigates how ICT can contribute to curriculum responsiveness. The benefits of ICT identified by Bates and Poole (2003) include the following: ICT allows a student to access course material anytime, and at his/her own pace. The student can also access the course material irrespective of the place, unlike the conventional method according to which the student has to go to the classroom. This favours a more student-oriented approach. Those lecturers, though, who are in favour of classroom-based teaching as opposed to online delivery, feel that the classroom environment provides communication (such as immediacy, personal contact and community) between students and lectures and among students (Kuriloff 2005). Such lecturers fear that some of these communication characteristics might be lost with online delivery. In response to this, Kennewell shows us how Vygotsky's learning theory supports the use of ICT in teaching and learning. When a student attempts an unfamiliar task, he/she may need support from a teacher, a colleague or any other knowledgeable person. One may use any of the ICT tools to convey the supporting information. The student will carry out the task with support and the actual learning takes place during this period. Vygotsky (cited in Kennewell 2004) calls this period, the 'zone of proximal development'.

I will make use of Figure 2.2 to explain the curriculum design of the IS course. It is important to note that although this study is attempting to move towards the student-oriented approach (which is underpinned by the constructivist learning theory), some subjects that are 'high consensus disciples', such as mathematics, science, computer science, information systems (the one considered in the study) are probably best suited for an instructional approach (underpinned by the behaviourist learning theory) (Ask & Haugen 2005). Hence the design of the course material in this study is informed by

instructional design strategies that are based on predominantly behaviourist principles, but includes some constructivist-informed activities.

The instructional approach makes use of instructional design models. Gustafson and Tillman (1991) emphasize that instructional design models differ because they are designed for different settings. Nevertheless all models recommend that lecturers analyze what is to be learned, specify who is to learn, describe in detail how the learning is to occur, conduct a formative evaluation and finally conduct a summative evaluation of the effectiveness of the instruction (Gustafson & Tillman 1991).

The authors have designed a ten-step model presented in Figure 2.2 below.

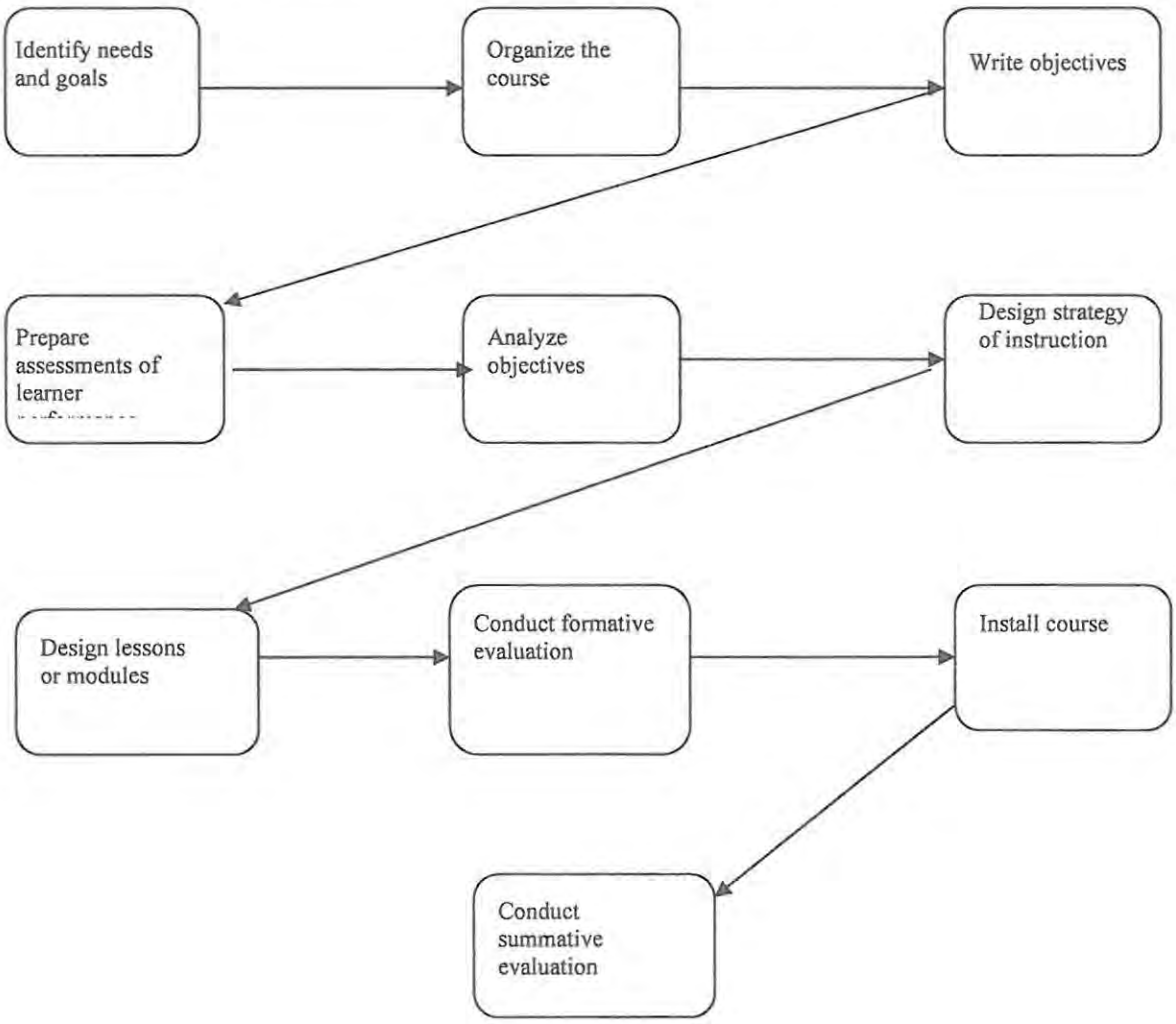


**Figure 2.2: Gustafson and Tillman's (1991:10) instructional design sequence**

Govindasamy (2002) recommends that the features included in an online course should be based on pedagogical principles. Hence, he has designed an instructional

development methodology for the development and evaluation of course content. Govindasamy's methodology is presented in Table 2.1 below.

**Table 2.1: Instructional development methodology for the development and evaluation of e-learning content**

| Phase | Step | Purpose | Activities |
|---|---|---|---|
| Analysis | 1. Learner analysis | Identify characteristics of learner | • Define minimum academic qualification target learners should have.<br>• Define personal and social characteristics of learners.<br>• Describe specific entry characteristics of learners. |
| | 2. Task analysis | Determine level of detail and depth of content | • Make a general list of topics to be covered by instruction<br>• Outline the course content<br>• Identify the tasks learners should be able to perform.<br>• Elaborate task into subtasks. |
| Design | 3. Defining instructional objectives | Write instructional objectives according to Mager's Format | • Analyze tasks to identify conditions, performance, and standard of performance.<br>• Consolidate the components to write objective statements.<br>• Identify terminal objectives, intermediate objectives and enabling objectives. |
| | 4. Selecting instructional strategies | Select instructional activities and media elements | • Analyze instructional objectives to identify types of learning involved.<br>• Match instructional objectives with Gagne's nine events of learning.<br>• Identify macro instructional strategy.<br>• Identify instructional activities<br>• Select media elements and rationalize selection. |
| Production | 5. Preparation of first draft material | Produce draft material | • Construct a concept map.<br>• Develop and validate Course Evaluation Questionnaire.<br>• Create storyboards<br>• Transform storyboards into instructional product. |
| Formative evaluation | 6. Review by content expert | Gather information about weaknesses and revise draft material | • Administer Course Evaluation Questionnaires (Part I) to content experts.<br>• Revise instructional material. |
| | 7. One-to-one trial | Gather information about weaknesses of the material | • Site visit.<br>• Select three learners, one high achiever, one average learner, and one lower achiever.<br>• Observe the learners' behaviour as they interact with the instructional product and respond to items in Course Evaluation Questionnaire (Part III). |
| | 8. Small Group Trial | Gather information about weaknesses of the material | • Site visit<br>• Select a sample of ten learners equivalent to and representative of the target learners.<br>• Administer the Course Evaluation Questionnaire (Part II) as they interact with the instructional material. |
| Production | 9. Production of the first version of the e-Learning module | Produce the instructional material | • Analyze feedback gathered.<br>• Revise instructional activities, media elements, interface design.<br>• Produce the first version of the material. |

Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology have been compared in Table 2.2 below.

**Table 2.2: Comparison of Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) Instructional development methodology**

| Gustafson and Tillman | Govindasamy |
|---|---|
| Identify needs and goals | |
| | Identify characteristics of learners |
| Organize the course | Determine the level of detail and depth of content |
| Write objectives | Identify conditions, performance and standard of performance |
| Prepare assessment of learner performance | Write objective statements |
| Analyze objectives | Analyze instructional objects to identify the types of learning |
| Design strategy of instruction | Identify instructional activities |
| | Select instructional activities and media elements |
| Design lesson or module | Produce draft material |
| Conduct formative evaluation | Conduct formative evaluation |
| Install course | Produce the instructional material |
| Conduct summative evaluation | |

This study has adapted Geyser's (2004) programme design, Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology. I have drawn some features from the models to design a six-stage instructional design model. In stage one of the six-stage ID model, I have drawn some features from Geyser's (2004) programme design; "Analysing situation at the national level". I have also drawn some features from Gustafson and Tillman's (1991) ID model; "Identifying student needs and course goals". Stage two of the six-stage ID model makes use of features from the three models; Writing objective statements, developing learning outcomes and assessment criteria. Stage three of the six-stage ID model has drawn features from the three models; Outlining the course content, analyzing objectives; preparing assessments of learner performance; designing strategies of instruction; designing lessons or modules, Liaise with Computer Services for installation of Learning Management Software (mine). Stage four of the six-stage ID model concurs

with a feature in Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology; Conduct formative evaluation. Stage five of the six-stage model concurs with a feature in Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology; Install course or produce the instructional material. The sixth stage concurs with the last step in Gustafson and Tillman's (1991) ID model; Conduct summative evaluation. This six-stage model is illustrated in Figure 2.3 below.

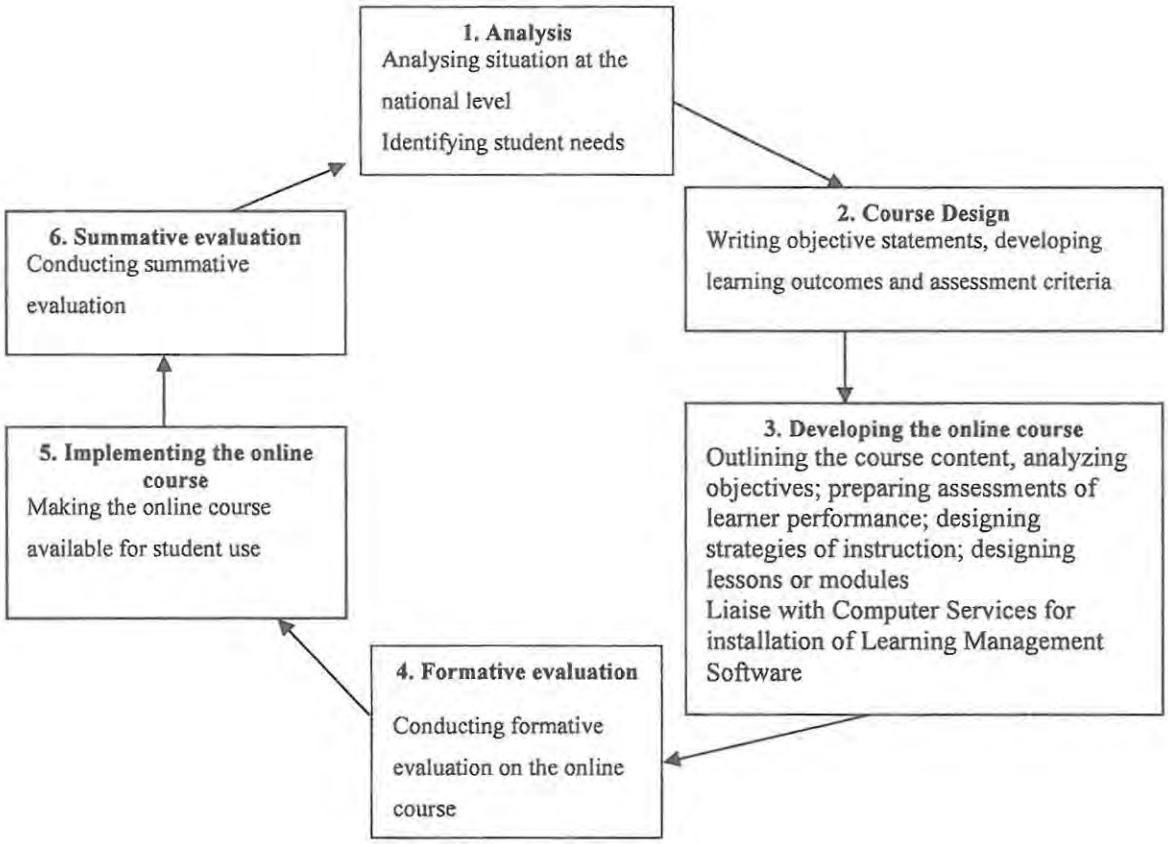


**Figure 2.3: The six-stage instructional design model** (adapted from Geyser's (2004) programme design, Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology)

### 2.4.2 ICT as a response to challenges

This subsection discusses how ICT has been used as a potential solution to some HE challenges.

#### *ICT and higher education internationally*

A study was conducted on three focus groups; English, Law, and Midwifery lecturers in the UK to obtain the lecturers' views of their experience of using ICT for teaching and learning. Evidence from all groups indicates that the decision to utilize ICT for teaching and learning was based on educational, not technological decisions (Eynon 2005). This research supports the idea that in general, ICTs should be used in context to solve actual problems. ICT should not be used because it is there, it should be "driven by specific course, programme and tutorial objectives" (Czerniewicz 2004:152). The objectives and the delivery method should be congruent for any course, programme or tutorial. Once the objective to be achieved in the course is established, then the most appropriate media to achieve that objective needs to be identified.

The lecturers in the focus groups mentioned above, suggested that the use of ICT helped them compensate for the increasing student numbers in their courses, which were not accompanied by any associated rise in funding (Eynon 2005). More particularly, the English group commented that ICTs provided students with access to resources and materials that were not available at their own institution, and provided the opportunity for online discussions (Eynon 2005). According to Eynon (2005), ICTs also helped to improve students' study skills and the background knowledge of the three surveyed subjects.

ICTs are also useful in providing flexible learning for the increasing number of part-time students that are geographically dispersed and who spend most of their time off campus (Eynon 2005). The lecturers also feel that ICTs have enhanced the educational experience for their students (Eynon 2005). Lairson (1999) acknowledges that the students need different amounts of time to learn the same thing, and that different people learn in different ways. He believes that an online course compensates for these differences:

> *... in an online world there is no good reason why a course needs to operate within a 15-week time frame; nor is it necessary that all students take the same amount of time to complete the course. ... This online world can be much more flexible in defining time as a basis for the "course"* Lairson (1999:188).

This does not mean that students will be left alone to advance at their own pace. The students' access rate should be tracked and there should be collaboration and communication between the students and the lecturer (Govindasamy 2002; Ismail 2002).

Flexibility of time will of course influence the "practices of knowing that reflect a range of strategies for 'assembling', 'editing', 'processing', 'receiving', 'sending', and 'working on' information and data to transform 'data into knowledge'" (Lankshear, Peters & Knobel, 2000:21).

Another study was carried out in the UK to evaluate the students' views and reactions to the extensive use of ICT for teaching and learning. Some students used the online material as a supplement to the timetabled classes and very few (who had other commitments) used the material as an alternative to the classes. They said that the material gave them an overview of the timetabled classes and this helped them get a better understanding of a topic in class, they could listen more during class instead of panicking to write down notes and that the material helped them fill the gap when one lost concentration in class (Saunders & Klemming 2003).

### *ICT and higher education in Africa*

Documentation of ICT implementation in higher education institutions in Africa is scarce, however, an institution such as the University of Botswana (UB) has shared its experience on the use of ICTs. This university made use of the "leadership, academic and student ownership and readiness model" for technological transformation in tertiary education. This model requires the commitment of the university management, academic staff and students (Uys, Nleya & Molelu 2004). The Educational Technology Unit (EduTech) within the Academic Development unit was the steering body in the use of ICT in teaching and learning at UB. With the help of faculty members that were delegated to form part of the e-learning committee, it became easier to gather the

university ICT needs, choose a learning management system and design e-learning pilot courses (Uys, Nleya & Molelu 2004; Thurab-Nkhosi, Lee & Giannini-Gachago 2005). All these activities worked hand-in-hand with two consecutive workshops; "Principles of e-Learning Course Design" and "Course Planning for e-Learning" that were conducted for staff members (Thurab-Nkhosi *et al* 2005). These workshops had a positive impact on staff members and motivated them to implement e-learning. Thurab-Nkhosi *et al* (2005) write:

When asked what they would adopt from the workshop in their practice, 80% of the participants indicated that they would rewrite course objectives to ensure that they were clear and consistent with both course content and student assessment. However, as of May 2005, 74 lecturers at the University were using e-learning in the teaching and learning-approximately 10% of the academic staff (Thurab-Nkhosi *et al* 2005:6).

### *ICT and higher education in South Africa*

According to Broekman *et al* (2002), ICTs can complement traditional face-to-face as well as distance education, create additional opportunities for lifelong learning, reduce "distance" by reaching remote areas and can provide easier access to global communities. The use of ICT in tertiary education is also evolving in South Africa. A survey carried out by Blewett and Singh (2003) looked at the usage of educational technology tools in IT departments (Information systems and Computer Science) in South African universities. Respondents identified a number of benefits including improved access to material, improved interactive learning, improved communication between the lecturer and students, students could access the material outside normal hours and flexibility in terms of time place, pacing (speed of learner) and repetition (Blewett and Singh 2003). According to Czerniewicz (2004), of the 2,548 courses offered by the University of Cape Town (UCT) in 2002, 55% had a web presence that usually included the course outline and related information, some readings, links to URLs, downloads for software and course notes. UCT has also made use of authoring software such as *Macromedia Authorware;* learning environments such as MOVES (MEG Office-Based Virtual Study)[4] which is designed for courses that require interactivity, real-world data, and automated feedback and assessment; and ***connect***, an open source learning environment that was used by students in classes to interact with

[4] MEG is an acronym for the Multimedia Education Group at UCT

each other (Czerniewicz 2004). This learning environment has proved to be effective, for instance:

> *By late 2003,* ***connect*** *had been integrated into nine different courses across several disciplines, at both postgraduate and undergraduate levels. Class sizes range from 12 to 490 students: in 2003, 1,206 students and 83 lecturers and tutors collaborated actively in the* ***connect*** *environment (Czerniewicz, 2004:153).*

According to Engelbrecht (2005) the School of Accountancy at the University of South Africa has used WebCT for its Masters programme in Taxation since 1999. The students benefited a lot from the online course; it made them self-directed, lifelong learners who could be productive and competitive in an information-based business environment (Engelbrecht 2005). There are many other South African HEIs that make use of WebCT for teaching and learning, such as University of the Western Cape, University of Johannesburg and University of Pretoria, Stellenbosch University, Tshwane University of Technology, to mention a few. Although there may not be much documented, but the above universities have showcased their progress and experience at the Seminar: 'Cultivate Best Practice Seminar hosted by the University of Pretoria on the 28 October 2005', that I attended. The University of the Western Cape has also made use of *KEWL* (Knowledge, Education and Web-based Learning). Rhodes University, more specifically the Information Systems Department has made use of PowerTutor, *KEWL* and *Moodle*.

### 2.4.3 Web-based learning

Web-Based Learning (WBL) can be described as learning that is facilitated by using web-based technologies (van der Westhuizen 2004). It can also be termed as "online learning", "online education" or "e-learning". According to van der Westhuizen, the environment consists of the learner; the teacher or facilitator of learning; the knowledge objects or content; the outcomes in terms of knowledge, skill and attitudes; learner activities and the medium of facilitation. Van der Westhuizen describes the promises that WBL has for teaching and learning as follows:

> *Web-based learning (WBL) holds pedagogical promises of improved information access, increased interactivity and communication between learning facilitators and learners, self-directed learning, and multi-sensory learning experience. Web-based courses can be delivered to learners over a*

> *wide geographical area, thereby extending the institution's ability to reach students in remote locations* (van der Westhuizen 2004:157).

According to the author, there are three modes of online learning. In the first mode WBL is integrated into the conventional classroom instruction. This is what Bates and Poole (2003) term as the Web-enhanced face-to-face classes. In the second mode WBL replaces the face-to-face classes. In this case modules are called web-based courses (van der Westhuizen 2004) or fully online classes (van der Westhuizen 2004; Bates and Poole 2003). In the third mode some of the constituents of the learning process are facilitated online and some in the classroom (van der Westhuizen 2004). This is called the hybrid or blended applications (van der Westhuizen 2004; Bates and Poole 2003) mode.

Course material is put onto a course management system (CMS). Examples of CMSs are *WebCT*, *Blackboard*, *KEWL* and *Moodle*. Some people use the term; learning management system (LMS). These terms are used interchangeably, but they can be differentiated according to their functions. A CMS "manages content or learning objects that are offered to the learner enrolled in the course" (van der Westhuizen 2004:167). On the other hand, a LMS manages learners, keeping track of their progress and performance in the learning activities (van der Westhuizen 2004). Since, in terms of curriculum responsiveness theory, courses no longer have an "instructor" but a "facilitator", the CMS or LMS should be capable of carrying out learning facilitating activities as well as administrative activities. Hence, it is not enough for one to say that the course is online by just dumping content on the web. Selim (2003) and Ngai, Poon & Chan (2005) have used the Technology Acceptance Model (TAM) to measure students' acceptance of a course website. This study has adapted this model to ascertain the WSU IS students' perceptions on the use of the LMS, *Moodle*.

### 2.4.4 *Moodle*

*Moodle* (Modular Object-Oriented Dynamic Learning Environment) is the LMS used to manage the course material in this study. *Moodle* is an open source Learning Management System released under a GNU public licence[5]. This is a popular system that hosts 247 300 courses and 266 2250 users. *Moodle* is customizable by

[5] refer to http://www.gnu.org/copyleft/gpl.html

programming staff and is flexible for the instructor and developer (Munoz & Van Duzer 2005). The design and development of *Moodle* is guided by the four pedagogical principles of: constructivism, constructionism, social constructivism, and separate and connected behaviour.[6]

Social constructivism plays a major role in helping the IS students learn through the collaboration process. Hence collaboration underpinned by the *socio-constructivist* theory in addition to the instructional approach also plays an important role in the learning process of the IS students. *Moodle* has features such as chat rooms that can facilitate synchronous communication among students and with their lecturer. *Moodle* also enables the students and the lecturer to communicate asynchronously by means of a forum. Moodle can be used for instructional design as well, such as in the study. There are features that support the behaviourist approach such as learning objects, self-assessment quizzes, and tasks and assignments that may be attempted both online and off-line. A study carried out by Munoz & Van Duzer (2005) discovered that *Moodle* provides individualized feedback easily to all assignments, easily tracks each student's activities in the course, when and how often each part of the course has been accessed and from where the students have accessed the course. *Moodle* has other features such as glossaries and links to external Web pages. Due to its features *Moodle* can contribute to curriculum responsiveness. It manages course content and helps change the mode of transmission from lecturer-oriented to learner-oriented and can support both behaviourist and constructivist-informed teaching strategies.

## 2.5 Summary

This chapter elaborated on the challenges that HEIs are faced with. It also illustrated how the challenges can be addressed, with particular emphasis on the use of ICT for teaching, learning and assessment. The chapter provided emphasises that the development of an online course or a web-based course should be guided by pedagogical principles. Various instructional models have been studied and how these models could be used to develop, implement and evaluate an online course. The models have been adapted and integrated to create a six-stage instructional design model. The chapter further described the three modes of online learning and subsequently deals

[6] see details in the document http://docs.moodle.org/en/Philosophy

with the different types of LMS with a particular interest about *Moodle*. The next chapter will describe the research methodology used in this study.

# CHAPTER 3

# RESEARCH DESIGN

## 3.1 Introduction

According to Yin (1998), a research design is the logical sequence that links the data to be collected to the question of study and ultimately to its conclusions. The research design is the action plan for getting from here to there. 'Here' may be defined as the initial set of questions to be answered and 'there' may be defined as the answers to the questions. There may be a number of major steps filling in the gap between 'here' and 'there' including data collection and data analysis. The main purpose of the design is to help the researcher to ensure that the evidence provided addresses the initial research question (Yin 1998).

This chapter includes an explanation of the orientation and approach underpinning the research. It also explains how the survey and action research methodologies were used to provide evidence for answering the research questions. It describes the research methods and the data collection techniques as well as the sample taken into consideration. It also describes the data analysis techniques that have been used, the ethical considerations and validity issues. It further describes the research milestones and activities.

The project is divided into two phases. The first phase attempts to find out how Information Systems (IS) departments use Information and Communication Technologies (ICTs) for e-learning and how the Walter Sisulu University (WSU) Accounting Department could make the IS course more accessible to its students. The second phase looks at the development of the WSU IS pilot website and at how the IS students at WSU respond to its implementation.

In response to the first part of the first phase, a questionnaire was sent to IS lecturers in South African contact teaching universities. The purpose of this questionnaire was to ascertain how the Information Systems departments in South African universities are using ICTs for e-learning. In order to establish whether e-learning would make the IS course more accessible to students, a questionnaire was sent to IS students at WSU to establish their reasons for missing classes and to identify their learning needs, and their

current computer access and skills. As the use of ICT was considered as a potential means of course delivery, a pilot IS website was developed using the six-stage instructional design model designed in Chapter 2. The development of the WSU IS pilot website is described in Chapter 6. Before the website was made available for the students' use, it was evaluated by a subject expert and revised. Subsequently, two focus groups were interviewed to determine the students' perceptions of the newly developed WSU IS website.

### 3.2 Research Orientation

The research is approached from an interpretive perspective. Janse van Rensburg (2001) describes the ontology of the interpretive approach as an internal reality of personal and subjective experience. Experience describes the actions that have been undertaken by an individual or group. From the interpretive perspective human actions are preceded by intentions and may be accompanied by reflection (Connole 1998). Meanings of these actions are constructed by interacting with individuals and groups and are shared through language and other forms of symbolism (Janse van Rensburg 2001).

In this approach, the researcher generates or produces data and constructs knowledge through communication with the actors (individual or group). Gough (2001) prefers the term, 'producing data' rather than 'collecting or gathering data'. He emphasizes that data is not waiting out there to be collected or discovered but is produced and constructed by the activities of the researcher. The researcher looks for data that is appropriate for the research question, problems or issues on which the research is focused and constructs knowledge from the research carried out. On the contrary, as pointed out by Janse van Rensburg (2001), within the positivist approach a researcher bases his/her knowledge of things on his/her own experience. The researcher observes facts and records these facts in the form of measurements. Janse van Rensburg (2001) emphasizes that this approach seeks to discover the absolute truth about things, assuming that the world-out-there is stable. According to Muller (2000), in the positivist approach, there is a 'disengaged observer' who is separated from the world that he/she observes in order to create an objective true representation of reality. "Truth then is the degree of correspondence between the representation and the reality" (Muller 2000:150). He highlights that the profound critiques of the 'disengaged observer' all

attempt to demonstrate that observers are always also agents. He further emphasizes that humankind are active, producing, fabricating agents of the world (Muller 2000).

The knowledge interest of the interpretive approach is to develop a deeper understanding of a situation, person, community or other case (Janse van Rensburg 2001). In Habermas's opinion (cited in Janse van Rensburg 2001), if people understand their situation better, they will be able to take practical actions within the situation. In the research carried out, I feel that with a better understanding of the implementation of ICT in a university course, I will be able to better meet the learning needs of IS students at WSU. A possible shortcoming of the interpretive approach is that "'everyone makes their own meaning and all views are equal' - and thus it fails to provide a basis for decision-making" (Janse van Rensburg 2001:18).

### 3.3 Research approach

The research approach can be broadly construed as action research. According to Zuber-Skerritt (1992), action research is a type of research conducted by Higher Education (HE) lecturers into their own teaching practice, with the aim of investigating social change and of improving the HE learning, teaching and the curriculum. One of the key features of action research that Zuber–Skerritt identifies is a spiral of cycles of planning, acting, observing and reflecting. This study forms one cycle of such an action research process. The action research approach follows a similar pattern to the six-stage instructional design model described in Chapter 2. In this study, I have planned the development of the WSU IS pilot website based on the findings from surveys of Information Systems (IS) staff at other institutions and of IS students at WSU; the WSU IS pilot website was developed and made available to the IS students; the WSU IS pilot website was formatively and summatively evaluated. The results of the summative evaluation will be used to inform the next cycle of development.

### 3.4 Research sites and participants

#### 3.4.1 Four higher education institutions

A staff survey was conducted of the IS department at four contact universities in South Africa. The contact universities were chosen because this study attempts to explore how face-to-face classes could be supplemented by the use of e-learning. Websites of various South African contact universities were examined to establish contact details for the IS

lecturers. Some of the contact universities did not have IS websites; they only had Computer Science (a related course) websites. Such universities were excluded from the study. Some universities had only course materials for the post-graduate levels on their websites, while this study focuses on IS as an undergraduate course. These universities were also excluded since they do not seem to use the Internet /Intranets for their undergraduate courses. The IS lecturers were contacted because they were expected to be well informed about the Learning Management System (LMS) and applications software that are used in their departmental websites. One member per institution was contacted telephonically. The aim was to explain the purpose of the research and to obtain the staff members' informed consent. If a staff member was not comfortable with participating in the research or was not quite clear about the department's website issues, he/she referred me to another person.

Four institutions responded to the staff survey questionnaire of the 9 South African contact teaching institutions approached. This constitutes a 44% response rate. The responses were from two universities in the Eastern Cape and two in the Western Cape. I have categorized the institutions as Historically Black Universities (HBUs) and as Historically White Universities (HWUs) (Table 3.1). The purpose of this categorization is that while looking at the availability of computers and online material to students at these institutions, I am also interested in equity: does ICT narrow or widen the gap between these two types of institutions.

**Table 3.1: Research sites**

| University | Category of institution | Staff members |
|---|---|---|
| Eastern Cape University 1 | A | 1 |
| Eastern Cape University 2 | B | 1 |
| Western Cape University 1 | A | 1 |
| Western Cape University 2 | B | 1 |
| Total | | 4 |

**Note:** The HBUs are identified as A and the HWUs as B

### 3.4.2 Students at WSU

A student survey was conducted at WSU. The purpose of this survey was to determine the IS students' reasons for missing classes, their learning needs, and their current computer access and skills. The student questionnaire was piloted during a lecture period with 40 IS students who were conveniently chosen (Henry 1998). This sample

constitutes 20% of the class of 198. It is critical to note that the sample was biased in the sense that the students who responded to the questionnaire were those who attended the class as opposed to those who did not attend. The latter may be the ones that more urgently need an alternative way of accessing the course material other than attending face-to-face sessions. After pilot testing, the questionnaire was analyzed, revised and adapted. The final student questionnaire was distributed to 198 IS students and 149 of these students responded, which constitutes 75% of the class (Table 3.2).

As outlined in Chapter 1; some of the students are registered as full-time but have other commitments during the day that make them unable to attend on a regular basis. These students miss some classes and need a way to compensate for these classes. To try to collect accurate data on how many students actually miss classes, I have included the whole IS class, which is composed of 198 students in the student survey.

**Table 3.2: WSU students**

| WSU | Information Systems students |
|---|---|
| Pilot questionnaire | 40 |
| Final questionnaire | 149 |
| Focus group | 24 |
| Total | 213 |

After the use of the WSU IS pilot website, two focus group interviews were conducted with 12 WSU IS students in each focus group. The 24 students were split into two groups so that the groups would be more manageable. The members of the groups were chosen using convenience sampling (Henry 1998) and they comprised both male and female students, but I was not interested in the gender per se, as I felt that the gender issue was beyond the scope of this particular study. This sample constitutes 12% of the class. The students were informed about the interview during the tutorial sessions. They were also briefed about the content of the interview schedule and the intended purpose of the exercise. They were also made aware that participation was voluntary. Each student who was willing to participate submitted his/her name to me. I checked each student's logon history on the WSU IS pilot website to verify that these students had indeed made use of the courseware. The logon history provided the details of how often the students accessed the pilot IS website and the amount of time they spent on the pilot IS website. It was of great importance to check the logon history of the students because the point of interest was to ascertain the perceptions of students who explored and interacted with the WSU IS pilot website.

### 3.4.3 Expert reviewer

An expert reviewer was appointed from WSU and was chosen because he is a lecturer who is an expert in the IS field. He has successfully used an online course for teaching and assessing his students in the department of Computer Science and I believed that he understands what is involved in an IS online course at WSU.

## 3.5 Research methods and data generating instruments

This study used research methods such as surveys, an expert review and focus group interviews.

