EVALUATING THE INTEGRATION OF ICTs INTO TEACHING AND LEARNING ACTIVITIES AT A SOUTH AFRICAN HIGHER EDUCATION INSTITUTION

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DECLARATION

I, the undersigned, hereby declare that the work contained in this dissertation is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature: ………………………………………. Date: November 2004

ABSTRACT

This study is a structured evaluation of the integration of ICTs (Information and Communication Technologies) in teaching and learning activities at the University of Stellenbosch. Although anecdotal evidence exists of the success of the e-Learning initiatives at the University of Stellenbosch, this study addresses these questions in a more structured approach within the global and local higher education context in order to:

- Improve the e-Learning project (as part of the e-Campus initiative) and other e-Learning initiatives,
- Generate knowledge to improve our understanding of how the e-Learning initiatives work and how people change their attitudes and behaviours because of successful interventions,
- Evaluate the institutional characteristics of successful integration,
- Evaluate the technological environment and, more specifically, the use of WebCT as learning management system, and
- Assess the overall progress of the e-Learning initiatives at the University of Stellenbosch.

This evaluation is done taking the broader global and changing local higher education landscape and, more specifically, the interplay of three of the main global drivers into account. The three drivers discussed are: knowledge as a driver of growth in a networked society, the information and communication technology revolution and new competitors in the higher education marketplace The first part of the study is therefore a literature review of the changing global higher education landscape, with a specific focus on how these changes are contextualised within the unique South African post-1994 higher education landscape.

After considering the global and South African higher education landscape, the study then provides a critical overview of the status of the integration of ICTs into teaching and learning activities world wide, the possible benefits of the integration of ICTs into teaching and learning activities and the implications of these changes for the lecturers, students and the higher education institutional and technological environment.

These overviews of both the global changing higher education landscape and the integration of ICTs into teaching and learning activities serve as the backdrop for the case study and retrospective assessment of e-Learning initiatives at the University of Stellenbosch. The study contains a description of the e-Campus initiative, the e-Learning project and other e-Learning initiatives. In the retrospective assessment, the main focus of the study, I make use of quantative and qualitative methods to analyse the results of two Web surveys administered to students and

lecturers who use WebCT. These results are integrated with other data sources to assess the progress made at the University of Stellenbosch.

This retrospective assessment of the e-Learning activities at the University of Stellenbosch, set against the backdrop of the global changing higher education landscape, enables me to make general recommendations for:

- Dealing with changes in the higher education context on an institutional level as a result of the three forces discussed,
- Integrating ICTs at the institutional level in all business process at a higher education institution,
- Integrating ICTs in teaching and learning activities, paying attention to the enabling institutional and technological environment, as well as to good teaching and learning practice, and
- Improving the implementation of the e-Campus initiative and, more specifically, the e-Learning project and other e-Learning initiatives at the University of Stellenbosch.

OPSOMMING

Hierdie studie is ‘n gestruktureerde evaluering van die integrasie van IKTs (Informasie- en Kommunikasietegnologieë) in leer- en onderrigaktiwiteite by die Universiteit van Stellenbosch. Alhoewel daar wel anekdotiese bewyse is dat die e-Leer inisiatiewe by die Universiteit van Stellenbosch suksesvol is, spreek hierdie studie die vrae binne ‘n gestruktureerde benadering aan met inagname van die globale en plaaslike hoër onderwys konteks om:

- Die e-Leer projek (as deel van die e-Kampusinisiatief) en ander e-Leer inisiatiewe te verbeter,
- Kennis te genereer om ons begrip van hoe e-Leer inisiatiewe werk en hoe mense hulle houdings en gedrag as gevolg van suksesvolle intervensies verander, te verbeter,
- Die institusionele eienskappe om sukses te behaal met die integrasie, te evalueer,
- Die tegnologiese omgewing, en meer spesifiek die gebruik van WebCT as leer bestuurstelsel te evalueer, en
- Die totale vordering met e-Leer inisiatiewe by die Universiteit van Stellenbosch te evalueer.

Hierdie evaluering word gedoen met inbegrip van die breër globale en plaaslike veranderende konteks, met spesiale inagname van die wisselwerking tussen drie van die hoof globale drywers. Die drie drywers wat bespreek word is: kennis as drywer van groei in ‘n netwerksamelewing, die revolusie in informasie en kommunikasie tegnologieë, en nuwe kompetisie in die hoër onderwys landskap. Die eerste deel van die studie is dus ‘n literatuuroorsig van die veranderende globale hoër onderwys landskap, met ‘n spesifieke fokus op hoe hierdie veranderinge binne die unieke Suid-Afrikaanse hoër onderwys landskap ná 1994 gekontekstualiseer word.

Na ’n oorweging van die globale en Suid-Afrikaanse konteks, voorsien die studie ‘n kritiese oorsig van die status van die integrasie van IKTs in leer- en onderrigaktiwiteite wêreldwyd, die moontlike voordele van die integrasie van IKTs in leer- en onderrigaktiwiteite en die implikasies van hierdie veranderinge vir dosente en studente, sowel as vir die institusionele en tegnologiese omgewings van hoër onderwys.

Hierdie oorsigte van beide die veranderende globale hoër onderwys landskap en die integrasie van IKTs in leer- en onderrigaktiwiteite verskaf die agtergrond vir die gevallestudie en retrospektiewe evaluering van die e-Leer aktiwiteite by die Universiteit van Stellenbosch. Die studie bevat ‘n beskrywing van die e-Kampus inisiatief, die e-Leerprojek en ander e-Leer inisiatiewe. In die retrospektiewe evaluering, wat die hooffokus van die studie uitmaak, maak ek gebruik van kwantitatiewe en kwalitatiewe metodes om die resultate van twee vraelyste te

ontleed wat aan studente en dosente wat WebCT gebruik, versprei is. Hierdie resultate is geïntegreer met ander databronne om die vordering wat reeds aan die Universiteit van Stellenbosch gemaak is, te evalueer.

Hierdie retrospektiewe evaluering van die e-Leer aktiwiteite by die Universiteit van Stellenbosch teen die agtergrond van die veranderende globale hoër onderwys landskap, stel my in staat om algemene aanbevelings te maak om:

- Op institusionele vlak veranderinge te hanteer wat ‘n resultaat is van die drie kragte wat bespreek is,
- IKTs op institusionele vlak in alle besigheidsprosesse van die instelling te integreer,
- IKTs in leer- en onderrigaktiwiteite te integreer, terwyl aandag geskenk word aan die institusionele en tegnologiese omgewing wat dít moontlik maak, asook aan goeie leer- en onderrigpraktyk, en
- Die implementering van die e-Kampus inisiatief, en meer spesifiek die e-Leer projek en ander e-Leer inisiatiewe by die Universiteit van Stellenbosch, te verbeter.

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CHAPTER 1: INTRODUCTION

1.1 FINDING THE RIGHT RESEARCH QUESTION

Change in the higher education context is a reality, with the interplay of forces such as the global networked knowledge society, the information and communication technology (ICT) revolution and competition changing higher education as we know it. As one response to these forces, higher education institutions world wide started investing vast amounts of money in the integration of ICTs into all their business processes, including teaching and learning activities. In 1998 Sir John Daniel (1998) claimed that the integration of ICTs into higher education institutions could lead to their renewal. This is quite an ambitious claim to make and therefore also tempting to try to find universal answers as to how this renewal process will take place.

Although this study attempts to make general recommendations about the integration of ICTs into teaching and learning activities, I argue that it is not about finding universal answers to questions about the comparative effectiveness (classroom vs online) and costs of technology. Stephen Ehrman correctly argues that those questions assume that "education operates something like a machine" (as cited in White 1999). Ronald Owston, director of the Centre for the Study of Computers in Education at York (as cited in White 1999), asserts that

> … we cannot simply ask 'Do students learn better with the Web as compared to the traditional classroom instruction?' We have to realize that no medium, in and of itself, will likely improve learning in a significant way when it is used to deliver instruction. Nor is it realistic to expect the Web, when used as a tool, to develop in students any unique skills.

Owen (as cited in White 1999) claims that the more appropriate question to ask is: What distinct advantages does an instructional technology offer that instructors can exploit to promote improved learning?

Although Owen's question is useful in that it focuses on the possible benefits of the integration of ICTs into the teaching and learning situation instead of opposing contact (classroom) and online teaching and learning, the institutional context is not included in this question. One cannot consider the use of ICTs in teaching and learning in isolation from the institutional context and policies of a specific higher education institution. A specific higher educational institution is also influenced and shaped by the interplay of the forces / trends affecting the global higher education context. The three main global trends that I address in this study, namely the knowledge society, the ICT revolution and new competitors in the global marketplace, are also relevant for the South African higher education context, as South Africa is part of the global networked economy. Although relevant, it will be argued that these trends present some unique challenges when contextualised within the South African higher education context.

Taking all of this into account, the main research question of this study is therefore:

How does a South African higher education institution, taking cognisance of worldwide trends, effectively integrate ICTs into its business processes and, more specifically, into its teaching and learning activities to promote deep learning experiences for students?

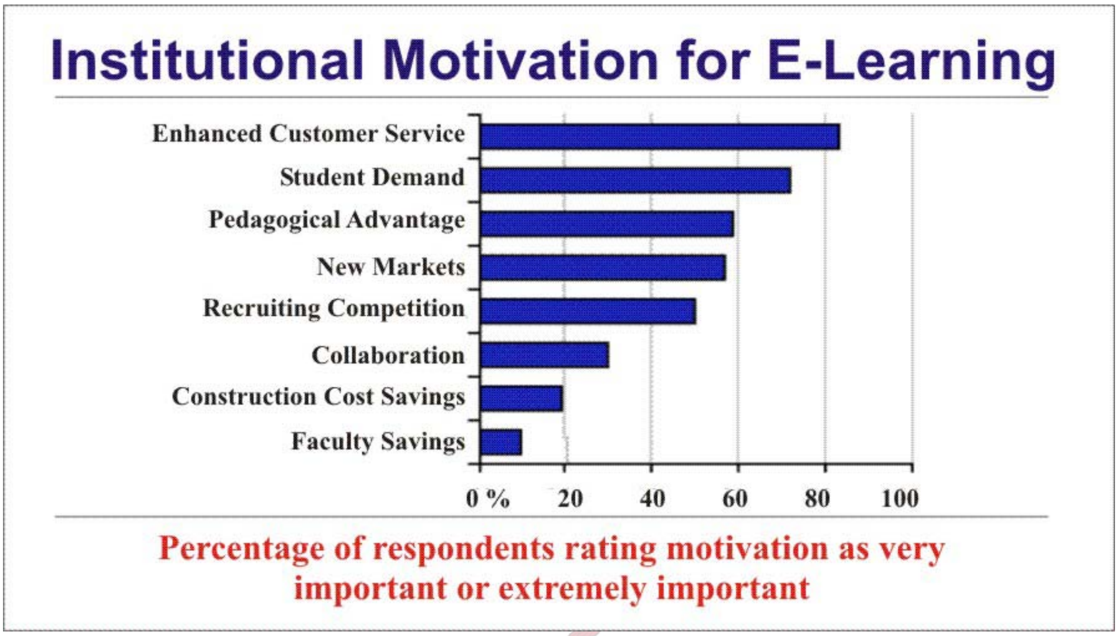
1.2 MOTIVATION FOR THE STUDY

Although many Universities already had stable IT infrastructures in the late 1980s and were using ICTs, e-Learning activities really exploded in the early 1990's following the hype of the dot-com start-up companies, as many people believed they could make money by putting an "e" in front of their business processes. E-learning, e-content and e-delivery of content became the buzz words that signified lucrative business opportunities to many higher education institutions and Internet start-up companies. The primary objective in most cases was profit. In some cases, this focus was only on the "sale" and "delivery" of content, without any attention being paid to quality educational teaching and learning activities.

Unfortunately for most of these companies and higher education institutions that were only out to make a profit, the dot-com bubble burst in the late 1990s, leading to huge financial losses. Although these companies suffered huge losses, I argue that, on the whole, this dot-com bubble burst was actually good for the integration of ICTs into higher education. It led to a more realistic evaluation of the value of the integration of ICTs into teaching and learning activities. With the profit motivation not really the primary motivation anymore, higher education institutions are now forced to critically evaluate the investments made in infrastructure, training and support and to reflect on the real longterm value of the integration of ICTs into their institutions. The critical evaluation of the value of the integration of ICTs into teaching and learning activities as one of the core functions of any higher education institution is therefore a vital issue for any higher education institution to consider.

Higher education institutions have to ask themselves: What is our main motivation for integrating ICTs into our business processes? A study done by the Gartner group in 2001 (Figure 1.1) found enhanced customer service, student demand and pedagogical advantage to be the three most important motivating factors for higher education institutions to invest in the use of ICTs (Yanosky and Zastrocky 2002). The respondents rated cost and faculty savings the lowest. A definite shift therefore occurred from the 1990s with its main focus on profit and cost savings, to a focus on the student's needs as customer and the pedagogical advantage.

Figure 1.1: Gartner study of institutional motivation



Source: (Yanosky and Zastrocky 2002)

The University of Stellenbosch is no exception when it comes to the integration of ICTs into the institution. The integration process started in the late 1980s with the establishment of an IT division, with various early adopters of ICTs in teaching and learning activities. A more coordinated effort to integrate ICTs started with the establishment of Uni-Ed (a division that undertakes faculty development initiatives), the introduction of WebCT as learning management system (LMS) in 1999, the formulation of an e-Campus strategy (1999 – 2001) and the implementation of the e-Campus initiative, a six-year project aimed at integrating ICTs into all business processes of the University, in 2002. The University has made substantial investments in e-Learning initiatives, with an e-Learning project defined as one of the projects within the e-Campus initiative. The University is also providing central funding for e-Learning support and training, WebCT infrastructure and IT support.

Because of these substantial financial investments and an exponential growth in e-Learning initiatives at the University of Stellenbosch, it is important at this juncture to critically look at the issue of the successful integration of ICTs into its core business activities. On a macro level, one has to look at the strategy that drives the implementation of ICTs and, specifically, the e-Learning strategy. I argue that pedagogical advantage (third on the Gartner list) is the main driver at the University of Stellenbosch. If one argues that it is teaching and learning issues, one has to answer the questions: What does it mean to "effectively" integrate ICTs into teaching and learning activities? What are the possibilities to add value to teaching and learning activities? What are the possible benefits for lecturers and students? Is there evidence at the University of Stellenbosch that these possible benefits are realised? At the institutional level, one has to consider the questions: What are the benefits of e-Learning initiatives for the University of Stellenbosch? Are lecturers and students aware of the potential benefits? Are they integrating ICTs to achieve these benefits? What do they consider to be the barriers and challenges? What can the institution do to provide incentives for using ICTs effectively in teaching and learning?

Although anecdotal evidence exists of the success of the e-Learning initiatives at the University of Stellenbosch, this study addresses these questions in a more structured approach within the global and local higher education context in order to:

- Improve the e-Learning project and e-Learning initiatives,
- Generate knowledge to improve our understanding of how the e-Learning initiatives work and how people change their attitudes and behaviours because of successful interventions,
- Evaluate the institutional characteristics of successful integration,
- Evaluate the technological environment, specifically the use of WebCT as learning management system, and
- Assess the overall progress of the e-Learning initiatives at the University of Stellenbosch.

This retrospective assessment has enabled me to:

- Make / formulate general recommendations pertaining to the integration of ICTs for other (South African) higher education institutions, and
- Make recommendations on how to improve the implementation of the e-Campus initiative and, more specifically, the e-Learning project and other e-Learning initiatives.

What has to be kept in mind, however, is that every higher education institution is unique and that the exact approach followed at the University of Stellenbosch will not necessarily be applicable to other higher education institutions. Nevertheless, important lessons have been learnt in the University of Stellenbosch context that could be useful for other South African higher education institutions.

1.3 EVOLUTION OF THE STUDY

Although I only enrolled for the DPhil programme in 2000, the study actually started in 1998, when I was appointed as multimedia adviser at Uni-Ed (Division for University Education). My chief responsibilities included the coordination of all multimedia learning and teaching projects on campus and providing training and support where necessary. The focus on multimedia applications changed at the end of 1998, when we identified a shift away from standalone multimedia content applications used in teaching and learning to a more Web-based approach to teaching and learning. This was the late 1990s and we were also caught up in the hype of e-Learning and Web-based delivery of content. We collaborated with the Universities of Potchefstroom and Pretoria to select a suitable Web-based learning management system (LMS). The University of Potchefstroom decided after the evaluation to develop their own LMS, whereas the University of Stellenbosch and Pretoria decided on WebCT. But even though we decided on the same LMS, our implementation strategies in 1999 differed significantly in two aspects:

- The University of Pretoria (UP) decided in 1999 on a "virtual" campus approach focused on Web-based distance education delivery[1], whereas the University of Stellenbosch's e-Campus initiative followed a hybrid model focused on integrating face-to-face and online activities in a campus-based approach. Web-based delivery for distance education purposes was only used in certain niche areas.
- The UP established a production unit that is responsible for the development of Web-based teaching and learning material for lecturers. The University of Stellenbosch decided to establish a faculty development unit to provide the necessary training and support to enable lecturers to do the development themselves.

After the introduction of WebCT, the University of Stellenbosch experienced an exponential increase in the use of WebCT. Although there was a general level of satisfaction with the infrastructure and support available, this increased use placed added pressure on the infrastructure and also made us aware of the interdependency of all the elements. Everett Rogers (1995) emphasises the interconnectedness of all the elements in the following way:

> No innovation comes without strings attached. The more technologically advanced an innovation is, the more likely its introduction is to produce many consequences, some of them anticipated, but others unintended and hidden. *A system is like a bowl of marbles: Move any one of its elements and the positions of the others are inevitably changed also.* The interdependency is often not fully understood by the adopters of an innovation, and may not be comprehended by the change agents who introduce a new idea in a system (My emphasis added).

[1] It is important to note that although this was the UP's original strategy, their strategy has also since changed to a more hybrid approach with distance education programmes in niche areas. This change was largely prompted by new guidelines and legislation by the Department of Education that aim to regulate residential Universities offering distance education courses. The UP is primarily a residential University and these guidelines and legislation therefore had a direct effect on their distance education programmes.

There was a definite need for coordination, integration and collaboration at institutional level, and this started in 1999 with a strategy formulation phase that included all service organisations, lecturers and students working together to formulate a strategy.

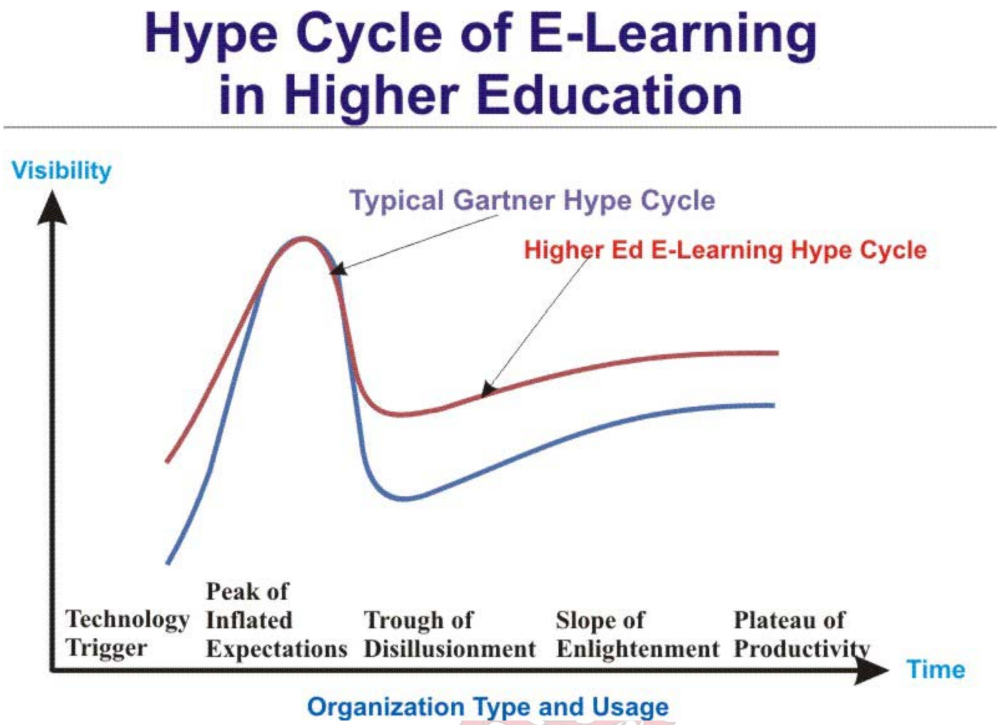
During this strategy formulation phase, I registered for a DPhil in Science and Technology Studies (at the beginning of 2000) and went to the USA to do research at the end of 2000 to the beginning of 2001. In the USA, I became keenly aware of the changing higher education context, the dot-com bubble burst as well as the need for a re-evaluation and critical reflection on the use of ICTs in higher education institutions. I also realised the importance of placing the University of Stellenbosch in the global context while remaining aware of the unique South African issues.

In 2001 it appeared as if the University of Stellenbosch was on the right road with the implementation of WebCT as LMS, as well as in terms of the exponential growth in the use of WebCT. This, along with a stable IT infrastructure, a scalable faculty development, training and support plan as well as an e-Campus strategy (end of 2001), made the University of Stellenbosch appear quite successful in the integration of ICTs into its business processes, especially teaching and learning activities. But studies done world wide in 2001 focused the attention on “what” the LMS is used for. These studies showed that, at most universities, an LMS such as WebCT was used mostly for the delivery of content. This was acknowledged as a small step in the right direction, but these studies also argued that the delivery of content alone does not maximise the potential communicative and interactive benefits of the integration of ICTs into teaching and learning activities. In this regard, the question could be asked whether WebCT is only used at the University of Stellenbosch to deliver content or whether there is evidence of modules and programmes being redesigned as a result of the integration of ICTs?

Furthermore, the e-Learning strategy and e-Campus initiative have definite benefits in the resultant coordination and collaboration, the strategic importance attached to the initiative and the earmarked funding, although there is resistance from some academics in spite of the monetary incentives provided as part of the e-Learning project. The monetary incentives even caused more questions to be raised in some faculties. This type of resistance and critical enquiry is natural and I found the Gartner Hype Cycle (Figure 1.2) quite useful to understand the dynamics at work in the adoption of ICTs in teaching and learning activities in a higher education context.[2]

[2] I discuss the assessment of the University of Stellenbosch in terms of the Hype Cycle in Chapter 7, Section 7.6.

Figure1.2: Gartner Hype Cycle of e-Learning in Higher Education



Source: (Yanosky and Zastrocky 2002)

I argue that the introduction of WebCT was the technology trigger with the resulting peak of inflated expectations (exponential growth of the use of WebCT). I show in Chapter 7 that the University is moving out of the trough of disillusionment into the slope of enlightenment with an increased focus on WHY we are integrating ICTs into teaching and learning activities and how we can maximise the benefits for both students and lecturers.

It soon became clear in this study that it was not enough to define it only in terms of international trends, USA and European studies or a narrative about the process at the University of Stellenbosch. The research project needed to include a structured evaluation of the e-Learning initiatives, both to evaluate what we have achieved and to use the results to inform our further planning of e-Learning at the University of Stellenbosch. The latter half of the thesis therefore presents an analysis of the results of two surveys (lecturer and student) done in October 2003. I used these results and other documentation gathered during the first two years of the e-Learning project implementation to undertake a retrospective assessment of the e-Learning initiatives at the University of Stellenbosch.

1.4 OUTLINE OF CHAPTERS

In order to answer the main research question:

How does a South African higher education institution, taking cognisance of worldwide trends, effectively integrate ICTs into its business processes and, more specifically, into its teaching and learning activities to promote deep learning experiences for students?

the chapters are divided as follows:

Chapter two focuses on providing answers to the first part of the research question. What are the “worldwide trends” in higher education? What does it mean to be a “South African higher education institution, taking cognisance of worldwide trends”? In order to answer these questions, Chapter two is devoted to a literature review covering the changes in higher education, their effect on higher education institutions as well as the specific position of South African higher education institutions. Chapter two takes stock of what is going on world wide, especially with regard to the new higher education providers, and reflects on whether these changes necessarily imply the “death” of the University as proclaimed by Peter Drucker (1997).

Three specific trends are discussed, namely:

- Knowledge as principal driver of growth in a networked society,
- The information and communication technology (ICT) revolution, and
- The business of higher education – new competitors in the market place.

After careful consideration of these three trends, I conclude that, although these trends do necessitate changes in higher education institutions, they do not spell the death of the university. If managed carefully, these trends could lead to the renewal of institutions. Keeping this in mind, I then consider the position of South African higher education institutions in the light of these global trends.

Chapter three, also a literature review, reflects on the question: What does it mean to “effectively” integrate ICTs into higher education business processes and, more specifically, into teaching and learning activities to promote deep learning experiences for students? To answer this question, I first of all consider the current situation with regard to the integration of ICTs into teaching and learning in higher education institutions world wide. I then turn to what is meant by “deep learning experiences” and how the integration of ICTs can possibly promote these experiences. The changing roles of both the lecturers and students as a result of the integration of ICTs are also discussed. Many lecturers fear that they will be replaced by technology, but I argue that the integration of ICTs could in fact lead to a rejuvenation of faculty members. Finally, to effectively integrate ICTs, I consider the enabling institutional and technological environment, specifically the role that a learning management system, such as WebCT, can play in the effective integration of ICTs into teaching and learning activities.

Chapter four outlines the case study of the three-phase integration of ICTs at the University of Stellenbosch: In the pre-strategy phase, the emphasis was on establishing the necessary IT infrastructure, faculty development programme and distance education division, as well as the implementation of WebCT as learning management system (LMS).This phase was characterised by a strong bottom-up growth in the use of WebCT in teaching and learning activities. In the second phase, the strategy formulation phase, the e-Campus strategy (including an e-Learning project) was formulated. This strategy, especially the e-Learning project, was driven foremost by teaching and learning considerations and also forms part of the University's Teaching and Learning Strategy. Although this phase is more "top-down" in nature, every effort was made to consult as widely as possible. The third phase is the strategy implementation phase, which is still ongoing. Analytical frameworks (programme theory, logic model and change theory model), which are also used in the retrospective assessment in Chapter 7, were constructed for these phases. Lastly, I reflect on the changes associated with the shift from a "bottom-up" to a more "top-down" approach, as well as the lessons learnt in the process.

Chapter five presents and analyses the results of an online questionnaire administered to lecturers using WebCT in October 2003. The analysis of the results gives a clearer picture of the lecturers' computer and WebCT literacies, what they are using WebCT for, how often they update their content and communicate with their students, whether they are satisfied with WebCT as an LMS, the infrastructure, support and training, what they perceive to be the advantages and disadvantages of using WebCT, whether they are aware of the possible benefits of the integration of ICTs, what they perceive to be the barriers with regard to the integration of ICTs and what type of (institutional) incentives they value.

Chapter six presents and analyses the results of an online questionnaire administered to students using WebCT in October 2003. As was the case with the lecturers, the analysis of the results gives a good picture of the students' computer and WebCT literacies, their satisfaction with the training, support and infrastructure available, what they find to be the advantages and disadvantages of WebCT, what they consider to be the specific barriers to the use of WebCT and ICTs in general in their learning activities, as well as whether they are aware of the possible benefits of the integration of WebCT.

Chapter seven presents the results of a retrospective assessment in that it integrates the results from the two surveys, the e-Learning project documentation, the feedback from the faculties as well as the observations of the e-Learning project manager. On a micro level, the input, activities, output and outcomes of each of the three phases identified in the University of Stellenbosch context (Chapter 4) are assessed. This is done in order to answer the macro questions related to the improvement of the e-Learning project, as well as to generate knowledge about how programmes work and how people change their attitudes and behaviours because of successful interventions. These answers are used to evaluate the institutional characteristics of the University of Stellenbosch and the technological environment, as well as to do an overall assessment of the e-Learning progress made at the University of Stellenbosch.

This retrospective assessment leads into the conclusion, where I reflect on the main research question in order to make general recommendations for other higher education institutions, as well as specific recommendations for the e-Learning project. Lastly, I include some recommendations for future research.

CHAPTER 2: CHANGES IN THE HIGHER EDUCATION CONTEXT

2.1 CHANGE IN THE HIGHER EDUCATION SECTOR: THE DEATH OF THE UNIVERSITY?

Herbert London, dean of the Gallatin Division of New York University and senior fellow at the Hudson Institute, predicted the "death of the university" in the *Futurist* in 1987. He listed as reasons the end of the baby boom, the rise of alternatives, specifically corporate universities, and public disenchantment with education (Kull and Halal 1999). Ten years later, Peter Drucker proclaimed the death of the university as we know it in a *Forbes* article. Peter Drucker predicted in 1997 that "thirty years from now the big university campuses will be relics. Universities won't survive" (Drucker 1997, p. 127). He argues that the forces of competition, technology, and new dynamics will make the University as we know it, obsolete. James Morrison (1999a) makes a similar point in a more recent work. He argues that the change in society, as we move from an industrial economy (in which competitive advantage was based on capital) to an information/knowledge era (where the capital is knowledge itself and the competitive advantage is innovation and creativity), necessitates a change in education. In today's society, knowledge workers have to continually increase their skills and competencies, thereby contributing to the growth of the education market themselves. Robert Reich (as cited in Gilbert 2001) argues in his seminal work, *The Work of Nations*, published in 1992, that these knowledge workers will make up around 40% of a developed workforce in the knowledge economy and that “the capacity to train, retain and add value to knowledge workers will be the single most important determinant of competitiveness and profitability for companies and nations in the 21st century”.

Apart from the changes necessitated by the knowledge society, experts agree that the information and communication technology (ICT) revolution is one of the most dominant forces driving change today. Momentous changes in the global environment are stretching the traditional time and space boundaries of higher education. The time dimension is altered by the requirement for lifelong learning, and space barriers are falling before the new information and communication technologies, giving rise to non-traditional university models – some consisting of only one office with no other infrastructure.

New university models (virtual, corporate, etc.) and higher education organisational typologies are made possible by the expanded information and communication technology networks world wide. This leads to increased competition in a global higher education market. A lot of hype surrounded these changes and new educational models, especially in the late 1990s, with frequent articles in the *Chronicle for Higher Education* on new universities and educational brokers opening their doors. The February 12th 1997 issue of the *Chronicle of Higher Education* alone contains four articles about the virtues of online learning and the money that can be made with distance education. This higher education "market", where the focus is on making money through mainly distance education, has somewhat stabilised in the 21st century, especially after the stock market crash.