### 3.5.1 Surveys

A survey is a method of collecting information about a human population in which direct contact is made with the units of study (individuals, organizations, communities, etc.) through such systematic means as questionnaires and interview schedules (Warwick & Lininger 1975:2). According to Fetterman (1998), a survey question is designed to elicit a broad picture of the participant, to map the cultural terrain. Cohen, Manion and Morrison (2000) emphasize that surveys gather data at a particular point in time with the intention of describing the nature of existing conditions, identifying standards against which existing conditions can be compared, or determining the relationships that exist between specific events. The above information implies that the advantage of a survey is to give an exploratory and descriptive understanding about a given phenomenon. The critique about this approach is that it does not give answers to causal reasoning. The study used the survey approach to elicit a descriptive understanding of South African contact universities' IS departments as well as the WSU IS students' reasons for missing classes, their learning needs and current computer access and skills, and was not interested in any causal relationship between two or more variables.

Firstly, a staff questionnaire (Appendix A) was sent by e-mail to the participating staff members (one staff member from each university) of the IS department. The questionnaire was used to explore how the staff members had used e-learning to support Information Systems students in tertiary institutions. The first part set out to establish the demographics of the institutions. The second part asked whether their students were

taking their IS course as a major or as a service course, and which departments required the IS service course. The third part enquired about the availability of the laboratories to the students which could possibly influence the students' participation in online learning. This part was inspired by Czerniewicz (2004) who emphasizes that lack of access to computers in South African universities can create new realms of exclusion for students. The fourth part aimed at determining the LMS and applications software used by the lecturer and establishing whether the media (Internet, e-mail, etc.) used had any discernable impact on the students' performance. The development of the questionnaire was influenced by international and local literature on access to course materials and resources (Blewett & Singh (2003); Czerniewicz (2004); Eynon (2005)).

The staff questionnaire was composed of both closed-ended and open-ended questions. Different types of closed-ended questions were used. There were nominal questions that were used to identify categories (Sanders & Pinhey 1983) such as the position held by the respondent in his/ her institution; is the institution in the Eastern Cape or outside the Eastern Cape. There were also contingency questions where the respondents were required to support the reason for making a particular choice. A contingency question serves as a filtering or screening method that determines who is or who is not supposed to respond to a certain question (Sanders & Pinhey 1983). Some questions required the respondents to rate themselves, for instance using ratings such as very often, often, seldom, never, or strongly agree, agree, neutral, disagree, and strongly disagree. Saunders and Pinhey (1983) refer to this type of question as Likert-scale questions. Such responses provide information about where the respondents stand as compared to others (Floyd & Fowler 1998). Open-ended questions allowed the respondents to express themselves in their own words, for instance, the staff were asked how they tracked their students' perceptions about the online material.

Secondly, a student questionnaire (Appendix B) was distributed to the IS students at WSU to generate information on their educational background, how often they were absent from class and the reasons for absenteeism, and their learning needs, and current computer access and skills. According to Govindasamy's (2002) instructional development methodology, the student's profile for which the course is being designed is important. The educational background may be an indicator of the students' computer competency. In most cases, a student from a poor educational background may have not

been exposed to using computers. The students' learning needs were judged by ascertaining how they preferred their learning material to be presented (hardcopy or softcopy). As e-learning was considered as a potential means of course delivery with the attempt to make the course more accessible to the WSU IS students, the students' perceptions of the potential benefits for putting the course online were also elicited. The development of the questionnaire was influenced by the relevant literature, including the physical and epistemological access to ICT (Broekman, Enslin & Pendlebury 2002; Blewett & Singh 2003; Czerniewicz 2004). After pilot testing, the questionnaire was analyzed, revised and adapted.

The student questionnaire was composed of both closed-ended and open-ended questions. Closed-ended questions included nominal questions that identified categories such as female or male, school where the student matriculated. According to Irwin (2004), some people find it difficult to give the exact age, they prefer choosing from a given interval. He believes that interval questions can have as many responses as there are people in the sample. So the age has been grouped into intervals in the questionnaire in order to achieve accuracy. There were also contingency questions where the respondents were required to support the reason for making a particular choice. There were also Likert-scale type questions. Where necessary, the respondents were stimulated to recall activities and place the activities in time (Floyd & Fowler 1998). For instance the question clarified that "Always" represented "every class a week". There were also rank ordering questions such as: "State what you can do best when using a computer". The questionnaire also had questions such as: "How do you think the Internet could be of help to your performance?" Floyd and Fowler (1998) term this kind of question 'Measuring responses to ideas'. The respondent is asked to rate his/her own views and the idea expressed in the question (Floyd & Fowler 1998). Open-ended questions allowed respondents to express their views in their own words, for instance, the students were asked what were the reasons for accessing a computer.

### 3.5.2 Expert review

For formative evaluation, an expert review (Appendix C) was conducted. The development of the expert review questionnaire was informed by the relevant literature on expert reviews and the evaluation of educational technology and integration strategies (Tessmer 1993; Shelly, Cashman, Gunter & Gunter 2004). The questionnaire

was used to determine the subject expert's views and opinions about the WSU IS pilot website. The questionnaire contained questions on focus areas such as technical support, technical quality, courseware content, interactivity of the courseware and students' learning process. The review looked at whether online technical support was provided or not. Technical quality focused on the use of animation and graphics, and the organization of the course. The courseware content questions were about the guide for each topic, the course outline, the teaching objectives and learning outcomes, examples, assessment and reporting tools, and assessment methods. Interactivity focused on the ability of students to move from one page to another and the appropriateness of the given links. The question on the students' learning process tried to establish how the courseware would influence the students' learning.

### 3.5.3 Focus group interviews

After the WSU IS pilot website had been developed and implemented, focus group interviews (Appendix D) were held with the IS students to elicit the students' perceptions of the pilot IS website. A focus group involves a group discussion on a particular topic and the main purpose of conducting the focus group interview is to stimulate in-depth exploration of a topic about which little is known (Steward & Shamdasani 1998). According to Steward and Shamdasani (1998), a focus group is generally composed of 8-12 members. According to these authors, focus groups enable a researcher to collect data more quickly and are less costly than one-on-one interviews. They also allow the researcher the opportunity to interact with respondents who produce richer data compared to an individual respondent, to seek clarification and probe by means of follow-up questions. I chose the focus group interview because I felt that the students would be able to interact with one another and share their perceptions about the implementation of the IS pilot website. I am aware though, that the results of a focus group may be biased by a very dominant respondent (Fontana & Frey 1994; Steward & Shamdasani 1998). I tried to limit the bias by encouraging even the shy members to contribute and the use of the audiotape helped me capture and consolidate the data and to come up with a comprehensive overview of students' perceptions.

The first part of the interview schedule aimed at determining the students' computer competence and familiarity with the use of the Internet. The second, third, fourth and

fifth parts of the interview schedule aimed at determining the students' perceptions of the technical support provided for the use of the LMS, the usefulness of the LMS, the ease of use of the LMS and the students' attitude and intention of using the LMS respectively. The first part of the interview schedule was developed specifically for this study. The second, third, fourth and fifth parts were adapted from Selim's (2003) and Ngai, Poon and Chan's (2005) Technology Acceptance Model (TAM). Selim's (2003) model elicits students' acceptance of course websites. Selim (2003) measures perceived usefulness, perceived ease of use, and attitude and intention to use a course website. As an extension to Selim's (2003) model, Ngai *et al.* (2005) have added the technical support component. Ngai *et al.* (2005) have used the TAM for judging the acceptance of *WebCT* for higher education. This study specifically focuses on the students' perceptions on the use of *Moodle*.

Table 3.3 below summarises the research design decisions in the form of a matrix, plotting the research questions against the research methods, data generation instruments and the Appendices (See Appendix A, B, C and D for Questionnaire 1, Questionnaire 2, the Expert review questionnaire and the Interview schedule respectively).

**Table 3.3: Research design**

| Research question | Survey | Expert review | Focus group interviews |
|---|---|---|---|
| How are Information Systems departments using the ICT for e-learning? | One staff member per institution *Questionnaire 1* (Appendix A) | | |
| How could the WSU Accounting department make the IS course more accessible to students? | 149 students *Questionnaire 2* (Appendix B) | | |
| How could the WSU IS pilot website be developed and implemented? | | One expert reviewer *Expert review questionnaire* (Appendix C) | |
| How do students at WSU respond to the newly developed pilot IS website? | | | 2 groups of 12 students *Interview schedule* (Appendix D) |

### 3.6 Data analysis and validity concerns

#### 3.6.1 Staff questionnaire: Data analysis and validity concerns

The staff responses to both the closed-ended and open-ended questions were analyzed manually and then represented in the form of tables. The variables were grouped into themes of related topics (Miles & Huberman 1994) such as the availability of the computers to the students; determining the LMS and applications software used by the lecturer; and determining the impact of making material available online. For the availability of computers, the number of students was compared to the number of computers available to the students to determine the adequacy of computers. Within the other themes, each question was analyzed independently. The demographic data was interpreted manually. The analysis of results subsequently informed the development of the WSU IS pilot website. The findings have been generalized to inform the design and development of the WSU IS pilot website in relation to the course content of a contact university departmental website. This is what Maxwell (1996) terms as the "Internal generalizability"; the generalizability of a conclusion within the settings or group studied.

#### 3.6.2 Student questionnaire: Data analysis and validity concerns

The students' responses to both the open-ended and closed-ended questions were analyzed using the *Statistical Package for Social Sciences* (SPSS). The qualitative data was summarized in the form of tables and graphs. The variables were analyzed independently, otherwise cross-tables were used to deduce meaning between related variables. Pie graphs were used to illustrate demographic data and bar graphs to portray meanings from other themes. The analysis was arranged according to themes such as how often the students were absent from class and the reasons for absenteeism; students' learning needs, and their current computer access and skills and the students' perceptions of the potential benefits for putting the course online.

The responses to the student survey questionnaire revealed the classroom situation of the WSU IS course. One of the themes of the students' questionnaire looked at how frequently students accessed a computer. To triangulate this piece of information, the students' logon history (to the pilot website) was studied and compared to the students' responses to the questionnaire. Using different methods to collect diverse sets of data

reduces the chance of drawing inappropriate conclusions (Arksey & Knight 1999). The survey was conducted with one group of students in 2004 and the WSU IS pilot website was presented to another group in 2006. It is crucial to note that although these are two different sets of students, they are typical of the IS student profile at WSU.

### 3.6.3 Expert review questionnaire: Data analysis and validity concerns

The responses from the expert reviewer were analyzed manually and represented in a table. I summarized the data and then checked with the reviewer if I had interpreted him correctly.

### 3.6.4 Focus group interviews: Data analysis and validity concerns

The responses from the focus group interviews were analyzed using an open source software package, *Freemind*. The data was represented in mindmaps. The variables were grouped according to topics so as to deduce meanings from what the respondents said about each topic. For this study, the students' perceptions have been useful in informing the lecturer about their perceptions of the implementation of the WSU IS pilot website and what needs to be modified or added to the website. Small modifications were made immediately, but the students' responses can inform a more substantial revision of the website for the next developmental cycle.

An audiotape was used to record the focus group interviews and the recordings were transcribed. The interviewing of two focus groups also strengthened validity.

## 3.7 Ethical considerations

I explained the purpose of the research to the staff, expert reviewer and students. Participation for all the parties was voluntary. The data was treated confidentially and the respondents were treated anonymously. The research results for the staff questionnaire will be distributed to the staff respondents. A copy of the thesis will be placed in the university library so that it can be used by anybody with an interest in the field of ICT and Higher Education. The student respondents will be informed in writing when this copy is available. The students' details for all previous years' graduands are available at the convocation office. The current students were informed that their logon history would be viewed by the lecturer, but kept confidential. The activity reports for all students were studied. The lecturer investigated how often the students accessed the

IS pilot website, what the students accessed most often and how many students accessed each activity and who these were.

### 3.8 Research milestones and Activities

All activities have been recorded together with the milestones (Appendix E). A milestone is a critical date for the completion of a major part of a project (Stair & Reynolds 2001). Activities include collecting literature review materials and proposal writing; developing questionnaires; piloting questionnaires; distributing questionnaires to staff and students; collecting questionnaires; analysing data, developing applications; designing interview schedule; publishing the pilot IS website; conducting focus group interviews; analysing data and writing up. This section shows clearly all the activities that have been carried out in the research.

### 3.9 Summary

This chapter explained the research design of the study. It provided an explanation of the orientation and approach underpinning the research. It also explained how the methodology, the research methods and the data collection techniques were used in the research. It also described the data analysis techniques that have been used, the validity issues and ethical considerations. It further described the research milestones and activities.

This research subscribed to the interpretive paradigm as the research is primarily interested in meaning-making using the participants' views and experience. The approach is broadly construed as action research and this study has undergone one cycle of an action research approach. The research methods used in this study include surveys (via questionnaires), an expert review (via an expert review questionnaire) and an interview (via focus group interviews). The staff and student questionnaires were composed of closed-ended and open-ended questions, the expert review questionnaire was composed of closed-ended questions and the interview schedule was composed of closed-ended questions and one open-ended question. While developing the questionnaires and interview schedule, relevant literature and previous research was consulted. The staff and student questionnaires were piloted, analyzed and subsequently adapted.

The first set of questionnaires was sent by e-mail to IS lecturers in contact universities in South Africa. Contact universities were chosen because they are typical to the university under study. The aim of the study is to find out how Information Systems departments in South African contact universities use ICTs for e-learning. The main interest is how these universities use ICT to supplement face-to-face classes. The information produced from this part of the study was used to inform the development of the WSU IS pilot website. The second questionnaire was administered to IS students to determine the reasons for missing classes, their learning and current computer access and skills. This information has helped the WSU Accounting department develop a pilot IS website, making the course more accessible to students. The third questionnaire was used to review the newly developed IS website. The subject expert's comments helped in improving the website. The focus group interviews attempted to determine the IS students' perceptions about the newly developed pilot IS website. This information could help the lecturer review and modify the course for future purposes.

The responses to the staff questionnaire were analyzed manually, the responses to the student questionnaire were analyzed using *SPSS,* the reviewer's comments were summarized in a table and the responses to the focus group interviews were analyzed using *Freemind.* The data being analyzed was grouped into themes and meaning was deduced from the data. The responses to the staff survey are analyzed in the next chapter.

# CHAPTER 4

# ANALYSIS AND FINDINGS: STAFF SURVEY

## 4.1 Introduction

The chapter includes the analysis of the data that was collected from the responses to the staff survey. The survey was conducted to elicit information on how Information Systems departments in South African contact universities are using Information and Communication Technologies (ICT) for e-learning. I have identified possible patterns and relationships in the data. The categories used to present the data have been guided by relevant literature on access to computer equipment and access to online material as well as from the themes that emerged from the open-ended questions. Finally a summary of the chapter is provided.

## 4.2 Presentation of data

As indicated in Chapter 3, four universities responded to the questionnaire. The responses to both the closed-ended and open-ended questions were analyzed manually. The responses to the quantitative open-ended questions in the second and third section (I will describe below) were represented in the form of tables. In the second section, the tables were used to capture data from the respondents. This format helps one to easily interpret and understand the data. In the third section, the tables have been used to clearly show what material each institution has online and which application software is used in each institution. I have looked at the institution with the maximum number of items and have checked the items against the rest of the institutions. In order to maintain anonymity, the institutions have been identified as A1, A2, B1 and B2 where A and B respectively refer to Historically Black Universities (HBUs) and Historically White Universities (HWUs).

The findings are provided in four sections. The first section refers to the demographic data of the staff. The second, third and fourth sections describe the themes emerging from the research: the availability of computers to students, the choice of Learning Management System (LMS) and range of applications software used in each department, and methods of determining student perceptions and opinions about the impact of making material available online.

### 4.2.1 Staff demographics

This section provides an overview of the positions held by the respondents in their respective departments, and whether the institution is inside/outside the Eastern Cape.

#### Position held by the member of staff in the department

The respondents were asked to identify their positions in their respective departments. The responses from the 4 participating universities included 2 lecturers, 1 head of department and 1 professor.

#### Location of institution

As the questionnaire was sent to institutions in the Eastern Cape and outside the Eastern Cape, respondents were asked to specify where their institutions were situated. Two institutions (A1 and B1) are situated inside the Eastern Cape and the other two (A2 and B2) are outside the Eastern Cape.

### 4.2.2 Availability of computers to students

This section reports on the number of students taking IS as a major/service course, which departments require the service course; the duration of the service course; how many computer laboratories and computers are available to students; and how often the students access computers outside practical sessions.

#### Number of students

In order to determine the adequacy of the computers available to the IS students, I ascertained the number of students undertaking IS as a major and service course. Year 1, Year 2 and Year 3 are represented respectively as Level 1, Level 2 and Level 3 in Table 4.1 and Table 4.2. The tables reveal that the institutions offer IS both as a major and as a service course. Table 4.1 below shows the number of students doing IS as a major course.

**Table 4.1: Number of students doing IS as a major course**

| Name of institution | Level 1 | Level 2 | Level 3 |
|---|---|---|---|
| A1 | Not specified | Not specified | 40 |
| A2 | Not specified | Not specified | Not specified |
| B1 | 0 | 125 | 140 |
| B2 | 100 | 80 | 80 |

The staff member in Institution A1 has not specified the number of students taking IS as a major at Level 1 and 2; the staff member has only indicated that there are 40 students who are taking IS as a major course at Level 3, while at the other HBU, the levels have unfortunately not been specified. Both HWUs offer IS at Levels 2 and 3, but Institution B2 also offers the course at a first year level. The HWUs have many students taking IS as a major; 265 students in institution B1 and 260 students in institution B2. Table 4.2 below shows the number of students doing IS as a service course at the four participating institutions.

**Table 4.2: Number of students doing IS a service course**

| Name of institution | Level 1 | Level 2 |
|---|---|---|
| **A1** | 0 | 40 |
| **A2** | Not specified | Not specified |
| **B1** | 0 | 125 |
| **B2** | 1400 | 700 |

The service course is offered at only two levels, as indicated in the table. Since this is a service course, students cannot major in the course, that is, they cannot follow it at the third level. Institution A1 has 40 students taking IS as a service course and the other HBU has not specified the number of students taking the service course. The HWUs have large numbers of students taking the IS service course; institution B1 has 125 students and institution B2 has 2 100 students. The total number of students is shown in Table 4.3 and they are classified as full-time and part-time.

**Table 4.3: Full-time/Part-time IS students**

| Name of institution | Full-time | Part-time | Total |
|---|---|---|---|
| **A1** | 60 | 20 | 80 |
| **A2** | 0 | 15 | 15 |
| **B1** | 390 | 0 | 390 |
| **B2** | 2360 | 0 | 2360 |

Institution A1 has full-time and part-time students; institution A2 has only part-time students, and the HWUs, institution B1 and B2 have only full-time students. The Walter Sisulu University (WSU) has both full-time and part-time students. This implies that the manner used by these institutions to deliver their course content to these sets of students may inform the institution under study.

The data reveals that the HWUs have large numbers of IS students as compared to the HBUs. The Department of Education (1997) is concerned about the access of black students to fields such as science, engineering and technology (of which IS is an element) programmes. This difference in student numbers indicates that inequality, in terms of access to the above mentioned programmes, has not yet been redressed in these HBUs. However, the university under study, which is a HBU, has 198 students which indicates that the inequality in access is in the process of being redressed in this institution.

**Departments that require the service course**

The respondents were asked to specify which departments require the IS service course. The responses included Accountancy, Actuarial Sciences, Human Resources, Marketing, Finance, Economics, Law and Organizational psychology (Table 4.4).

**Table 4.4 Departments that require the service course**

| Department | A1 | A2 | B1 | B2 | TOTAL |
|---|---|---|---|---|---|
| **Accountancy** | 1 | | 1 | 1 | 3 |
| **Actuarial sciences** | | | | 1 | 1 |
| **HR** | | | | 1 | 1 |
| **Marketing** | | | | 1 | 1 |
| **Finance** | | | | 1 | 1 |
| **Economics** | | | | 1 | 1 |
| **Law** | | | | 1 | 1 |
| **Organizational psychology** | | | | 1 | 1 |

One institution, institution A2 has not specified the department but has written 'Economic and Management Sciences Faculty'. The other institutions have the Accountancy department among those departments that requires the service course. This is important to know as the institution under study is offering the IS service course to Accountancy students in the Faculty of Economic and Management Sciences. This implies that the course website will be developed for the typical set of students (full-time and part-time students undertaking the IS service course offered to the Accountancy students in the Faculty of Economic and Management Sciences).

**Duration of the service course**

Three institutions (A1, A2, B2) offer the service course over one semester and one institution (B1) offers the IS service course over two semesters. The institution under study offers the IS course over two semesters.

**Number of computer laboratories and computers**

To capture the number of computers available to the IS students in the respective departments, I gave the respondents ranges to choose from. These include 1-3 laboratories, 4-5 laboratories and more than 5 laboratories. Three institutions (A2, B1, B2) have 1-3 computer laboratories available for IS students and one institution (A1) has 4-5 laboratories available for its IS students (Table 4.5).

The respondents were further asked to specify the average number of computers that these laboratories have that are in good condition[7]. I gave the respondents ranges such as less than or equal to 25 computers; between 26 and 50 computers; between 51 and 100 computers; and above hundred computers, to choose from.

Two institutions (A1 and A2) have less than or equal to 25 computers that are in good condition, one institution (B1) has between 51 and 100 computers in good condition, and one institution (B2) has more than 100 computers that are in good condition (Table 4.5).

**Table 4.5: Number of computer laboratories and number of computers available to the IS students in the respective institutions**

| Name of institution | Number of computer laboratories | Number of computers in good condition |
|---|---|---|
| A1 | 4-5 computer laboratories | $\leq$ 25 computers |
| A2 | 1-3 computer laboratories | $\leq$ 25 computers |
| B1 | 1-3 computer laboratories | 51 < computers <100 |
| B2 | 1-3 computer laboratories | computers > 100 |

In response to the question of the adequacy of computers, the data reveals that institution A1 has less than or equal to 25 computers available to 80 students, institution A2 has less than or equal to 25 computers available to 15 students, institution B1 has between 50 and 100 computers available to 390 students and institution B2 has more

[7] Computers in good condition = functional computers with Internet and e-mail connectivity

than 100 computers available to 2360 students. This implies that the HWUs have an adequate number of computers that are in good condition.

It is surprising that institution A1 has between four and five computer laboratories, but has less than or equal to 25 computers that are in good condition. This implies that the computers at this institution have other application software such as *Microsoft Word, Microsoft Excel and so on,* and not the required technology (Internet and e-mail).

**Students' access to computers**

It was of interest to know how often the students access the computers outside practical and tutorial sessions. The lecturers were asked to rate their responses as either very often, often, seldom or never. The responses reveal that the students from two institutions (B1 and B2), the HWUs, often access computers outside practical and tutorial sessions and students of the other two institutions (A1 and A2), the HBUs, access computers very often outside practical and tutorial sessions.

This means that the IS students from the HBUs respond more positively to the question of access and use of equipment as compared to the HWUs. The reason for the frequent access by these students in Institutions A1 and A2 may be due to the limited number of computers. It is important to note that I enquired about the student access in general and not per student. The computers may be occupied all the time because the laboratory schedule is tight and not because an individual student comes into the laboratory frequently. However, the initial question may have been vague, hence the confusion between the general and individual student access.

### 4.2.3 The LMS and applications software used by the lecturer

This section describes the material that is available online to the students; the application software used and the purpose for which the software is used; the Computer Assisted Assessment (CAA) software used; and the Learning Management System used in the respective departments.

**The material available online to students**

The respondents were asked to outline what material is made available online for their students. It is important to know the course content of the respective departments' websites, as this information will inform the course content of the WSU IS pilot website. The responses included presentation slides, practical questions, tests, solutions, general instructions, references, articles, websites, lecturer notes, assignments, mark schedules, past test papers, past exam papers, staff contact details, class lists and course outlines.

Table 4.6 shows the material that is made available online by the IS departments of the various institutions.

**Table 4.6: Material available online**

| Online material | A1 | A2 | B1 | B2 | Total |
|---|---|---|---|---|---|
| Presentation slides | 1 | 1 | 1 | 1 | 4 |
| Practicals | 1 | | | | 1 |
| Tests | | | | 1 | 1 |
| Solutions | 1 | | | 1 | 2 |
| General instructions | 1 | | | 1 | 2 |
| References | 1 | | | | 1 |
| Articles | 1 | | 1 | | 2 |
| Websites | 1 | | 1 | 1 | 3 |
| Lecture notes | | 1 | 1 | 1 | 3 |
| Assignments | | | | 1 | 1 |
| Mark schedules | | | | 1 | 1 |
| Past test papers | | | | 1 | 1 |
| Past exam papers | | | | 1 | 1 |
| Staff contact details | | | | 1 | 1 |
| Class lists | | | | 1 | 1 |
| Course outlines | | 1 | | | 1 |

The responses reveal that institution B2 makes fruitful use of e-learning. Institution A2 only has three resources on the website. These resources only enhance access to the learning material as these resources are limited to the resources that are already made available in lectures and no additional information is provided. The other institutions have provided access to class handouts as well as to additional material (links to articles, websites and references). The WSU IS pilot website will contain the course outline, course notes, links to references and websites, quizzes, tasks and an assignment, as a starting point. As this will be the IS students' first experience of using an online course and bearing in mind that the students survey reveals that only 11 students can search the Internet and 50 students can make use of *Microsoft Office*, I believe that the WSU IS pilot website should not be overloaded.

**The applications software used and the purpose for which the software is used**

The responses given for the applications software used by the respective departments included *Microsoft Office*, *Microsoft Word*, Web-authoring tools, *Powerpoint* and *Excel*. The respondents also explained the purpose for which each application software package was used. The purposes varied from notes, practical sheets, test and exam solutions, lecture material and handouts, lecture timetables and the maintenance of the departmental website. One institution makes mention of *KEWL* as applications software, which I believe is a misinterpretation of terms, as *KEWL* is an Open Source Learning Management System (http://kewl.uwc.ac.za). Table 4.7 below summarises the applications software used in the IS departments of the various institutions and the purpose for which the software is used.

Table 4.7: The applications software used and the purpose for which the software is used

| | ***Microsoft Office*** | ***Microsoft Word*** | **Web-authoring tools** | ***PowerPoint*** | ***Excel*** | ***KEWL*** |
|---|---|---|---|---|---|---|
| **A1** | Not specified | | | | | |
| **A2** | | | | | | Not specified |
| **B1** | | Notes, practical sheets, test and exam solutions | For the maintenance of the Web | | | |
| **B2** | | Lecture material, handouts that are put on the course website | FrontPage for maintaining the Web | Lecture material, handouts that are put on the course website | Lecture timetables | |

The IS departments use *Microsoft Word* and *Powerpoint* for lecture material, and handouts, *Microsoft Word* for practical sheets, and test and exam solutions, authoring software for maintaining the websites and *Microsoft Excel* for time-tables. The data reveals that only the respondents from the HWUs have specified the applications software used in their respective departments and the purpose for which the software is used. The WSU IS pilot website will use *Microsoft Word* for the course outline,

*Powerpoint* and *Microsoft Word* for the course notes, and the *Moodle* features to create links to references and websites, and for quizzes, tasks and the assignment.

**The Computer Assisted Assessment software used**

The respondents were asked what Computer Assisted Assessment (CAA) software they used in their respective departments. Three IS departments (in institution A1, A2 and B2) do not use any Computer Assisted Assessment software, implying that they use written tests to assess the students. One department (in institution B1) uses *Question Mark Perception* (http://www.questionmark.com/), implying that only one institution uses CAA. WSU will use the quizzes option in *Moodle*.

**The Learning Management System used**

The respondents were asked to give the names of the LMS they used to manage their course material. Responses were *Moodle* (http://moodle.org/), *WEbCT* (http://www.webct.com/) and *KEWL*. One department did not respond. The LMS's used in the respective institutions are illustrated in Table 4.8 below.

**Table 4.8: Learning Management System**

| Name of institution | *Moodle* | *WebCT* | *KEWL* | No response |
|---|---|---|---|---|
| A1 | | | | 1 |
| A2 | | | 1 | |
| B1 | 1 | | | |
| B2 | | 1 | | |
| Total | 1 | 1 | 1 | 1 |

Although the respondent from institution A1 has not responded in this instance, this respondent had mentioned *KEWL* as applications software. This means that the respondent may use the *KEWL* LMS but, as I had mentioned, there may have been a misinterpretation of terms. The learning material on the WSU IS pilot website is managed by the open source LMS, *Moodle*. With the limited funds that WSU has, it had to consider using an open source LMS in preference to expensive proprietary software.

### 4.2.4 The impact of making material available online

This section determines whether the respondents believe that having online material has any impact (negative or positive) on students. Firstly, the section determines which

methods are used by the respondents to elicit students' perceptions. Secondly, since the respondents have experience of putting their material online for their students to use, they were asked to provide their opinions about the impact of online material on class attendance, students' performance and student-to-lecturer communication. Lastly, the respondents were asked to rate their opinions about the Internet as a teaching tool.

**Student perception**

The respondents were asked to identify the methods they used to elicit the students' perceptions. Three respondents (from institution A2, B1 and B2) ascertain their students' perceptions by conducting formal student evaluations, while one institution (A1) elicits the students' perceptions informally.

**Impact on class attendance**

It was of interest to find out whether the provision of online material has any impact (positive or negative) on class attendance, as the university under study intends using online material as well. The respondent from institution A2 believes that putting material online has no impact on class attendance. This insignificance may be a result of the inadequate material provided by this staff member's department website, and so the students still feel there is a need to attend classes. The other three respondents believe that there is a slightly negative impact on class attendance.

The respondent from institution B1 goes on to say:

> *Anecdotal evidence suggests that students are more likely not to attend lectures if they can source material off the web. However, in a study of availability of material on the web and lecture, tutorial and practical attendance, no relationship could be found between availability and attendance. I suspect that many students falsely regard mere possession of material with understanding and learning. So, they print off the web, think they now know and understand the material and absent themselves from lectures. The ghastly truth dawns on them when they sit their test and examinations and achieve poor marks.*

The respondent from institution B2 emphasized that even with paper-based handouts, students could get copies from friends if they missed a class. This implies that there is no significance in the form of the material presented to students. The students may not attend classes if they know that they can access class notes from friends or online. This has taught me (the researcher and developer of the WSU IS pilot website) to be critical when developing the online learning material. I will provide the WSU IS students with

course notes (entails the whole course content) and not class notes (what is taught in class). I hope this may somehow create an inquisitive mind for some students who may be aware of the fact that the information on the website may be discussed in detail in class. There may be some questions that are raised in class that may lead to further discussion. Although I support the availability of online material, I believe this should supplement the face-to-face classes and not replace them.

**The influence of the media used on students' performance**

Since e-learning is considered as the potential means of delivery for the WSU IS course, it is of interest to know if the media used have any influence on the students' performance. To determine the respondents' opinion about this, I asked them to choose "Yes" or "No" to the question: "Do you think that the media (Internet, E-mail) used have influence on the students' performance?"

Two respondents (from institution A2 and B2) believe that media has an influence on the students' performance while the other two (from institution A1 and B1) do not believe that media has an influence on the students' performance. The respondent from institution A2 emphasized that the material is always available to students and students can always access it. The respondent from institution B2 commented: "More revision material made available improved test and exam techniques". This implies that the students can revise material repeatedly at their own pace and time.

One of the respondents (from institution B1) who opted for "No" says:

> *... I am convinced that good students benefit greatly from both media – they search for material; they search for material to support new ideas; they chat among themselves, etc. However, for the poor students, they battle to distinguish between a good tool, a bad tool, how to use it, good practices, bad practices, mix-up possession of material with learning, etc.*

The other opposing respondent, from institution A1, believes that the media could be of help to students who undertake research.

From the responses, the benefits identified of using the Internet and e-mail include improved access to material, improved flexible learning as the students are able to access the material anytime (including outside practical sessions), which in turn improved the students' performance, and improved communication among students. The problem identified with using the Internet and e-mail is lack of epistemological

access. Morrow (1993/4 cited in Broekman, Enslin and Pendlebury 2002:31) makes it clear that "even students who have material access to the required technology may nevertheless not have epistemological access, in this instance, being able to distinguish between poorly substantiated material from a questionable source and rigorously validated information from a reputable person or organisation.

**E-learning promotes communication**

The point of interest here is to find out whether e-learning promotes communication between the lecturer and the student or not. I gave the respondents choices such as strongly agree, agree, neutral, agree and strongly agree to rate their opinions.

Two respondents (from institution B1 and B2) agree that communication between the lecturer and the student is promoted. Institution B1's respondent emphasizes that "some students prefer e-learning as a communication mechanism: they may be shy, prefer to have the time to think about something before challenging or being challenged". The other respondent (from institution B2) believes that "students are more comfortable interacting impersonally, and timing is more convenient". One respondent (from institution A2) has neutral feelings about e-learning's role in communication. The respondent emphasizes that communication depends on the sender and the receiver. The other respondent (from institution A1) strongly disagrees to the fact that e-learning promotes communication between the lecturer and students.

The responses indicate that the staff members from the HWUs perceive that they make effective use of e-learning for communication with their students. This indicates that while the technology affords the lecturers the opportunity to use e-learning to communicate with students, this does not mean that all lecturers take up this opportunity. The responses of the staff members reveal however that "how a technology is used relates to the teacher's (and students') perception of how it can be used" (Amstrong, Barnes, Sutherland, Curran, Mills and Thompson 2005:459). The respondents from the HWUs find e-learning useful for communication while the respondents from the HBUs, although they have access to the technology, do not have the same view about this.

**The Internet is a good teaching tool**

The respondents were asked to rate their opinions about the Internet. In order to determine whether the Internet is a good teaching tool or not, I gave the respondents options such as strongly agree, agree, neutral, disagree and strongly disagree to choose from.

Three respondents (from institution A1, A2 and B1) agree that the Internet is a good teaching tool. The respondent from institution A2 commented that the Internet can complement the teaching styles of a lecturer. This respondent goes on to say: "Online learning cannot replace and will never replace face-to-face. It is just another tool to use in teaching". The respondent from institution B1 makes note of the fact that:

> *Some students thrive on the Internet: they enjoy the exploration, whether as a group or individually, and the mass of information appeals to their sense of searching through loads of "stuff" to get hold of the golden nugget. For others it is a complete battle ground where they understand little and falter often.*

On the other hand, the respondent from institution B2 disagrees with the fact that the Internet is a good teaching tool and this staff member emphasizes that:

> *I like to be able to see whether students are keeping up, alter pace as required, introduce examples, and get feedback and interaction from the class. The Internet provides good support but IN ADDITION TO regular face-to-face teaching.*

The responses indicate that although the staff members from institution A2 and B1 are advocates of the Internet, they understand that it has some shortcomings. Institution B2's staff member has a fear of losing contact and interaction with the class of students and contends that the Internet and face-to-face classes are complementary. This section alerts me that the face-to-face classes could be supplemented by online delivery, but not replaced. From this section I have learnt that there should be a clear guide for each topic to help the students understand the content of each topic and how to move around in a topic. The website to be developed should be interactive, that is, the hyperlinks (the label on the link) should indicate what the student should expect after clicking on the hyperlink and this should take the student to the expected reference or website. In this way, the WSU IS pilot website could help the students filter information, as Eriksen

(2001) emphasizes that the main priority in the information society should be the filtering of information.

### 4.3. Summary

The findings obtained from the staff survey have been discussed in detail in this chapter. The lecturers from the universities who responded to the questionnaire, report that their students access computers in order to view and interact with the online material. The IS departments of these universities have online material such as presentation slides, practical questions, tests, solutions, general instructions, references, articles, websites, lecturer notes, assignments, mark schedules, past test papers, past exam papers, staff contact details, class lists and course outlines. These institutions use LMS's such as *KEWL*, *Moodle* and *WebCT* to manage their online courses. One of the institutions uses CAA software to assess students. The data reflects that in general, the HWUs make more use of e-learning than the HBUs. The manner in which these surveyed institutions deliver their learning material provides insights into how the IS course might be supplemented at WSU. These institutions placed a variety of learning material on the department websites which gives a clue of what could be made available on the WSU IS pilot website. The material for the respective departments is managed by a LMS. This will be the case with the WSU IS pilot website. However, the data reveals that the availability of online material tends to have a detrimental effect on the class attendance; this has been taken care of in the development of the WSU IS pilot website. The next chapter presents findings obtained from the student survey to ascertain whether they would be amenable to e-learning at WSU.

# CHAPTER 5

# ANALYSIS AND FINDINGS: STUDENT SURVEY

## 5.1 Introduction

This chapter includes the analysis of the data that was collected from the responses to the student survey. The research question was: How could the Walter Sisulu University (WSU) Accounting department make the IS course more accessible to its students. The student survey was conducted in an attempt to answer this question. I have identified possible patterns in the data and also relationships between WSU and the surveyed institutions. The framework used for the discussion has been guided by the literature on physical and epistemological access to Information and Communication Technology (ICT). The chapter also highlights results of the surveys that have provided insights in the development of the WSU IS pilot website. The chapter concludes with a summary of the findings.

## 5.2 Presentation of data

The responses to both the open-ended and closed-ended questions were analyzed using *Statistical Package for Social Sciences* (SPSS), then represented by means of tables and graphs. The results to the student survey are reviewed in four sections. The first section describes the students' demographics. The other sections describe the themes emerging from the research: when students attend classes; how often are they absent from class and the reasons for absenteeism; students' learning needs and their current computer access and skill; and their perceptions of the potential benefits for putting the course online.

### 5.2.1 Students demographics

The section includes the gender and age of the students, and the type of school where the students matriculated.

**Gender of students**

The students were asked to specify their gender. The responses indicated that a large percentage of the respondents were females. This is illustrated in Figure 5.1 below.

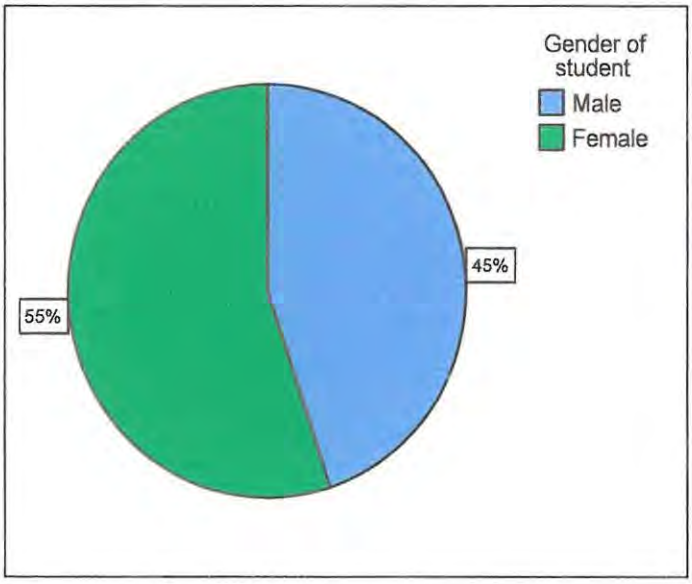


**Figure 5.1: Gender of students**

The above figure shows that 55% of the 149 respondents are female and 45% are male. This indicates a measure of redress with respect to female access to science and technology subjects.

**Age of the students**

The students were asked to select a given age range. The ranges included 15-20, 21-25, 26-30, 31-35 and above 35. The largest percentage is composed of students of the age group between 21 and 25 years, followed in descending order of percentages by students between 15 and 20 years, between 26 and 30 years, above 35 and between 31 and 35 years.

The distribution of the age ranges is illustrated in Figure 5.2 below.

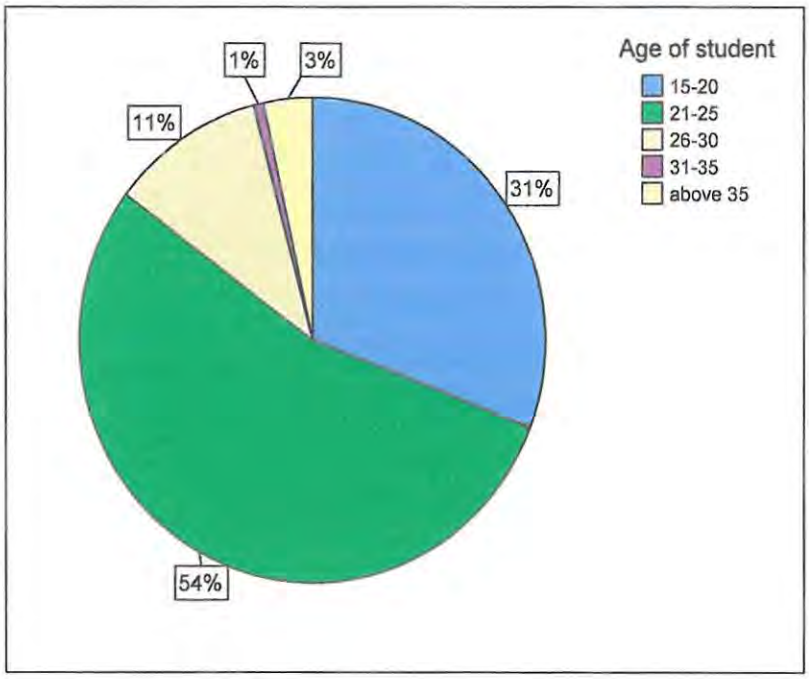


**Figure 5.2: Age of students**

Slightly more than half of the class (54%) is between 21 and 25 years of age. Thirty one percent is between 15 and 20 years of age; 11% is between 26 and 30 years of age; 3% is above 35 years of age while only 1% is between 31and 35 years of age.

**School where matriculated**

The educational background is considered as an important variable in the research. The belief here is that the educational background of a student may influence the student's computer competence, assuming that the private schools usually have sufficient resources (such as computers) for their students. The results reveal that the students matriculated in a variety of schools such as government schools, private schools, schools in other countries and 1% represents 'other'. No specific question was asked about the students' access to computers at the schools. Further research could ask this specific question eliciting this information. It is important to note that since the percentages have been rounded off to the nearest unit, the total of the reflected percentage in the graph is 99% as the first decimal for the private schools, schools in other countries and 'other' is less than five.

The schools where the IS students matriculated together with the percentage representation of students are illustrated in Figure 5.3 below.

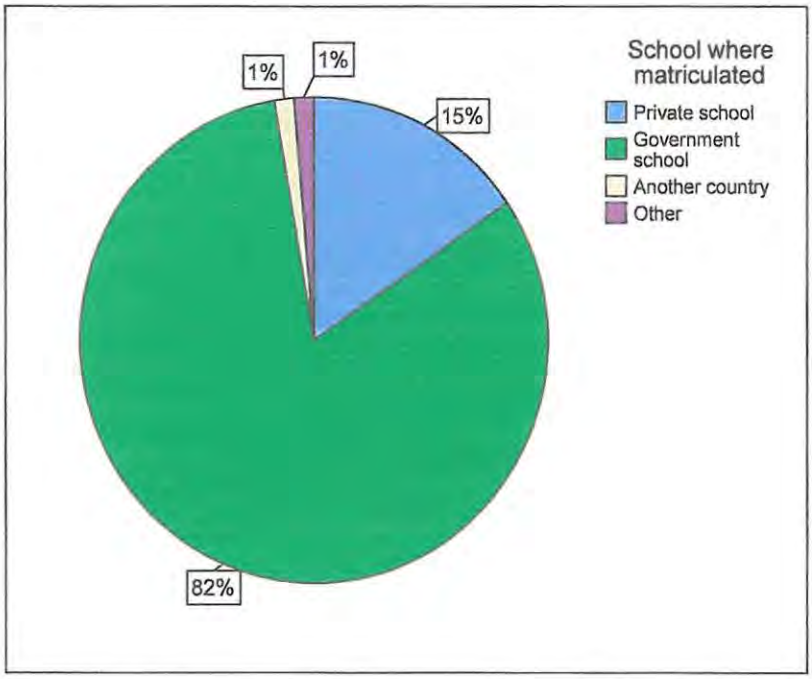


**Figure 5.3: School where matriculated**

The largest group of students (82%) matriculated from the government schools. Fifteen percent matriculated from private schools, 1% from another country and 1% is represented as 'other'. These students have indicated that they studied in Funda Trust schools. On the assumption that the private schools usually have sufficient resources and the students from these schools are more likely to be computer competent than those from the government schools, the data reveals that more than 80% of the class matriculated from government schools and this percentage has come to university with little prior experience of using computers. This then indicates that I need to prepare initial material for real beginners to help the students boost their computer skills.

It may be a useful idea to ask the students what their home language is in future surveys as the home language may have a role in the students' understanding (epistemological access) in a predominantly English environment, where the material and language of instruction are English (Gumede 2005).

### 5.2.2 Students' attendance

This section determines when the students attend classes, how often the students attend classes and the reason for being absent from classes.

#### Time of attendance

In order to determine when the students attended classes, I ascertained the percentage of students who were registered as full-time, part-time (attend in the evening) or full-time, but were attending in the evening. It is important to know the type of students the IS class is composed of as the purpose of the study is to determine means of making the course more accessible to all the IS students; full-time and part-time students. The results reveal that 86% of the students are full-time, 5% are part-time and 9% are full-time, but attend in the evening. Figure 5.4 below illustrates when the IS students attend.

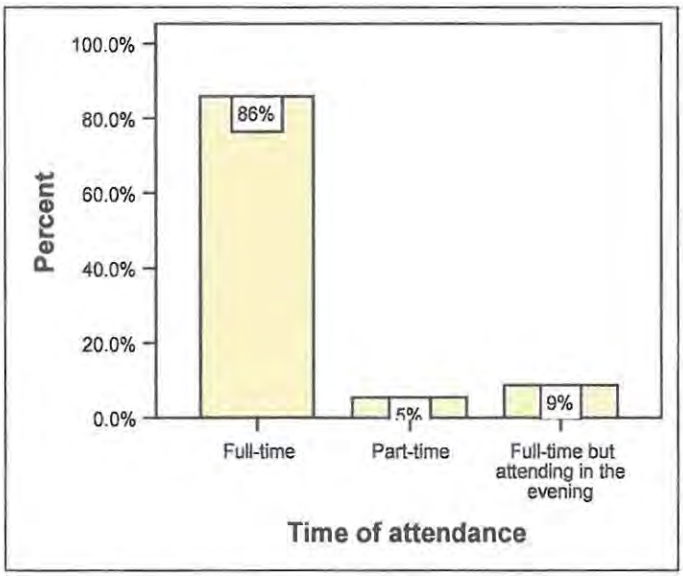


**Figure 5.4: Time of attendance**

One hundred and twenty eight (86%) students are full-time, 13 students (9%) are registered as full-time, but attend in the evening and 8 (5%) students attend part-time. Those students who are registered as full-time but are attending in the evening were asked to specify reasons for this conduct. The respondents' reasons included work commitment, family commitment and time-table clashes. There was one student who had some other reason.

Table 5.1 below illustrates the various reasons why students attend at a particular time.

**Table 5.1: Time of attendance vs Reason for time of attendance**

| | | Time of attendance | | | Total |
|---|---|---|---|---|---|
| | | Full-time | Part-time | Full-time but attending in the evening | |
| Reason for time of attendance | Work commitment | 0 | 0 | 5 | 5 |
| | Family commitment | 0 | 0 | 1 | 1 |
| | Time-table clashes | 0 | 0 | 6 | 6 |
| | Other | 0 | 0 | 1 | 1 |
| | Not applicable | 128 | 8 | 0 | 136 |
| Total | | 128 | 8 | 13 | 149 |

Figure 5.5 below illustrates the bar graph for the cross-tabulation of the time of attendance and reason for time of attendance.

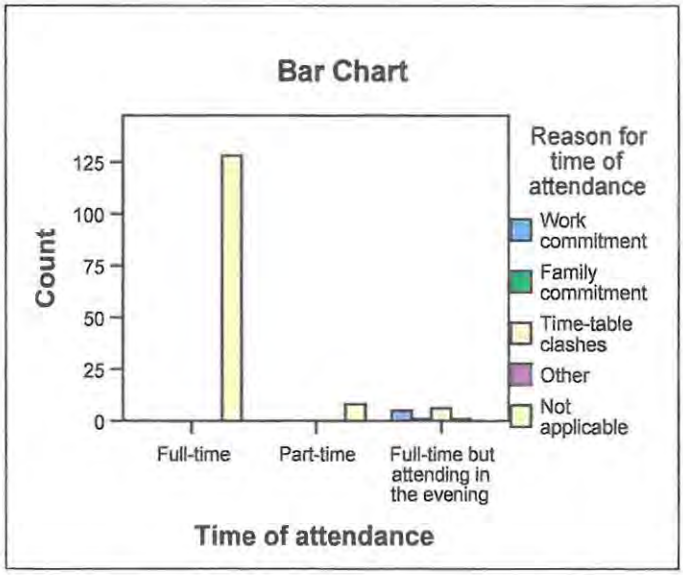


**Figure 5.5: Time of attendance vs. Reason for time of attendance**

Of those students who are registered as full-time but are attending in the evening, five students work during the day, one has a family commitment and six have time-table clashes. The person who indicated another reason for attending in the evening indicated that he/she has an eyesight problem and that there are too many students during the day.

It is a concern to find that there are students who are registered as full-time although they are working. It may be that these are final year students who are gaining work experience in nearby companies. Alternatively, these students may have been employed

during the course of the year because they have a light course load or have financial problems. This may need to be investigated in further research.

**How often students attend classes**

The students were asked how often they attended classes. I gave them options such as always, often and seldom to rate themselves. The means of course delivery is intended to cater for students who miss classes for whatever reason. The responses indicate that the greater percentage of the class attend every class in a week. The responses also indicate that some students fail to attend classes on a regular basis. Figure 5.6 below illustrates how often the students attend classes.

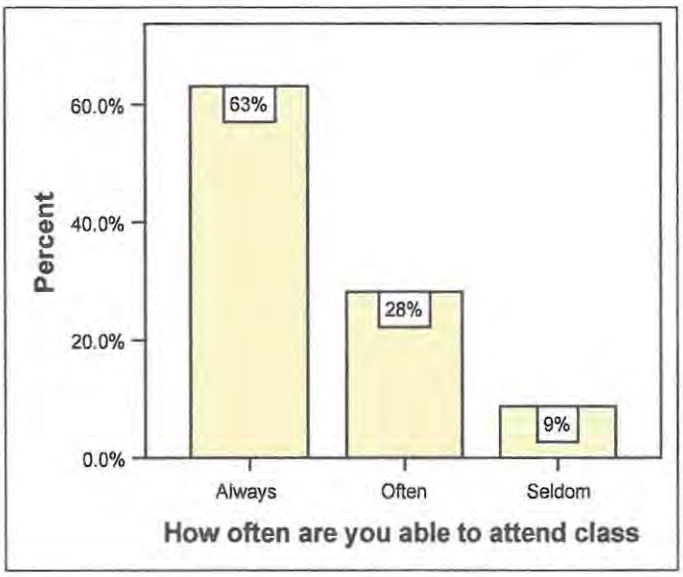


**Figure 5.6: How often students attend classes**

Ninety six (63%) students attend every class in a week (there are four classes in a week), while 40 (28%) students of the class often attend and 13 (9%) seldom attend. They have various reasons for not attending which include work commitment, family commitment, time-table clashes and health issues. Some students indicated that they had other reasons besides these mentioned above.

The reasons are illustrated in Table 5.2 below. Three students who chose 'often' have not given any reason for missing some lectures. These students are not reflected in the table and graph.

**Table 5.2: How often the students are able to attend class vs Reasons for non-attendance**

| | | How often are you able to attend class | | | Total |
|---|---|---|---|---|---|
| | | Always | Often | Seldom | |
| Reasons for non-attendance | Work commitment | 0 | 5 | 7 | 12 |
| | Family commitment | 0 | 9 | 1 | 10 |
| | Time-table clashes | 0 | 13 | 4 | 17 |
| | Sick | 0 | 10 | 0 | 10 |
| | Not applicable | 93 | 0 | 0 | 93 |
| | Other | 0 | 3 | 1 | 4 |
| Total | | 93 | 40 | 13 | 146 |

Figure 5.7 below illustrates how often the students are able to attend class and the reasons for non-attendance

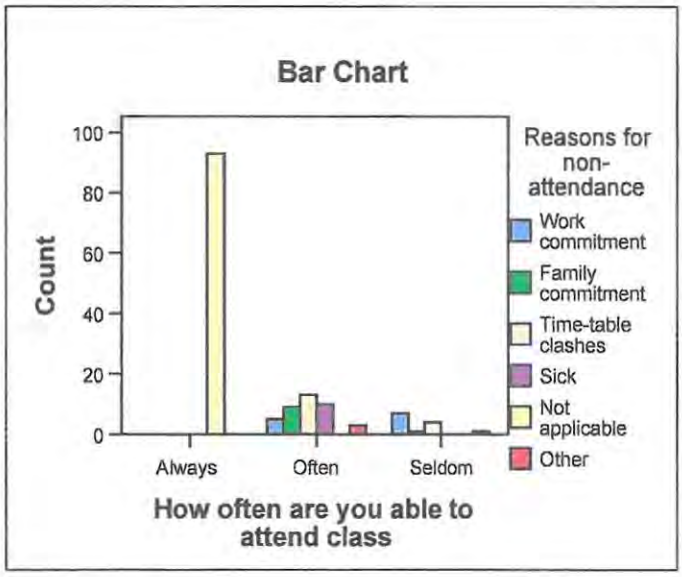


**Figure 5.7: How often students attend classes vs Reasons for non-attendance**

Twelve students miss classes because of work commitments, 10 students miss classes because of family commitments, 17 students miss classes because of time-table clashes, 10 students are sometimes sick and four have indicated that they do not attend because of other reasons. Three of these students indicated that they do not attend because of transport costs as they are staying off campus, and one said that the class is sometimes

boring. This implies that some students miss out in some of the coursework covered in class.

The data from the staff survey reflected that there were some students who missed classes. The reason was that the students of the respective institutions were provided with online material. One staff member emphasized that the students falsely regard the possession of material with understanding and learning, and as a result they absent themselves from class.

It is important to note that the IS students who often or seldom attend class at WSU are from the three categories; full-time, part-time and full-time but attending in the evening. Therefore, the WSU IS pilot website will be developed to provide those students who are unable to attend classes on a regular basis with what is covered in class.

Table 5.3 below illustrates how often the students are able to attend and the reason for not attending. The students are grouped according to the time of attendance. Since the information of the above table (Table 5.2) is split in this case, the three students that were not reflected in Table 5.2 do not appear in Table 5.3 as well.

**Table 5.3: Time of attendance, how often is the students able to attend and the reason for non-attendance**

| Time of attendance | | | How often are you able to attend class | | |
|---|---|---|---|---|---|
| | | | Always | Often | Seldom |
| Full-time | Reasons for non-attendance | Work commitment | 0 | 2 | 1 |
| | | Family commitment | 0 | 9 | 0 |
| | | Time-table clashes | 0 | 12 | 4 |
| | | Sick | 0 | 10 | 0 |
| | | Not applicable | 84 | 0 | 0 |
| | | Other | 0 | 3 | 1 |
| | Total | | 84 | 36 | 6 |
| Part-time | Reasons for non-attendance | Work commitment | 0 | 1 | 4 |
| | | Not applicable | 3 | 0 | 0 |
| | Total | | 3 | 1 | 4 |
| Full-time but attending in the evening | Reasons for non-attendance | Work commitment | 0 | 2 | 2 |
| | | Family commitment | 0 | 0 | 1 |
| | | Time-table clashes | 0 | 1 | 0 |
| | | Not applicable | 6 | 0 | 0 |
| | Total | | 6 | 3 | 3 |

### 5.2.3. Students' learning needs in the IS course, and computer access and skills

This section describes the students' learning needs which are determined by the way they prefer their course material to be distributed. Their preference could be influenced by a number of factors. These factors include the availability of a computer for the students' studies, whether or not they have access to the Internet and e-mail, how often they access a computer and for what purpose they access a computer. The section also describes the level of computer competence of the students and what they can do best using a computer.

#### Availability of computer for studies

In order to determine the availability of computers for student use, the students were asked to choose "Yes" or "No" to indicate whether or not they had computers to use for their studies at their spare time (outside practical and tutorial sessions). A very large percentage (88%) of the respondents said that they had access to computers at their spare time. Figure 5.8 below illustrates whether or not the students have access to a computer at their spare time.

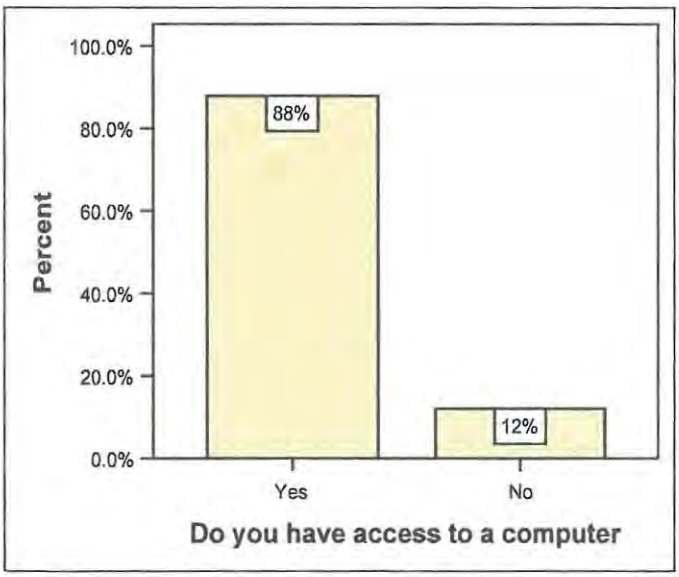


**Figure 5.8: Availability of computers for studies**

One hundred and thirty one (88%) students have access to computers that they can use for their studies while 18 (12%) students do not have access to computers outside practical and tutorial sessions. Those students who said that they had access to computers at their spare time were asked to indicate where these computers were

located. I gave them locations such as University laboratory, Home, Work, Friend's place to choose from. The students were also asked to specify any other place if they did not access the computers from these given locations. Of the respondents, some access computers in the university laboratory, at home, at a friend's place and in the workplace. Figure 5.9 below illustrates the location of computers that are used by students.

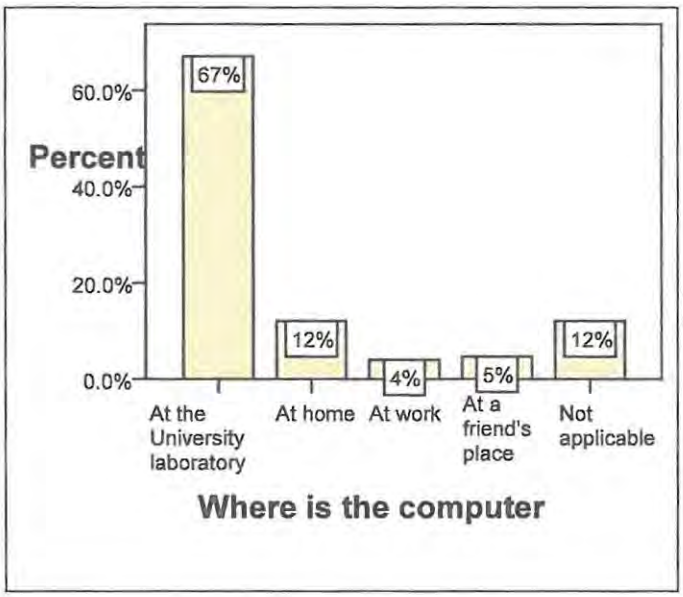


**Figure 5.9: Location of computers**

The 88% of respondents who access computers is split as follows: 67% of the students access the computers in the university laboratory, 12% access the computers at home, 5% at a friend's place and 4% in the workplace.

### Internet and E-mail

In order to determine whether the students will be able to access the WSU IS pilot website, it is important to know if they have access to the Internet. I asked them to choose "Yes" if they had access and "No" if they did not have access to the Internet. Eighty four percent of the class has access to the Internet and 16% do not have access to the Internet.

Figure 5.10 below illustrates whether or not the students have access to the Internet.

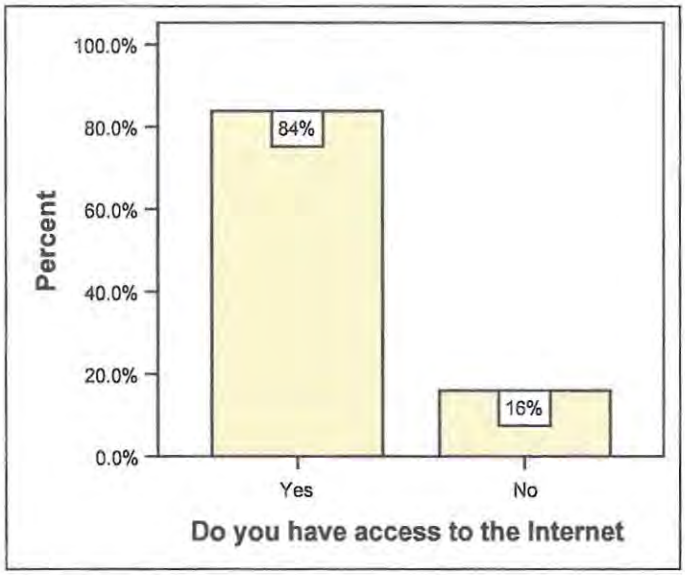


**Figure 5.10 Internet access**

One hundred and twenty five (84%) students have access to the Internet. This large number is probably influenced by the fact that the WSU laboratory has Internet connection. That is, those students who access computers from the university laboratory will automatically have access to the Internet. All those students that access computers from their workplaces have also indicated that they had access to the Internet. The 24 students (16%) who do not have access to the Internet include those who have no access to computers and some of those students who access computers from home. This is illustrated in Table 5.4 below.

**Table 5.4: The location of the computer vs Students' access to the Internet**

| | | Where is the computer | | | | | |
|---|---|---|---|---|---|---|---|
| | | At the university laboratory | At home | At work | At a friend's place | Not applicable | Total |
| Do you have access to the Internet | Yes | 100 | 12 | 6 | 7 | 0 | 125 |
| | No | 0 | 6 | 0 | 0 | 18 | 24 |
| Total | | 100 | 18 | 6 | 7 | 18 | 149 |

The students were also asked to indicate whether or not they have access to E-mail. The students were prompted to choose "Yes" if they had access to E-mail and "No" if they did not have access to E-mail. E-mail is important in facilitating communication among students and between students and a lecturer in an online course. A large percentage

(74%) of the respondents has access to E-mail. Figure 5.11 below illustrates whether or not the students have access to e-mail.

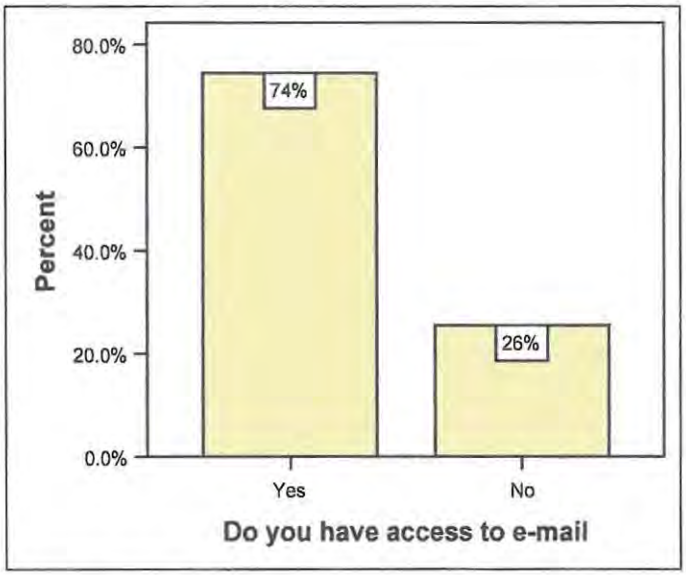


**Figure 5.11: E-mail access**

One hundred and eleven (74%) students have access to E-mail and 38 (26%) do not have access to E-mail. Nine students of those who access computers from the university laboratory have indicated that they have not subscribed to the e-mail. Hence this decreases the percentage of students with e-mail as compared to those with Internet access at the university laboratory. The rest of the percentage of those students who do not have access to E-mail is made up of seven students who access the computers from home, three students who access computers from work, one student who accesses the computer from a friend's place and 18 of those students who do not have access to a computer at their spare time. This is illustrated in Table 5.5 below.

**Table 5.5: The location of the computer vs Students' access to E-mail**

| | | Where is the computer | | | | | |
|---|---|---|---|---|---|---|---|
| | | At the university laboratory | At home | At work | At a friend's place | Not applicable | Total |
| Do you have access to e-mail | Yes | 91 | 11 | 3 | 6 | 0 | 111 |
| | No | 9 | 7 | 3 | 1 | 18 | 38 |
| Total | | 100 | 18 | 6 | 7 | 18 | 149 |

The data from the staff survey revealed that the IS students in the respective institutions accessed computers with Internet connectivity and e-mail in the university laboratory

even outside practical sessions. There was no question asked to elicit information about the other locations from which the students accessed computers. This question could be asked in further research.

**Frequency of accessing computers**

In order to determine how frequently the students accessed a computer at their spare time, I gave the students options to rate how often they access a computer. The options included very often, often, seldom and never. The responses indicated that most of the respondents spend some time on the computer while a very small percentage never accesses a computer outside the practical and tutorial sessions. Figure 5.12 below illustrates how often the students access a computer.

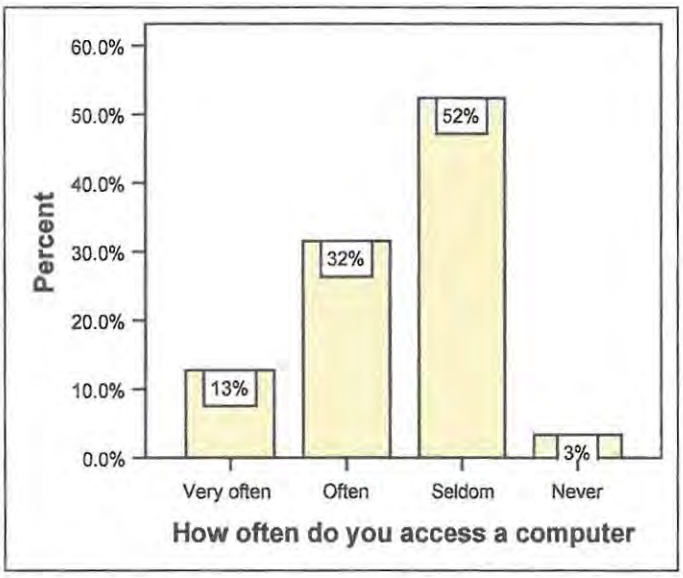


**Figure 5.12: Frequency of accessing computers**

Of the respondents, 13% accesses a computer very often. 32% often accesses a computer, 52% seldom accesses a computer and 3% never accesses a computer outside practical and tutorial sessions. As indicated above, 12% of the respondents have no access to computers at their spare time, but now only 3% of the respondents say they never access a computer at their spare time. This implies that 9% of the respondents do have some access to a computer although it may be seldom.