But one cannot dismiss all these changes in higher education as only hype. The hegemony of classical higher education institutions, especially universities, has been definitively challenged by the demands of the knowledge society, the ICT revolution and the new competitive forces in higher education in the form of new higher education providers. Richard Katz et al (1999) argue that higher education institutions' unique economic standing as quasi monopolies is at risk. It is not a question whether higher education will change, but rather how and by whom. When looking beyond the hype at the studies done world wide and the experience gained so far in South Africa, it becomes clear that the traditional university will not cease to exist - only alter its form. The World Bank report, *Constructing Knowledge Societies: New Challenges for Tertiary Education* (2002), predicts that institutional differentiation is bound to accelerate, resulting in a greater variety of organisational configurations and patterns, including the emergence of a myriad of alliances, linkages and partnerships within higher education institutions, across institutions, and even extending beyond the higher education sector. Universities will have to undergo transformations prompted by the application of new education technologies and the pressure of market forces. It is therefore up to traditional universities to see these changes, and especially the new modes of teaching and learning facilitated by ICT, as either serious threats or opportunities.

The higher education sector in South Africa has not been left untouched by these global changes in higher education. These changes, coupled with the political changes and higher education restructuring efforts in the 1990s, present unique challenges to higher education institutions in South Africa. The government is taking full cognisance of the global drivers, but is at the same time conscious of the special challenges a South African higher education faces in a developing country and in the light of the apartheid past. It is therefore important to contextualise the implications of these changes in the South African context.

This chapter will focus on the changing higher education environment, with specific attention to three principal drivers of change selected for this study:

- Knowledge as principal driver of growth in the network society,
- The information and communication technology revolution, and
- Increased competition, with new competitors entering the global higher education marketplace.

After discussing the drivers separately, the combined impact of the three drivers on the higher education sector, specifically on the "traditional" university, will be considered. Lastly, the implications of these drivers and their potential impact will be considered within the South African higher education environment.

2.2 THE CHANGING HIGHER EDUCATION ENVIRONMENT

It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change.

Charles Darwin

Higher education institutions have traditionally prospered without any real change. Clark Kerr of the Carnegie Commission made the following observation about the university's longevity in 1968:

> Taking as a starting point, 1530, when the Lutheran Church was founded, some 66 institutions that existed then still exist today in the Western world in recognizable forms: the Catholic Church, the Lutheran Church, the parliaments of Iceland and the Isle of Man, and 62 universities … They have experienced wars, revolutions, depressions, and industrial transformations, and have come out less changed than almost any other segment of their societies. (as cited in Daniel 1998, p.6)

Although universities are, according to Gilbert (2001), quite robust institutions, he asserts that the "idea of the university" has gone through many manifestations during the past centuries. He does identify the following three enduring characteristics of the university:

- The idea of a university as "a scholarly place where truth is pursued through reasoned, disciplined inquiry, and knowledge valued, preserved, transmitted, advanced and applied".
- The idea of a university as "a cultural bridge across the generations for what Matthew Arnold once called 'the best that is known and thought in the world'".
- The role of the university "as a chartered or licensed monopoly for the assessment and certification of higher learning".

Although relatively unchanged taking the historical perspective into account, higher education institutions can no longer ignore the unprecedented challenges arising from the convergent impacts of globalisation, the increasing importance of knowledge as a principal driver of growth, the information and communication technology revolution, and the appearance of new providers of higher education in the so-called "borderless education" environment, resulting in increased competition in the higher education marketplace (World Bank 2002). Other changes, related to these drivers, include the transformation of modes of delivery and organizational patterns and the rise of market forces in higher education. The important point to emphasise is the convergent nature of all of these drivers and changes. Madelein Green and co-authors (2002) describe the interrelationship between the drivers as follows: “They interact with each other, so that technology intensifies competition as well as enables globalization; similarly, globalization fosters competition.” It is therefore difficult (and even superficial) to separate their impact in separate categories. The three main drivers identified are discussed below.

2.2.1 Knowledge as principal driver of growth in a networked society

Knowledge accumulation and application have become major factors in economic development and are increasingly at the core of a country’s competitive advantage in the global economy (World Bank 2002). Werner Hirsch and Luc Weber (1999) argue that globalisation and, in particular, the rapid growth and development of the "knowledge industry" have been two of the main drivers of higher education.

Hirsch and Weber (1999) argue that the quantity of knowledge seems to double every five years. The implication of their assertion for knowledge workers is that they will have to continually increase their skills and competencies in their particular jobs. This need for "lifelong learning" does not, however, only describe the need for people to continue their education and training throughout life to do their particular job. It also applies to the fact that people will need different skills because they will face multiple careers in changing economies and enjoy longer lives in evolving societies (Daniel 1998). This transformation taking place in the work place and labour market is emphasised by Manuel Castells when he argues that “increasingly the model of stable, long term, employment under contract in the same, or similar, firm or administration is being phased out.“ He argues that the value of workers will “increasingly depend on their capacity to store specialty knowledge, and to reprogram their skills according to changing market demand, which ultimately means education, and cultural development” (Castells 1999, p.4). This leads to the growth of the importance of the so-called earner-learner market – working adults need to continue their education throughout their careers (Cunninghan et al. 2000). Education is no longer separate from the rest of life, but a continuous learning process (Kull and Halal 1999).

This imperative of lifelong learning generates increasing demands for greater access to higher education and maintaining and upgrading skills at lower cost for this “earner-learner” market. This inevitably leads to a change in the nature, age and requirements of the student body.

The traditional boundaries of the university are therefore blurring not only because of technological changes, but also because of the growing demand for education beyond the campus and beyond the undergraduate and graduate years. Universities can now maintain lifelong partnerships, with their alumni forming learning networks wherein the former students are both learners and teachers.

Hirsch and Weber (1999) argue that, in order to act globally and in a competitive environment, the university will have to adapt its programmes to the needs of its students and the knowledge society as a whole. However a study done in Australia, *The Business of Borderless Education*, identifies a dissatisfaction by industry with the responsiveness of traditional providers to the needs of lifelong learners in the knowledge society (Cunninghan et al. 2000).

James Morrison (1999a) argues that the change in society, as we move from an industrial economy (in which competitive advantage was based on capital) to an information/knowledge era (where the capital is knowledge itself and the competitive advantage is innovation and creativity), necessitates a change in education to serve the needs of the knowledge-based economies. The authors of a 2000 World Bank study, *Higher Education in Developing countries: Peril or Promise*, concur with Morrison in that they identify a global move from manufacturing- and service-based economies to knowledge-based economies. The authors of this study (World Bank - Task Force on Higher Education and Society 2000) describe the implications of this change for higher education as follows: “The world economy is changing as knowledge supplants physical capital as the source of present (and future) wealth … As knowledge becomes more important, so does higher education.” This is an opportunity for developing countries, because a knowledge-based economy requires less time, less infrastructure, and less capital to grow. But there is also the danger that developing countries could be left behind if the skills and knowledge to participate are not immediately adopted. Another potential danger is the fact that these global knowledge-based economies are built around sophisticated information and technology communication networks. With the digital divide, developing countries often have no access to this type of infrastructure, and are therefore not part of the global networks (World Bank - Task Force on Higher Education and Society 2000).

Michael Gibbons (1998) observes a shift within the traditional higher education paradigm in the past 20 years, from the Von Humboldt / Newman idea of "pursuit of knowledge for its own sake" (Mode 1) to a more pragmatic, economically-oriented paradigm with the emphasis on service to society, knowledge production, accountability and "value for money" (Mode 2). In this regard, Gibbons identifies a shift in knowledge production to the configuration of knowledge that is being produced in a distributed knowledge production system. He argues that

> knowledge production and dissemination - research and teaching - are no longer self-contained activities, carried out in relative institutional isolation. They now involve interaction with a greater variety of knowledge producers than in the past. In this situation, the connections between the role players will increasingly involve the use of the potentialities of the new information and communication technologies (Gibbons 1998, p.i).

He further argues that, “in order to operate efficiently, universities will need to be much reduced in size, and they will have to learn to make use of intellectual resources that they don't fully control" (Gibbons 1998).

The success of universities depends on how they re-position themselves in the distributed knowledge production system and what type of partnerships they forge (Gibbons 1998). These partnerships include partnerships with businesses, industries and government agencies, among institutions of higher education for sharing knowledge, experience and resources, and with experts at local and global levels (Nasseh 2000), (Petrides 2000), (Lord Dearing 1998). Brown refers to this as a new "knowledge ecology": learning networks which reach beyond the university's resources to transform the university into a learning organisation (Brown 2001).

The metaphor of a “learning organisation” is also used by business analyst, Arie de Guess, to describe successful companies. After studying 27 long-lived corporations, he found that the resilient, long-lived companies are those that exhibit the behaviour and certain characteristics of living entities, especially two sets of characteristics:

> One is a strong sense of community and collective identity around a set of common values; a community in which all members know that they will be supported in their endeavours to achieve their own goals. The other set of characteristics is openness to the outside world, tolerance for the entry of new individuals and ideas, and consequently a manifest ability to learn and adapt to new circumstances (as cited in Capra 2003, p.92).

Again, in order to be successful, the university has to remain a learning organisation – open and connected to networks inside and outside higher education. This necessity of being connected to other networks is further underscored by Manuel Castells’s theory of the rise of the network society. He argues that the recent information technology revolution has given rise to a new economy, structured around flows of information, power and wealth in global financial networks. Castells observes that, throughout society, networking has emerged as a new form of organisation of human activity. He has coined the term “network society” (Castells 1996) to describe and analyse this new social structure. Castells argues that institutions of higher education have a privileged place in this knowledge economy. He argues: “if knowledge is the electricity of the new informational international economy, then institutions of higher education are the power sources on which a new development process must rely” (Castells 1993). This privileged role is with respect to universities’ core activities as both producers of new knowledge (research) and disseminators of knowledge (teaching and learning).

Universities as monopolies, drawing only on their own resources, can therefore no longer be successful in this type of knowledge-based network society. To be successful in the knowledge-based network society the university has to:

- Become part of the global network,
- Form partnerships and interact within the network to be a “learning organisation”,
- Equip itself to deal with change and new forms of knowledge production, and
- Be able to produce graduates who are “knowledge workers” and lifelong learners.

2.2.2 Information and Communication Technology Revolution

The second driver of change is the information and communication technology revolution. Kull and Halal (1999) argue that information technology has become the primary factor enabling unusually rapid technical developments and accelerating advances in all fields. Graham B. Spanier, president of Pennsylvania State University, argues that, in the past ten years, information technology has moved from being primarily a research tool to being a central part of the institutional fabric. “The Web now touches all of the critical process of teaching, research, and administration, and I can't imagine higher education without such technology" (Panel on the Future of American Higher Education 2000).

A new term, “borderless education”, has been coined to refer to these developments enabled by technology which cross (or have the potential to cross) the traditional borders of higher education, whether geographical or conceptual (CVCP and HEFCE 2000). On the geographical level, new information and communication technologies address the issue of improved access in that they expand delivery modes and organisational types to address the needs of the knowledge society. On the conceptual level, the integration of ICT into teaching and learning activities could lead to new and improved educational models. On this level, the effective integration of ICT into teaching and learning activities could add value to existing educational activities. Furthermore, on the conceptual level, borderless could also indicate a blurring of the classical boundaries separating teaching, learning, research, administration, communication, media and play, all brought about by new technologies. Brown refers to this new environment as a new form of "learning ecology" which can be seen as an "active place where the virtual and the physical seamlessly and synergistically coexist" (Brown 2001). The World Bank report also concludes that the ICT revolution has the potential to expand access and improve the quality of instruction and learning at all levels (World Bank 2002).

It is important to distinguish between the two implications of “borderless”:

- ICT as the tool/infrastructure (increased computing power, more sophisticated satellite and wireless technologies, the physical networks, hardware and software) that enables the transmission of information in distributed networks world wide, and

- ICT as the application of these new technologies in higher education institutions and specifically in teaching and learning.

This distinction is often not clearly made and leads to inaccurate statements, such as "the Internet and related technologies really will profoundly transform society". This statement implies that the particular technologies are the decisive agents. Technologies per se do not have any transformative powers. The potential for transformation arises in the ways we, as agents, use these technological developments to effect changes. Stephen Talbott (2003) points out that the process of technological development is ongoing; it is a process with a certain historical character. We are the ones driving it from one stage to the next and determining its character. He argues that, if there is an agent at work, revolutionary or otherwise, it is us (Talbott 2003).

I will now reflect on the impact of these two aspects of the information technology revolution on higher education institutions, specifically on their integration into teaching and learning activities.

2.2.2.1 Impact of technology as a tool

The exploding information and telecommunication technologies offer new potential for producing and distributing knowledge. The improvement of wireless and satellite technologies and reduced telecommunication costs have all but removed the space and time barriers to information access and exchange (World Bank 2002).

The use of Internet technologies in particular to deliver courses means that students are no longer bound by geographical boundaries. This has profound implications for the traditional residential university. Although academics and experts agree that residential universities will not disappear, the influence of ICT cannot be underestimated (Hawkins 2000). Brian L Hawkins (2000), president of Educause, predicts that residential universities will still be significant, but that technology will transform college and university operations. As a result of these technologies, there is a rapid growth of technology-based distance education in a market traditionally strongly dominated by campus-based education (Cunninghan et al. 2000). Richard Katz makes the following predictions about how the information technology revolution will transform higher education:

1. Ubiquitous, high-speed, economically accessible network capacity will exist nationally and, to a great extent, globally.
2. Affordable multimedia-capable computers will be commonplace, and most leading universities will assume student ownership of such devices.

3. US graduate education[3] is and will be an export industry. Colleges and universities that enjoy great reputations can and will attract student bodies regionally, nationally and even globally. The creative application of instructional innovation and advanced technology will open the door to less well known providers of postsecondary education, including those in private industry.

4. Most colleges and universities will deliver some portion of their instructional offerings via communication networks.

5. As the ability to use technology in support of instruction improves, the differentiators of technology-enriched course offerings will continue to be price, quality and access. Institutions that succeed in delivering instruction in a networked fashion will need to move well beyond an educational-TV model of "talking heads". The ability to deliver instruction in ways that meet students' geographical and scheduling needs will become increasingly important.

6. Non-traditional sources of university-calibre instruction, such as software developers and publishers, are likely to become increasingly important suppliers of course content and materials in select and highly remunerative educational niches.

7. Laws that govern intellectual property will change significantly (Katz and Associates 1999).

The majority of these seven predictions focus either just on the technology (points one and two) or on the mechanistic delivery opportunities created by these technologies. Only point three refers to instructional innovation, although it also refers to the delivery mode by mentioning the “export industry” facilitated by these new technologies. These seven points give a very limited mechanistic view of the potential role of ICTs in higher education, because they only focus on technology as a delivery tool and not as an application. Interestingly enough, as we will see in the next section (2.2.3 The business of education – new competitors in the global marketplace), the non-traditional providers who only used ICTs for delivery of content (without any added interactive value) failed miserably in their higher education attempts (See discussion under section 2.2.3.2 Critical success factors of new providers and their impact on the university).

[3] Although Katz focuses on the situation in the USA, it is also important for South Africa to take note of these developments, given the global context of higher education in which all South African universities have to compete.

2.2.2.2 *Potential impact of technology on teaching and learning as application*

Education and learning are often (as we see in Katz's list in the previous section) considered only in terms of information transmission or delivery of content. Because ICTs enable this transmission of content to cross geographical and time boundaries, it is often considered to be the "perfect marriage". The focus on information and transmission is, however, limiting for both education and the use of information and communication technologies.

John Seely Brown (as cited in Devlin 2001) emphasises the social context of learning. For him, knowledge implies the understanding of information rather than merely holding it. Thus, the resources for learning lie not simply in information, but in the practice that allows people to make sense of it and in the practitioners who know how to use it. Teaching is therefore not only the delivery of information, but one has to look at the social context, resources, background and history within which information resides (Brown 2001). Brown (2001) argues that it is the learning communities that are established and nurtured by universities that remove them from the realm of a delivery service or from being mere traffickers of information to being knowledge creators - this is what is fostered in on-campus or online social learning environments.

Diana Laurillard (as cited in Devlin 2001), professor of educational technology and pro-vice-chancellor at the Open University, UK, also advocates a radical shift from the standard transmission model, from teaching "what is known" to teaching "how one comes to know". She uses the "conversational framework"[4] for learning based on a continually iterative dialogue between teacher and student and the constant interplay of theory and practice as a model for teaching and learning.

Michel Resnick (2001), associate professor in the Epistemology and Learning Group at the MIT Media Lab, similarly describes how technology can transform this learning environment. He emphasises the interconnectedness of the knowledge society and digital technology in describing the transition from an "information society" to a "knowledge society". He argues that, in this transition, we realise that the key to change and progress is not information per se, but rather how people transform information into knowledge. He moves up the trajectory to the "creative society", where we find a shift from how much we know to an emphasis on our ability to think and act creatively. It is this creative energy that we can use to take advantage of the possibilities presented by digital technology.

Resnick further argues that one must move beyond an information-centric view of computing and learning. Learning should be seen as an active process in which students construct new

[4] A discussion of the "conversational framework" is provided in Chapter 3, section 3.3.2.

understandings of the world around them through active explanation, experimentation, discussion and reflection. Instead of viewing computers as information machines and ICT as simply transmission of information, ICT can be used in the teaching and learning process for active explanation and experimentation, as well as for facilitating discussion and reflection (Resnick 2001). The essence of higher education is therefore connecting people into learning communities. Sir John Daniel (1998) argues that new technologies, notably the Internet and the WWW, may provide superior ways of creating these academic learning communities. Daniel uses Eisenstadt's (as cited in Daniel 1998) definition of "knowledge media" for today's technologies which are emerging from the convergence of computing, telecommunications and the learning sciences. This definition expands the role that the integration of ICT can potentially play in higher education, from merely delivery using computing and telecommunications, to include the renewal of the teaching and learning process revising the learning sciences.

With this supposed potential of ICTs[5] to transform teaching and learning, the question remains why there is not evidence of a massive change in higher education teaching and learning.[6] Possible barriers include the reluctance of some of the faculty members to change and the absence of real incentives for them to change.[7] Furthermore, the development of adequate infrastructure and effective software to use in teaching and learning also take time. Frank Newman and Jamie Scurry (2001) claim, however, that the software is becoming better, faster, easier to use, cheaper and, most importantly, more reliable[8].

2.2.2.3 E-learning activities in traditional universities

Kenneth Green gives an indication of the scope of the use of ICT at residential universities in the US in his annual *2002 Campus Computing Survey* (http://www.campuscomputing.net). This survey has been done annually since 1994 at residential universities in the USA to measure the extent to which residential universities are using ICTs in all aspects of the University. The 2002 survey, focusing on the use of ICTs in teaching and learning as one of its components, was completed by more than 700 residential universities in the USA. Figure 2.1 indicates the growth from 1994 – 2002 in residential universities reporting the use of:

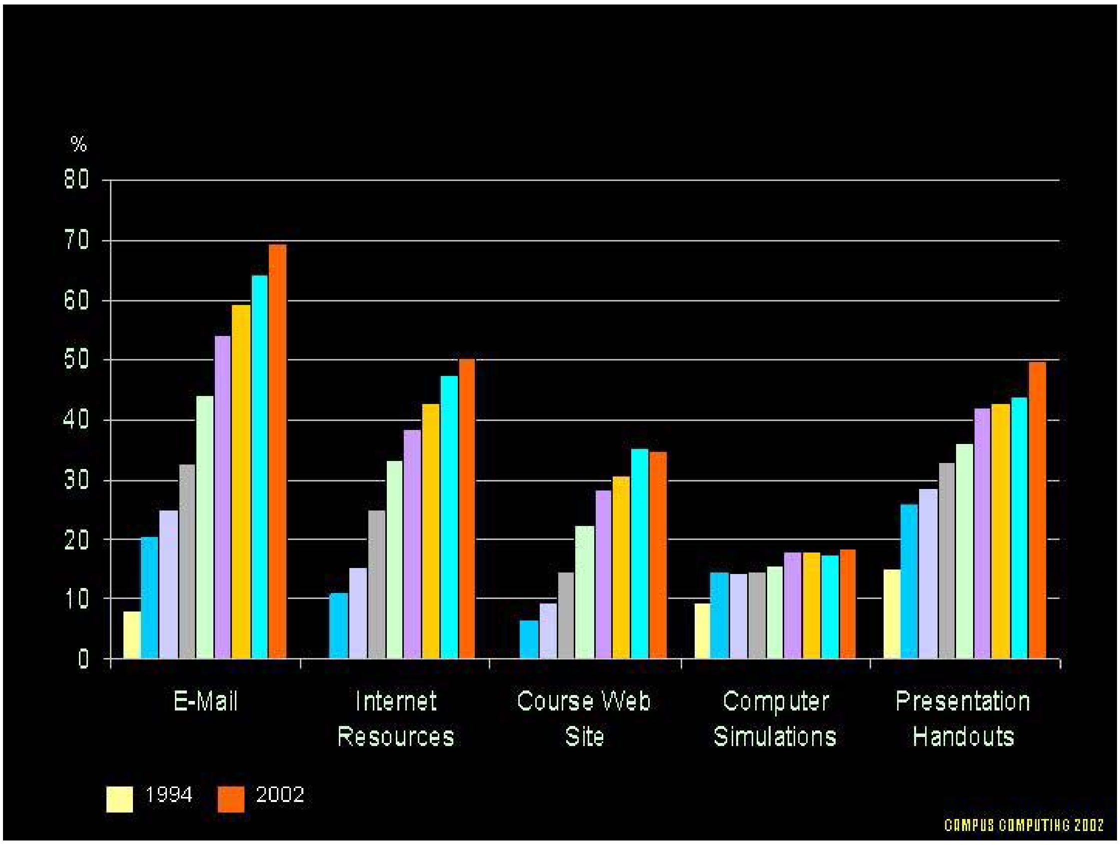
- E-mail
- Internet resources

[5] The potential of ICTs to transform teaching and learning is further elaborated in Chapter 3.
[6] The current status of the integration of ICTs into teaching and learning is discussed in Chapter 3, section 32.
[7] We will return to this point in Chapter 3, when we discuss the challenges and responses in the higher education institutional environment under section 3.6.2.
[8] As a result of this, I will discuss Web learning management software packages, and specifically WebCT, as the backbone of teaching and learning activities in an enabling technological environment in Chapter 3, Section 3.7.

- Course websites
- Computer simulations
- Presentation handouts

Each of the bars for each of these aspects represents a year from 1994 to 2002.

Figure 2.1: Use of ICTs in teaching and learning at residential universities



Source: (Green 2002)

It is interesting to note that the use of e-mail has increased steadily in the eight years from 1994 to 2002, whereas the use of computer simulations has remained stable. A possible explanation for this is that computer simulations are relatively expensive to create and therefore not that widely used.

The trend towards a “mixed system of course delivery” is very well reflected in Figure 2.1. Frank Newman, when speculating about the future changes in higher education as a result of the technology revolution, predicts that we will see “a much more mixed system of course delivery, not simply offering courses either in the classroom or online. What continues to emerge steadily throughout higher education is a trend toward providing an online component in on-campus, traditional courses. Such hybrid courses will clearly play a large role in the years to come" (Morrison and Newman 2003, p.4).

The potential of the use of these e-Learning activities reflected in Figure 2.1 to renew higher education institutions, will however only be realised if they are managed properly. Whereas Frederick Nickols (1999) Kit Taylor (1998) and Phil Agre (1999) concur that technology will transform higher education, they also caution that technology as a tool only holds the promise of improving higher education if managed properly. Issues such as quality become increasingly important and one has to look at quality at the systemic as well as individual teaching and learning programme level.[9] Faculty members will also have to change to take full advantage of the potential of ICTs in the redesign of their academic programmes.

What emerges from the discussion on e-Learning activities in residential universities is:

- The growth in new hybrid models of higher education where online components are integrated into the teaching and learning activities of traditional residential universities as reflected in the *2002 Campus Computing Survey* (Green 2002).
- The need for universities to manage the integration of technology into all activities strategically.
- The need for faculty members to change to take full advantage of the interactive possibilities for teaching and learning offered by the new information and communication technologies.

[9] The importance of a strategy will be discussed in Chapter 4, which focuses on the case study of the University of Stellenbosch.

2.2.3 The business of education – new competitors in the global marketplace

It was the best of times, it was the worst of times,
It was the age of wisdom, it was the age of foolishness,
It was the epoch of belief, it was the epoch of incredulity,
It was the season of Light, it was the season of Darkness,
It was the spring of hope, it was the winter of despair

Charles Dickens, A Tale of Two Cities

The third driver is the increased competitiveness as a result of the new higher education competitors in the global higher education marketplace. Frank Newman and Lara Couturier (2001) argue that the higher education system has historically operated in a heavily regulated and benign market, with only limited pressures for competition, efficiency and innovation. What has changed, however, especially in the 1990s is that market forces have entered higher education. The above authors assert that this entry is unstoppable and ubiquitous and that institutions are being forced to behave as competitors.

The 1990s therefore saw the rapid emergence of new types of higher education institutions, new forms of competition forcing traditional institutions to reconsider their ways of doing things to take advantage of the new opportunities offered by ICTs, and the increased need for lifelong learning created by the knowledge society (World Bank 2002). A lot of hype surrounded the emergence of these new competitors in the 1990s, with e-Learning seen as the "killer application" of the Internet. According to a study done by PricewaterhousCoopers (2000), investors were eager to invest in dot-com educational startups because they believed that the profits would be significant. The American Department of Education estimated in 1999 that higher education was a $225 billion market (Oblinger and Kidwell 2000). This e-Learning “market space”[10] attracted a number of venture capital groups (e.g. CMG@Ventures, BancBoston Capital Inc. and Kestrel Venture Management). Curriculum and content development were provided by university spin-offs such as OnlineLearning.net, NYU Online, and educational publishers (Katz and Oblinger 2000).

It was difficult, especially with all this hype in the 1990s, to establish the real impact of these alternative providers on the “traditional” higher education sector. Matters had stabilised to a certain extent by the early years of the new millennium, with many of the “fly by night” institutions closing their doors and a renewed look at the issues of quality and the protection of students against institutions that offer a qualification without any quality assurance measures in place.

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[10] This “market space” is a very contentious issue in higher education circles - especially in the South African political situation, where it is argued that a higher education system cannot be left to market forces without a plan or steering mechanisms. This will be discussed in more detail in section 2.4 of this chapter.

Higher education institutions world wide are measuring the "real" impact of the "borderless education" developments, mostly in the USA, in order to separate the reality from the hype – especially the hype of the 1990s. The comments of analysts such as Oblinger and Katz above are often dismissed as only hype. Two separate studies were done in 2000 in Australia (Cunninghan et al. 2000) and the United Kingdom (CVCP and HEFCE 2000) to measure the real impact of non-traditional providers on the higher education landscape. The Australian study, *The Business of Borderless Education*, examines the activities of corporate, virtual and for-profit institutions offering educational and training programmes that could be seen to impact on the traditional non-profit university sector, and to consider the implications this could have for Australian universities. It finds that it is a very volatile market (Cunninghan et al. 2000). The UK report, *The Business of Borderless Education: A UK Perspective,* was undertaken in parallel with the study in Australia to measure the impact of the new private for-profit, virtual and corporate providers on the UK institutions (CVCP and HEFCE 2000). Both the studies cite a range of new models that might have an impact on the traditional university. The studies concur that it is not enough for traditional universities to just take notice of the impact of these non-traditional providers on the traditional university - each traditional university has to plan and implement strategies to deal with the competition from the non-traditional providers.

These two reports were, however, done before the dot-com crash in 2000 and 2001. As Oblinger and Kidwell (2000) mention, many of these new universities relied on venture capital and the decline in e-commerce, e-business and telecommunications stock in 2001 had a definite effect on the for-profit education providers and education services companies.[11] In 2001, an Australian update on the *Business of Borderless Education* report was issued. The Futures Project, an initiative of Brown University in the United States, also did an update on the new providers in 2002. These two reports give a more realistic picture of the non-traditional higher education market and the impact thereof on the traditional university.

2.2.3.1 Mapping of the non-traditional landscape from the 1990s to 2002

Articles on the new providers frequently appear in the *Times Higher Education Supplement* and *The Chronicle for Higher Education*, outlining their strategies as well as their status. These articles, the websites of the non-traditional universities and the studies below were used to map the new “non-traditional” higher education landscape from the 1990s to 2002.

1) *The Business of Borderless Education*, a study done by the Department of Education, Science and Training (DETYA) in Australia in 2000 (Cunninghan et al. 2000)

[11] I will elaborate more on the influence of the dot-com crash on the Higher Education “market” in the discussion of the critical success factors in section 2.2.3.2.

2) *The Business of Borderless Education: 2001 Update*, done by DETYA in 2001 (Ryan and Stedman 2001)

3) *The Business of Borderless Education: UK Perspectives*, done by the CVCP and HEFCE in the United Kingdom in 2000 (CVCP and HEFCE 2000)

4) *The Futures Project: An Update on New Providers*, done by the Futures Group at Brown University, USA in 2002 (Visible Knowledge Project 2002)

This mapping is quite difficult to do because of the dynamic and volatile nature of the higher education market. Where possible, the yearly changes in some of the important issues are indicated in the footnotes. This mapping should therefore not be seen as a snapshot of the non-traditional higher education market, but rather as a moving picture, which had already changed when the mapping was done in 2003. The mapping is, however, useful to:

a) understand the distinguishing characteristics, critical success factors and impact of the non-traditional higher education market; and

b) understand the reality after the hype, the future of e-Learning activities and the management thereof at the traditional university.

The volatility of the higher education market is underscored by the rise in the higher education consultant market, which has specialist services for higher education institutions, providing so-called "intelligence reports" on the impact of these new providers. These consultants, such as the longstanding Gartner Group (http://www3.gartner.com/Init), the relatively new ECAR (part of EDUCAUSE at http://www.educause.edu/ecar/) and the Observatory on Borderless Education (http://www.obhe.ac.uk/), charge substantial subscriber fees for access to these "intelligence reports".