The data from the staff survey indicated that the students from the Historically Black Universities (HBUs) access computers very often. It is a shame to find that the largest

percentage (52%) at WSU (which is a HBU) seldom access a computer and 3% never bother to access a computer outside practical and tutorial sessions.

**Reasons for accessing a computer**

The reasons given for accessing a computer varied from information searching, checking e-mail, academic purposes, work related issues to entertainment. Figure 5.13 below illustrates the reasons for accessing a computer.

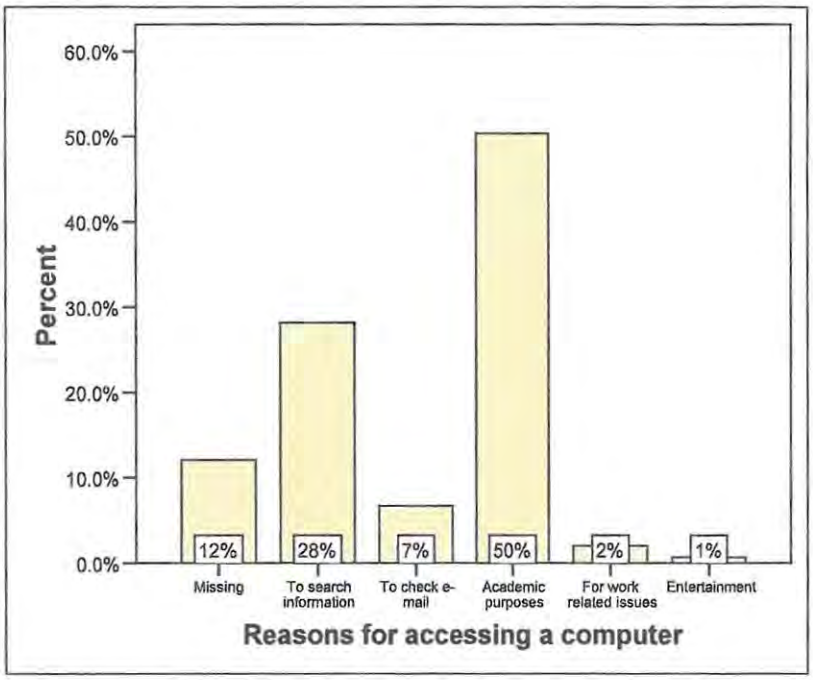


**Figure 5.13: Reasons for accessing a computer**

The students have various reasons for accessing a computer. Fifty percent of the students use a computer for academic purposes, 28% use a computer to search information, 7% check e-mail, 2% use the computer for work related issues, 1% use the computer for entertainment. The other 12% of students have not responded. Responses from staff of the surveyed institutions indicate that their students primarily access the computer to view and interact with the online material, but they may have other reasons as well.

### Computer competence

In order to determine the level of computer competency of the students, I asked the students to rate themselves on how well they could use a computer. The ratings included very well, moderate and poor. The students differ in their levels of competence and can undertake many activities using a computer. I attempted to ascertain what the students could do best using a computer. The responses included searching for information, working with Microsoft Office, preparing a general ledger, designing a website and dealing with other Internet issues. Table 5.6 below illustrates a cross-tabulation of the student's level of computer competency and what they can do best with a computer. Of the 149 respondents, 32 students have not responded, so the table below indicates the responses of 117 students only.

**Table 5.6: How well students use a computer vs What they can do best with a computer**

| | | How well can you use a computer | | | Total |
|---|---|---|---|---|---|
| | | Very well | Moderate | Poor | |
| What can you do best with a computer | Search for information | 3 | 7 | 0 | 10 |
| | Microsoft Office | 30 | 20 | 0 | 50 |
| | I can prepare a general ledger | 0 | 1 | 0 | 1 |
| | Typing | 2 | 18 | 0 | 20 |
| | Design a website and deal with other Internet issues | 1 | 0 | 0 | 1 |
| | Nothing | 0 | 0 | 35 | 35 |
| Total | | 36 | 46 | 35 | 117 |

The above information is graphically illustrated in Figure 5.14 below.

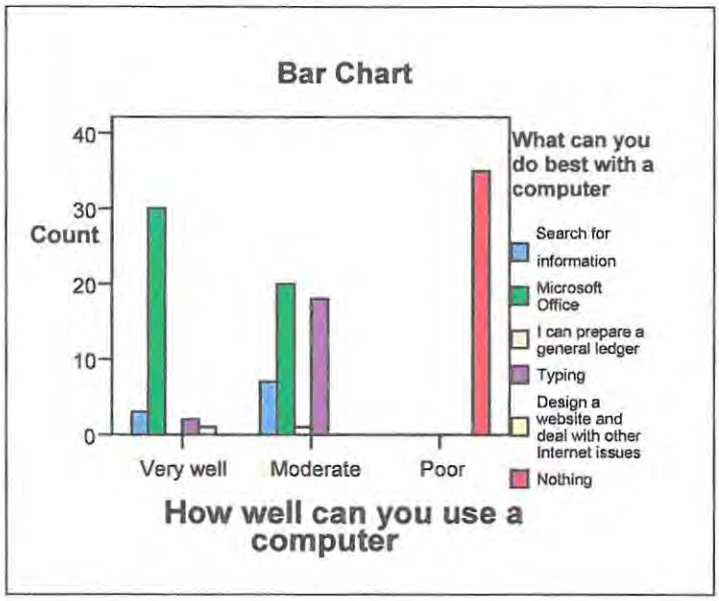


**Figure 5.14: Students' computer competency vs What they can do best**

Those students who can use a computer very well can carry out activities such as searching for information, making use of *Microsoft Office*, typing, and designing a website and dealing with other Internet issues. Those students who rate themselves as moderate can search for information, use *Microsoft Office*, prepare a general ledger and can type. It is important to note that those students who are incompetent (reflected as poor) do not have anything they can do best using a computer hence their skills are reflected as 'Nothing'. It is also important to note that there is no prerequisite for INS 2101; it is possibly the first time for some of the IS students to come across the computer literacy module in this course, so it may be true that some students are computer illiterate. There might also be a difference between the way some students feel and the way they actually are, that is, they might have passed some computer literacy courses but still feel computer illiterate. The data reveals that only 11 students out of 149 respondents (7%) can use and search for information on the Internet. The rest of the respondents do not have epistemological access, even though they have physical access to the WSU computer laboratories and other locations. One of the staff members from the Historically White Universities (HWUs) consistently raised the issue of the students' lack of epistemological access. This implies that students from any type of institution may not know how to use and search for appropriate information on the Internet. In fact, Czerniewicz makes it clear that having access to technology is a necessary but insufficient condition for social inclusion. Even if the data reveals that

HWUs have a large number of computers for their students' use, the students may not have all the necessary skills to use the computers efficiently and effectively for academic purposes.

While still looking at competence, one of the assumptions mentioned was that the schools from where the students matriculated may have had an influence on the students' computer competence. The belief being that the Private schools have sufficient computers for their students as compared to the Government schools. The lack of the computer resources in return may result in students who are not computer competent and consequently who have limited, if any, access to the Internet. Table 5.7 below reveals to what extent this assumption is true.

**Table 5.7: School where the students matriculated vs How well can one use a computer**

| | | | How well can you use a computer | | | Total |
|---|---|---|---|---|---|---|
| | | | Very well | Moderate | Poor | |
| School where matriculated | Private school | Count | 5 | 15 | 3 | 23 |
| | | % within School where matriculated | 21.7% | 65.2% | 13.0% | 100.0% |
| | Government school | Count | 33 | 58 | 31 | 122 |
| | | % within School where matriculated | 27.0% | 47.5% | 25.4% | 100.0% |
| | Another country | Count | 1 | 1 | 0 | 2 |
| | | % within School where matriculated | 50.0% | 50.0% | .0% | 100.0% |
| | Other | Count | 1 | 0 | 1 | 2 |
| | | % within School where matriculated | 50.0% | .0% | 50.0% | 100.0% |
| Total | | Count | 40 | 74 | 35 | 149 |
| | | % within School where matriculated | 26.8% | 49.7% | 23.5% | 100.0% |

It is important to note that I will round off the results from the above table to the nearest unit to so as to maintain uniformity. The computer competence distribution in the Private schools is as follows: 5 (22%) the students can use a computer very well, 15 (65%) can moderately use a computer and 3 (13%) students are incompetent (reflected as poor). In Government schools, 33 (27%) students can use a computer very well, 58 (48%) can moderately use a computer and 31 (25%) students are computer incompetent. One (50%) of the students who matriculated in Other Countries is very competent and the other one (50%) of these students is moderately competent. One (50%) of the students who matriculated in Other Schools is very competent, while the other one (50%) is computer incompetent. It is important to note that 27% of students from

Government schools and only 22% of students from Private schools claim to be very computer competent. We therefore need to guard against assuming that the school that the students attended necessarily indicates a level of computer competence.

**Delivery preference**

When students were asked: "Do you think it is better to have lecture notes on the Internet rather than providing hard copies?" They responded as follows: "Yes", "No" and "OK either way". This is illustrated in Figure 5.15 below.

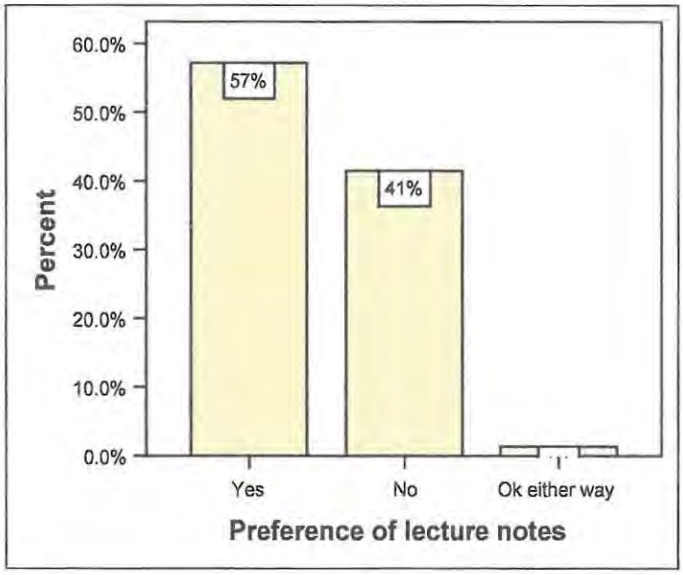


**Figure 5.15 Delivery preference**

The student response is as follows: 57% chose "Yes", 41% chose "No" while only 1% preferred "either way"; softcopy or hardcopy. In the latter case it is not possible to assess this response because they have not stated any reason for their statement. The other groups have various reasons for their preferences. Those students who prefer to have lecture notes on the Internet (softcopies) have various expectations such as the clarity of notes, the ability to pay full attention in class, the opportunity to read notes at their own time and to familiarize themselves with the Internet. Those who preferred to use printed handouts (hard copies) have various reasons including the shortage of computers, fear of being computer illiterate and the belief that there should be face-to-face communication between the students and a lecturer.

Figure 5.16 below illustrates the students' preference for course delivery.

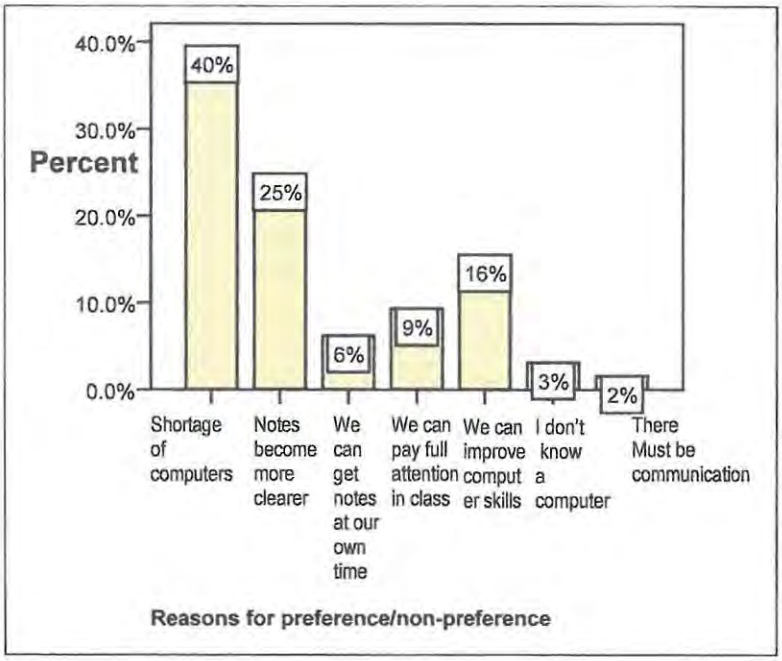


**Figure 5.16: Reasons for preference or non-preference**

The students who feel comfortable with the softcopies comprise the larger percentage of the class. Twenty five percent of these students state that 'the notes become clearer', 16% believe that accessing the notes from the Internet will improve their computer skills, while others (6%) believe that they would be able to access the notes at their own time. Others (9%) even said: 'We can pay full attention in class without copying notes'.

A large percentage (40%) of the students who prefer hardcopies of notes are concerned about the shortage of computers in the institution. The data in the staff survey also indicated a shortage of computers in the HBUs. The WSU IS students feel that they will not be able to access the notes as often as they wish. This problem (shortage of computers) has a negative impact on the results because it affects the students' preference. It may be that some would have liked softcopies of notes if there were sufficient computers. Three percent of the students indicate that they are not computer competent, while 1% of the students who resist the use of softcopies fear that communication between the students and the lecturer would be lost. This was also a concern of one of the staff members in the surveyed institutions. In fact, Kuriloff (2005) expressed this threat; the educators who are in favour of classroom based teaching as opposed to online delivery fear that communication (with characteristics such as

immediacy, personal contact and community) between the lecturer and students might be lost with online delivery.

### 5.2.4 Potential benefits for creating an online course

This section includes the students' perceptions about the goals of having a web-enhanced course. The section determines how the students perceive the Internet's help in their performance. The section intends to elicit the usefulness of 'test yourself questions' at the end of each chapter and how the e-mail could promote communication.

#### Internet and student performance

To determine the students' perceptions on how the Internet could boost their performance, I gave the students a range of factors that could influence the students' performance, which included motivation to read notes, boosting of learning skills, accessing of related topics and the ability to read notes in the students' own time. This question allows for multiple responses. The students were allowed to tick any number of responses they felt comfortable with. In the analysis, each response was created as a variable. I have coded the ticked variable as "Yes" and the unticked variable as "No". The figures below show the number of students who have ticked each response.

It is important to note that a student may be represented as "Yes" in more than one figure as the question allows multiple responses. Some students have ticked all of the responses. Three students have not responded or have not ticked any response. They are represented as missing in the figures.

**The Internet could be of help to students' performance by:**

a) motivating students to read notes

Thirty six students believe that the use of the Internet would motivate them to read notes, while 110 students do not believe that having notes on the Internet would motivate them to read notes. This is illustrated in Figure 5.17 below.

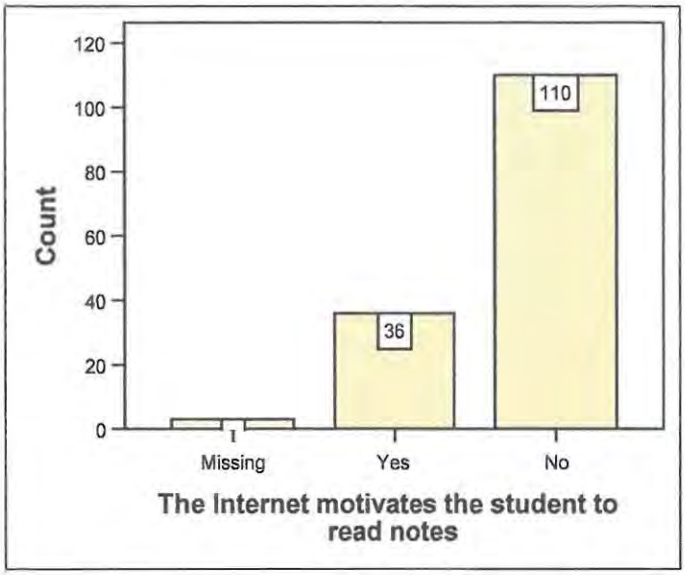


**Figure 5.17: The Internet motivates students to read notes**

The 110 students possibly want much more interactivity than merely reading notes on the Internet. There is the added concern that students may struggle to read the notes online, but be reluctant to print the notes because of cost implications.

b) boosting learning skills

Eighty eight students believe that the use of the Internet would boost their learning skills while 58 students did not believe that the use of the Internet would boost their learning skills. This is illustrated in Figure 5.18 below.

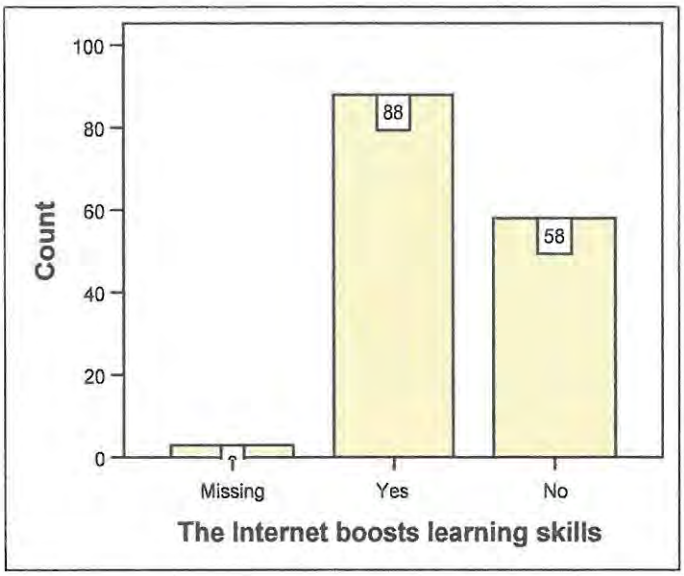


**Figure 5.18: The Internet boosts learning skills**

There is clearly no universal acceptance of the potential value of e-learning amongst the IS students. This might influence how students respond to the e-learning course. Hence the students' perceptions will need to be closely monitored to judge if the perceptions are changing, one way or the other, so that I can adapt the WSU IS pilot website accordingly.

c) allowing them access to related topics

Fifty four students believe that using the Internet for course delivery would help them access related topics, while 92 students do not see the use of the Internet for course delivery as a way to access further information. This is illustrated in Figure 5.19 below.

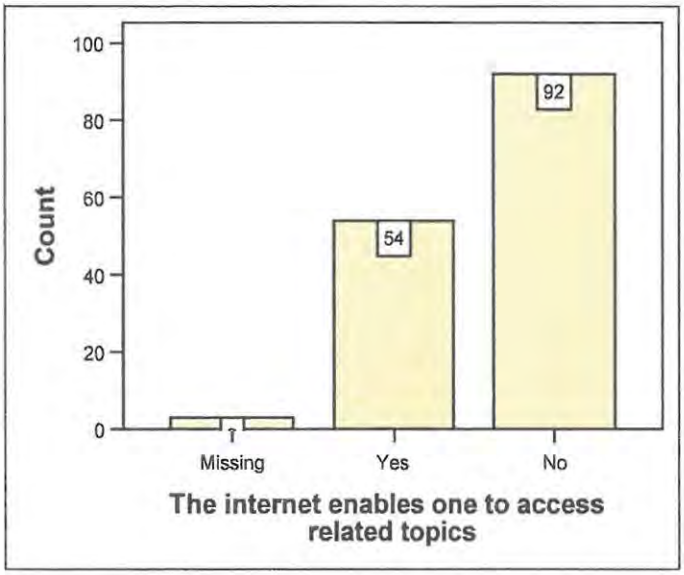


**Figure 5.19: The Internet enables one to access related topics**

The responses of the 92 students may be a result of the students' computer incompetence and the lack of epistemological access among students. This implies that the WSU IS website should be interactive and there should be a clear guide for each topic to help students navigate from one page to another and make use of the provided links.

d) giving them the opportunity to access the material anytime

Thirty three students believe the Internet would allow them the opportunity to access the material anytime while 113 students say that they don't believe that access to the Internet will help them access materials at any time. This is illustrated in Figure 5.20 below.

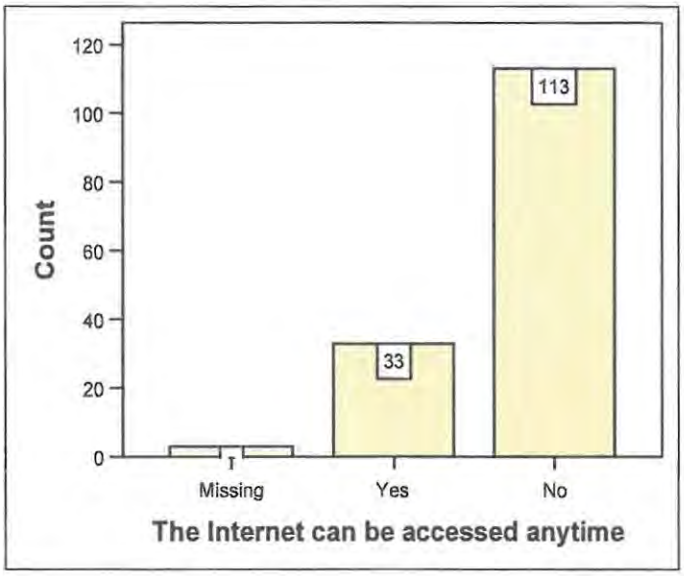


**Figure 5.20: The Internet can be accessed anytime**

The responses of the 113 students might be influenced by the fact that the students do not have access to computers at convenient times. The responses may also be influenced by the fact that the students lack the experience of using the Internet. The potential value of accessing the Internet anytime has been revealed in the staff survey. Two staff members (one from the HBUs and the other from the HWUs) expressed the view that providing students with online material enables the students to access learning material as well as revision material anytime and in turn, improves their performance.

**Test yourself exercises**

To agree or disagree about having 'test yourself exercises' (quizzes and tasks) after each topic, I asked the students to choose "Yes" or "No" to give their opinion. One hundred and two students said "Yes" and 15 students said "No" to the view of having exercises after each topic. The students have given various reasons for agreeing or disagreeing with this view. Those who opted for "Yes" have expectations such as that of helping

students learn how to use the Internet, motivating students, helping students to memorize, testing knowledge and the ability to attempt questions at the student's pace. Those who opted for "No" stated reasons such as the shortage of computers, fear of being computer illiterate and fear that communication among students would be lost. Table 5.8 below shows the students' responses to having 'test yourself exercises' after each topic against the students' reasons of wanting or not wanting exercises. Thirty two students have not responded and are not reflected in the table or graph.

**Table 5.8: Test yourself exercises vs Reason for exercises**

| | | Test yourself exercises | | |
|---|---|---|---|---|
| | | Yes | No | Total |
| | Help learning how to use the Internet | 17 | 0 | 17 |
| | It will motivate students | 13 | 0 | 13 |
| | I will not easily forget what I have been taught | 10 | 0 | 10 |
| | Test understanding | 61 | 0 | 61 |
| | Shortage of computers | 0 | 9 | 9 |
| | I don't know a computer well | 0 | 3 | 3 |
| | I will be doing it at my own pace | 1 | 0 | 1 |
| | Students must communicate together and not a computer | 0 | 3 | 3 |
| Total | | 102 | 15 | 117 |

The above information is also illustrated in Figure 5.21 below.

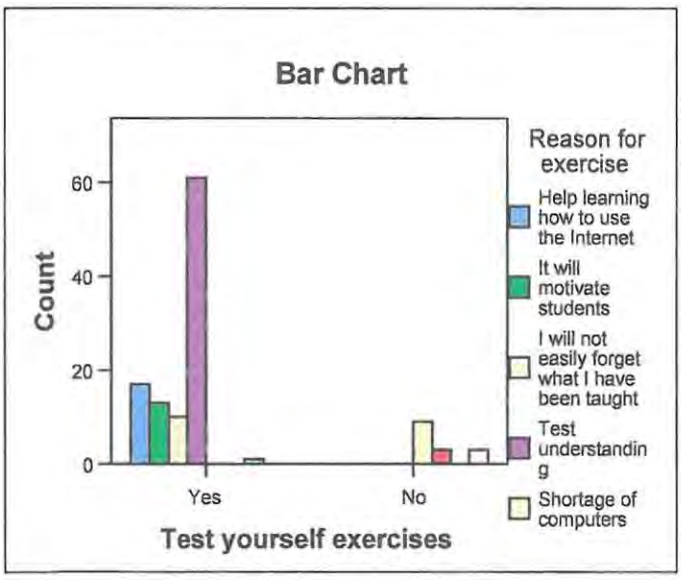


**Figure 5.21: Preference of Test yourself exercises vs Reasons for preference**

Of the students who prefer 'test yourself exercises' after each topic, 17 students hope that these exercises will help them learn how to use the Internet, 13 students hope that the exercises will motivate them, 10 students believe that the exercises will help them remember what they have been taught, 61 students believe that the exercises will help them test their understanding and one student believes that he/she will have the opportunity to attempt the exercises at his/her own pace. Of those students that said "No" to exercises, 9 say that they have a shortage of computers, 3 say that they do not know a computer well and the other 3 believe that students must communicate together and not with a computer. The responses indicate that most of the students are positive about the exercises.

**E-mail promotes communication**

The purpose of this question was to determine how the students think the use of e-mail would enhance communication between the lecturer and the students. This question allows multiple responses. The students were allowed to tick any number of responses. In the analysis, each response is created as a variable. I have coded the ticked variable as "Yes" and the unticked variable as "No". The figures below show the number of students who have ticked each response. It is important to note that a student may be represented as "Yes" in more than one figure as the question allows multiple responses. Some students have ticked all of the responses. Twenty one students have not responded or have not ticked any response. They are represented as missing in the figures.

**Using e-mail for communicating with the lecturer could help a student ask questions:**

a) one never thought of in class

Forty students believe that e-mail could help them ask questions they never thought of in class and 88 students do not believe that they would use e-mail for communicating with the lecturer. This is illustrated in Figure 5.22 below.

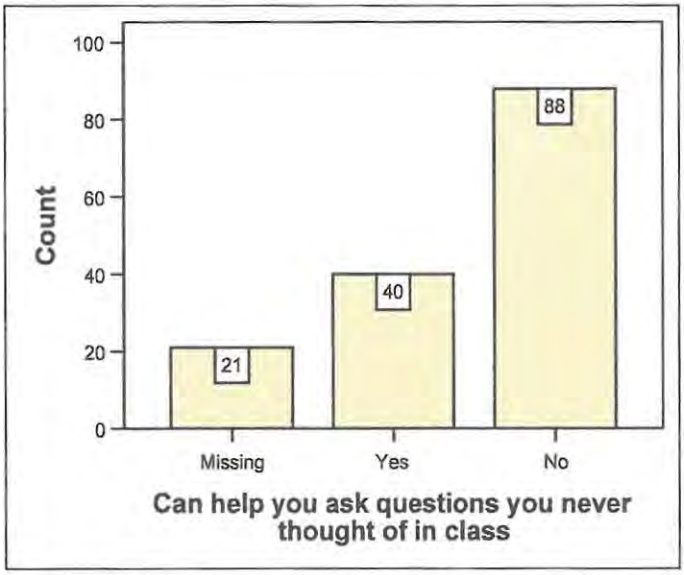


**Figure 5.22: E-mail can help one ask questions he/she never thought of in class**

The 88 students may prefer communicating verbally, instead of using e-mail. In fact, the students will be allowed to use consultation hours to consult the lecturer if they prefer so. As we are mindful that this study attempts to supplement face-to-face communication with the Internet and e-mail, and not to replace it, so students are not forced to turn away from contact sessions.

b) one was shy to ask in class

Sixty two students believe that e-mail could help them ask questions they were shy to ask in class and 66 students do not see this as an opportunity. This is illustrated in Figure 5.23 below.

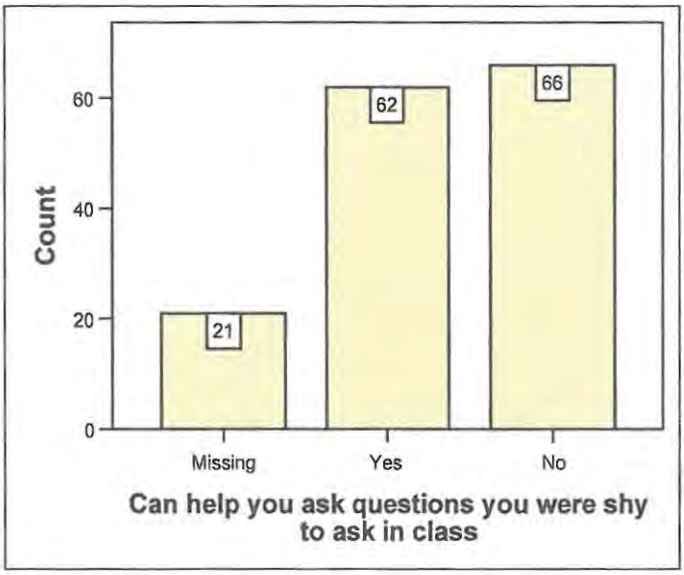


**Figure 5.23: E-mail can help one ask questions he/she was shy to ask in class**

This is a very positive response as compared to the 88 students who do not intend using e-mail to communicate with the lecturer. The 62 students who intend to take the opportunity indicate that despite the limited experience of using e-mail, the students can anticipate at using e-mail. E-mail can be used when a question is related to a specific issue, rather than just communicating with the lecturer in general. The staff members from the HWUs that were surveyed raised the same issue; that some students may be shy to communicate in class and prefer to interact impersonally. One even went on to say that the students prefer to have time to think about something before challenging or being challenged.

b) that generated from a group discussion

Forty four students believe that e-mail could help them ask questions that generated from a group discussion while 84 students do not see this as an opportunity. This is illustrated in Figure 5.24 below.

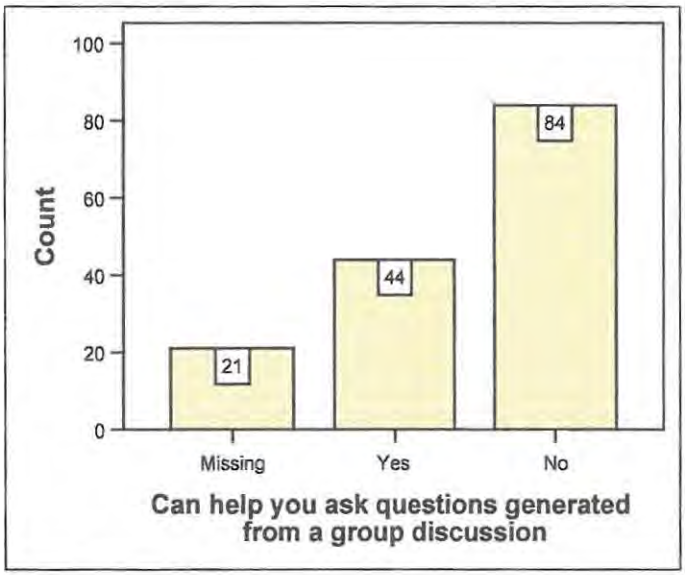


**Figure 5.24: E-mail can help one ask questions that generated from a group discussion**

The response indicates that the students do not see communicating with the lecturer by e-mail as a benefit of e-learning. The 84 students who do not intend using e-mail to ask the lecturer questions that generated from a group discussion are almost equal in number to the 88 students who do not intend using e-mail to ask questions they never thought of in class (see question a). These students may prefer verbal communication with the lecturer.

c) that one would need a lecturer to reply in writing

Thirty six students prefer to use e-mail to ask their lecturer questions for which they would like to receive response in writing, while 92 students do not need written responses. This is illustrated in Figure 5.25 below.

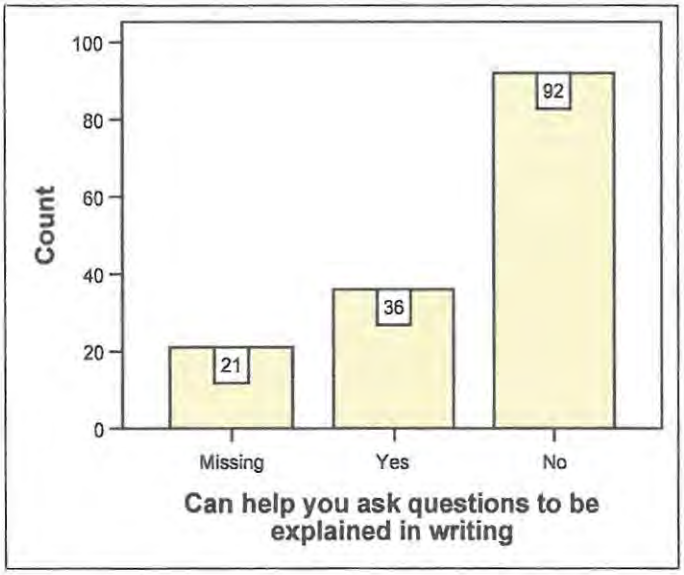


**Figure 5.25: E-mail can help one ask questions that he/she would like the lecturer to respond in writing**

Clearly, the students do not see receiving a written response from the lecturer as a benefit. I think this may mean that the students would prefer a verbal explanation instead. This may link to the question of home language. The students may not be comfortable with using English as a language of instruction.

### 5.2.5 Comments/suggestions

The students were asked to give any comments or suggestions about the implementation of an online course. This gave the students the opportunity to express themselves. The comments and suggestions included a request for more computers, expressed eagerness to use an Intranet and also expressed fear of losing face-to-face communication.

The comments are illustrated in Figure 5.26 below.

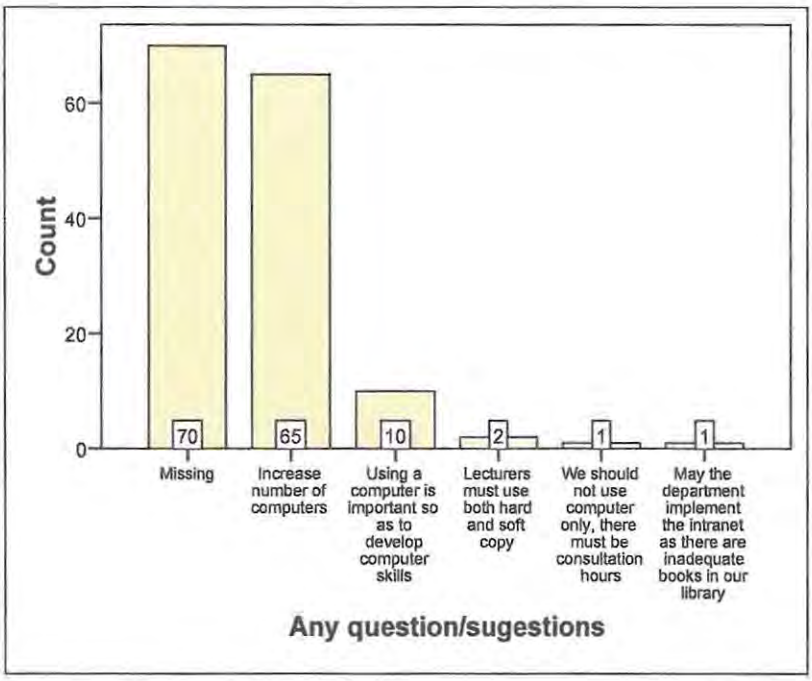


**Figure 5.26: Comments/suggestions**

Seventy students have not commented at all and the rest have provided different comments and suggestions. Sixty five students request that computers be increased, 10 students feel that using a computer will help them develop computer skills, one student requests that the department implements the IS website soon as there are inadequate books in the university library whereas, the resources provided by the IS website could be useful, two students suggest that the lecturer must use both the soft copy and the hard copy, and one student feels that there is a need for consultation hours, the students and the lecturer should not use e-mail only for communication.

### 5.3 Discussion of findings in WSU in relation to the surveyed institutions

This section describes the ICT access patterns of the WSU and surveyed institutions' students. The section also describes the needs and interests of the WSU students, and the effectiveness of using ICT at the surveyed institutions. The section further expresses the concern of epistemological access at WSU as well as in the surveyed institutions.

### Access to ICT

The HBUs have a shortage of computers that are in good condition. The students of the two surveyed HBUs frequently access computers at their spare time, while the largest percentage of the students from WSU seldom access computers. The difference here may be caused by the fact that during the WSU students' spare time, the students use the computers to type their assignments and most of the time access computers for their own purposes, while the students from the surveyed HBUs were prompted by the online material to access the computer. The data reveals that the WSU IS students are in need of computers and these students are eager to use ICT for learning and revision material, and communication. At least two staff members from the institutions that were surveyed contend that the provision of online learning and revision material has helped their students improve their performance. Two institutions have also witnessed that online communication between the lecturer and students is effective.

### Epistemological access

Epistemological access involves the ability to search for information on the Internet and being able to distinguish between poorly substantiated material from a questionable source and rigorously validated information from a reputable person or organisation. One lecturer from a surveyed HWU expressed the concern of the students' lack of epistemological access. The data from WSU reveals the same problem. The HBUs have not touched on this issue, but it is highly possible that their students experience the same problem as these institutions are servicing students from poor educational backgrounds, like WSU does.

## 5.4 Insights provided by the surveys in the development of the WSU IS pilot website

There are positive and negative issues that were raised in the survey that gave me insight to the development of the WSU IS pilot website. The positive issues include:

- The data revealed that there were students from three of the categories, full-time, part-time and full-time but attending in the evening, who were sometimes unable to attend classes.

- Considering the fact that the IS students (who have foundational and practical skills of using a computer) could access computers from various locations, I thought of using the computer as a tool for delivery. I do acknowledge that 35 students of the 149 who responded to the student survey considered themselves computer illiterate. I believe that by the time the WSU IS pilot website is implemented, in the second semester, the IS students will be computer literate (considering the fact that they do computer literacy in the first semester).

- The information on how the other institutions have used ICT for course delivery inspired me to develop the website. The data from the student survey also revealed that the WSU IS students had access to the Internet (84% of the 149 respondents) and e-mail (74% of the 149 respondents) which are the requirements for e-learning.

- The surveyed institutions use websites to deliver the IS course to the typical set of students (part-time and full-time students undertaking the IS service course offered to the Accountancy students in the Faculty of Economic and Management Sciences) that WSU has, meaning that their content is relevant to that offered by the WSU IS course.

- The staff survey assisted me to know what material one could have online and to see which LMS's have been used successfully.

- The self-test exercises were viewed positively by 102 students in the student questionnaire and this has inspired me to include quizzes, tasks and an assignment in the WSU IS pilot website.

The negatives points include:

- The student survey revealed that WSU has a shortage of computers. I will meet with the relevant stakeholders to address this issue.

- The WSU IS students lack epistemological access. This has given me insight on how to develop the WSU IS pilot website and on how to guide the WSU students to search for appropriate information on the website.

- The WSU IS students don't see the value of e-learning affording them access to materials at any time (113 students); motivating them to read notes (110 students); allowing them access to related topics (92 students) or receiving written responses from lecturers (92 students). The students may fear that they would lose face-to-face communication with the lecturer (as one has indicated in the comments). The perceptions of the students could change as they engage and gain experience in using the WSU IS pilot website.

- The student survey revealed that 88% of the 149 IS students do not intend to use e-mail to communicate with the lecturer to ask questions they never thought of in class but 62% of the 149 students said they would use e-mail to ask questions they were shy to ask in class. Two respondents (from institution B1 and B2) in the staff survey indicated that e-learning has improved communication between the students and lecturers because some students are shy to talk in class. I believe that once the IS students become familiar with the e-mail, their perceptions will change and they will use the e-mail anytime to communicate with the lecturer. At the moment, there might be contraction in the students' minds, who on one hand see the advantages of e-mail but on the other feel somehow intimidated by (afraid of) it.

- The staff survey revealed that students tend not to attend when they have access to online material. This has taught me to design a website that will encourage face-to-face communication between the students and the lecturer because the aim of developing the WSU IS pilot website is to supplement and not to replace the face-to-face classes.

### 5.5 Summary

The findings obtained from the student survey have been discussed in detail in this chapter. Despite the lack of epistemological access and the shortage of computers, a large proportion of the WSU IS students are interested in using an online course which includes course notes, exercises and communication by means of e-mail (to ask questions that they are too shy to ask in class, but not in general). The data from the student survey together with the staff survey is used to inform the development of the

WSU IS pilot website. The next chapter describes the design, implementation and evaluation of the WSU IS pilot website.

# CHAPTER 6

# COURSE DEVELOPMENT

## 6.1 Introduction

This chapter focuses on the development, implementation and evaluation of the Walter Sisulu University (WSU) Information Systems (IS) pilot website. The website was specifically developed for the WSU IS students. The findings of the staff and student surveys have provided insights into the development of the website; these findings are described in the chapter. The chapter further describes the features of the Learning Management System, *Moodle,* that make it suitable for managing the Information Systems (IS) courseware used in this study and describes how *Moodle* has been used to develop and manage the IS courseware. The expert reviewer's evaluation of the website as well as the responses to the focus group interviews are included in this chapter.

To reiterate, the study focuses on the following research question:

> **How could the Walter Sisulu University use e-learning to support the teaching, learning and assessment of Information Systems (IS)?**

In order to answer this question, subsidiary questions were asked:

1. How are Information Systems departments in South African contact universities using the ICT for e-learning?
2. How could the WSU Accounting department make the course more accessible to students?
3. How could the WSU IS pilot website be developed and implemented?
4. How do students at WSU respond to the newly developed pilot IS website?

Findings from Chapter 4 and 5 attempted to answer questions 1 and 2 respectively. The findings from these chapters informed the development of the WSU IS pilot website. This chapter, therefore, focuses on questions 3 and 4.

### 6.2 Insights provided by the surveys in the development of the WSU IS pilot website

This section describes the findings from the surveys that provided insights for the development of the WSU IS pilot website.

The development of the WSU IS pilot website was informed by some key aspects that emerged from both of the staff and student surveys. The staff survey highlighted the following:

- The Historically White Universities (HWUs) had only full-time students, one of the Historically Black Universities (HBUs), institution A2 had only part-time students and the other, institution A1 had both part-time and full-time students. The institution under study has both part-time and full-time students. This implies that the manner in which these surveyed institutions delivered their material provided insights into how the IS course might be supplemented at WSU.

- The IS departments of the institutions that were surveyed offered a service course to students under the Faculty of Economic and Management Sciences. The same applies to the institution under study.

- The respective IS departments placed a variety of learning material on their websites which gave a clue of what could be made available on the WSU IS pilot website. The material for these respective departments was managed by a Learning Management System (LMS). Two institutions used *KEWL* (http://kewl.uwc.ac.za/) while one used *Moodle* and the other used *WebCT* (http://www.webct.com/). Considering the use of the LMS, I chose *Moodle* because it is an open source LMS with an extensive international support base (http://moodle.org/), and allows for learning activities that support both behaviourist and constructivist learning theories. The IS course is a high consensus discipline where the theoretical aspects can be best taught using the instructional approach (underpinned by behaviourist learning theory) and the applied aspects can be best facilitated through discussion and debate (underpinned by constructivist learning theory).

The student survey highlighted the following:

- Some students were unable to attend on a regular basis.
- The students had access to computers at WSU, which were the required equipment for e-learning.
- Most (57%) of the students were eager to use the Internet for lecture notes. A few students could search the Internet, but even those who could not, hoped that they would benefit from receiving lecture notes on the Internet.

Putting together the aforementioned findings and the fact that the researcher is a lecturer of the IS course, it was much easier for the researcher to shape the development and implementation of the WSU IS pilot website.

### 6.3 The development of the pilot IS website

The IS course curriculum was designed in response to the challenges facing Higher Education Institutions (HEIs) identified in chapter 2. I used the six-stage instructional design (ID) model developed in Chapter 2 as the conceptual framework for developing the IS courseware. The ID model includes the following steps: analysis; course design; developing the online course; conducting formative evaluation; implementing the online course; and conducting summative evaluation. I used the model because I felt that the interaction between the six steps of the model would provide an appropriate course curriculum, more especially if the development of the course was to be an on-going process in the future.

The Information Systems course consists of two modules: Introduction to Information Systems and Information Systems Applications. For the purpose of the pilot website, topics of the second module were developed and hosted. First of all, the staff experience on the use of ICT for teaching, learning and assessment was elicited by means of the staff survey and the students' needs and the course goals were identified in the student survey. This step adheres to step 1 of the six-step ID model; analysis. The overall course objectives were described in the course outline (see Appendix F for course outline). The teaching objectives, learning outcomes and assessment criteria are described for each topic in the courseware. Assessment is directly related to the selected outcomes of the

course or topic being studied. This is done to assess whether the students have achieved what was expected of them. Hence steps 2 (course design) of the six-stage ID model is covered. The IS courseware consists of course notes and links to useful websites that are used as references by students; quizzes; tasks; and an assignment. The LMS, *Moodle*, was installed onto a server by the WSU Computer services department. Outlining the course content, analyzing objectives; preparing assessments of learner performance; designing strategies of instruction; designing lessons or modules; liaising with Computer Services for installation of Learning Management Software are step 3 (developing the online course) of the six-stage ID model.

The courseware was evaluated (See Appendix C) by a subject expert, the non participant observer, and was revised. The subject expert is from the institution under study. This step adheres to step 4 of the six-stage ID model; conducting formative evaluation. The main purpose of the subject expert's evaluation was to elicit whether the students' learning needs (revealed by the student survey) were met and this was also justified by the focus group interviews. The course was made available for the students' use in October 2006. At the end of the semester, two focus groups evaluated the pilot IS website (see Appendix D). The implementation of the online course and conducting summative evaluation of the course are steps 5 and 6 of the six-stage ID model respectively.

### 6.4 *Moodle* features

While the *Moodle* developers' espoused informing pedagogical principles for the development of *Moodle* are based on constructivism, constructionism, social constructivism, and separate and connected behaviour[8], from my perspective, some aspects of *Moodle* are influenced by the behaviourist learning theory.

*Moodle* provides the opportunity for students to interact with the courseware. By so doing, students learn the course content as well as improve their computing skills. That is, students learn by seeing and doing which is a principle underpinned by the behaviourist learning theory. I felt that this (learning of the course content and improving computing skills) was a key feature needed for any LMS selected, given the needs of the students. Moreover, the students are dependent on their lecturer, who

[8] see details in the document http://docs.*moodle*.org/en/Philosophy

selects the sources and instructional material, and monitors their performance (Ask & Haugen 2005). This was a further feature of the LMS that I considered to be important for these students, given their background and situation. The LMS also provides students with the opportunity to go through the course repeatedly, at their own pace and in their own time. The learning process involves the repetition of the activity to be learned and reinforcement of learning in terms of positive feedback to the student (Kennewell 2004). *Moodle* allows the topics to be presented repeatedly, tests the knowledge of the students and rewards the students with formative feedback or summative feedback in the form of comments and marks respectively. Once the topic is mastered, it presents another topic the same way. The danger with this behaviourist approach is that the student may become a passive receiver of instruction. To avoid such passivity of students, *Moodle* provides communication tools (such as ChatRooms and discussion forums used in the IS website) to enhance collaboration (which has its underpinnings in the social constructivist theory), and sharing of ideas and meanings. The students are able to communicate among one another as well as with their lecturer.

### 6.5 Designing the course interface

The design approach adopted by *Moodle* was a further aspect that led to my selection of this LMS for the WSU IS pilot website. The *Moodle* interface provides a three columnar screen. The left column has a variety of features that can be used by the lecturers and the students. The lecturers are able to view and make changes to features such as **people** (all the participants subscribed to the course), **activities** (resources, quizzes, assignments, tasks, etc.), **administration** (settings, students, groups, grades, activity reports, etc) and **my courses** (all the courses developed and managed by the lecturer). The students are able to view features such as **people** and **my courses** (the courses available to the student). It is important to note that a lecturer may develop courses for different sets of students, but a student will be able to view only those courses to which he/she is subscribed. The students are able to view and interact with the **activities**. Within the **administration** feature, the students are able to view grades and activity reports and are able to edit their profiles and change passwords. The **administration** feature for the students is completely different from that of the lecturer, which is password protected.

The middle column is used by the lecturer to upload **resources** (notes, quizzes, tasks, etc.) and by students to view and interact with the resources. There are a variety of formats for the middle column. These include the weekly format, the topic format and the social format, to mention a few. The topic format has been used for the IS course. I have experienced this format as the most straight forward one as it takes the students through the topics that they have covered in class.

The right hand displays **latest news, upcoming events** and **recent activities** for the course. The students can only view the information in these features while the lecturer can add a new topic to the **latest news.**

The columns allow for all these choices to be viewed in one screen. However, as this appearance could confuse or overwhelm the students who are new to the interface, I added graphics and text enhancements to the traditional *Moodle* interface. A picture was added in the introductory section; a line was inserted below each heading; and the headings have been made bold, have been centered, and the text colour changed to red as the default colour for the *Moodle* interface is blue.

### 6.6 The course

This section includes selected screen shots illustrating how *Moodle* was used to design the WSU IS pilot website. The section also explains each *Moodle* feature that has been used in the WSU IS pilot website; firstly what *Moodle* can provide to any teacher/lecturer, then how the feature has been used in the WSU IS pilot website and why.

One of the challenges stated in Chapter 2 was that the Internet speed tends to be slow during the day, hence it is important to note that the use of graphics for this courseware has been limited so that the course website can be able to run smoothly, efficiently and economically.

In order to access the courseware, students are required to logon to *Moodle*. First time users are required to create log on accounts. Whenever a student logs onto *Moodle*, his/her log on history is updated. The lecturer is able to view a report that shows the time (day, date, time) when a student accessed a particular resource (notes, quiz, etc.); the Internet Protocol (IP) address of the computer from which the student accessed the

resource; the full name of the student; the action undertaken by the student; and the information or resource opened by the student. For ethical reasons I have used my log on history to demonstrate the above information (Figure 6.1 below).

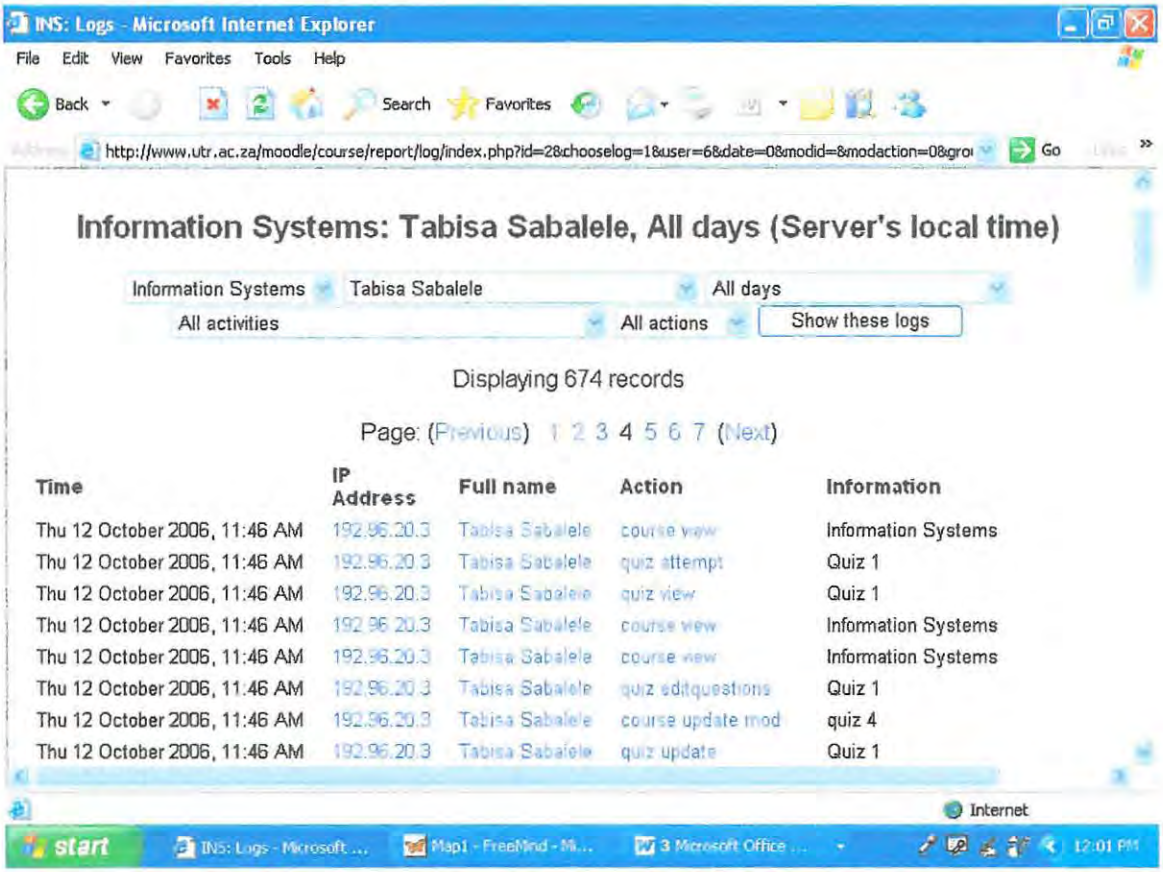


**Figure 6.1: Log on history for user**

*Moodle* allows lecturers to choose the course, name of the student, day, activity and action for which they want to generate a report. It is important to note that a lecturer may develop and run more than one course. I have chosen the Information Systems course, my name, all days, all activities and all actions, as shown in the top centre of the screenshot. The report has a total of 674 records, each record showing the time when I accessed a particular resource; the Internet Protocol (IP) address of the computer from which I accessed the resource; my full name; the actions that I have undertaken; and the name of the resource I have opened.

After logging on to the IS website, the Course Main page appears (Figure 6.2 below).

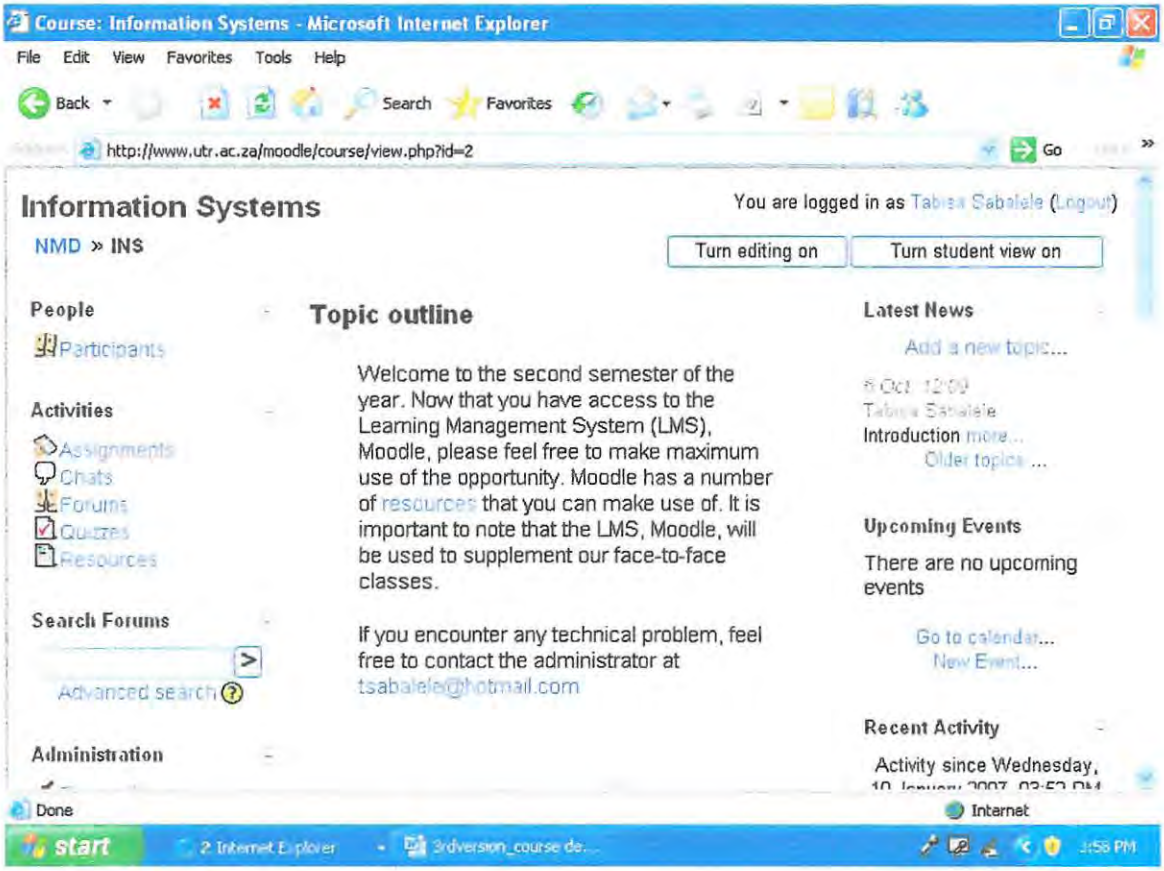


**Figure 6.2: Course Main page**

In the middle column of the Course main page, students are welcomed to the course and provided with the lecturer's e-mail address. Whenever students encounter problems, they are encouraged to use the e-mail address to communicate with their lecturer. On the right column, the students and lecturers can view the **Latest news; Upcoming events**; and the **Recent activities**. On the left column, the students view the participants and activities, and can make changes to their profiles under the administration feature. The lecturer uses the left column features for various reasons. If students have forgotten the enrolment key and cannot finish their subscription, the course lecturer can add them to the course. The lecturer has added the activities as shown on the screenshot (e.g. **Assignments, Chats, Forums, Quizzes and Resources**).

Below the welcome message in the middle column of the Course main page are the **Notices** put up by the lecturer, the detailed **Course outline** and the **Module overview** describing the composition of the course module (Figure 6.3 below).

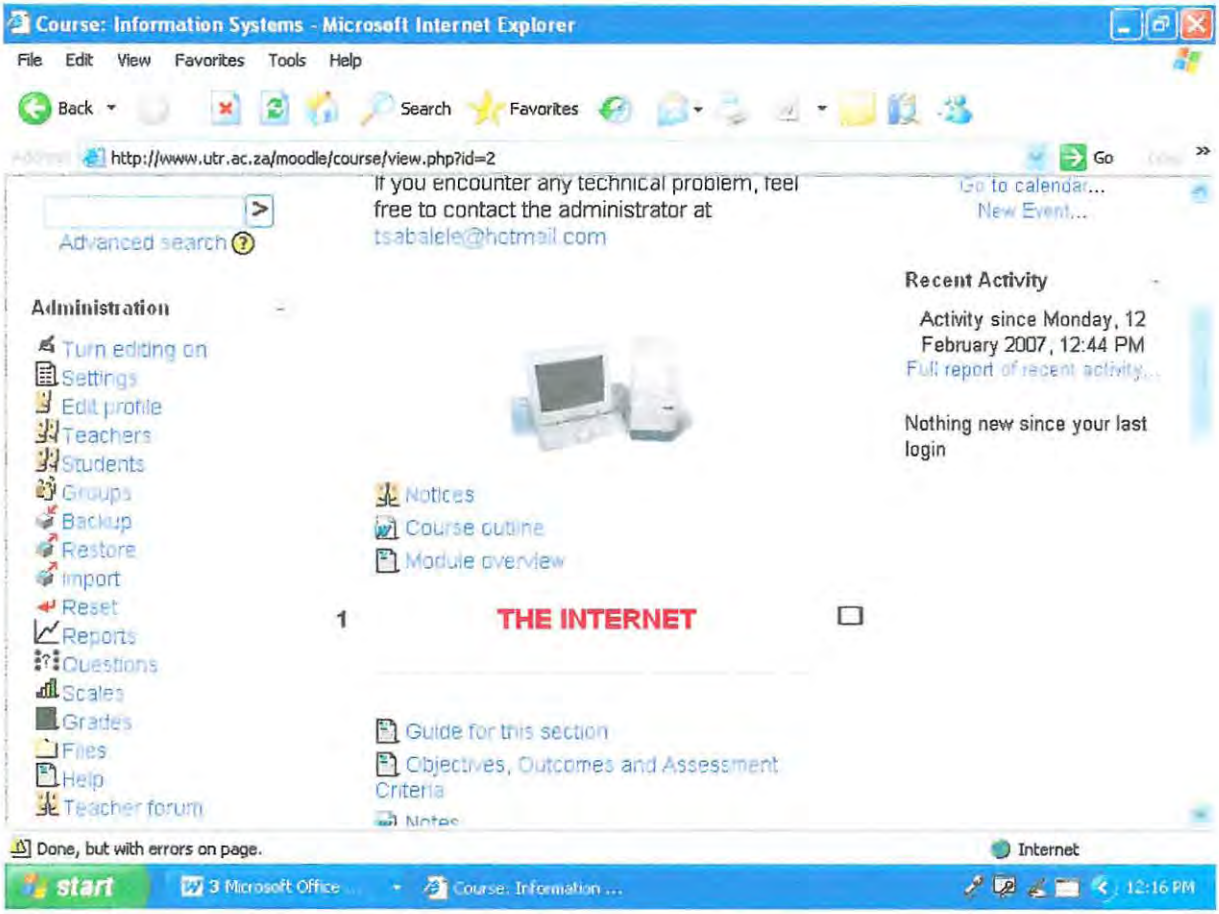


**Figure 6.3: Course Main page with the general features**

Notices are put onto a forum (a communication tool used for asynchronous communication among students and between the lecturer and students) and students may reply if necessary. For instance the lecturer asked each student to introduce him/herself to other students at the beginning of the IS course. The lecturer received responses posted to the forum while each and every student enrolled in the course received the message by e-mail.

In the left column, there are a variety of administration features. The lecturer has set up the course settings, edited her profile, enrolled students to the IS course (after subscribing, the students become 'potential students' who have then to be enrolled manually by the lecturer to the course), viewed the activity reports (log on history) for the students and entered the students' grades. Making use of the activity reports, I was

able to see how frequently the students logged on, the actions undertaken by the students and what the students accessed most frequently. One hundred and forty-six IS students accessed the WSU IS pilot website. They accessed in descending order, the notes, module overview, assignment, links to websites, quizzes, tasks and forums (although they have just viewed the forum and did not participate in the discussion). This data is valuable to inform the lecturer about what is going on in the WSU IS pilot website and the lecturer can also deduce some patterns, such as what the students access most in the WSU IS pilot website, the amount of time they spend on each resource (notes, quiz, task, etc.), which can help me infer where a problem might be. In a further study, I would need to ask the students directly in a Forum Question or a chat if I wanted to find out why they struggled with a particular resource and make the required change if it be so.

Just below **Notices, Course outline** and **Module overview** in the middle column is the course content. Figure 6.4 below illustrates the content of the first topic.

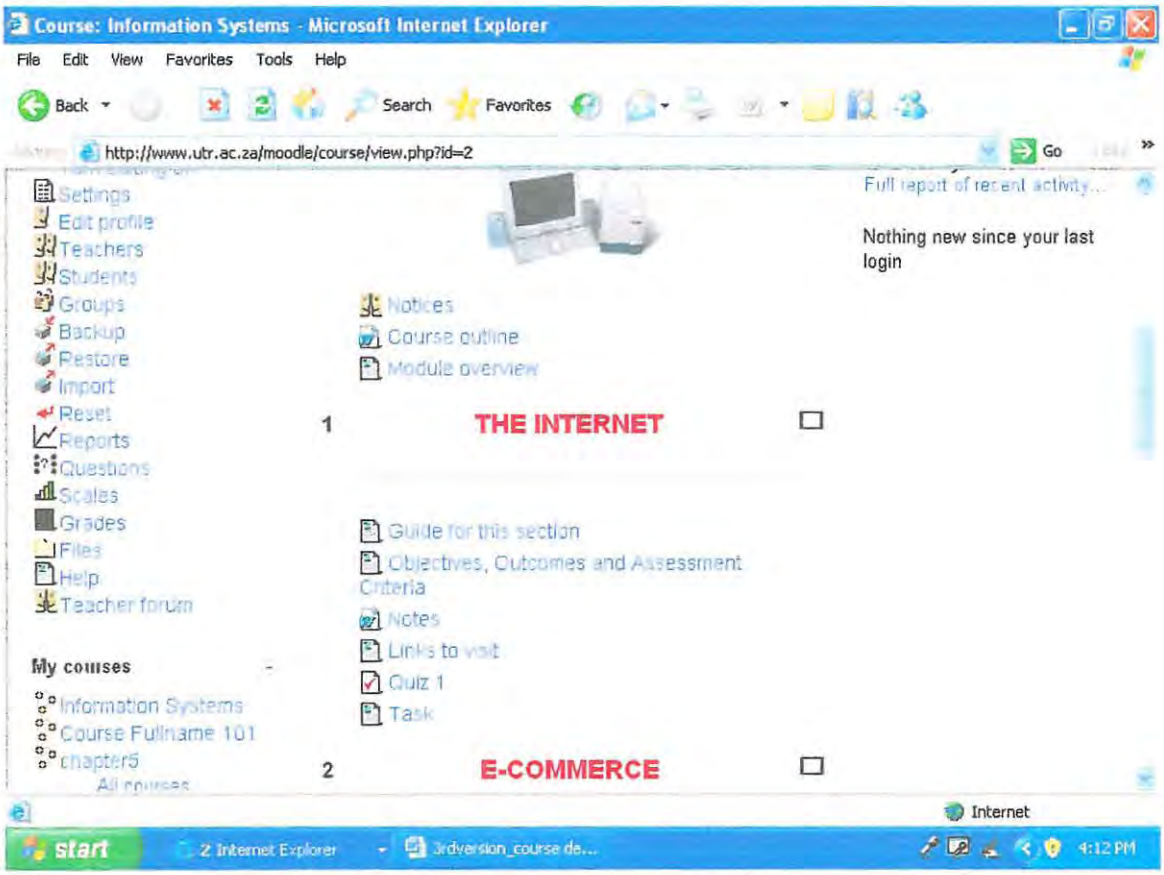


**Figure 6.4: Content of the first topic**

The courseware consists of four topics: the explanation of how the Internet works and its applications; E-commerce tools, models and applications; How the Transaction Processing Systems (TPS) operate and examples of TPS applications in business; Systems Investigation and Analysis: the Systems Development Life Cycle (SDLC) and descriptions of the different types of SDLC.