The provider categories used in this mapping, with a brief description of each, are:

1. For-profit universities

1.1 Corporations with universities

<u>Description:</u> The Australian *Borderless Education* study defines the for-profit university as an "educational institution which has as its primary goal profit from selling education and training as a service, and which achieves this through strict business principles of operation: focus on a particular niche client group; developing a specific and limited range of education 'products' and (…) focussing on 'convenience', 'self-service' and 'uniformity'" (Cunninghan et al. 2000 p.16). The major for-profits are listed on the stock exchange. The structure of the university is determined by its mission to educate the workforce and to enrol only working adult students. This model is in response to forces of globalisation and the knowledge-based economy (Sperling 1998).

1.2 Corporatised arms of traditional universities

Description: High-profile traditional universities have created separate for-profit corporations in order to achieve greater flexibility and a means for accumulating capital for investment. Michael Goldstein, an attorney who has been involved in the establishment of several for-profit arms, argues that the following attributes are the fundamental elements for a for-profit subsidiary:

- Academic control remains with the institution and its faculty,
- Marketing, R&D, product delivery and business services reside in the capitalisation entity,
- The structure does not adversely affect either accreditation or state authorisation,
- The venture can negotiate the rules governing the ownership of intellectual property and courseware technology,
- Control is appropriately balanced between the university, the new entity and the investor(s) and strategic partner(s), and
- Economic risks and rewards are appropriately shared, protecting the key interests of the university (The Futures Project 2001, p.13).

Examples include New York University Online and the University of Maryland.

1.3 Alliances: corporates and universities

Description: These alliances are characterised by a company forming alliances with a consortium of well-known and established universities to offer distance learning courses and degrees globally. According to an *Update on Providers* report done by the Futures Project (Visible Knowledge Project 2002), the intent of the venture is “to secure a substantial share of the global higher education market”. Examples include Universitas 21, Fathom Consortium and Cardean University.

2. Corporate universities

Description: Jeanne Meister defines the corporate university as “The strategic umbrella for developing and educating employees, customers, and suppliers in order to meet an organization’s business strategies” (Meister 1998). The authors of the *2001 Update on the Business of Borderless Education* (Ryan and Stedman 2001) maintain that “there remains little evidence that most of these universities are more than rebranded training units”. Meister argues, however, that there is a definite difference between training departments and corporate universities. According to her, training units tend to be “reactionary, fragmented, and decentralized," whereas the corporate university "pulls together all learning in an organization by managing education as a business project" (Morrison 2000).

Corporate universities may operate through their own network of physical campuses (examples are Disney, Toyota and Motorola), as virtual universities (e.g. IBM and Dow Chemical) or through an alliance with existing higher education institutions (as do Bell Atlantic, United HealthCare and United Technologies) (World Bank 2002).

3. Education brokers (also called virtual universities)

Description: Instead of using the classification "virtual", which according to both the Australian and UK Borderless Education studies rather refers to an approach to delivery, I will use the term "broker" to refer to the "hollow organisation which has unbundled services conventionally provided in-house in a university, and sub-contracted these services" (Cunninghan et al. 2000). Examples include Western Governors University, California Virtual University and the African Virtual University.

4. Service companies / content providers/ media companies

Description: Media and publishing companies, libraries, museums and secondary schools have also extended their reach by means of ICTs (Abeles 1998). Media companies, including publishers, collaborate with existing universities in the marketing, design, delivery and accreditation of academic programmes. Many of them also supply some of the shelf content (CVCP AND HEFCE 2000). Examples are Hungry Minds and ProQuest Information and Learning.

For each of these categories (1-4 above), I have chosen representative examples. It is naturally impossible to do a mapping of all of the examples of each of the categories. These examples are, however, representative of the provider categories and the ones most discussed in research on alternative providers.

The mapping is according to each institution's:

- Discipline focus,
- Student type,
- Type of certification offered,
- Mode of delivery, and
- Support structures for students

The mapping furthermore includes:

- Whether the certifications are accredited,
- Partnerships with other universities, companies etc.,
- What type of technology they use (e.g. video conferencing, learning management system), and
- Their status in 2002 – whether they are still in operation or not. In some case the 2003 status will also be indicated.

Table 2.1: Mapping of changing higher education landscape: 2002 status

Example	Discipline focus	Student type	Type of certification	Mode of delivery	Support structures	Accreditation / Job placement / QA	Partnerships	Techno-logy/ LMS[12]	Status
1. FOR-PROFIT UNIVERSITIES									
1.1 NEW UNIVERSITIES									
Apollo Group University of Phoenix (UoP) UoP (online)[*] FLEXNET	Limited range of Management, Information Technology, Education and Nursing programmes	Full-time employed	Degrees	Campus based Online* Hybrid	End-to-end service[13] Virtual library	Own processes Not full accreditation in all states Emphasis on assessment and quality assurance	Thompson Learning (digital content) Institutions in Brazil, China, India and Mexico	Own LMS	2001: High share prices
DeVry University (Previously: DeVry Inc. & Keller Grad School of Mgt)	Mostly IT and Business	Corporate clientele Adults	Undergrad and postgrad degrees	Campus based (small persona-lised classes) Online*	Emphasis on customer service	Emphasis on accreditation of both campus based and online	Becker Conviser Professional Review division, and Ross University (acquired in 2003)	eCollege as LMS	Enrolment rise of 30% in past 2 years
Sylvan Learning Systems Inc	Business, Marketing, Journalism, Hospitality Management, Healthcare, Dentistry and Law	Families, Schools, Industry Working profession-nals	Degrees	Campus based Two-way audio Two-way video Intranet Online	Learning centres	Some of degrees are accredited	Wharton School of University of Pennsylvania Johns Hopkins University (Medical) Southern California Marshall School of Business Universities in Mexico, Switzerland, Chile, Spain, France, bought	Caliber technolo-gy (video-conferen-cing)[14]	Enrolment rose 24% in 2002 Share price losses Caliber filed for bankrupt-cy in 2001

[12] Web-based learning management system
[*] New to operations in 2001, but according to 2002 reports not used anymore.
[13] The end-to-end service is based on the so-called “convenience principle”; which entails that UoP assesses previous courses and qualifications for equivalence for each individual student. This ultimately reduces the cost of an individual degree because of credit transfer.
[14] According to analysts, Caliber should have focused on internet-based instead of video-conferencing technology for delivery to its corporate clients.

Example	Discipline focus	Student type	Type of certification	Mode of delivery	Support structures	Accreditation / Job placement / QA	Partnerships	Techno-logy/ LMS[12]	Status
							National Technological University (NTU)		
1.2 CORPORATE SUBSIDIARIES OF TRADITIONAL UNIVERSITIES (ONLINE)									
New York University Online	Target products in Finance and Management, e.g. Certificate in Management	Corporate market	8-12 hour self-paced modules (originally semester subjects) Certificate Non-credit subjects	Online	Library resources	Not applicable	McGraw-Hill	Click2-Learn Web develop-ment	Folded[15]
University of Maryland College Online	Business & Management, Communications & Journalism Computer Science and Information Systems Mgt Health Leadership training and development services Paralegal studies	Working adult market	Credit and non-credit	Video, audio, text, computer-based	University of Maryland	University and courses are accredited	Not available	WebTycho (Own develop-ment)	Folded[16]
1.3 ALLIANCE: CORPORATES AND UNIVERSITIES									
Universitas21	IT and Business	Corpora-tions and individuals	Master's degrees (MBA and Master's in Information Systems)	Online	Not available	U21pedagogica (accrediting body of the U21 Universities)	18 universities in 10 countries Thompson Publishing	Not available	Development (supposed to start in 2001, but enrolled students only in 2003)
Fathom Consortium	Liberal Arts	Lifelong learners, "armchair autodidacts" & hobbyists	No full qualifications and degrees	Online	Partner institutions	Not accredited	Cambridge University Press, London School of Economics, British Library, Victoria and	Sophisti-cated technology requiring high bandwidth	Folded (10 January 2003)

[15] Initial investment of $20 million in infrastructure. The University still offers online courses as part of normal operations.
[16] The University continues to offer online courses as part of its normal operations.

Example	Discipline focus	Student type	Type of certification	Mode of delivery	Support structures	Accreditation / Job placement / QA	Partnerships	Techno-logy/ LMS[12]	Status
							Albert Museum, Science Museum and the Natural History Museum; Columbia University, New York Public Library, University of Chicago, University of Michigan, American Film Library, RAND Corporation and Woods Hole Oceanographic Institution		
Cardean University (Unext.com)	Business education	Corporations and individuals	MBA	Online	Partner universities	University accredited by the US Distance Education and Training Council MBA accredited by the Illinois Board of Higher Education	Columbia Business School, Stanford University, The University of Chicago Graduate School of Business, Carnegie Mellon, and the London School of Economics and Political Science Thompson Publishing General Motors	Sophisticated online technology	No real profits UNext laid of 135 employees in 2001 (Half of its workforce)
2. CORPORATE UNIVERSITIES									
McDonalds Hamburger University	Strategic training for own employees	McDonalds employees	Bachelor of Hamburger-ology	Campus based Online[17]	Not available	Rigorous training of trainers Constant monitoring of training	Not applicable	Know-ledge-NET	Stable
General Electric Crotonville	Mostly “soft skills” training	GE employees	No full qualifications	Campus based	Not available	Limited internal certification and	Not applicable	Not applicable	Stable

[17] New to operations in 2001, despite the insistence in 1999 that it would not be appropriate for their market.

Example	Discipline focus	Student type	Type of certification	Mode of delivery	Support structures	Accreditation / Job placement / QA	Partnerships	Techno-logy/ LMS[12]	Status
	(leadership, teamwork, conflict resolution, strategic thinking) Limited technical training					accreditation, but GE Crotonville regarded as "Holy Grail" for corporate education			
3. VIRTUAL UNIVERSITIES / EDUCATIONAL BROKERS									
Western Governor's Virtual University	Arts, Learning and Technology "Competency-based education"	Part-time, non-traditional students	Broker Associate and Master's degrees Own Bachelors degree in Business-IT	Online	Advisor-mentors	No accreditation	30 partnering institutions 18 Western States	Online portal – no LMS specified	Under-perfor-ming[18]
California Virtual University	Broker qualifications of partner universities	University-age students	No degree-granting powers	Front-end for more than 100 higher educational entities in California	Dependent on traditional member institutions to provide courses and grant the degrees	No accreditation Great differences in format and quality from different universities' courses	More than 100 educational entities in California Sun Microsystems, Microsoft, Pacific Bell, KPMG Consulting, and International Thomson Publishing	Online portal – no LMS specified	Folded in 1999[19]
African Virtual University	Engineering, Computer Science, Information Technology, Business Studies, Health, and Teacher Training	Students (school leavers) and profession-als	Mostly pre-university (grade 12) courses Few 4-year undergraduate degree programmes	Online satellite technology with learning centres Synchro-nous video broadcast-	34 learning centres with trained facilitators in 17 African countries Digital library	Delivered courses sourced from leading universities in Europe and America	World Bank initiative Partner institutions in 17 African countries Part of global network of	Online portal – no LMS specified	Successful in pilot phase[20]

[18] Reconceived as a teacher-training programme in September 2001
[19] Folded as a result of both political and financial reasons. Governor Gray Davis (Democrat), who replaced Pete Wilson (Republican), who started the initiative, did not support the venture and, as a consequence, did not allocate any state funding to the initiative. The private partnerships were formed by governor Wilson personally and, with him out of the picture, the companies did not want to commit funding to the initiative.
[20] After its successful pilot phase, AVU transitioned from being a World Bank Project to establish itself as an independent non-profit organisation with headquarters in Nairobi, Kenya.

Example	Discipline focus	Student type	Type of certification	Mode of delivery	Support structures	Accreditation / Job placement / QA	Partnerships	Techno-logy/ LMS[12]	Status
			in Electrical and Computer Engineering, and Computer Science to start in 2002	ing, online materials, pre-packaged learning materials on CD-ROMs and DVD, as well as synchronous chat sessions (telephone, e-mail and chat)			leading universities in Europe and America		
4. SERVICE COMPANIES / CONTENT PROVIDERS / MEDIA COMPANIES									
HungryMinds	Generic off the shelf content (Business and IT)	Working adults	No certification – just content	Online	Portal	Not applicable	None specified	None specified	Folded (bought by Wiley and Sons)
ProQuest Co. consisting of: ProQuest Information and Learning (education and electronic publishing) and ProQuest Business Solutions	e-Library services and dissertation publishing	Working adults	No certification – just library sources and dissertation publishing	Online	Library resources in portal environment	Not applicable	Daimler-Chrysler, Ford and GM	None specified	Losses in 2000 and early 2001 Gains in last part of 2001 due to subscription base and dissertation publishing

2.2.3.2 Critical success factors of new providers and their impact on the university

Focus on profitable niche areas

As can be seen from the Table 2.1 above, most of these alternative providers focus on Information Technology and Business disciplines – niche areas in which they feel they can make an impact or make money. Michael Gallagher (2000) refers to this as horizontal disaggregation of the functions of traditional higher education institutions, in that these new providers focus on teaching and learning with a limited range of relevant course offerings. Because of this limited range, they do not have to sustain an extensive infrastructure and library service.

These niche areas are sometimes the most popular and profitable for universities and the impact on the traditional university would therefore be felt in these areas. A study on new providers done in Canada concludes that the danger for the traditional university is not from the "alligator of an open university", but rather the "piranha" attack from small topic or domain niche players (as cited in CVCP and HEFCE 2000, p.34). Danielle Sessa (2001) asserts that “These schools (for-profit providers) read the want ads closely, and they respond by offering courses in subjects such as finance, management, nursing and information technology”. These organisations will therefore be more nimble and able to take small bites out of the educational market and possibly leave very little for traditional suppliers.

Focus on working adult market

However over 77% of the for-profit education providers in the USA are in the certificate and associate degree level market (Breneman, Pusser, and Turner 2000), thereby not affecting the university with degree-granting status. Their student focus is furthermore largely on the adult working market, looking to the lifelong learning needs of the knowledge-based economy, instead of the 18 year old, school-leaving market. Sessa (2001) asserts that “Students who enroll in these institutions care about one thing: classes. They are in their mid-30s. They don’t want frat parties. They want better jobs”.

Despite this claim it is interesting to note that the authors of the *2001 Update* maintain that “The supposed driver of the business of education, the need for constant lifelong learning as a feature of global competitiveness, has failed to convince many corporations, which have preferred more traditional financial solutions to hard times: staff layoffs” (Ryan and Stedman 2001, p.3). The lifelong learning market (a feature of the knowledge-based economy discussed above) has therefore not materialised to the full extent as originally predicted.

Flexible service and the provision of an "end-to-end" service to students

It is clear from the table above that the successful for-profit institutions, such as the University of Phoenix and DeVry (Keller School of Graduate Management), focus on the learners' needs, providing an "end to end" flexible service, student support, accreditation and quality assurance.[21] These for-profit institutions pay close attention to learner needs, focusing on convenience: the learning centres are often close to the work places of individuals, and they offer the potential for banking and transfer of educational credit. John Sperling, who founded the University of Phoenix, emphasises the focus on the learner as the customer when he describes how students are treated at the University of Phoenix: "The student is treated with consideration and respect that a valuable customer deserves. The University is designed and operated to serve the students, not the faculty and the administration"(Sperling 1998).

The authors of the *2001 Update* (Ryan and Stedman 2001) argue that it is this "convenience model" of the University of Phoenix and its for-profit campus-based rivals, with their short terms, vocational curricula, small classes and customer service, that have attracted both students and investors.