Each topic consists of a number of resources such as: The **Guide to this section**; **Objectives, Outcomes and Assessment criteria**; **Notes**; **Links to visit**; a **Quiz**; and a **Task**. It is important to note that the resources need not be the same for all topics; they are based on the requirements of the content to be covered.

Table 6.1 illustrates the course content for the WSU IS pilot website. If a feature is included in a topic, it is indicated with a tick. If a feature is not included, there is a cross in the block of that particular topic.

**Table 6.1: Course content**

| Topic | How the Internet works | E-commerce tools, models and applications | Transaction Processing Systems | Systems Investigation and Analysis | Important resources |
|---|---|---|---|---|---|
| Guide for this section | ✓ | ✓ | ✓ | ✓ | ✗ |
| Objectives, Outcomes and Assessment criteria | ✓ | ✓ | ✓ | ✓ | ✗ |
| Course notes | ✓ | ✓ | ✓ | ✓ | ✗ |
| Links to visit | ✓ | ✓ | ✗ | ✗ | ✗ |
| Quiz | ✓ | ✓ | ✓ | ✓ | ✗ |
| Task | ✓ | ✓ | ✓ | ✓ | ✗ |
| Assignment | ✗ | ✗ | ✓ | ✗ | ✗ |
| Forum | ✗ | ✗ | ✗ | ✗ | ✓ |
| Chat | ✗ | ✗ | ✗ | ✗ | ✓ |

The **Guide to each section** describes the content of the topic. *Moodle* provides a number of templates (one can compose a text page, compose a web page, and create a link to a file or webpage). In the study, I have used a text page. The text page is much

easier to work with; it takes up less storage space and comes up immediately when the link is clicked. Figure 6.5 below is a screenshot of the guide for the first topic.

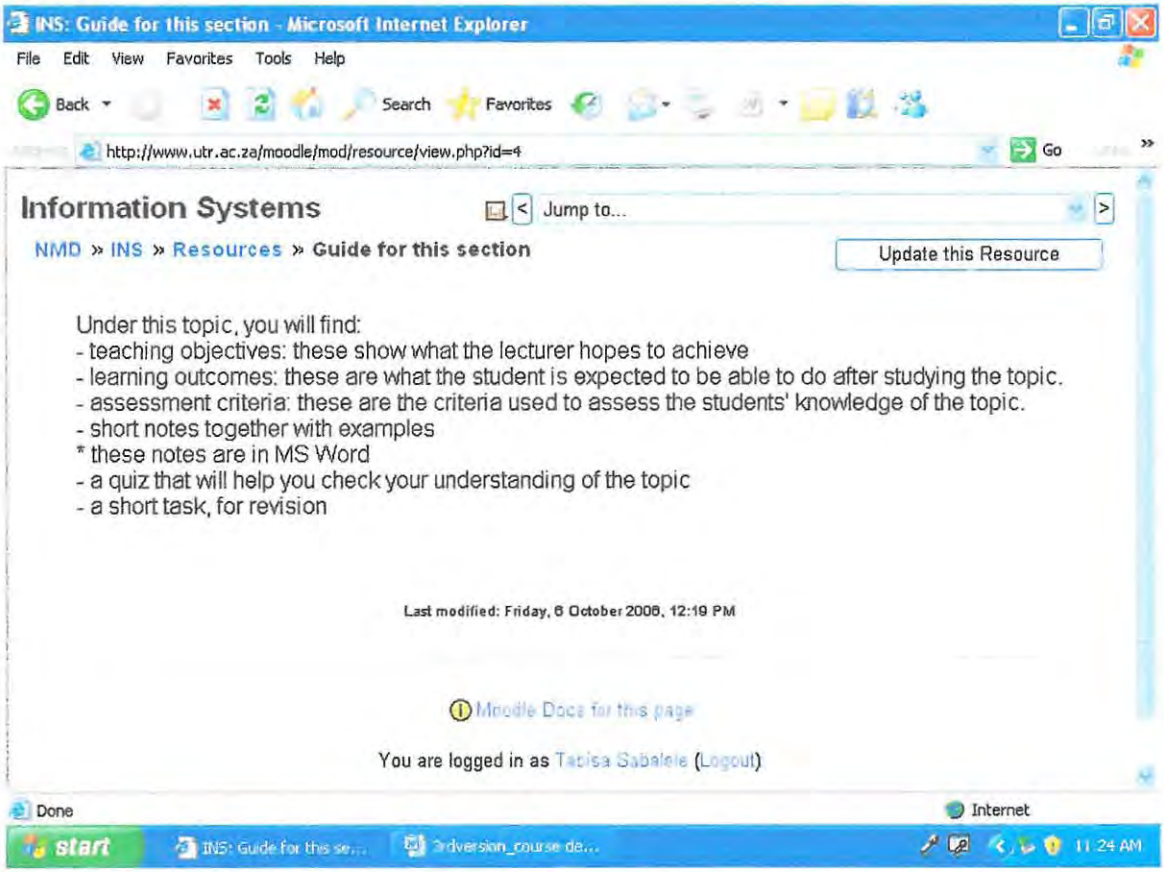


**Figure 6.5: Guide to the section**

The guide for the first topic provides an overview of **The Internet**. The content includes a description of the teaching objectives, learning outcomes and assessment criteria. The students are also provided with course notes with examples, a quiz and a task.

Figure 6.6 below is a screenshot for the objectives, outcomes and assessment criteria of the first topic, **The Internet**.

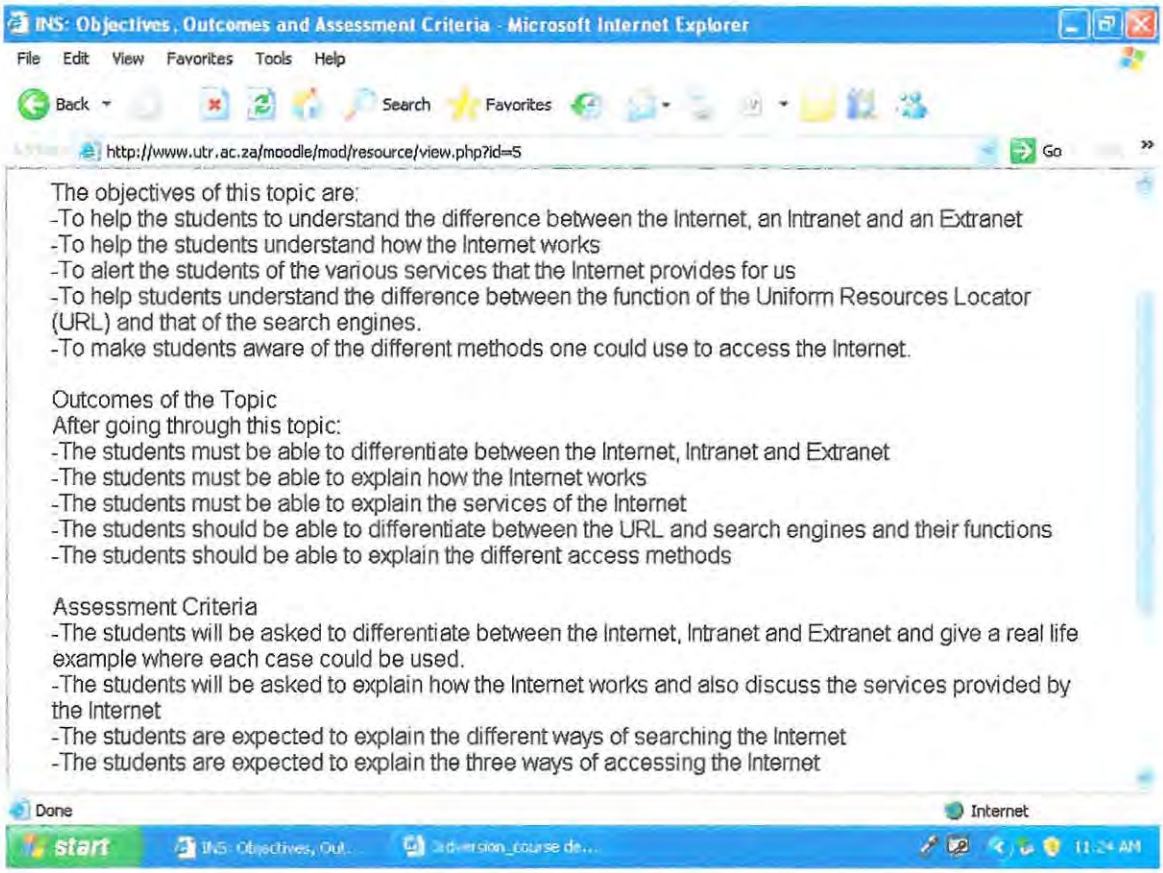


**Figure 6.6: Objectives, outcomes and assessment criteria**

The teaching objectives of the topic describe what the lecturer hopes to help the students understand in the topic. The learning outcomes describe what the students are expected to be able to do after going through the topic. The assessment criteria describe how the students will be assessed.

The course **notes** are a series of pages that can be presented in a linear or non-linear fashion or a combination of both. *Moodle* allows lecturers to create a link to a file or web page where the notes are located. In the study, the **notes** are presented in either *PowerPoint* slides (more especially in cases where there is a need for links to nodes[9]) or in *Microsoft Word*.

9 A node may be a word, a paragraph or a page

Figure 6.7 is a screenshot of notes for the first topic.

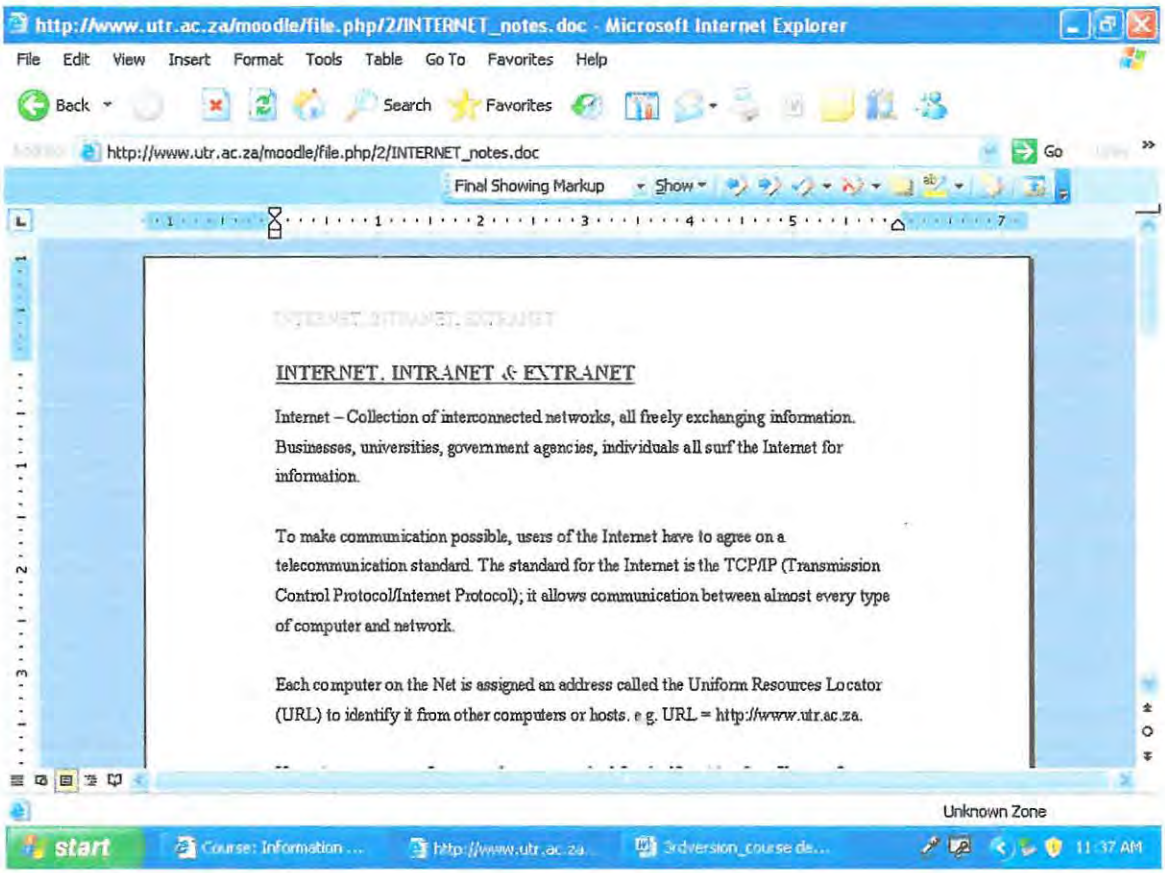


**Figure 6.7: Notes on how the Internet works**

The notes have been developed in Microsoft Word and were uploaded onto the *Moodle* server. Students can either read the notes on-screen, or save and print then for reading at a later stage

Some topics have such a wide scope that the course notes alone are insufficient and students cannot rely on notes only. These topics have **links** to some relevant websites. *Moodle* allows lecturers the opportunity to compose web pages with links to other websites or any resource. In the WSU IS pilot website, the students have been referred to a variety of websites. Some of these websites are commercial websites. I am aware of the fact that these websites change often hence the references will need to be updated regularly.

Figure 6.8 shows a web page with links.

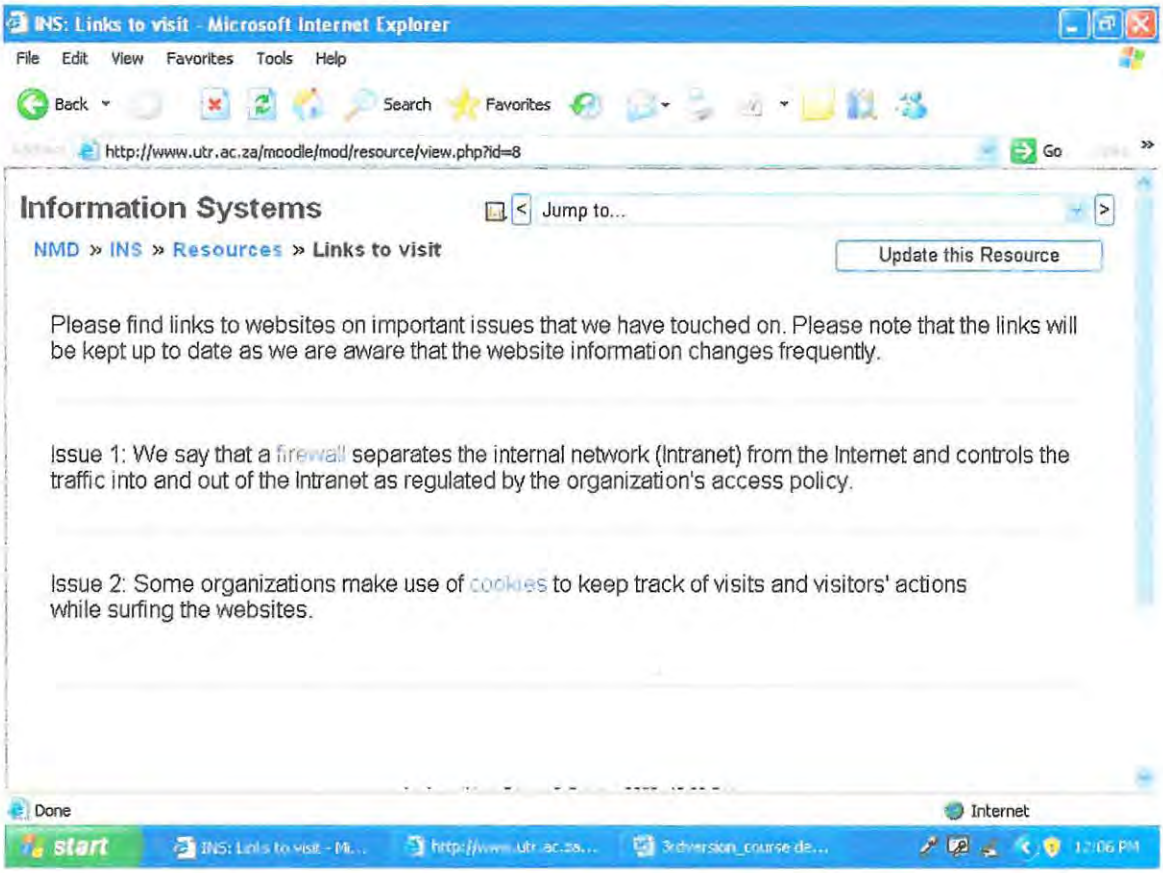


**Figure 6.8: Links to visit**

The web page has hyperlinks to relevant websites and the text is written in blue colour. The students are referred to websites with information on firewalls and cookies.

A **quiz** may consist of, to mention a few, multiple choice questions, True/False questions, short answer type questions, descriptions and matching questions. The quizzes are automatically graded and can be re-graded if questions are modified. Quizzes can be attempted multiple times depending on a lecturer's choice and can show feedback and/or correct answers. A lecturer can choose whether or not to include a penalty factor. The penalty factor should be a number between 0 and 1. A penalty factor of 1 means that the students have to get the answer right in their first response in order to get any credit for it at all. A penalty factor of 0 means the students can try as often as they like and still get the full marks. Quiz questions and quiz answers can be shuffled to reduce cheating.

Figure 6.9 below shows a screenshot of a quiz design for the WSU IS pilot website.

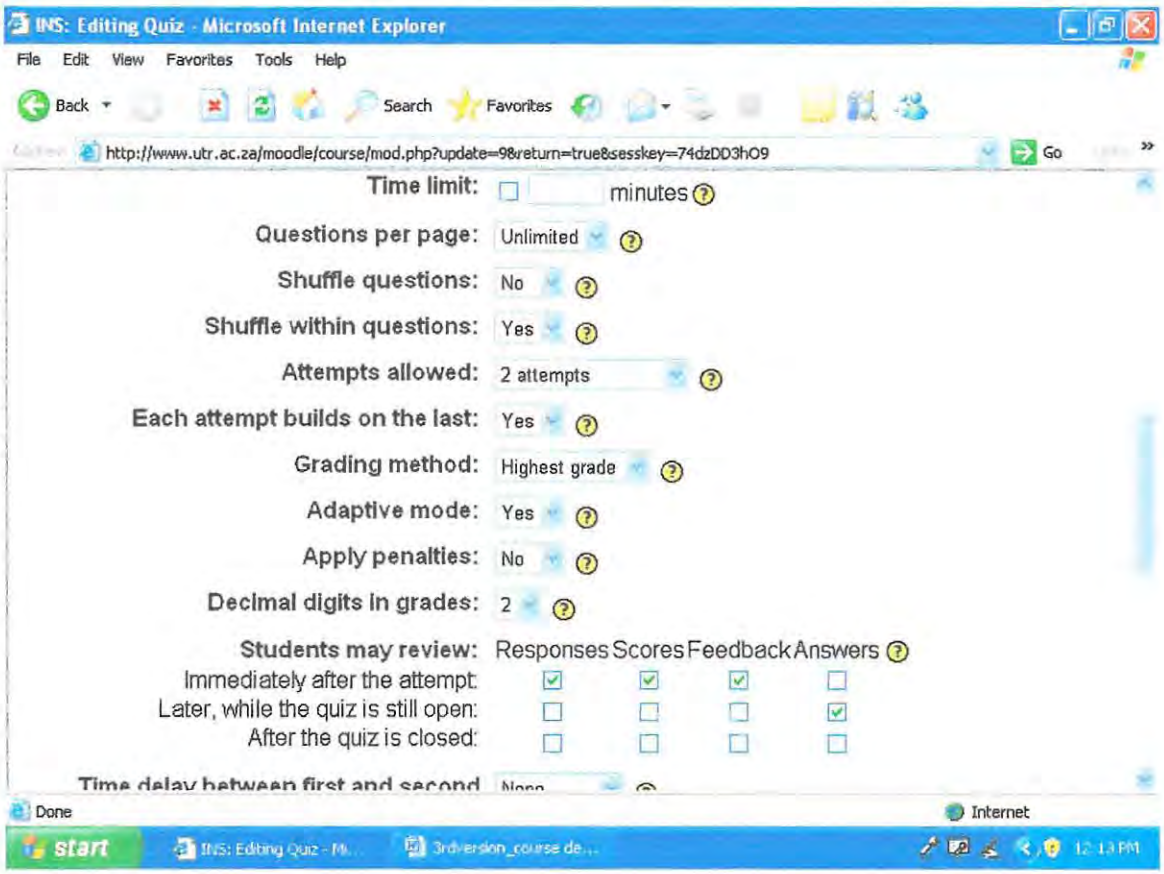


**Figure 6.9: Design view for a quiz**

In the WSU IS pilot website, the topics have quizzes of various lengths, depending on the content of the topic. The students attempt quizzes in order to test how much they understand a particular topic. If the students answer incorrectly, they are prompted to refer to the reading material. At this point in time the student is already aware of what he/she understands or does not understand and knows where exactly to focus. The questions within each quiz have been shuffled in order to avoid cheating and memorizing. The students are allowed to attempt each quiz twice. I believe that the limited attempts would make the students read attentively and make sure they understand a topic well before they attempt any quiz. The quiz is run in adaptive mode, that is, the students are allowed to make repeated responses to the same question. The penalty factor has not been chosen. I felt this would discourage the students in undertaking the second attempt if the marks would not change.

The **task** may be attempted online as well as offline. In the WSU IS pilot website the tasks were attempted offline. I felt this would help the students to interact and communicate with one another. Figure 6.10 below shows a screenshot of the task for the first topic.

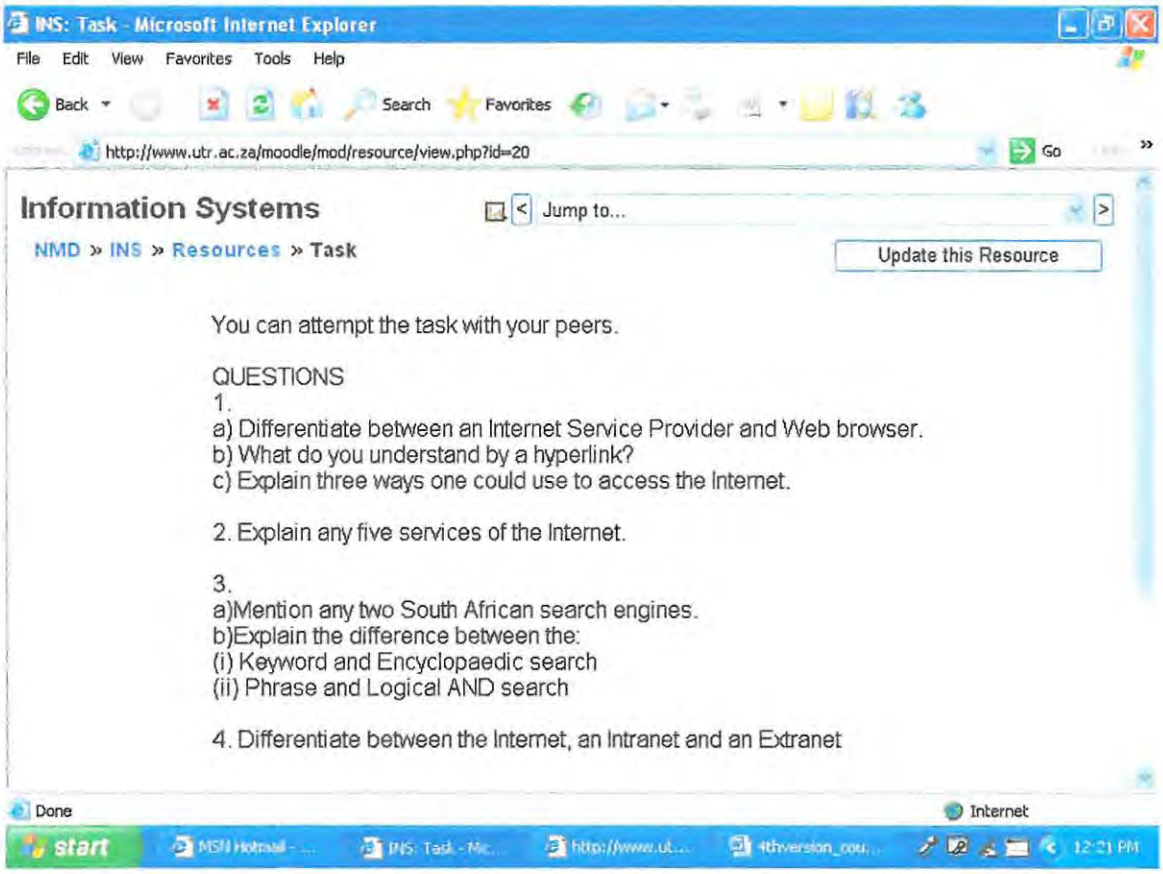


**Figure 6.10: Task on Topic 1**

The lecturer can also give students **assignments**. The assignment can be submitted offline or online. For online submission, the lecturer sets the due date and time. If an assignment is submitted later than the set date and time, the amount of lateness is shown to the lecturer. The online assignments are graded online and the lecturer can also add comments. The students are able to view their grades and feedback. A lecturer can also allow students to re-submit should they wish. In the study, the assignment was submitted online only once, before or on the due date. The lecturer graded the assignment and provided feedback to students. As this was the first time students were required to submit online, some students found it difficult to follow instructions and ended up e-mailing the assignment to the lecturer thereby increasing the lecturer's workload. The logic behind the online submission was to help students learn by doing

and also to make the management of assignment submission more streamlined for the lecturer.

*Moodle* is capable of calculating the grades of online activities and this information can be printed in either *Excel* or Text format. Grades for attempted quizzes and the online assignment have been put together for the course. As this is still a new project, these marks were not considered for summative assessment. Only the assignment marks were printed and added to the semester mark.

There are different types of **forums.** These include the teacher-only, course news and the one open to everyone. In the study, the latter case was used. The lecturer can choose to allow replies (for instance in the forum open to everyone) or not to allow replies (for instance in the case of an announcement). In the WSU IS pilot website, the lecturer created an opportunity for asynchronous communication by means of a forum. The forum was used for two purposes; for students to introduce themselves (in the general section), and for asking and replying questions (in Topic 5) about the course. The first forum is referred to as 'Notices' and the other as 'QUESTIONS AND ANSWERS'. Both forums allowed two way communication. Only two students introduced themselves to the class. Unfortunately no questions were posted to the 'QUESTIONS AND ANSWERS' forum. The inadequate use of forums may be a result of the short space of time for which the students used the IS pilot website.

A screenshot for the design view of the 'QUESTIONS AND ANSWERS' forum is shown in Figure 6.11.

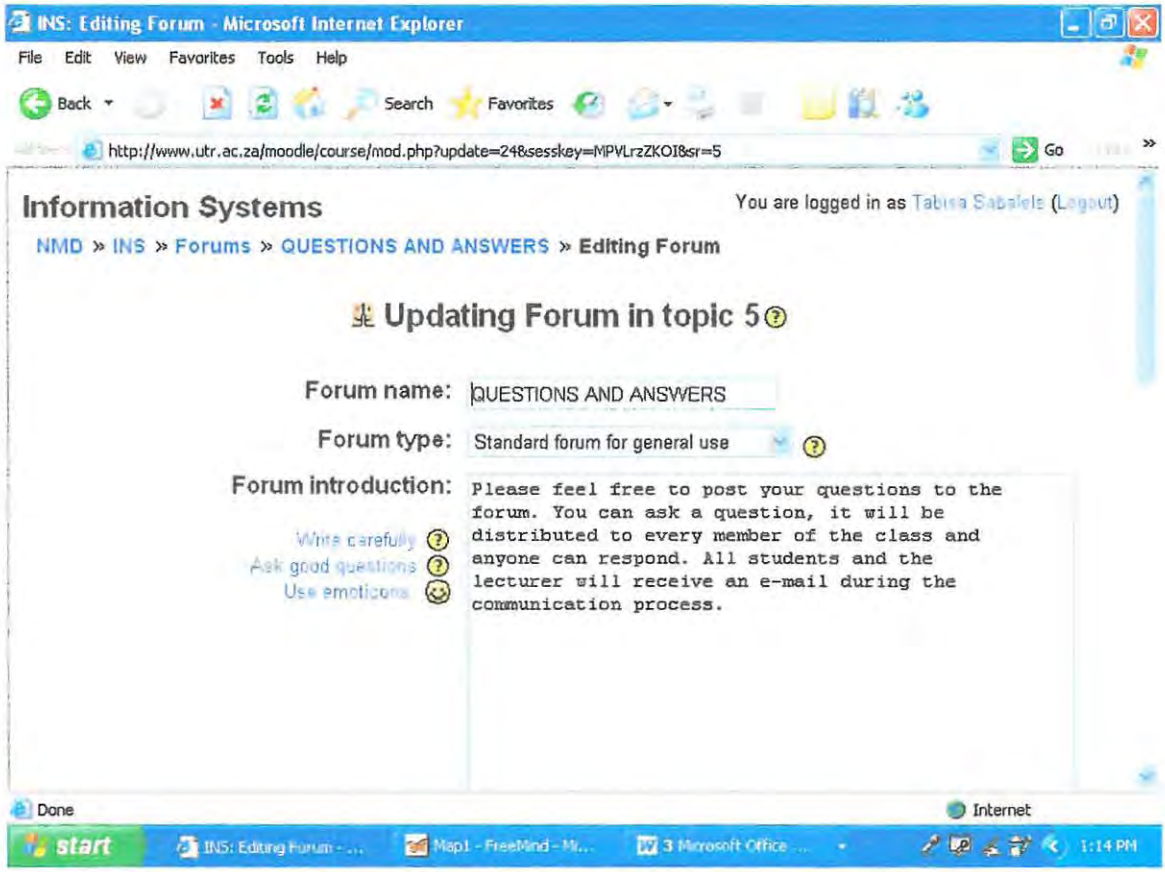


**Figure 6.11: Design view for a Forum**

The **chat** facility allows synchronous communication. All chat session are stored for later viewing. In the WSU IS pilot website, the Chat Room was designed and explained to students but was never used, possibly due to the limited time available. The forum and the chat facility were included in the WSU IS pilot website with the intention of enhancing collaboration among students.

Figure 6.12 shows a screenshot of the chat design view.

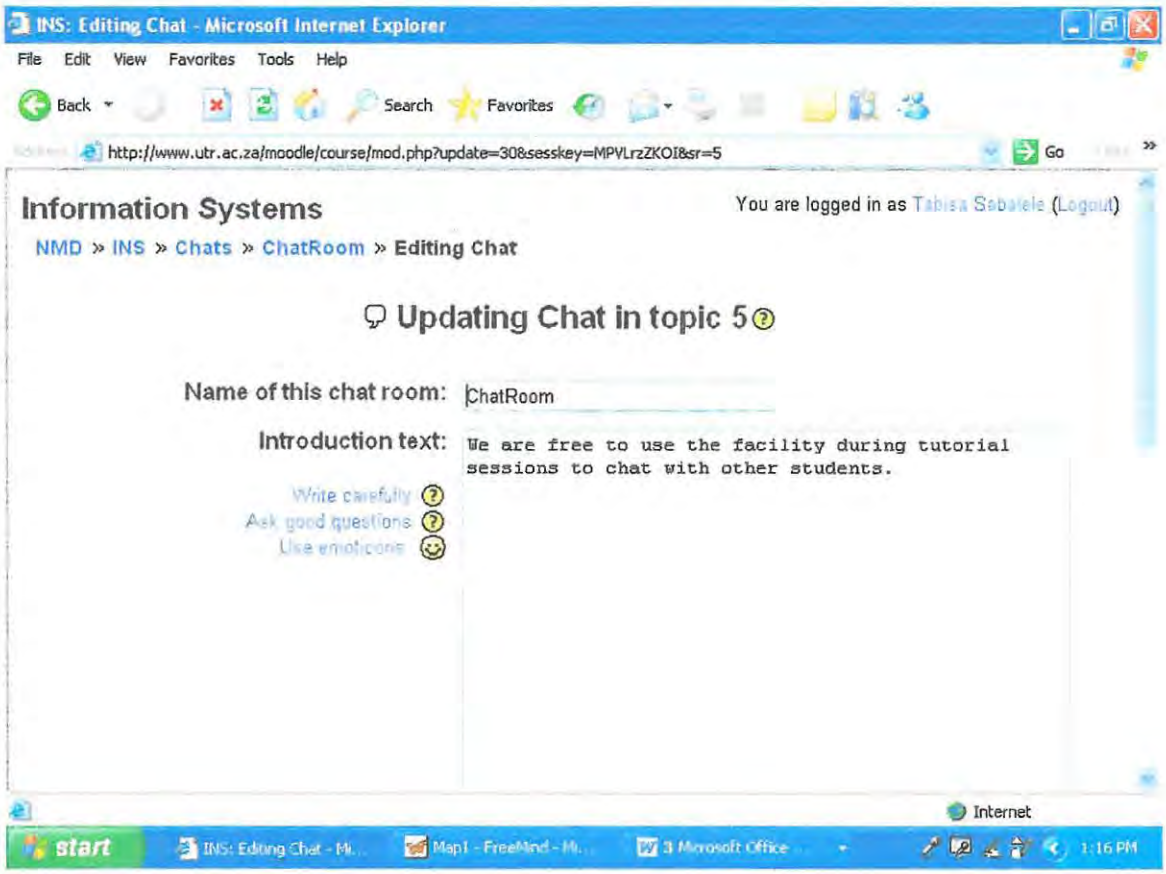


**Figure 6.12: Design view for a Chat facility**

### 6.7 Course evaluation

The section includes a report from the subject expert, the analysis of responses from the focus group interviews and subsequently the findings from the focus group interviews.

#### 6.7.1 Report on expert evaluation

Before the newly developed WSU IS pilot website was made available for students to use, it was evaluated by a subject expert. The expert review mainly scrutinized the availability of technical support, the course content, the interactivity of the courseware, clarity of the course and whether the courseware would stimulate any student interest or not.

Table 6.2 below reveals the opinions of the subject expert about the website.

**Table 6.2: FORMATIVE EVALUATION: EXPERT REVIEW**

*Please rate your answers from 1 to 5. 1 = Excellent; 2 = Good; 3 = Fair; 4= Poor; 5 = No data. Cross the appropriate number.*

| **Instruction design** | **1** | **2** | **3** | **4** | **5** | **Comments** |
|---|---|---|---|---|---|---|
| Online technical support is available | | x | | | | Technical support is not adequate |
| The guide for each topic is clear | x | | | | | The guide is self-explanatory |
| The students can move from page to page | x | | | | | |
| The course outline is provided | x | | | | | |
| The content meets the teaching objectives and learning outcomes | x | | | | | |
| The examples are appropriate | x | | | | | |
| The links to references are appropriate | | x | | | | References should be given to many links including FAQ |
| Animation and graphics are used well | x | | | | | |
| The course has built-in assessment and reporting tools | | x | | | | Can be amplified to have more exercises which are difficult |
| Assessment methods are appropriate and suited to the learning outcomes | | x | | | | |
| The learner will be induced to learn and remember | | x | | | | |
| The course is well organized | x | | | | | |

### 6.7.2 Focus group interviews

This section describes the students' perceptions about the newly developed WSU IS pilot website and provides a summary of the findings of the focus group interviews. The two focus groups contained 12 students each. Each interview was 45 minutes long.

**Presentation of data from the focus group interviews**

The results of the focus group interviews are given in five sections. The first section describes the students' computer competence and familiarity with the use of the Internet. The results to the second, third, fourth and fifth sections of the focus group interview describe the students' perceptions of the technical support provided for the use of the LMS, the usefulness of the LMS, the ease of use of the LMS and the students' attitude and intention of using the LMS respectively.

The responses to the first section were transcribed and are represented in the form of tables while the responses to the other sections are analyzed using *Freemind* and represented using mindmaps. The focus groups have been identified as Group 1 and Group 2.

In the mindmaps, the title for each section (two, three, four and five) mentioned above has a grey background. The questions for each section are written in blue and the nodes have a bubble border. The responses are represented in two colours to differentiate the responses from the two focus groups. The responses for Group 1 are in red and the responses for Group 2 are in green. The main responses expected from the respondents are either strongly disagree, disagree, uncertain, agree or strongly agree. These responses are shown on the mindmaps with the extracts on the right-hand side of the comma.

- **Computer competence and familiarity with the Internet**

This section reports on whether the students are full-time/part-time; the students' level of computer literacy; the location of computers from which the students access the Internet; the period of students' Internet experience; and the period of students' LMS experience.

The students were asked whether they were full-time, part-time or full-time but attending in the evening. The students were asked to grade their level of computer literacy. They were given three levels to choose from which are competent, satisfactory and not yet competent. The students were asked to identify from where they accessed the Internet. They were given a variety of locations to choose from such as the university laboratory, home, workplace, a friend's place and other location. They were requested to specify the "other" location. In order to determine for how long the students have used the Internet, the students were asked to fit themselves into one of the given ranges: 1-3 years, 4-6 years, 7-8 years and above 8 years. The purpose of this question was to determine how familiar the students are with using the Internet. The students were asked to specify for how long they have used a LMS. They were given options to choose from such as never, 1 year, 2 years, 3 years and more than 4 years. The results to the first section, students' computer competence and familiarity with the use of the Internet, are illustrated in Table 6.3 below.

**Table 6.3: Results of students' computer competence and familiarity with the use of the Internet.**

| Question | Group 1 | Group 2 |
|---|---|---|
| Are you Full-time, Part-time or Full-time but attending in the evening? | Full-time | Full-time |
| How would you grade your level of computer literacy? | Satisfactory, Not yet competent | Not yet competent |
| From where do you access the Internet? | University laboratory, Internet café | University laboratory, at a friend's place, Internet cafe |
| Years of Internet experience? | 1-3 years | 1-3 years |
| Years of experience in using any LMS? | Never | Never |

The students are full-time, part-time or attending in the evening

The respondents were all full-time students. This has no significance on the results because the interest of the research is to ascertain perceptions of students who have used the LMS, irrespective of whether they are part-time or full-time. In the future as the lecturer I will endeavour to elicit responses from the part-time students specifically.

- The students' level of computer literacy

About a third of the students in Group 1 graded themselves as "Satisfactory" and others as "Not yet competent" while all the students in Group 2 felt that they were "Not yet competent".

- The location of computers from which the students access the Internet

In order for the students to make use of the LMS, they accessed the Internet from various locations such as the university laboratory, a friends' place and the Internet café.

- The period of students' Internet experience

The students did not have much experience with using the Internet.

- The period of students' LMS experience.

It was the first time the students were exposed to a LMS

- **Technical support**

This section reports on the sufficiency of the technical support provided to the students for the use of the LMS. To determine this, I asked the students two questions; whether the training given to them on the operation of the LMS was sufficient and if they were given the opportunity to make enquiries via e-mail when they encountered technical problems while using the LMS. They were requested to rate their responses as either strongly disagree, disagree, uncertain, agree or strongly agree.

The students' responses to the question about technical support are illustrated in Figure 6.13 below.

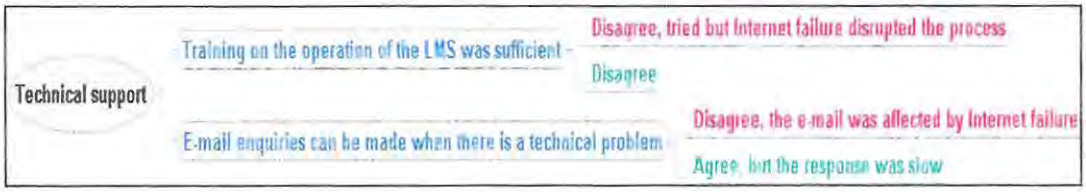


**Figure 6.13: Technical support**

- Training on the operation of the LMS

Both groups disagreed that they were provided with sufficient LMS training. Group 1 identified the Internet failure as a contributing factor of insufficient training. To provide adequate training, I would need more tutor support.

- E-mail enquiries were made

Group 1 disagreed to the second question, emphasizing that the e-mail was affected by the Internet failure. Group 2 agreed that they used e-mail to enquire from the lecturer when there were technical problems, but commented that the response was slow. The response was slowed down by the Internet failure which interrupted the communication process. Of the 250 registered IS students, 126 students enrolled to the WSU IS pilot website. Of these 126 students only 18 students sent me e-mails when they encountered technical problems. To speed up the response rate, when more students use the e-mail, I will need additional tutor support.

- **Usefulness of the LMS**

In order to determine the students' perceptions about the usefulness of the LMS, I asked them a range of questions about usefulness, which included: ease with which the course material could be studied; the improvement in quality of the course work; whether the LMS enabled students to accomplish the course tasks more quickly; whether the students' productivity increased; if the LMS allowed students control over learning; and if students found the LMS useful in the course work. The students were requested to rate their responses as either strongly disagree, disagree, uncertain, agree or strongly

agree. Figure 6.14 illustrates the students' responses to the question about usefulness of the LMS.


**Figure 6.14: Usefulness of the LMS**

- The LMS makes it easier to study course materials

Both groups strongly agreed that the LMS makes it easier to study the course material, although Group 1 stressed that access to the LMS was sometimes affected by the Internet failure.

- The LMS improves quality of course work

Some students in Group 1 disagreed with the statement that using a LMS improves the quality of course work and some agreed. Those that strongly disagreed had the feeling that the Internet failure interfered with the quality of their course work. Group 2 students strongly agreed to the fact that using a LMS improves the quality of course work.

- Using the LMS increases speed at which tasks can be completed

Group 1 students agreed that using a LMS enables them to accomplish the course tasks quickly. They even added to this saying that if students were absent from class or did not understand what was taught in class, that they would be able to go through the course material in their own time. Some students from Group 2 strongly agreed and others strongly disagreed emphasizing that there was shortage of computers and sometimes network failure.

- Using the LMS increases productivity

Some of Group 1 students agreed that the LMS increased their productivity and they were able to read course material while others were uncertain, declaring that productivity will be determined by their examinations results. Group 2 students agreed that the use of the LMS has increased their productivity.

- Using the LMS allows for greater learner control

Group 1 students agreed and Group 2 students strongly agreed that the LMS allowed them greater control over learning.

- The LMS is useful in coursework

Both groups strongly agreed that they found the resources of the LMS useful in their course work.

- **Ease of use of the LMS**

To determine whether or not the students could use the LMS easily, I asked them a range of questions about ease of use. There were questions such as was it easy to get information from the LMS; was the LMS flexible to interact with; was it easy to share information with peers using the LMS; was it easy to become skillful at using the LMS and did the students find the LMS easy to use. The students were asked to rate their responses as either strongly disagree, disagree, uncertain, agree or strongly agree.

The students' responses are illustrated in Figure 6.15 below.

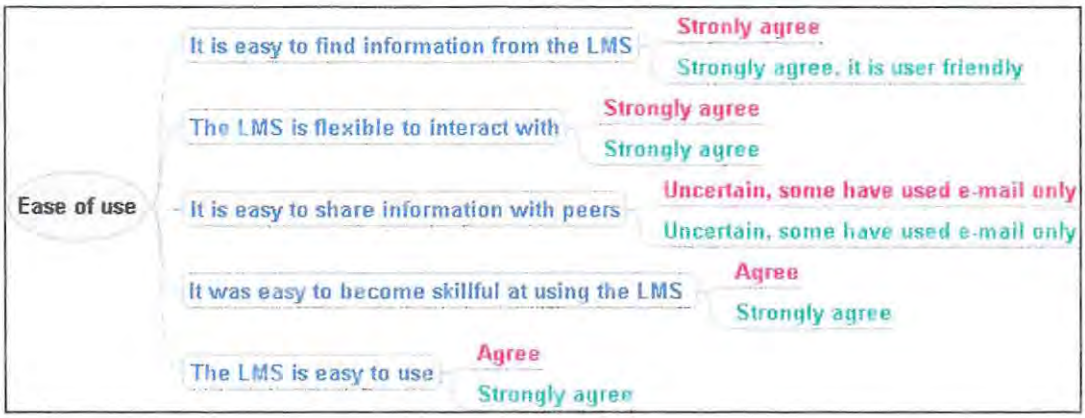


**Figure 6.15: Ease of use of LMS**

- It was easy to get information from the LMS

Both groups strongly agreed that it was easy to get the information they wanted from the LMS. Group 2 even went on to say that the LMS was user friendly. I believe that the feature, Guide to the section, helped a lot in guiding the students on how to go about searching for information and what they should expect in each link.

- The LMS was flexible to interact with

Both groups strongly agreed that the LMS was flexible to interact with. The links were very useful. The names of the links that were provided were relevant to what was contained in the link and the students could navigate from one page to another.

- It was easy to share information with peers using the LMS

Both groups had mixed feelings about sharing information with peers using the LMS. They emphasized that they have only used e-mail to communicate with peers; they have not used the chat facility and forums. Since the students only implemented the LMS in October and in mid November they wrote their examinations, I believe that, given more time the students would become familiar with these *Moodle* features.

- It was easy to become skillful at using the LMS

Group 1 agreed and Group 2 strongly agreed that it was easy to become skillful at using the LMS. I feel that the website was worthwhile and the students were exposed to many *Moodle* features that enhanced them in searching for information.

- The students found the LMS easy to use

Group 1 agreed and Group 2 strongly agreed that they find the LMS easy to use.

- **Attitude and intention to use the LMS**

To determine the students' attitude towards the implementation of the LMS and whether or not they intend using the LMS in the future, I ascertained whether the learning environment provided by the LMS was attractive, whether the students enjoyed using the LMS and whether they intend using the LMS for their course work. The students were asked to rate their responses as either strongly disagree, disagree, uncertain, agree or strongly agree. Their responses are illustrated in Figure 6.16 below.

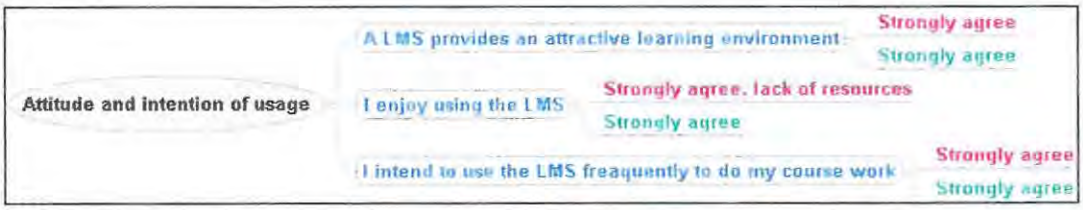


**Figure 6.16: Attitude and intention to use the LMS**

- The learning environment provided by the LMS was attractive

Both groups strongly agreed that the learning environment provided by the LMS was attractive. I believe that the features that I added to the *Moodle* interface played a large role. The students' responses indicate that they are satisfied with the LMS learning environment.

- The students enjoyed using the LMS

Both groups strongly agreed that they enjoyed using the LMS although, Group 1 stressed that they were sometimes frustrated by the lack of resources. The positive response indicates that the students value the LMS. However, easy access to computers needs to be addressed.

- The students intend using the LMS for their course work

Both groups intend to use the LMS for their course work.

- **Changes or additions to course content**

The responses given provide ideas about what the students would change or add to the content. These suggestions focused mainly on the provision of past question papers and results, answers to tasks, administration and increased details in the course notes. This is illustrated in Figure 6.17 below.

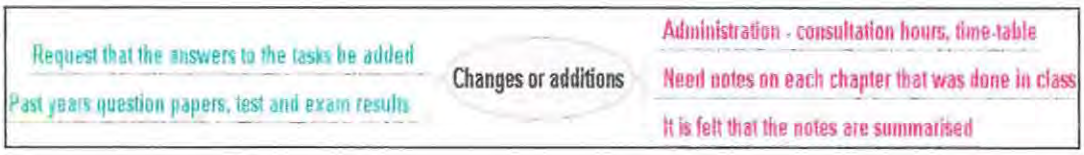


**Figure 6.17: Changes and additions to course content**

- Group 1

Group 1 students requested that the consultation hours, and lecture and practical sessions' time-table be included in the course website. I will include this information to enhance the course administration. These students also felt that the course notes were summarized and requested that the content be increased, they requested that everything that was done in class be included in the notes and also all the chapters that were done in class be included in the LMS. As indicated earlier on, the WSU IS pilot website contains course notes. I feel that the course notes are more detailed than what is done in class, for example, there are links to useful websites and ample examples. I think the problem here is the students' background, they want to be spoon fed and another problem could be the financial problem that results in students not being able to buy textbooks. I could use a Forum question or chat to investigate the areas of content that

the students are not satisfied with. Concerning the chapters covered in class, I only developed those chapters that were covered in the last quarter of the year as the website was only implemented in October; for the e-learning at WSU, I will include all the chapters that were covered in class.

- Group 2

Group 2 students requested that answers to the tasks be added to each chapter as well as previous question papers, and that test results be posted on the LMS. This is a good idea for the WSU IS pilot website; I will include these elements in future. I will set a deadline for the tasks and then upload answers after the due date for the task.

### 6.8 Summary of the chapter

The chapter has illustrated how *Moodle* was used for managing the Information Systems courseware and also how the course has been designed, implemented and evaluated by a subject expert and students. Despite the technical difficulties that were experienced when the students were using the WSU IS pilot website, the students intend to use the LMS for their course work.

The main positive points about the development and implementation of the WSU IS pilot website were:

- The WSU IS pilot website was developed based on the findings of the surveys.
- During the development of the course, pedagogy was taken into consideration. The six-stage ID model was used to develop the WSU IS pilot website
- The subject expert and students were impressed with the website. The expert claimed that the course was up to standard. The students found the website to be useful, easy to use, and also enjoyed using the website in so much that they intend to use it frequently for their course work.
- Students used the material on the website to fill-in the gaps they had in class and even those students that did not attend were able to access the material.
- The students could access the material from any location and anytime.

The problems with the implementation were:

- The shortage of computers that deprived the students the opportunity to complete their tasks quickly.
- The network failure made the students unable to access the LMS as much as they wished.
- The students did not get sufficient technical support on the use of the LMS.
- There was a delay in the response from the lecturer because of the network failure and the lecturer's workload.

Areas where there were mixed reactions include:

- The sharing of information among students. The students used only e-mail to communicate with their peers. Although communication was prompted by the material on the LMS, students were not confident to use the communication tools such as the Forum and the Chat facilities provided by the LMS.

Changes and additions to the WSU IS pilot website include:

- The consultation hours, and lecture and practical sessions' time-table will be added to the website.
- The course notes of all the chapters covered in class will be made available to students in the website.
- A deadline will be set for each task and the answers to the tasks will be uploaded for each chapter in the website.
- The previous question papers and test results will be posted on the website.

The next chapter will discuss and relate the staff and students' findings, the course development, and the expert evaluation and student course evaluation to the literature.

# CHAPTER 7

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 7.1 Introduction

In this chapter, I briefly state the aim of the research and motivation for this research, reflect on the research process, summarize the main findings, discuss the lessons learnt from the research and make recommendations for the presentation of the Information Systems (IS) course. The limitations of this research are also considered and areas for further research are suggested.

This study aimed at making the IS course more accessible to the Walter Sisulu University (WSU) IS students. As a Higher Education Institution (HEI) situated in a rural area in the Eastern Cape, WSU has part-time students who are unable to attend contact classes on a regular basis, which seems to be contributing to an increasing failure rate in IS. The main challenges faced by WSU include finding ways to supplement contact classes.

In attempting to respond to these challenges the research questions were posed:

1. How are Information Systems departments in South African contact universities using the Information and Communication Technology (ICT) for e-learning?
2. How could the WSU Accounting department make the course more accessible to students?
3. How could the WSU IS pilot website be developed and implemented?
4. How do students at WSU respond to the newly developed IS pilot website?

The literature on the use of ICT in HEIs indicates that decisions to utilize ICT for teaching and learning should be based on educational objectives (Chapter 2). In this study the method of instruction, the computer-assisted instruction (CAI) method, was determined by the learning outcomes, learner characteristics, and available resources (Gustafson and Tillman 1991) elicited by means of the student survey. This is one of the aspects covered in step one of the six-stage instructional design model adapted from Geyser's (2004) programme design, Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology (Chapter 2); identifying

student needs and course goals. The six-stage instructional design model worked well in this research and I believe this model can be used to develop any course. By examining the theory, the government documents, and practice (including the staff survey) on the use of ICT for teaching and learning in HEIs, I was able to develop, implement and evaluate the WSU IS pilot website. I then evaluated to what extent the WSU IS pilot website made the course more accessible to the IS students.

### 7.2 Reflection on the research process

As I indicated in Chapter 3, the research was approached from an interpretive perspective. I used this approach to develop an understanding of staff experiences in using ICT for teaching, learning and assessment, and also the students' learning needs and characteristics. To elicit information about the staff experiences in using ICT for teaching, learning and assessment, I conducted a survey of IS staff at other HEIs in South Africa. The findings of the staff survey from four HEIs (two Historically Black institutions and two Historically White institutions) reflected that their IS students accessed computers in order to view and interact with online material. The availability of online material to students allowed the students the opportunity to access the material anytime and in addition, revision material was made available to students, which in turn seemed to improve the students' performance. Some staff members believed that the online connectivity improved communication between the students and their lecturers. There was of course a drawback of making the material available online; the students believed that because they had all the course material they could absent themselves from classes.

To elicit information about the students' learning needs and characteristics, I conducted a student survey. According to Habermas (cited in Janse van Rensburg 2001), if people understood their situation better, they will be able to take practical actions within that situation. As a researcher and a lecturer of the IS course at WSU, I felt that with a better understanding of the WSU students' learning needs, I would be able to develop a website that would meet their needs.

Findings from the staff and students surveys informed the subsequent development of the WSU IS pilot website. The website was evaluated prior and after implementation. Although difficulties were encountered during the implementation of the website

(Limitations, 7.6), the findings from the evaluations provide sufficient evidence to claim that the website was of good quality and met the students' needs to some extent. The students are able to access the material anytime and from anywhere. It was important to carry out the research because the improved access to course material that is a result of the research, will hopefully improve the student pass rate.

### 7.3 Summary of the main findings

The findings from the staff and student surveys, the expert evaluation and the student course evaluation in light of the literature reveal the following:

#### 7.3.1 Globalization and homogenization

It would seem that globalization is in the initial stages in the four institutions that I surveyed. By means of ICT, the IS course websites could be viewed from anywhere in the world, although it was beyond my scope to find out if these institutions had any international students registered for the course. The staff survey revealed that the students from the respective institutions were able to access the learning material anytime. The student survey revealed that 88% of the WSU IS students were able to access computers anytime and from various locations. This survey further revealed that

mean that the students would be able to access the learning material anytime and from anywhere. The 'anytime' and 'anywhere' provides solutions to what Middlehurst (2001) refers to as the traditional borders of time and space respectively. She emphasizes that erosion of the traditional borders results in globalization.

It was beyond the scope of the study to analyze the curriculum for each institution, I only investigated the medium of instruction. It is evident from the data (the staff and student survey, and the student course evaluation) that there is eagerness to use ICT for course delivery, from both the lecturers' and students' perspective. This in turn contributes towards globalization, as it has been spelt out above, and may in the later instances result in the homogenization of course curricula.

### 7.3.2 Commercialization of university instruction

Noble (2002) has a critical view about the commercialization of university instruction. He emphasizes that there is little thought given to pedagogy when developing courseware. Govindasamy (2002) recommends that the features included in an online course should be based on pedagogical principles. Pedagogical principles have been taken into consideration when developing the WSU IS pilot website; the IS course was not merely transferred into an online version of the paper-based course. In the development of the website, I incorporated some of the pedagogical principles that Hargreaves (2003) says should guide the teaching process in the knowledge society. These include the opportunity to develop cognitive learning skills, creativity and ingenuity among students, problem solving skills and also developing trust in the collaborative process. I developed and used the six-stage instructional design model (adapted from Geyser's (2004) programme design, Gustafson and Tillman's (1991) ID model and Govindasamy's (2002) instructional development methodology) to design, develop, implement and evaluate the WSU IS pilot website. I conducted the situation analysis by carrying out the staff and student surveys. Findings from these surveys provided insight for the development of the WSU IS pilot website. The course goals and the expected learning outcomes were set. The WSU IS pilot website was developed and implemented for teaching and learning. The students were assessed and the assessment criteria were congruent to the teaching objectives and learning outcomes of the course. The WSU IS pilot website was evaluated prior to implementation by the subject expert and after implementation by the IS students. The subject expert found the WSU IS pilot website to be of good standard and also the students found the website useful and suitable for their needs.

The method of instruction, the CAI method, was determined by the student survey, which is step one of the six-stage instructional design model; identifying students' needs and course goals. This concurs with Czerniewicz's (2004) point that the use of ICT should be driven by specific course objectives. A study conducted by Eynon (2005) on three focus groups to elicit lecturers' views of their experience on using ICT for teaching and learning revealed that the decision to utilize ICT for teaching and learning in the courses offered by the respective lecturers was based on educational decisions rather than on technological ones. This implies that lecturers are developing courses in

the light of their own students' needs rather than developing courses that are seen as "generic" and used to contribute to the commercialization of instruction that Noble (2002) critiques.

### 7.3.3 Equity among South African Higher Education Institutions

First of all, the staff survey revealed that the Historically Black Universities (HBUs) had fewer IS students as compared to the Historically White Universities (HWUs). This implies that the equity targets of increasing the number of students in the fields of science, engineering and technology (IS in an element of this field) programmes have not yet been redressed in the HBUs that were studied.

Lack of ICT facilities also poses a threat to equity targets at the HEIs. The staff survey revealed that HBUs had fewer computers available for IS students' use than the HWUs. The student survey revealed that the institution under study (which is a HBU) had a shortage of computers. This means that the students from these HBUs were unable to access the online material as often as they would have liked at their spare time. This was evidenced by the data of the students' course evaluation.

So while ICTs can potentially help to bridge the so-called "digital divide", the current lack of ICT facilities at HBUs may not be attracting sufficient IS students and may be unwittingly entrenching this divide. In order to avoid a further widening of this gap, HEIs such as WSU, would be well advised to see how ICTs can contribute to what Selwyn, Gorard, & Williams (2001) refer to as a "digital opportunity".

### 7.3.4 Gender and diversity

The data from the student survey revealed that 55% of the 149 respondents were females and 45% were males. Although I acknowledge the literature by the Department of Education (DoE) (1997) on gender equity, I did not dwell much on this aspect in this study. I also acknowledge the literature by Thomas and de Villiers (2000) and Cloete and Bunting (2000) on diversity, but I did not look into this aspect as it was beyond the scope of the study. These two aspects need further research.

### 7.3.5 Physical access to Higher Education Institutions

The student data revealed that access to a university does not mean automatic access to computers in addition to lectures. Thirty seven percent of the students who responded were unable to attend lectures on a regular basis and 12% were unable to access computers (either from the university laboratory or any other location) at their spare time. The student data also revealed that most of the students (67%) accessed computers from the university laboratory rather than any other location. A similar study carried by Broekman, Enslin and Pendlebury (2002) on the first and second year flexi BEd students at the University of Witwatersrand revealed that a large proportion of students had no access to computers when they were off campus. The student data in the student survey also revealed that six out of 12 students who accessed computers from home did not have Internet connectivity access which implies that these six students could not take up the opportunity via internet and email to participate in e-learning.

When the students had the opportunity to access ICT, either from the university laboratory or any other location, they claimed to have benefited tremendously. This is indicated by the data from the students' course evaluation which revealed that the website improved the quality of their course work; enabled students to accomplish the course tasks more quickly; increased the students' productivity and allowed students to have control over their learning. The students even went on to say that the material helped them fill in the gaps if someone missed classes or did not understand what was taught in class. A similar study carried out by Saunders and Klemming (2003) in the UK revealed that some students used the online material as a supplement to the timetabled classes (as is the case in this study) and very few (who had other commitments) used the material as an alternative to the classes. This latter case could be true for the university under study as well because some students indicated that they seldom attended classes because of work commitment, time table clashes and family commitments. The students in the UK study said that the material gave them an overview of the timetabled classes and this helped them get a better understanding of a topic in class, they could listen more during class instead of panicking to write down notes and the material helped them fill the gaps when they lost concentration in class (Saunders and Klemming 2003). A study conducted by Blewett and Singh (2003) also revealed a number of benefits for putting the course online including improved access to

material during and outside normal hours and flexibility in terms of time, place, pacing (speed of learner) and repetition. This benefit seemed to be evident in this study as well.

### 7.3.6 Epistemological access

Morrow (1993/4 cited in Broekman *et al* 2002:31) emphasizes that "even students who have material access to the required technology may nevertheless not have epistemological access". This is true in my research. The student data revealed that 125 (74%) of the 149 students who responded had Internet access. Of the 125 students, only 11 students could use and search for appropriate information on the Internet. The students may be merely browsing the Internet and not critically choosing and filtering information as indicated by the Department of Education (1995), Eriksen (2001) and Gumede (2005). This has also been noted by one staff member in the surveyed HWUs; students have access to the Internet, but cannot critically search for and filter information.

I think that the WSU IS pilot website provided aspects of epistemological access to the IS students. The subject expert commented that the guide for each section was self-explanatory. The students, in the course evaluation, acknowledged that it was easy to use the website, it was easy to find information from the website, the website was flexible to interact with and it was easy to become skillful at using the website. The students were also given technical support, although, I understand there were some network problems that disrupted the process. The website provided the students with communication tools such as e-mail, chat rooms and forums that they could use to communicate among themselves and with their lecturer, although as evidenced by the data from the course evaluation, they only used e-mail. If a student experienced difficulty in using any resource (notes, quiz, assignment, etc.) in the website, the student could consult the lecturer or peers for assistance. The student could then carry out the activity with the support of the lecturer or peers, and the actual learning takes place during this period. Vygotsky (cited in Kennewell 2004) calls this period the 'zone of proximal development'.

I learnt that epistemological access should be considered when designing an online course. The students should at least be provided with a clear guide for each topic and the website should be interactive, and deliberately require students to solve problems (DoE 1995).

### 7.3.7 Quality

Harvey and Green (1993 cited in Lomas 2002) define quality by viewing it as excellence, as transformation, as fitness for purpose and as value for money.

#### Excellence

The two notions: "more means worse" and "more means different" apply in the definition of excellence (Lomas 2002). Those academics who say that "more means worse" claim that massification leads to poorer quality provision (Radford 1997 cited in Lomas 2002). These academics believe that education institutions introduce a number of new degrees that are of poor quality with the intention of accommodating everybody in society. On the other hand, advocates of the notion "more means different" claim that the higher education curriculum should be relevant to all groups in society (Lomas 2002).

The WSU IS pilot website was designed and developed in order to respond to the challenges the HEIs are currently facing, one of which is curriculum responsiveness. According to Moore and Lewis (2004), curriculum responsiveness could work in two directions; the change in knowledge content of the curriculum or the change in the mode of transmission from lecturer-oriented to student-oriented. This study has attempted to move from the lecturer-oriented to the student-oriented mode of transmission. The content of the curriculum has not changed, but only the mode of transmission has been changed. This means that the study has followed the notion that "more means different" – not different content, but different mode from teacher-orientated to student-orientated to supplement the lectured-based course. It has tried to accommodate the increased number of less-prepared students in the WSU society, but the quality of the WSU IS pilot website was not compromised. This is evidenced by the data from the expert evaluation.

**Fitness for purpose**

According to Lomas (2002), a product or service is fit for its purpose if it fulfils a customer's needs, requirements or desires. I am confident to say that the WSU IS pilot website fulfilled the customer's (students in the case of this study) needs, requirements and desires. The data from the student course evaluation revealed that the students from both focus groups strongly agreed that the website was useful and these students also strongly agreed that they intend using the website frequently for their course work.

**Value for money**

A student pays fees in order to attain a particular award (Lomas 2002). The website has provided the students with the opportunity to equip themselves with computer skills while at the same time mastering the course content. This implies that by the time the students finish the IS course, they should be computer competent. It is a pity that these students do not write practical tests because of the shortage of computers, but their written tests reflect that they have worked through the website and also indicate the value of the website.

**Transformation**

As mentioned in Chapter 2, transformation in education is 'doing something to the customer rather than doing something for the customer' (Harvey & Green 1993:24 cited in Lomas 2002:75). I think that the use of the website "transformed" the IS student to some extent. The data from the student course evaluation revealed that the students became skillful at using the website. This implies that epistemological access has been integral to the idea of transforming students, that is, the idea of not accepting that there is only one view on what is conceived as valuable knowledge. The students were also afforded the opportunity to exercise great control over their learning. This concurs with the purpose of the study, to move from the lecturer-oriented to the student-oriented approach.

The issues discussed here about quality have taught me that an online course can be designed to suit the students' needs (or needs of a society) without lowering the

standards of the course. If the development of an online course is guided by pedagogical principles, then the online course could transform the students and these students could also develop the relevant knowledge, skills, values and attitudes.

### 7.4 The lessons learnt from the research

The lessons I have learnt from the research include:

- The development of an online course should be based on the course objectives. The course objectives are based on the students needs. We are aware of the fact that the students of any institution have different needs. So when a lecturer develops a course, the course should be designed to meet the needs of those students.

- An online course can be designed to suit the students' needs without lowering the standards of the course.

- The development of an online course should be guided by pedagogical principles. The relevant literature made it clear that one should not use technology because it is available; the choices of technology should be based on the educational needs. Based on the educational needs, the development of an online course should be guided by pedagogical principles. This implies that one should be critical about commercializing courseware.

- When developing an online course, the students should be provided the opportunity to develop the skills associated with epistemological access. The relevant literature makes us aware that some students may have access to the required technology but not have epistemological access. This has also been revealed by the student data and has been raised as a concern by a staff member from one HWU.

- Part-time students (who have little time for their studies) who do not have Internet and e-mail access should not register with the IS course because they are increasing the failure rate.

### 7.5 Recommendations for the delivery of the Information Systems (IS) course

Arising from the findings, I would like to make the following recommendations:

- The lecturer should advise the students on the importance of familiarizing themselves with using the Internet and e-mail at the beginning of each semester.

- The lecturer could use e-mails in conjunction with consultation hours. Those students that are comfortable with consultations should visit the lecturer during consultation hours and those that prefer e-mail for communicating with the lecturer should do so.

- The students could be given group assignments in order to encourage group work and face-to-face communication with their peers and could also be given tasks that require the use of the Learning Management Systems (LMS) communication tools.

- The students should be trained on application packages and on information searching on the Internet prior to the use of the LMS.

- At the beginning of each semester, the students should be well orientated on the use of the LMS. Some students may have to complete only one semester, for one reason or another, so when these students join in the semester, they should participate in an e-learning orientation session.

- The course content of a LMS could be reviewed at the end of each semester.

- The university management, the ICT department and the faculty of Business, Management and Law need to work out strategies to increase the number of computer laboratories and computers dedicated for the IS students.