The focus of these institutions on learning outcomes also has definite implications for academic planning in traditional institutions. Students will become more accustomed to choosing an institution on the basis of the learning outcomes of a specific academic programme instead of just going to a "brand name" institution. Sperling further argues that traditional adult students need an institution which is "flexible, able to apply new technologies, willing to provide access to all who need it, cost effective and able to thrive without placing a burden on the taxpayer" (Sperling 1998).

The traditional university has not been left untouched by this focus of the for-profit university on the business of education providing a "service" to its "clients". The 2001 updated report finds that the resistance of traditional universities to use the business lexicon has, to a large extent, disappeared. University committees now routinely use the words "product", "brand", and "strategic positioning" without irony or inverted commas (Ryan and Stedman 2001).

Analysts claim that the factors leading to the failure of the Western Governor's and the California Virtual Universities include the wrong choice of technology and the fact that these universities have no direct access to and control of the interaction with students. The fact that the Western Governor's University struggles to obtain accreditation for its courses is a further factor leading to its under-enrolment figures.

[21] These institutions have their own internal quality assurance mechanisms.

Political and personal motivation

Political and personal considerations, as was the case with the California Virtual University (CVU), could also play a role in the success or not of higher education institutions. As outlined in footnote15 under Table 2.1, politics played a big role in the demise of CVU. Carl Irving argues that the CVU was initiated by Governor Pete Wilson in 1997 to increase his chances to win the bid for the Republican presidential nomination in 2000. Neither of these two initiatives was successful (Irving 1999).

Accreditation and quality assurance

Accreditation and quality assurance frameworks are becoming more and more important, but also more complex in the higher education context – not only in relation to virtual universities, but also with regard to so-called "franchise universities", which are not described as a separate category in the mapping above. In the developing world context, however, it is an important category to take note of. According to the 2002 *World Bank Report* (World Bank 2002), there has been a proliferation of overseas "validated courses" offered by franchise institutions operating on behalf of British, American and Australian universities, predominantly in South and Southeast Asia and the formerly socialist countries of Eastern Europe. The cost of attending these franchise institutions is usually one-fourth to one-third what it would cost to enrol in the mother institution (World Bank 2002). This has a potentially devastating effect on developing public higher education institutions in developing countries, as students might choose the cheaper (franchise) option in lieu of the public option. In a recent survey in India it was found that 46 of 144 foreign providers advertising higher education programmes in the newspapers were neither recognised nor accredited in their countries of origin (Powar and Bhalla 2001). There is therefore a definite need for quality assurance in the global marketplace - a need for global standards and principles, but also an acknowledgement of the complexity of global quality assurance mechanisms.[22]

The American for-profit universities are the major lobbyists for faster resolution of the WTO 1994 agreement on recognising education as a tradable commodity, with higher education becoming an issue for the General Agreement on Trade in Services (GATS) (Knight 2003). This is a complex international regulatory process which, according to the authors of the *2001 Update* (Ryan and Stedman 2001), "go(es) to the heart of national interests, quality regimes, and funding mechanisms to support the public subsidy of education". In an article titled, "The unauthorised chapter of the Dearing Report", Lord Dearing predicts an increased role for governments to

[22] It is not only the for-profit and e-learning environments which have demonstrated that the current quality assurance frameworks are not adequate. The different quality issues involved in distributed learning also need to be addressed. Organisations such as the Commonwealth of Learning and the Pew Learning and Technology Program attend specifically to these issues. It should, however, be noted that although attempts are made to define "global" standards, the complexity of defining "global standards" should not be underestimated.

proactively support their institutions as education become a tradable service (Lord Dearing 1998). Jane Knight outlines the position for and against GATS as follows:

> Some view GATS as a positive force, accelerating the influx of private and foreign providers of higher education into countries where domestic capacity is inadequate. Other take a more negative view, concerned that liberalisation may compormise important elements of quality assurance and permit private and foreign providers to monopolise the best students and most lucrative programmes (Knight 2003, p.5).

Critics furthermore view GATS as a threat to the government role and "public good" aspects of higher education (Knight 2003).[23]

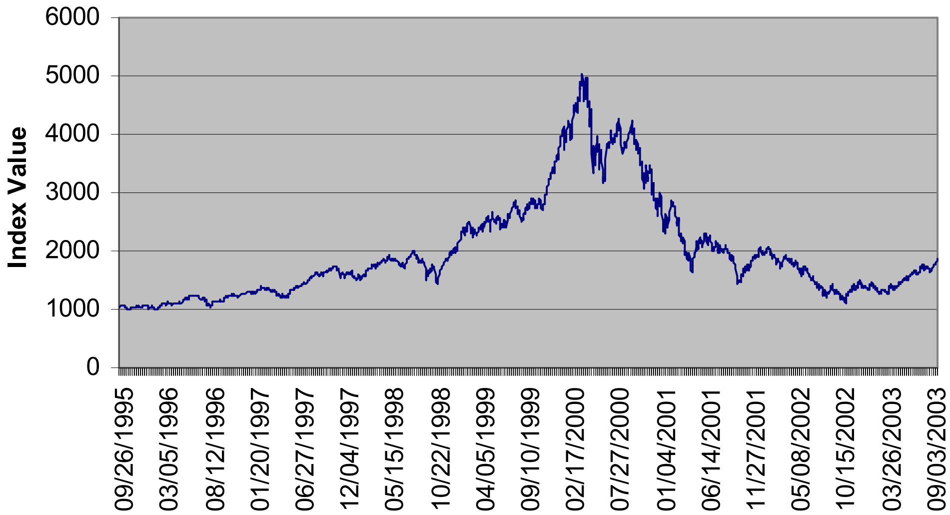
Sale of online content and quick profit

As can be seen in Table 2.1, the providers who focused just on selected generic off-the-shelf content were less successful – most of them suffering great losses after the dot-com crash in 2001. The established for-profit institutions, such as DeVry, Apollo and Sylvan, which have reliable cash inflows as a result of government financial aid programmes and employer-paid tuition, weathered the economic downturn in the USA well. As can be seen from the table, their share prices were at near highs in late 2001 (Ryan and Stedman 2001).

The authors of the *2001 Update* (Ryan and Stedman 2001) claim that a lot of the hype of higher education was built on this technology related stocks that climbed sharply in the late 1990s. Frank Newman (Morrison and Newman 2003), current director of The Futures Project at Brown University, claims in an interview with James Morrison that "many companies that expected to make huge amounts of money by providing technology for teaching have backed off, gone out of business, or shut down operations". Figure 2.2 below, the Nasdaq Composite Index: 1995 – 2003 (http://www.nasdaq.com), provides a graphic illustration of the steep rise of technology-related stocks in the late 1990s and then the severe downturn in 2000, which also had an effect on the education market.

[23] The position on GATS from a South African higher education perspective will be discussed in section 2.4.3 below.

Figure 2.2: Nasdaq Composite Index: 1995 - 2003



Source: (NASDAQ 2003)

The authors of the *2001 Update* of the Futures Project claim that, in 2000, US$482 million in venture capital was spent on companies building online tools aimed at the higher education market. In 2002, this amount dropped to $17 million. A company such as HungryMinds was promoted by *University Business* editor Scott Berinato in March 2000 (and is also explicitly mentioned by Diane Oblinger). It is just one example of a company which could however not survive the economic slowdown illustrated in Figure 2.2. John Wiley and Sons bought HungryMinds in August 2001, at which stage it had debts of $92 million. Lifetime Learning also closed in early 2002, with the Vice President of Communications observing that "people weren't looking for off-the-shelf content but an end-to-end solution" (Ryan and Stedman 2001). This also explains the success of a University of Phoenix model, which provides an end-to-end solution, in comparison to a company that delivers only packaged content.

The focus on the sale of online content was furthermore hurt by the emergence of open source code[24] and the emergence of free resource banks of online teaching materials. As Bill Minor, Senior Director of Marketing for Pennsylvania State University Outreach, notes, "The economy is down … there is not as much market demand and there is more competition, some of it free" (Phillips 2001). Open source developments and free course materials are definitely challenging the traditional notions of competition, markets and intellectual property (Slaughter, Kittay, and Duguid 2001).

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[24] MIT's Open Knowledge Initiative is the development of an open source learner management system in a consortium of Stanford, Harvard, Pennsylvania, North Carolina, Dartmouth, Cambridge and IMS.

One of the prime examples is the MIT initiative, OpenCourseWare, which aims to make MIT course materials for both undergraduate and graduate subjects available on the web, free of charge, to any user anywhere in the world. They argue that this content will not be a substitute for an MIT education. MIT argues that the most fundamental cornerstone of the learning process at MIT is the interaction between lecturers and students in the classroom, and amongst students themselves on campus. This interaction is therefore one of the vital components of an education, and distinguishes e-content (delivery of content) from e-Learning (focus on interactivity) (The Futures Project 2002).

Another example of free online content is the Merlot Project (www.merlot.org), a peer-reviewed database of teaching materials, established by the Faculty Online Technology Training Consortium at the University of Maryland (Ryan and Stedman 2001).

Market analysts who were previously very optimistic about the prospects for profit from online education are now conceding that the distance education market is "not as large as some had projected" (Stokes, T, and Gallagher 2000).

Partnerships

There is also an increase in partnerships in the higher education market (evident in Table 2.1) and it seems as if successful partnerships could be an indicator of success. Richard Katz and co-authors (Katz, Ferrara, and Napier 2002, p.12) identify the following principles of successful partnering:

- The partnership is a top priority for all entities involved in it.
- All partners recognise speed (in decision making, in action, and in market delivery) as a core value.
- The partnership agreement incorporates and memorialises elements that originate from the different partners. The agreement truly captures the consensus of the partners and serves as a touchstone for numerous downstream implementation decisions and actions.
- Personnel are well-prepared, and membership in the core project team is stable. Customer and employee impact driven decision making.
- Efforts to integrate operations, marketing and processes are aligned with the broader partnership intentions, expectations and motivations.

Maynard Robinson and Stephen Daigle argue that although partnerships have the potential to be extremely valuable to "increase institutional resources, augment expertise, and discover new ways to conduct business and provide services" (Robinson and Daigle 2000, p.29), a "commitment" to a partnership alone is not sufficient. They argue that an organisational readiness assessment has to be done before a university enters into a public-private partnership. These partnerships have “cultural and procedural implications as well as financial and economic ones”. Higher education institutions are at times described as “adhocracies” or “loosely coupled organizations” that have to undergo quite considerable adjustments to align with partners’ visions and goals (Katz, Ferrara, and Napier 2002). The success of the partnership is, according to Robinson and Daigle (2000), often directly related to the university’s preparation and an assessment of the readiness of the institution prior to any formal agreements. Other reasons why partnerships might fail include:

- Loss of champions (e.g. when a dynamic leader leaves)
- Disagreement over the distribution of returns (or losses)
- Inadequate financial due diligence
- Clash of organisational cultures
- Clash of leadership vision and style
- Inadequate information technology infrastructure (Katz, Ferrara, and Napier 2002, p.11)

The much touted Universitas 21 still has to open its doors, but it will be interesting to see whether it will be successful. According to the authors of the *2001 Update* (Ryan and Stedman 2001), it is unclear how U21pedagogica, Universitas 21’s accrediting body, will be able to call on sufficiently wide expertise to validate proposed programmes without the deep expertise that a comprehensive university uses in its usual accrediting procedures. These procedures normally proceed from department level, where the expertise resides, through the various academic bodies of the university. Accreditation and degree-awarding status are definite critical success factors. California Virtual University was only the front-end for the hundred-plus higher educational entities in California. It did not grant degrees, provide accreditation or assess quality, and consequently did not last very long (Athey 1998).

Corporate universities

As can be seen from the corporate university examples in Table 2.1 (also reflected in general in the statistics), the corporate university market is doing well. Experts are predicting that, by 2010, there will be more corporate universities than “traditional”[25] campus-based universities in the world and that an increasing proportion of them will be serving smaller companies rather than corporate giants (World Bank 2002), (Abeles 1998). However, few are officially accredited and can grant formal degrees. Questions can certainly be raised whether the term “university” can

[25] It is becoming increasingly difficult to define a “traditional” campus-based university.

apply in this case and whether a "Bachelor of Hamburgerology" qualifies as a higher education certification (Cunninghan et al. 2000). The use of the term "university" is therefore misleading. The subject coverage of these corporate universities is narrow, practitioners rather than academics act as tutors, and links to academic research are rarely part of curriculum design and content (CVCP and HEFCE 2000). Therefore, although successful, they do not pose a serious threat to the traditional university.

It is interesting to note that universities are not, as predicted, forming partnerships with corporate training units – only 16% of the training contracts are with universities, compared to 37% with training vendors. Corporate training units therefore prefer to partner with training vendors when it comes to their training needs. The authors of the *2001 Update* (Ryan and Stedman 2001) argue that this should not be seen as an indication of the university's reluctance to provide short courses or degree programmes for corporations, but rather that so much of the corporate training market is focused only on new product training and low level IT training. On the other hand, Jeanne Meister believes that universities often do not create programmes quickly enough to satisfy the needs of companies. She claims that the "obsolescence of knowledge" is one of the driving forces behind the development of corporate universities (Cited in Morrison 2000).

Choice of technology and model of delivery

The choice of technology and mode of delivery is also an influence in determining the success of these alternative providers, as well as their potential impact on traditional universities. Joseph Schumpeter argued 60 years ago that technology created the opportunity for a fundamental shift in the nature of competition, thus threatening the lives of existing organisations (Schumpeter 1942). Clayton Christensen updated this idea 50 years later with his description of "disruptive technologies". He argues that these "disruptive technologies", in their first iteration, have different benefits and often lower costs, but they still need refinement to become competitive (Christensen 1997). Frank Newman and Laura Coutorier (Newman and Couturier 2001) argue that this is exactly the pattern by which the use of technology for learning is evolving in higher education. They assert, "While its use is growing rapidly, it is, in its present form, primitive compared to the obvious potential. Each month sees new applications that are better, more exciting for the student, less costly, more reliable, and easier to use"[26]. The influence of technology, specifically Caliber, the video conferencing technology used by Sylvan Learning Systems, contributed to the losses leading to Caliber filing for bankruptcy in 2001.

[26] This not only applies to the technology itself, but also to how the technology is used in the teaching and learning process to add maximum value to the learning process. We will return to this discussion in Chapter 3.

Hybrid models

It is interesting to note in Table 2.1 that the combination of campus-based and online delivery is a feature of all of the successful alternative providers. [27] Where brand-name institutions have formed separate online subsidiaries (NYUonline, UMUO), they have largely not been successful. A *New York Times* study of online learning found that many schools' efforts to develop online learning programmes failed simply because they tried "to provide traditional courses in a non-traditional manner". Trying to market a comparable alternative to a "bricks and mortar" education using old business models remains problematic (Christensen, Aaron, and Clark 2001).

Another possible reason for the failure of online subsidiaries is that quality online education programmes from these "brand name" institutions have not delivered the anticipated cost savings at institutional level. The authors of the *2001 Update* (Ryan and Stedman 2001) argue that reputable institutions have not adopted the "mass distribution model of simply putting resources online". According to the *2001 Update* (Ryan and Stedman 2001), staffing costs have therefore increased due to the interactive nature of the online teaching programmes. The expense of technical and administrative support systems has also contributed to the cost.

In general, the economies of interactive online programmes are still unclear (Ryan and Stedman 2001). Sally Johnstone (2002) argues that, too often, "traditional measures to cost technology have reflected whatever conclusion a researcher wanted to reach". She argues that a generally accepted methodology for calculating the costs of alternative technology models is not followed in all cases. To this end, WCET (Western Cooperative for Educational Telecommunications), of which Johnstone is currently the director, and NCHEMS (the National Centre for Higher Education Management Systems) have developed a series of tools based on objective costing measures that have been tested in twenty different types of settings. Some case studies (Pew Learning and Technology Program) have proven that, with the proper redesign of an academic program, cost savings can be achieved (Center for Academic Transformation 2003). However, if technology is only seen as an add-on and there is no redesign, no cost savings can be guaranteed.

The third factor that contributes to the demise of pure online education programmes is a credibility problem. The perception exists that online education is a poor experience. Phillips remarks on the difference between the uptake of e-education and other online activities when he argues that "People have taken to the net quicker than any previous household technology. Still, e-education lags far behind other online activities, such as gathering travel or health information. The promise of e-Learning is great; the barriers, beginning with public trust are as many" (Phillips 2001).

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[27] The advantages of the so-called "brick and click" hybrid model that includes both face-to-face and online teaching and learning activities will be discussed in Chapter 3.

In conclusion, the following critical success factors of new providers emerge from the discussion above:

- Focus on profitable niche areas (Business, Management, IT) and basic skills training.
- Focus on working adult market.
- Flexible service based on a “convenience model”, focusing on the individual learner’s needs.
- The provision of an “end-to-end” service to students, with the recognition and accreditation of prior learning and previous qualifications.
- A focus on e-Learning and online interactivity, and not only the online sale of packaged content.
- Focus on student learning and not just making a quick profit.
- Successful partnerships between universities and between universities and companies, where universities have done a thorough assessment of the impact of the partnership prior to signing any agreements.
- Using appropriate technologies to facilitate online learning.
- Non-traditional university partnerships should not be formed for political reasons or based on personal relationships between individuals and companies.
- Accreditation and quality assurance of new providers and their academic programmes.
- Hybrid models, focusing on a combination of face-to-face and online learning, seem to be the most effective.

The main impact of new providers and the consequences for traditional universities can be summarised as follows:

- The for-profit providers operate in niche areas (mostly Business and IT), which could have a potential impact on the traditional university.
- The alternative providers focus largely on the working adult market, which could be a concern for traditional universities. This concern is, however, lessened by the fact that the working adult market for higher education is not as large as anticipated, because lifelong learning is not as large a factor as expected.
- The skills needed by the workforce are, in most cases, basic training skills, which the traditional university is less interested in providing.

- The business focus of new providers, viewing the students as "customers", has permeated the traditional university, with an increased focus on "customer service".
- Hybrid models, focusing on a combination of face-to-face and online learning, seem to be the most effective and also are the models adopted by traditional universities (see, for example, the MIT example and the fact that UMUO and NYO have incorporated their online activities into their normal operations).
- Placing a face-to-face bricks and mortar course online without any redesign is often more expensive and lowers the quality of teaching and learning activities.
- Redesigned quality online programmes that focus on interaction between learner and lecturer could be more expensive in terms of development and staff costs.

2.3 THE REALITY AFTER THE HYPE: THE COMBINED EFFECT OF THE DRIVERS ON THE "TRADITIONAL" UNIVERSITY

"I know that Harvard has to change. No institution remains at the forefront of its field if it does the same things in 20 years that it does today."

Harvey Fineberg, Harvard's provost

E-learning initiatives (as opposed to just the delivery of e-content) have not ceased. According to the *2001 Update*, there has just been a continued re-assessment of the value of the Internet in education (Ryan and Stedman 2001). At the Futures Project at Brown University, this period after the 1990s is viewed as "a period of realism more than a period of backing off" (Morrison and Newman 2003).

Both the Australian and UK studies concur that traditional residential universities, offering a combination of face-to-face and ICT-enabled teaching and learning, are a threat to the traditional university (CVCP and HEFCE 2000). The Canadian study done by the "Advisory Committee for Online Learning" (the presidents of Canadian colleges and universities and senior business managers) also recommends that, if Canadian universities want to remain competitive, they have to invest in online learning. David Johnston, the chair of the committee, asserts the following: "If Canada doesn't create a top-notch online-education program, … its residents will turn to the many competitors that are on the rise around the world, including established institutions and new, for-profit businesses" (2001). When it comes to the cost issue for traditional universities in this regard, the authors of the *2001 Update* (Ryan and Stedman 2001) argue that, with the rapid blending and convergence of face-to-face and online education, the focus of attention will shift away from comparisons of distinct modes of teaching, towards more fundamental questions about the costs of higher education activities in general.

2.3.1 A mapping of possible shifts as a result of the combination of drivers

With regard to the combined effect of the three drivers discussed, George Subotzky argues that higher education institutions are changing their organisational forms and are operating more as “market-like organizations engaging in ‘academic capitalism’, as a result of the “changing knowledge production, IT advances, the massification of HE and the increasing dominance of globalizing markets and discourse” (Subotzky 2000). He argues that the marketisation of higher education is characterised by increased partnerships with outside knowledge producers, the imperative that academics find outside sources of funding and the so-called “managerialist ethos in institutional governance, leadership and planning” (Subotzky 2000). The three levels of “marketisation” are summarised by Subotsky as follows:

- Epistemological and organisational changes towards applications-driven or strategic forms of knowledge production and dissemination;
- Through this, greater responsiveness to societal needs, with the dominant emphasis on meeting the interests of the private sector market; and
- Changes in institutional management style towards managerialism and entrepreneurial income generation.

According to Mala Singh (2001), this last level of marketisation results in the “tendency to run higher education institutions like income-generating businesses”. She argues that this approach renders fields like the humanities more vulnerable, because they do not have the same income-generation potential as business-related fields (Singh 2001).

In an article aptly named “*Technology, Higher Education, and a Very Foggy Crystal Ball*”, Bryan Hawkins argues that residential campuses will still be significant. But he also states that the traditional markets will be eroded and that institutions will not effectively participate as stand-alone entities. He therefore emphasises the need for partnerships developing distributed learning environments (Hawkins 2000).

Sally Johnstone (2002) identifies a shift from the “cottage industry” model of the university to a “brick-and-click” model, a term coined by Arthur E. Levine, president of Columbia University Teachers College. Johnstone identifies the cottage industry model as follows: “Those in the individual institution have defined, designed, implemented and assessed the entire process of teaching, research, and service as conducted within those walls.” In this model, technology is just used to enhance the existing cottage-based product, rather than considering its implications for the future of the institution. According to Johnstone (2002), for-profit providers, such as the entrepreneurial University of Phoenix, have demonstrated key characteristics of information-age organisations: they are oriented toward broader (sometimes global) markets and they focus on functions in which they excel and can compete effectively. Johnstone argues that the “traditional” university is gradually moving towards the “brick-and-click” model: “they have added a significant layer of technology-based services on top of their traditional structure” (Johnstone 2002).

Especially in the late 1990s, and even today, some of the literature only focuses on the “virtual universities” / “new providers” in opposition to or even replacing the “traditional” university. What I am proposing is a move beyond this opposition between the two “extremes”, towards a position of “complementarity” between the two (“brick-and-click” / hybrid), where online instruction is integrated into “traditional” universities, not to replace face-to-face teaching, but as another tool that lecturers can use to enhance the quality of teaching and learning activities (Vlasceanu and Davies 2001). Fully online courses are often criticised as being “disembodied” educational experiences. This criticism is based on the notion that learning cannot happen when the whole person is not present. Hybrid courses, a mixture between face-to-face and online learning, allow for both classroom community and online community, thus avoiding the criticism levelled at purely online courses (Villanti 2003).

Table 2.2 presents my summary of all the shifts that may occur as a result of the three drivers (knowledge as principal driver of growth in a networked society, information and communication technology revolution, the business of education – new competitors in the global marketplace) that have been discussed. The shifts are categorized according to the following domains:

1. The influence of the market on higher education (external environment),
2. The university as an organisation (organisational domain),
3. Academic programmes / curricula / qualifications,
4. The use of ICTs in the university, and
5. The student population.

The “old” position for each of these categories is reflected on the left hand side of the double arrow, whereas the right hand side presents the “new” position. It is important to emphasise that Table 2.2 only reflects the shifts and does not claim to make value judgements on the two extreme positions. The right hand side should therefore not be seen as the more desirable option. The table is only useful to indicate the general shifts that can be applied world wide.

The double arrow between the “old” and “new” positions represents a continuum between the extreme positions on the left and the right and specific students or universities can and should position themselves anywhere on the continuum according to their specific situation or, in the case of universities, their specific missions. These positions can also vary over time and should not be seen as absolutes. With specific regard to the first category, the influence of market forces, different countries and universities will have different experiences of this influence.

Table 2.2: Possible shifts by domain

Shifts from the "traditional" to the "new" position		
1. Influence of the market on higher education (external environment)		
HE as regulated sector	⟺	HE dominated by market forces
HE as benign environment with limited pressure	⟺	Increased competition between HE institutions and from "non-traditional" providers
"University" lexicon used in HE	⟺	Business lexicon used in HE
Student as student focus	⟺	Student as customer focus
2. University as an organisation		
Cottage industry	⟺	Knowledge ecology
Discipline-focused, "curiosity-driven" academic research – "blue-sky research"	⟺	Trans-disciplinary applications-driven knowledge production and dissemination
University as self-contained, isolated unit (monopoly)	⟺	Partnerships between universities and between universities and private sector University as part of various global networks
Campus-based university	⟺	"Brick-and-click" university as part of learning network
Management style = Collegial management	⟺	Management style = Managerialism with focus on entrepreneurial income generation
University as unchanging / closed system	⟺	University as flexible "convenience" system
"Brand name" of university is enough to ensure quality	⟺	Focus on (global) quality assurance (QA) mechanisms
Institutional QA mechanisms	⟺	Global QA mechanisms
Higher education sector has relative autonomy	⟺	Increased role for governments in higher education
3. Changes in academic programmes / curricula / qualifications		
Only degrees offered	⟺	Degrees and short courses offered

Shifts from the "traditional" to the "new" position		
Focus on certification	⟺	Focus on learning outcomes, competencies
Focus on packaged content	⟺	Focus on providing "end-to-end" comprehensive solution
Face-to-face teaching and learning	⟺	Hybrid: Face-to-face & online teaching and learning
4. Use of ICTs in the university		
ICT mainly used as research tool	⟺	ICT as part of institutional fabric
Technology is used only as tool	⟺	Technology is used as application
ICTs are used to deliver information / content	⟺	ICTs are used for instructional innovation
5. Changes in student population		
Students prepare for one career	⟺	Students prepare for multiple careers
Students obtain one qualification	⟺	Students take part in lifelong learning
Student = 18 years old	⟺	Students are working adults
Students are university partners only while at university	⟺	Students are lifelong university partners as alumni

As can be seen from Table 2.2, there are definite shifts within each domain. With regard to the first domain, the external environment, there is a general trend towards a more demand-driven higher education system with increased competition between institutions. With regard to the university organisational domain, one finds a general shift towards the "new university" that is characterised by a greater openness and responsiveness to the "network" society's needs. The nature of academic programmes, the third domain, is a result of the first two shifts changing their focus to become more diverse in both their certification as well as their delivery modes. ICTs, the fourth domain, are no longer just an add-on to "business as usual", but are becoming an integral part in the total operation of the university. Lastly, we find a shift in the student population as a result of the importance of lifelong learning. James D Duderstadt argues that the concept of student and alumnus will merge in the following way:

> Our highly partitioned system of education will blend increasingly into a seamless web, in which primary and secondary education; undergraduate, graduate. And professional education; on-the-job training and continuing education; and lifelong enrichment become a continuum (Duderstadt 2001).

2.3.2 Possible strategies for the renewal of the university as organisation

The *World Bank Report* of 2002 states that, in many countries higher education institutions are indeed initiating sweeping transformations to align themselves better with new educational demands and competitive challenges. According to this report, the main goal is to “increase institutional flexibility and build up the adaptive capacity of higher education institutions and programs” (World Bank 2002). The authors of the report further argue that,

> (T)hese reforms are all-encompassing, touching on program offerings, academic structure and organization, pedagogical processes and modes of delivery, physical infrastructure, and the teaching profession. Many changes are brought about or facilitated by the application of new technologies. These technologies can be used as pedagogical tools for transforming the learning process; as communication tools supporting new modes of information sharing; as resource tools (electronic libraries, for example); and as administrative tool to improve the efficiency and cost effectiveness of academic management processes (World Bank 2002, p.29).

Diana Laurillard claims that universities will maintain their competitive edge against the knowledge industries through the maintenance of their core values - including research-based teaching and a curriculum that provides for the long-term cognitive needs of individuals - and not necessarily through their degree-awarding powers (Laurillard 2001). Peter Scott cautions that, although universities should be flexible in their approach to avoid redundancy, they should not sacrifice their core values. He argues that “(i)f they abandon their commitment to liberal learning, to critical knowledge, to disinterested scholarship and science – in other words if they sacrifice their core, their fundamental, values on the altar of novelty – universities may not be worth defending” (Scott 2000). James D Duderstadt concurs with this view when he argues that, if markets alone are allowed to reshape higher education, some of the most important values and traditions of the university might be lost (Duderstadt 2001). Jean Barr (2002) similarly argues that the language of the industry needs to be challenged to ensure that the university remains a place where knowledge is advanced and where students also receive some form of moral education applicable to their specific discipline. Although this is a valid concern, 30 American, Canadian and European presidents and rectors largely agreed in an informal poll that:

- Borderless education will not undermine higher education’s capacity to contribute to social development and cultural identity, and
- Policy makers will not abandon the concept of higher education as a social investment (public good) in favour of higher education as a personal investment only (private good) (Green, Eckel, and Barblan 2002).

Steve Wheeler (2000) identifies five key strategies for survival / renewal of the traditional university:

1. Collaboration - between universities and between universities and industry,
2. Investment in new technologies,
3. Development of human infrastructures - staff development,
4. Widening access and exploiting new markets, and
5. Specialisation (Wheeler 2000)

Wheeler argues that universities will need to diversify, innovate, collaborate and invest in human capital in order to survive. Scenario planning, careful economic management, risk and benefit analysis and quality assurance evaluation will become essential activities. Doing nothing, however, is no longer going to be an option (Wheeler 2000). Graham B. Spanier, president of Pennsylvania State University, also argues that "complacency - the sense that the global changes that affect most other institutions won't greatly affect higher education" is one of the biggest mistakes a university could make (Panel on the Future of American Higher Education 2000).

In order to do this, a fundamental change process should take place within traditional universities. Prof James Duderstadt, president emeritus and university professor of science and engineering at the University of Michigan, argues that the most critical challenges facing institutions are:

1. To develop the capacity for change,
2. To remove the constraints that prevent institutions from responding to the needs of rapidly changing societies,
3. To remove unnecessary processes and administrative structures,
4. To question existing premises and arrangements, and
5. To challenge, excite, and embolden all members of the campus community to embark on the adventure (Duderstadt 1999).