### 7.6 Limitations of the study

There were five main limitations for this research:

- The study was part of a real-life course. This positively contributed towards the research as I was part of the course. However, the research process was hindered by various factors that were beyond my control.

- The implementation of the WSU IS pilot website by the students was hindered by factors such as the students being computer illiterate and the technical problems. Connection to WSU IS pilot website sometimes failed because of the network failure that affected the whole university. The Internet was overloaded during the day and this slowed down the Internet response rate. The SQL database that supports the LMS was sometimes overloaded by the information stored onto the database and the website would reflect an error message. This caused pressure for the researcher who had to liaise with the ICT department to ask for assistance with maintaining the website and on the other hand motivate the students to use the website.

- The shortage of computers demotivated the students. They had to book time slots in the walk-in laboratories that had few computers that were in good condition.

- The gender and age aspects were not considered.

- The research process was prolonged by the fact that the researcher was sometimes overwhelmed by the teaching workload and as a result spent less time on the research.

## 7.7 Suggestions for further research

I have identified these areas of further research:

- Strategies for monitoring the pass rate of part-time students.
- Student access patterns in the WSU IS website.
- Tertiary institution students' perceptions about the implementation of e-learning.

## 7.8 Summary

The main purpose of the study was to find potential means to make the IS course more accessible to students. The intention was not to change the course delivery mode to entirely online delivery, but to supplement the face-to face classes. I would suggest that the two delivery modes, the face-to-face classes and online delivery be integrated. This is termed as the hybrid or blended applications (van der Westhuizen 2004; Bates and Poole 2003). I have found this method valuable for the IS students. The students attended classes and filled-in the gaps by making use of the WSU IS pilot website that provided rich information. If the students were unable to attend classes because of various reasons, they accessed course material from the WSU IS pilot website. The websites also provides students the opportunity to access course material anytime and from anywhere.

Hence, given a chance, the WSU IS pilot website is part of a more globalized higher education offering than the paper-based IS course offered before. The discussion indicates that the courseware was developed under the guidance of pedagogical principles. The staff and the student surveys revealed that ICT has opened the gap in equity (in terms of physical access to computers) between HWUs and HBUs. The study did not investigate the relationship of gender and diversity in the use of e-learning; this was beyond the scope of the study. The student data revealed that access to a university does not mean equal access to lectures and computers. The WSU IS pilot website endeavoured to support students' epistemological access. The website was found to be of good quality in respect to the four aspects that Harvey and Green (1993 cited in Lomas 2002) use to define quality.

In light of the above discussion, I feel that the WSU IS pilot website has been able to answer the research question: How could Walter Sisulu University use e-learning to support the teaching, learning and assessment of IS?

## REFERENCES


**Amstrong, V., Barnes, S. Surtherland, R. Curran, S. Mills, S. and Thompson, I.** (2005). Collaborative research methodology for investigating teaching and learning: the use of interactive whiteboard technology. *Educational Review*, 51(4): 457-469.

**Arksey, H. and Knight, P.** (1999). *Interviewing for Social Sciences: An Introductory Resource with examples*. London: Sage publication.

**Ask, B. and Haugen, H.** (2005). The pedagogical touch of e-Learning. Proceedings of the 8th IFIP World Conference on Computers in Education, University of Stellenbosch, Cape Town.

**Bates, A.W.T.** (1997). *Technology, open learning and distance education*. USA and Canada: Routledge.

**Bates A.W.T and Poole G.** (2003). *Effective teaching with technology in higher education: foundations for success*. San Francisco, California: Jossy-Bass.

**Blewett, C.N and Singh, U.G.** (2003). The Cobbler's Children have no shoes: An investigation into the usage of Educational Technology tools within University IT Departments in South Africa. University of Natal-Durban.

**Broekman, I., Enslin, P. and Pendlebury, S.** (2002). Distributive justice and information communication technologies in higher education in South Africa. *SAJHE/SATHO*, 16(1), 29-35.

**Broere I., Geyser, H.C. and Kruger, M.** (2002). Technology development: imperatives for higher education. SAJHE/SATHO 16(3): 29-35.

**Burbules, N.C. and Callister, T, A.** (2000). Universities in transition: The promise and the challenge of new technologies. *Teachers College Record*, 102 (2), 271-293.

**Castells, M.** (2001). *The new global economy*. In Muller, J., Cloete, N. & Badat S. *Challenges of Globalisation: South African debates with Manuel Castells*. (pp. 2-21). Cape Town: Maskew Miller Longman.

**Cloete N. and Bunting I.** (2000). *Higher education Transformation: Assessing Performance in South Africa*. Pretoria: Center for Higher Education Transformation.

**Cohen, L., Manion, L and Morrison, K.** (2000). *Research methods in education* (5th edition). London: Routledge.

**Connole, H.** (1998). The Research enterprise. In Research methodologies in education. Study guide. Geelong: Deakin University.

**Czerniewicz, L.** (2004). Cape of Storms or Cape of Good Hope? Educational technology in a changing environment. *British Journal of Educational Technology*, 35(2), 145-158.

**Department of Education.** (1997). Education Draft White Paper 3, "*A Programme for the Transformation of Higher Education*". Pretoria. Available online: http://www.info.gov.za/whitepapers/1997/education3.htm

**Department of Education.** (2001). *National plan for higher education in South Africa.* Government of South Africa, Pretoria.

**Department of Education.** (2003). Draft White Paper on e-Education, "*Transforming Learning and Teaching through Information and Communication Technologies (ICTs)*". September 2003, Department of Education. Available online: http://education.pwv.gov.za/content/documents/305.pdf [12 August 2004]

**Department of Education.** (2005). *Student Enrolment Planning in Public Higher Education.* Government of South Africa. Pretoria. Available online: http://education.pwv.gov.za/content/documents/705.pdf [5 September 2005]

**Dick W. and Carey L.M.** (1991). *Formative Evaluation.* In Briggs L.J., Gustafson, K.L. and Tillman, M.H. *Instructional Design: Principles and Applications.* New Jersey: Educational Technology Publications, Inc.

**Engelbrecht, E.** (2005). Adapting to changing expectations: Post-graduate students' experience of an e-learning tax program. *Computers & Education,* 45(2), 217-229.

**Ensor, P.** (2004). Contesting discourses in higher education curriculum restructuring in South Africa. *Higher Education*, 48, 339-359.

**Eriksen, T.K.** (2001). *Tyranny of the moment: Fast and slow time in the information age*. London: Pluto Press.

**Eynon, R.** (2005). The use of the internet in higher education: Academics' experiences of using ICTs for teaching and learning. *Aslib Proceedings: new information perspectives*, 57(2), 168–180.

**Fetterman, D.M.** (1998). *Ethnography.* In Bickman, L. and Rog, D.J. *Handbook of Applied Social Research Methods.* London: Sage Publications.

**Floyd, J and Fowler, J.R.** (1998). *Design and Evaluation of Survey Questions.* In Bickman, L. and Rog, D.J. *Handbook of Applied Social Research Methods.* London: Sage Publications.

**Fontana, A and Frey, J.H.** (1994). *Interviewing: The art of Science.* In Denzin, N. K. and Lincon, Y.S. *Handbook of Qualitative Research.* Sage Publications.

**Fourie, M.** (1999). Institutional transformation at South African universities: Implications for academic staff. Netherlands: Kluwer academic Publishers. *Higher Education*, 38:275-290.

**Geyser, H.** (2004). Programme development: a curriculum design perspective. In Gravett, S. and Geyser, H. *Teaching and learning in higher education.* (pp 139-155). Pretoria: Van Schaik Publishers.

**Gough, N.** (2001). Perspectives on research: Reading research and reviewing research literature. In Research in Education and Training. Faculty of Education Masters program. Deakin University, Australia.

**Govindasamy, T.** (2001). Successful implementation of e-Learning: Pedagogical considerations. *The Internet and Higher Education,* 4(3-4), 287-299.

**Gumede, T.** (2005). The biography of "access" as an expression of human rights in South African education policies. Unpublished PhD thesis, University of Pretoria.

**Gustafson, K.L. and Tillman, M.H.** (1991). *Introduction.* In Briggs, L.J., Gustafson, K.L. and Tillman, M.H. *Instructional Design: Principles and Applications.* New Jersey: Educational Technology Publications, Inc.

**Hall M.** (2001). *Education and the margins of the network society.* In Muller, J., Cloete, N. & Badat S. *Challenges of Globalisation: South African debates with Manuel Castells.* (pp. 224-243). Cape Town: Maskew Miller Longman.

**Hargreaves, A.** (2003). *Teaching in the knowledge society: education in the age of insecurity.* Open University Press. Philadelphia.

**Hart, G. and Mason, J.** (1999). *Computer-facilitated communications in transition.* In C.M. Feyten & J.W. Nutta, *Virtual instruction: Issues and insights from an international perspective.* (pp.147-172). Englewood: Libraries Unlimited, Inc.

**Henry, G.T.** (1998). *Practical Sampling.* In Bickman, L. and Rog, D.J. *Handbook of Applied Social Research Methods.* London: Sage Publications.

**Irwin, P.** (2004). An introduction to surveys and questionnaires. Rhodes university: Education Department.

**Ismail, J.** (2002). The design of an e-learning system: Beyond the hype. *The Internet and Higher Education*, 4(3-4), 329-336.

**Janse van Rensburg, E.** (2001). *An orientation to research.* Rhodes University, Environmental Education Unit, Research methods short course 2001.

**Kennedy, I.G.** (2001). Why use digital media exclusively. University of Witwatersrand, Johannesburg. Available online: http://dept.ee.wits.ac.za/~kennedy/alldigital.htm [26 March 2004].

**Kennewell, S.** (2004). *Meeting the standards in using ICT for Secondary schools.* London: Routledge.

**Knowles, M.S. & Associates.** (1985). *Andragogy in action: Applying modern principles of adult learning.* California: San Francisco & London.

**Kuriloff, P.** (2005). Breaking the Barriers of Time and Space: More Effective Teaching using e-Pedagogy. Innovate 2(1). Retrieved April 20, 2006 from the World Wide Web: http://www.innovateonline.info/index.php?view=article&id=64

**Lairson, T.D.** (1999). Rethinking the "course" in an online world. *Campus-Wide Information Systems*, 16 (5), 186–190.

**Lankshear, C., Peters, M. and Knobel, M.** (2000). Information, knowledge and learning: Some issues facing epistemology and education in a digital age, *Journal of Philosophy of Education*, 34(1), 17-39.

**Lomas, L.** (2002). Does the Development of Mass Education Necessarily Mean the End of Quality? *Quality in Higher Education*, 8(1), 71-79.

**Lowe, H. and Cook, A.** (2003). Mind the Gap: are students prepared for higher education? *Journal of Further and Higher Education,* 27(1), 53-76.

**Mallinson, B. and Sewry, D.** (2004). eLearning at Rhodes University: A case study. *ICALT 2004 proceedings*. Available online: http://lttf.ieee.org/icalt2004.

**Massy, W.F. and Zemsky, R.** (1995). Using Information Technology to Enhance Academic Productivity. Available online: http://www.educase/edu/ir/library/html/nli0004.html [26 March 2004].

**Maxwell, J. A.** (1996). *Qualitative Research Design: An Interpretive Approach.* London. Sage Publications.

**Middlehurst, R**. (2001). University challenges: Borderless Higher Education, Today and Tomorrow. *Minerva,* (39), 3-16.

**Miles, M.B. and Huberman, A.M.** (1994). *Qualitative data analysis: An expanded Sourcebook.* Second edition. Thousand Oaks, Califonia: Sage Publications.

**Moja, T. and Cloete, N.** (2001). *Vanishing borders and new boundaries*. In Muller, J., Cloete, N. & Badat S. *Challenges of Globalisation: South African debates with Manuel Castells*. (pp. 244-270).Cape Town: Maskew Miller Longman.

**Moll, I.** (2004). *Curriculum responsiveness: The Anatomy Of A Concept*. In Griesel, H., Fish, P. and Moll, I. *Curriculum responsiveness: Case studies in Higher Education.* South Africa: Pretoria.

**Moore, R. and Lewis, K.** (2004). *Curriculum responsiveness: The implications for Curriculum Management.* In Griesel, H., Fish, P. and Moll, I. *Curriculum responsiveness: Case studies in Higher Education*. South Africa: Pretoria.

**Moja, T.** (2004). *Glocalisation: A Challenge for Curriculum Responsiveness*. In Griesel, H., Fish, P. and Moll, I. *Curriculum responsiveness: Case studies in Higher Education*. South Africa: Pretoria.

**Muller, J. (2000).** *Reason, reality and public trust.* In *Reclaiming knowledge: Social theory, curriculum and education policy.* New York: Routledge/Falmer.

**Munoz, K.D. and Van Duzer, J.** (2005). Blackboard vs Moodle: A comparison study of satisfaction with online teaching and learning tools. Humboldt State University.

**Murphy, D., Walker, R. and Webb, G.** (2001). *Online learning and teaching with technology: Case studies, experience and practice.* London: Kogan Page.

**Ngai, E.W.T., Poon, J.K.L., and Chan, Y.H.C.** (2005). Empirical examination of the adoption of WebCT using TAM. *Computers & Education,* xxx:xxx-xxx

**Noble, D.F.** (2002). *Digital diploma mills: The automation of higher education.* Toronto: Between the lines.

**Saunders, W. B. and Pinhey, T. K.** (1983). *The conduct of Social Research.* New York, Holt Rinehart and Winston.

**Scott, D** (2000). *Realism and Educational Research: New Perspectives and Possibilities.* London: Routledge/Falmer.

**Scott, P.** (2000). Globalisation and the University challenges for the twenty-first century. ACE/CHET Seminar on globalisation. Durban. Available online: http:www.chet.org.za/oldsite/debates/scott.html [23 May 2005].

**Selim, H.M.** (2003). An empirical investigation of student acceptance of course websites. *Computers & Education,* 40: 343-360.

**Selwyn, N., Gorard, S. and Williams, S.** (2001). Digital Divide or Digital Opportunity? The Role of Technology in Overcoming Social Exclusion in U.S. Education. *Educational Policy,* 15(2), 258-277.

**Shelly, G.B, Cashman, T.J, Gunter, R.E. and Gunter, G.A.** (2004). *Teachers discovering computers: Integrating technology in the classroom.* (3rd Edition). Boston: Thomson Learning.

**Stair, R.M. and Reynolds, G.W.** (2001). *Principles of Information Systems.* 5th ed. Cambridge: International Thomson Publishers.

**Steward, D.W and Shamdasani, P.N.** (1998). Focus Group Research: Exploration and Discovery. In Bickman, L. and Rog, D.J. *Handbook of Applied Social Research Methods.* London: Sage Publications.

**Saunders, G. and Klemming, F.** (2003). Integrating technology into a traditional learning environment: Reasons for and risks of success. London: Sage Publications 4(1), 74-86.

**Teferra, D. and Altbach, P.G.** (2004). African higher education: Challenges for the 21st century. *Higher Education,* 47(1), 21-51.

**Tessmer, M.** (1993). *Planning and Conducting Formative Evaluations: Improving the Quality of Education and Training.* London: Kogan Page.

**Thomas, T. and de Villiers, C.** (2000). Handling Diversity in Group Work in the Information Systems Class. *SART/SACJ*, 26(1), 231-236.

**Thurab-Nkhosi, D., Lee, M. and Giannini-Gachago, D.** (2005). Preparing Academic Staff for e-Learning at the University of Botswana. *Innovate* 2(1). Retrieved April 20, 2006 from the World Wide Web: http://www.innovateonline.info/index.php?view=article&id=43

**Trow M.** (2000). From Mass Higher Education to Universal Access: The American advantage. *Center for Studies in Higher Education,* 1-18.

**Van der Perre, G.** (1999). *Educational Innovation and Information and Communication Technologies (ICT): Revolution or Evolution?* In Feyten C.M. & Nutta J.W. *Virtual Instruction. Issues and Insights from an International Perspective.* (pp.107-125). Englewood: Libraries Unlimited, Inc.

**Uys, P.M., Nleya, P. and Molelu,G.B.** (2004). Technological Innovation and Management Strategies for Higher Education in Africa: Harmonizing Reality and Idealism. *Educational Media International*, 41(1), 67-80.

**Van der Westhuizen, D.** (2004). *The design and development of a web-based learning environment.* In Gravett, S. and Geyser, H. *Teaching and learning in higher education.* (pp157-179). Pretoria: Van Schaik Publishers.

**Warwick, D.P. and Lininger, C.A.** (1975). The Sample Survey: Theory and Practice. United States of America: McGraw-Hill Inc.

**Weigel, Van B.** (2002). *Deep learning for a Digital Age: technology's untapped potential to enrich higher education.* San Francisco, California: Jossey-Bass.

**Yin, R.K.** (1998). *The Abridged Version of Case Study Research: Design and Method.* In Bickman, L. and Rog, D.J. *Handbook of Applied Social Research Methods.* London: Sage Publications.

**Zuber- Skerritt, O.** (1992). *Professional Development in Higher Education : A Theoretical Framework for Action Research.* London: Kogan Page.

# APPENDICES

## Appendix A

**Use of e-learning to support Information Systems students in Tertiary institutions: A survey**

**Questionnaire 1**

1. What position do you hold within the institution (*e.g. lecturer, etc.*)?

.....

2. Your institution is:

| | |
|---|---|
| In the Eastern Cape | |
| Outside the Eastern | |

3. How many students take Information Systems as a major course or as a "service" course (i.e. non-major course)? *Write the number in the block provided*

| | Level 1 | Level 2 | Level 3 |
|---|---|---|---|
| Major course | | | |
| Service course | | | ------ |

4. Which departments require their students or offer them the option to take IS as a service course?

.....

.....

.....

5. How long is the IS service course?

| | |
|---|---|
| 1 semester | ☐ |
| 2 semesters | ☐ |
| Other duration | ☐ |
| Specify..... | |

*The next section refers to both groups of students, i.e. those students who take Information Systems as a major course or as a service course*

6. How many students are full-time or part-time? *Write the overall number in the block provided.*

| | |
|---|---|
| Full-time | ☐ |
| Part-time | ☐ |

7. How many computer laboratories are available for the IS students?

| | |
|---|---|
| 1-3 | ☐ |
| 3-5 | ☐ |
| >5 | ☐ |

8. These labs have an average of:

| | |
|---|---|
| ≤ 25 computers in good condition[10] | ☐ |
| 26≤ computers in good condition ≥50 | ☐ |
| 50≤ computers in good condition ≥100 | ☐ |
| > 100 computers in good condition | ☐ |

9. How many practical sessions per week does each IS student have?

.....

10. How often do the IS students access the computer when the lab is open outside practical and tutorial sessions?

| | |
|---|---|
| Very often | ☐ |
| Often | ☐ |
| Seldom | ☐ |
| Never | ☐ |

[10] Computers in good condition = functional computers with Internet and e-mail connectivity

11. What information is made available online for this IS course (e.g. lecturer notes, presentations, etc.)?

.....

.....

.....

12. Has the provision of information on the Internet had an impact (positive or negative) on class attendance?

.....

.....

.....

13. How does the IS department track the students' perceptions of information made available online?

.....

.....

.....

14. Do you think the media (Internet, e-mail, etc.) used have an influence on the students' performance?

Yes ☐ No ☐

Give reasons

.....

.....

.....

15. If you are using Computer Assisted Assessment (CAA) software, which program are you using in your institution (e.g. Perception Question Mark)

.....

.....

.....

16. Which application software are you using in your institution to enhance e-learning? Name the application software and the purpose for which it is used (*e.g. MS Word for developing notes*).

.....

.....

.....

17. If you are using Learning Management System software, which one are you using in your institution (*e.g. Moodle, WebCT, etc*)?

.....

.....

.....

18. E-learning promotes communication between the lecturer and students as compared to face-to-face communication?

| | |
|---|---|
| ☐ | Strongly agree |
| ☐ | Agree |
| ☐ | Neutral |
| ☐ | Disagree |
| ☐ | Strongly disagree |

Explain .....

.....

.....

19. The Internet is a good teaching tool

| | |
|---|---|
| ☐ | Strongly agree |
| ☐ | Agree |
| ☐ | Neutral |
| ☐ | Disagree |
| ☐ | Strongly disagree |

Explain: .....

.....

.....

20. Any other comments or suggestions

.....

.....

.....

Thank you for taking time to respond to this questionnaire

**Appendix B**

**Use of e-learning to support Information Systems students in Tertiary institutions: A survey**

**Questionnaire 2**

1.Are you?

| | |
|---|---|
| | Male |
| | Female |

2.Your age?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15-20 | | 21-25 | | 26-30 | | 31-35 | | above 35 | |

3. School where matriculated?

| | |
|---|---|
| Private school | |
| Government school | |
| Another country | |
| Other | |

4. Are you?

| | |
|---|---|
| Full-time | |
| Part-time | |
| Full-time but attending in the evening | |

5. If you have chosen the third option above, why?

| | |
|---|---|
| | Work commitment |
| | Family commitment |
| | Time-table clashes |

If you have other reasons specify them below

.....

.....

.....

6. How often are you able to attend class?

| | |
|---|---|
| Always (Every class per week) | ☐ |
| Often | ☐ |
| Seldom | ☐ |
| Never | ☐ |

7. If you are unable to attend, what is the major reason? (*Tick the appropriate one*)

| | |
|---|---|
| Work commitment | ☐ |
| Family commitment | ☐ |
| Time-table clashes | ☐ |
| Sick | ☐ |

If you have other reasons specify them below

.....

.....

.....

8. Do you have access to a computer to use for your studies?

Yes ☐ No ☐

If Yes: Where is the computer?

| | |
|---|---|
| At the university laboratory | ☐ |
| At home | ☐ |
| At work | ☐ |
| At a friend's place | ☐ |
| Other place | ☐ |

Specify.....

10. Do you have access to e-mail?

Yes ☐ No ☐

11. Do you have access to the Internet?

Yes ☐ No ☐

12. How often do you access a computer?

☐ Very often
☐ Often
☐ Seldom
☐ Never

13. For what reasons do you access the computer?

.....

.....

.....

14. How well can you use a computer?

☐ Very well
☐ Moderate
☐ Poor

15. State what you can do best when using a computer

.....

16. Do you think it is better to have lecture notes on the Internet rather than providing hard copies?

Yes ☐ No ☐

Give reasons

.....

.....

.....

17. How do you think the Internet could be of help to your performance? (*Tick all that are appropriate*)

It motivates a student to read notes ☐
It boosts learning skills ☐
It enables one to access related topics ☐
It can be accessed anytime ☐

Other (Please specify below)

.....

.....

.....

18. Do you think interactive 'test yourself exercises' (whereby you attempt a question and the computer gives you a solution) at the end of each chapter of your lecture notes will be a good idea?

Yes ☐ No ☐

Explain:.....

.....

.....

19. Using e-mail for communicating with your lecturer can help you ask questions:

| | |
|---|---|
| You never thought of in class | ☐ |
| You were shy to ask in class | ☐ |
| Generated from a group discussion | ☐ |
| Which you need your lecturer to explain in writing | ☐ |

Other (Please specify below)

.....

.....

.....

20. Any other comments or suggestions

.....

.....

.....

Thank you for taking time to respond to this questionnaire

## Appendix C

### Formative evaluation: Expert review

*Please rate your answers from 1 to 5. 1 = Excellent; 2 = Good; 3 = Fair; 4= Poor; 5 = No data. Cross the appropriate number.*

| ***Instruction design*** | *1* | *2* | *3* | *4* | *5* | *Comments* |
|---|---|---|---|---|---|---|
| Online technical support is available | | | | | | |
| The guide for each topic is clear | | | | | | |
| The students can move from page to page | | | | | | |
| The course outline is provided | | | | | | |
| The content meets the teaching objectives and learning outcomes | | | | | | |
| The examples are appropriate | | | | | | |
| The links to references are appropriate | | | | | | |
| Animation and graphics are used well | | | | | | |
| The course has built-in assessment and reporting tools | | | | | | |
| Assessment methods are appropriate and suited to the learning outcomes | | | | | | |
| The learner will be induced to learn and remember | | | | | | |
| The course is well organized | | | | | | |

What changes or additions in the content itself would you suggest?

.....

.....

.....

.....

Thank you for taking time to respond to this questionnaire

**Appendix D**

**Looking at the students' perception on the use of a Learning Management System (LMS) e.g. *Moodle*: An interview**

**Questionnaire 3**

1. Are you?

| | |
|---|---|
| Full-time | |
| Part-time | |
| Full-time but attending in the evening | |

2. How would you grade your level of computer literacy?

| | | | | | |
|---|---|---|---|---|---|
| Competent | | Satisfactory | | Not yet competent | |

3. From where do you access the Internet?

| | |
|---|---|
| From the university laboratory | |
| From home | |
| From work | |
| At a friend's place | |
| Other place | |

Specify:

4. Years of Internet experience?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1-3 | | 4-6 | | 7-8 | | Above 8 | |

5. Years of experience in using any Learning Management System (LMS) e.g. *Moodle*, *WebCT*, *Blackboard*?

| | |
|---|---|
| Never | |
| 1 | |
| 2 | |
| 3 | |
| >3 | |

*For question 6, 7, 8 and 9, rate your answers from 1 to 5. 1 = strongly disagree; 2=disagree; 3 = uncertain; 4 = agree and 5 = strongly agree. Cross the appropriate number.*

6. Technical support

| | | | | | |
|---|---|---|---|---|---|
| a. The training on the operation of the LMS (*Moodle*) is sufficient | 1 | 2 | 3 | 4 | 5 |
| b. E-mail enquiries can be made when there is a technical problem | 1 | 2 | 3 | 4 | 5 |

7. LMS e.g. *Moodle* usefulness

| | | | | | |
|---|---|---|---|---|---|
| a. | Using the LMS makes it easier to study the course material | 1 | 2 | 3 | 4 | 5 |
| b. | Using the LMS improves the quality of the course work I do | 1 | 2 | 3 | 4 | 5 |
| c. | Using the LMS enables me to accomplish course tasks more quickly | 1 | 2 | 3 | 4 | 5 |
| d. | Using the LMS increases my productivity | 1 | 2 | 3 | 4 | 5 |
| e. | Using the LMS allows me greater control over learning | 1 | 2 | 3 | 4 | 5 |
| f. | Overall, I find the LMS useful in the course work | 1 | 2 | 3 | 4 | 5 |

8. Ease of use of LMS (*Moodle*)

| | | | | | |
|---|---|---|---|---|---|
| a. | I find it easy to get the information I want from the LMS | 1 | 2 | 3 | 4 | 5 |
| b. | I find the LMS to be flexible to interact with | 1 | 2 | 3 | 4 | 5 |
| c. | I find it easy to share information with my peers using the LMS | 1 | 2 | 3 | 4 | 5 |
| d. | It was easy for me to become skillful at using the LMS | 1 | 2 | 3 | 4 | 5 |
| e. | Overall, I find the LMS easy to use | 1 | 2 | 3 | 4 | 5 |

9. Attitude and intention to use the LMS (*Moodle*)

| | | | | | |
|---|---|---|---|---|---|
| a.A LMS provides an attractive learning environment | 1 | 2 | 3 | 4 | 5 |
| b. I enjoy using the LMS | 1 | 2 | 3 | 4 | 5 |
| c. I intend to use the LMS frequently to do my course work | 1 | 2 | 3 | 4 | 5 |

10. What changes or additions in the content itself would you suggest

.....

.....

.....

Thank you for taking time to respond to this questionnaire

**Appendix E**

**Research milestones and activities**

| Dates | Activity |
|---|---|
| Feb 2004 – March 2005 | **Literature review and proposal writing**<br>At this stage, the literature had been gathered and the research proposal was written and accepted in March 2005. |
| Aug – Sept 2004 | **Development of questionnaires**<br>The staff and students questionnaires were developed. The questionnaires were composed of closed-ended and open -ended questions. The open-ended questions allowed the respondents to provide rich information. The staff questionnaire also served as part of the literature as it is looking at the use of e-learning in South African universities |
| | **Piloting of questionnaires**<br>The staff questionnaire was piloted with a staff member from a university at the Eastern Cape. The student questionnaire was piloted with 40 IS students. The questionnaires were analysed and adapted. The pilot study could be biased in that the students that responded to the questionnaire were those that actually attended. This is particularly relevant to question 4 – 7 of the questionnaire as these questions are looking at absenteeism. |
| November 2004 | **Distribution of questionnaires to staff and students**<br>The staff members' contact details were identified in the IS Websites. A telephone call was made to the staff members. During the conversation, the purpose of the research and the questionnaire was clarified. In some cases, the person being contacted would refer me to the course coordinator or the Head of Department. An e-mail was then sent to these staff members (one per university) as per agreement from the telephone conversation. The e-mail clarified the purpose of the research and the questionnaire, and also assured the lecturers of their anonymity. Their participation was voluntary. The questionnaire was attached to the e-mail.<br>The students' questionnaire was distributed to them when they were leaving the examination room. All students were present; those that usually attend and those that do not attend classes. The students were informed of the purpose of the research. They were told not to put their names on the questionnaire. |
| November 2004 | **Collection of questionnaires**<br>The staff respondents sent their responses by e-mail. The students respondents dropped the questionnaires in the IS |

| | |
|---|---|
| | assignment box. |
| January 2005 | **Data analysis**<br>The questionnaires responses were analyzed |
| June – Nov 2005 | **Developing applications – pilot website for WSU IS department**<br>During this period the IS department website was developed. The course material in the Intranet is managed by a LMS. Formative evaluation of the website was conducted and the website was revised. |
| March – May 2006 | **Designing interview schedule**<br>The interview schedule was designed and two focus groups were interviewed on the second week of November. The summative evaluation was conducted just before the second semester exams. |
| October 2006 | **Publishing of the website to IS students**<br>The website was published to the IS students. The students booked time slots in the university walk-in laboratories in order to access the website. Tutorial sessions were used to familiarize the students with the LMS. At first students were not familiar with registering into the course but later on the matter was resolved. |
| November 2006 | **Conducting interview and Data analysis**<br>The interview was conducted and responses were analyzed. |
| May 2006 –June 2007 | **Write up** |

**Appendix F**

**Course outline**

| | | |
|---|---|---|
| **NAME OF COURSE** | : | **INFORMATION SYSTEMS APPLICATIONS** |
| **COURSE CODE** | : | **INS 2202** |
| Lecturer | : | T. Sabalele |
| Office Hours | : | Mon-Fri (09h00-13h00) and others by appointment. |

INTRODUCTION

Information systems course is presented by the Department of Accounting at the Walter Sisulu University

PRESCRIBED TEXTBOOK

**Stair, R.M.** (2000). *Principles of Information Systems*. 5th edition. International Thomson Publishing Company.

SUPPORT MATERIAL

**Eccles, M.G., Julyan, F.W., Boot, G., and van Belle, J.P.** (2000). *The Principles of Business Computing.* 5th edition. Juta: Kenwyn.

**Laudon, K.C. & Laudon, J.P.** (1998). *Information systems and the Internet: A problem solving approach.* Fort Worth: Harcourt Brace.

- You will need access to a computer for word processing.

PREREQUISITE

Information Systems 2101 or Computer Science 1101

PURPOSE OF THE CLASS

In this class students are exposed to an advanced level of Information Systems concepts. This class will help you learn that Information Systems is an indispensable managerial tool. The class will also help you to build on your careers. The emphasis will be on how businesses are increasingly using Information Systems to plot and implement strategic moves of importance to their organization.

**COURSE OBJECTIVES**

Students will be given the opportunity to:
Understand the functions of different types of information systems and how different levels within an organisation are served by different information systems.
Understand how information inflows can be controlled within organizations.
Understand the importance of information systems security within organizations.
Identify and discuss the ethical and social conflicts created by the widespread use of information systems.

ATTENDANCE

Attendance is strongly encouraged as self-study and class notes may not be enough. The text material is rather voluminous, thus limits the success achievable by cramming only.

ASSESSMENT

Two regular tests, case studies, tutorials and a final exam will be administered. If you miss a test for any of the following reasons: sickness or death in the family, you will have to produce accompanying documents so as to qualify for a supplementary.

GOLDEN RULES

Students will be allowed to write a supplementary test three working days after writing a test. Failure to do so means forfeiting any chance you might have of writing that supplementary. The onus is on each student to watch the departmental notice boards to see when the supplementary will be written.

NB: TO ALL FINAL YEAR STUDENTS

Those students who are in their final year of studies are entitled to an automatic supplementary. A student who fails an automatic supplementary is **NOT** by any means entitled to another supplementary be it written or oral (see ***Walter Sisulu University Prospectus rule G.13.6)***. If you fail to present yourself for automatic supplementary for whatever reasons, you will not be granted another chance.

COURSE CONTENT

Introduction to Management Information Systems: this includes concepts and issues as they relate to management and organizational theories, current trends in MIS, managerial and design tools.
1.1 Transaction Processing Systems
1.2 Functional aspects of Information Systems.

2. Strategic Information Systems: Utilizing Information Systems for strategic decision in organizations.
2.1 Electronic Commerce.
2.2 Internet, Intranets and Extranets.

3. Controls in Accounting Information Systems.

4. Introduction to Accounting packages such as Pastel.

5. Introduction to knowledge based information systems
5.1 Decision Support Systems.
5.2 Artificial Intelligence and Expert Systems.

6. Systems Development in Perspective

7. Security, Privacy, and Ethical Issues in Information Systems.