Sir John Daniel furthermore emphasises the challenges for governments to develop policies for a world in which traditional funding methodologies and quality assessment procedures for higher education will no longer work (Daniel 1998).

2.4 WHERE DOES THIS LEAVE THE HIGHER EDUCATION SECTOR IN SOUTH AFRICA?

The *World Bank Report* of 2002 states that developing countries are faced with a double task. On the one hand, they have to overcome the existing access, equity, quality and governance problems. On the other hand, they are also exposed to the new challenges arising from the construction of knowledge-based economies and democratic societies (World Bank 2002).

If one considers the three global drivers discussed in section 2.2, we find that the South African higher education system as part of the global higher education system has not been left untouched and that the government is taking full cognisance of the influence of the three drivers discussed.

2.4.1 Knowledge as driver of growth

In the global network society described by Castells, new power relations are defined around the acquisition of knowledge and access to new knowledge. A nation's position in the global information economy is determined by its access to knowledge and information technologies and countries without access become increasingly marginalised. In relation to these countries' opportunities to participate in the global economy, Nico Cloete quotes Fernando Cardoso, who claims that these countries will "not even be considered worth the trouble of exploitation, they will become inconsequential, of no interest to the developing globalized economy" (as cited in Cloete 2000).

Martin Carnoy views higher education as a way for newly industrialising countries (NICs) to become part of this globalised economy. He states that "Higher education has been a crucial component of the newly industrialising countries' (NICs) drive to become part of the global innovation economy and to acquire innovation rents in the global economy" (Carnoy 1998). In this regard, the *1997 White Paper on Higher Education* indicates that the role of higher education in a knowledge-driven world is threefold:

- Human resource development: The mobilisation of human talent and potential through lifelong learning to contribute to the social, economic, cultural and intellectual life of a rapidly changing society.
- High-level skills training: the training and provision of person power to strengthen this country's enterprises, services and infrastructure. This requires the development of professionals and knowledge workers with globally equivalent skills, but who are socially responsible and conscious of their role in contributing to the national development effort and social transformation.

- Production, acquisition and application of new knowledge: national growth and competitiveness is dependent on continuous technological improvement and innovation, driven by a well-organised, vibrant research and development system which integrates the research and training capacity of higher education with the needs of industry and of social reconstruction (Department of Education 1997).

From the second role identified by the *White Paper*, it is however clear that, within the South African context, higher education's role is not only, as Carnoy suggests, to ensure that South Africa becomes part of the global innovation economy. Whereas the *White Paper* acknowledges the issue of global competitiveness and the need to produce the knowledge and graduates to remain competitive in the global network society described by Castells, it also emphasises the "social responsibility" of higher education within the reconstruction and development process in South Africa. The third role mentioned by the *White Paper* also underlines this social responsibility with its emphasis on the needs of both "industry" and of "social reconstruction".

The purpose of the South African higher education system is therefore twofold: On the one hand it has to produce the required knowledge and graduates to remain competitive in the global arena, but it also has to support local social reconstruction and development (Subotzky 2000).

Saleem Badat (2000) poses this dual role as one of the specific challenges in the South African higher education context: "How do we engage with globalisation in a manner which is proactive, and integrate ourselves into the global order in a way that is as far as possible beneficial to us and enables us to pursue the reconstruction and transformation of our society and overcome the ravages of apartheid?"

2.4.2 The information and communication technology revolution

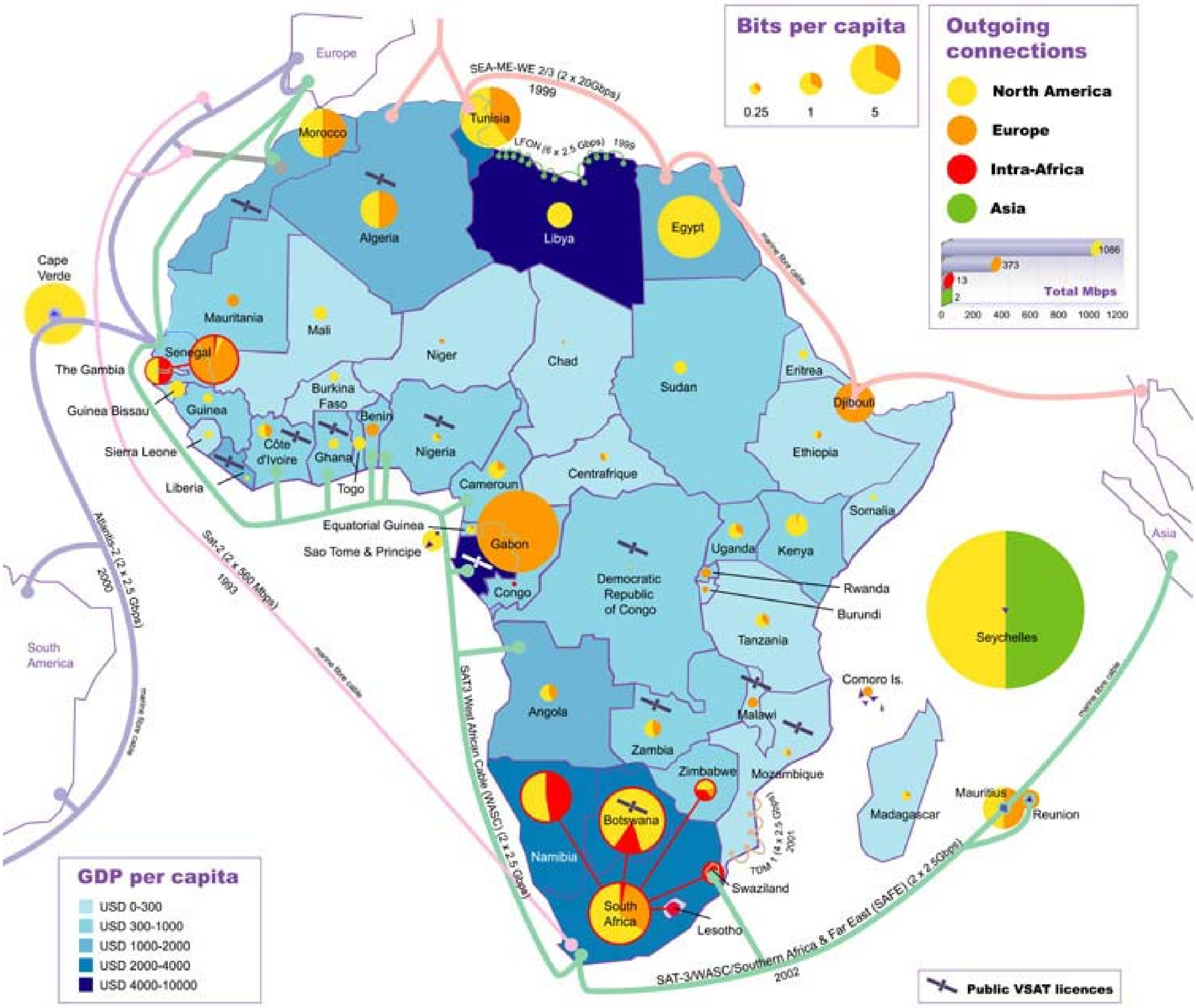
Access to ICTs and specifically the Internet remains a challenge in the African context. According to an *African Internet Status Report* done in July 2002 (Jensen 2002), however, the use of the Internet has grown relatively rapidly in most urban areas in Africa. Whereas only a handful of countries had local Internet access five years ago, it is now available in every capital city on the continent. The number of dialup subscriber accounts is available, but is only a partial indicator of the size of the Internet sector, because a large number of these accounts are shared accounts and the numbers do not include the high use of public access services. Other factors, such as the quantity of international traffic each country generates and the extent of the local Internet infrastructure, should be included to get a more accurate picture of the Internet access.

As of mid-2002, the number of dialup Internet subscribers was close to 1.7 million, with 1.2 million of these subscribers in the Northern African region and in South Africa. That leaves only about 500 000 for the remaining 49 Sub-Saharan African countries. When one takes into account that in

Africa, each computer with an Internet or e-mail connection usually supports three to five users, the total number of African Internet users is estimated at around five to eight million, with about 1.5-2.5 million outside the Northern African region and South Africa. When looking at the total population of Africa, this amounts to one user for every 250-400 people, which does not compare very favourably with a world average of about one user for every 15 people, and a North American and European average of about one in every two people. (The UNDP World Development Report figures for other developing regions in 2000 were: one in 30 for Latin America and the Caribbean, one in 250 for South Asia, one in 43 for East Asia, one in 166 for the Arab States).

Despite these numbers of dialup users, it is important to note that there has been a greater growth in shared / public access and the use of corporate networks. This is reflected in the more than 100% growth in the deployment of international Internet bandwidth, from 700 Mbps in 2001 to 1 500 Mbps in 2002 (Jensen 2002). The main areas of growth are indicated in the map below.

Map 2.1: Africa International Bandwidth



Source: (Acacia Project 2002)

As can be seen from the dial-up subscriber statistics and the international bandwidth map, South Africa is doing reasonably well in relation to the rest of Africa and the world. Although Internet access is still a problem in Africa and cannot be compared to that in Europe or North America, the growth in the past five years has been very encouraging.

The potential role of information and communication technologies to transform higher education has also been recognised by the government. In his *State of the Nation Address* at the opening of the 2001 Parliamentary session, President Thabo Mbeki indicated that the government is giving priority to the development of the telecommunications sector. In order to "get onto and stay on the information super-highway", he proposed the establishment of a Presidential National Commission on Information Society and Development and the establishment of a Presidential

International Task Force on Information Society and Development. President Mbeki also acknowledged the influence of ICT on higher education when he emphasised that "the application of modern communication and information technology in the fields of education, health, commerce and government will be expedited" (SABC 2001).

The importance of ICT, specifically in higher education, is emphasised in the report *Towards a New Higher Education Landscape: Meeting the Equity, Quality and Social Development Imperatives of South Africa in the 21st Century* (CHE 2000). The report outlines the challenge for higher education providers to integrate information and communications technologies as follows:

> One particular challenge that will require explicit attention by all higher education providers is the development of information and communication technologies. The rapid growth and convergence in functionality of these technologies over the last few years is being harnessed by a growing number of higher education systems and organisations around the world. Information and communication technology is allowing for exponential increases in the transfer of data through increasingly globalised communication systems. Information and communication technology networks have significantly expanded the potential for organisations to expand their sphere of operations and influence beyond their traditional geographical boundaries. It is expanding the range of options available to education planners with respect to teaching and learning strategies, design and combinations, and administering and managing education (CHE 2000, p.18).

2.4.3 Competition and the emergence of new providers

The third international driver, the issue of competition and the emergence of new providers, becomes more problematic in the South African context because of the further fragmentation it causes. The South African higher education system is already characterised by fragmentation as a result of the apartheid system. One of the key goals of the *1997 White Paper on Higher Education* was to establish "a single, differentiated and co-ordinated system, which would meet the learning needs of South Africa's citizens and the reconstruction and development needs of our society and economy" (Department of Education 1997). What did emerge in the post-1994 era, however, is greater fragmentation and incoherence in the higher education system. This can be attributed to the persistence of apartheid fragmentation, as well as the unanticipated vigorous campaigns of private education institutions, the proliferation of new private campuses and the growth in telematic education. In this regard, Saleem Badat (1999) identifies a potential problem for the ideal of unity outlined in the White Paper, when he refers to the danger of the "institutionalisation of rampant and even destructive competition" which could "make institutions excessively market-oriented with a mindset of 'marketshare', and ultimately make the achievement of a national, integrated, co-ordinated and differentiated higher education system, a key goal of the White Paper, much more difficult".

As far as the issue of competition is concerned, John Gultig (1999) observes that the public universities soon realised that the high levels of competition from these private institutions would generate new challenges. He continues that, as a result, “Established (mostly historically white) higher education institutions have moved rapidly from a cultural conservatism to symbolise most significantly the new 'entrepreneurial' university. They are unashamedly expanding student numbers and meeting market demands for professionally-oriented courses. They are also making extensive use of new communication technologies and distance education to attract and teach new students" (Gultig 1999).

This fierce competition was largely unanticipated by policy analysts and decision makers in 1997 (CHE 1999). In his *Call to Action* in July 1999, education minister Kader Asmal emphasised an increased role for the state when he stated that the size and shape of higher education "cannot be left to chance if we are to realise the vision of a rational seamless higher education system, responsive to the needs of all ages and the intellectual challenges of the 21st century" (Department of Education 1999). Whereas the *White Paper on Higher Education* acknowledges the role that private institutions can potentially play in expanding access to higher education, it outlines the challenge of regulating the higher education environment. On the one hand, the government does not want to suffocate the educationally sound and sustainable private institutions with overregulation, but on the other hand, it cannot allow a “plethora of poor quality, unsustainable ‘fly-by-night’ operators into the higher education market” (Department of Education 1997).

Professor Kader Asmal made it clear to the portfolio committee on trade and industry in a 2003 presentation on the implications of GATS for higher education that he views the designation of education as service in itself as problematic. He argues that education is not a commodity which can be bought and sold and states that the “public good” agenda cannot be sacrificed to the “vagaries of the market”. He distinguishes between a “reductionist view of education”, according to which education is viewed as “merely an instrument for the transfer of skills” and eduation that must “embrace the intellectual, cultural, political and social development of individuals, institutions and the nation more broadly” (Asmal 2003). He furthermore asks for vigilance to ensure that “increased trade in education does not undermine national efforts to transform higher education”. Higher education in South Africa has, according to him, a central role to play in nurturing the values of our democracy and to help build a critical citizenry. Prof Asmal therefore proposed to the portfolio committee on trade and industry that no commitments should be made in the education sector and asked for a fundamental rethinking of the inclusion of education in GATS (Asmal 2003).

Frank Newman and Lara Couturier compare higher education to a forest and assert that the competition in the higher education marketplace offers the same contradiction as a controlled burn in a forest. They state:

> Imagine a forest of stately trees overgrown by weeds and underbrush. The forest could benefit, even flourish, from a fire – a controlled burn. However, the same fire, if not carefully designed and executed, could blaze into a wildfire that threatens the very existence of the forest. Now imagine higher education as a forest of stately institutions, hampered by the low quality of teaching and learning found in many universities, a lack of responsiveness and innovation, and limited access for significant parts of the population. Competition offers the same contradiction as the controlled burn. If applied wisely, competition can force higher education to fix these problems, but competition also has the potential to threaten crucial attributes of the system. Don't strike that match yet (Newman and Couturier 2002, p.1).

The authors of the draft report, *A New Challenge for Higher Education Policy: Channelling the Power of Market Forces to Achieve a New Vision for Higher Education* (The Futures Project 2001), provide an outline of the definite risks involved in leaving a higher education system to market forces. They put forward the following results of a higher education system left to market forces without any planning:

- Limited access for low-income students, or students who are not "easy to educate," and therefore require a higher investment of resources and funding and less of a likelihood to return profit.
- A two-tiered system, with traditional, high-quality institutions reserved for the elite class and all other institutions serving the "non-traditional" or disadvantaged students.
- A decrease in the quality of offerings as institutions focus more on profitability and less on delivering a high-quality product, which is often quite expensive.
- Loss of those experiences and processes by which higher education stimulates the life of the mind and introduces students to the role of engaged, thoughtful citizen.
- Intrusion of market interests into the areas of research and scholarship.
- More homogenisation of institutions as they conform to industry standards in an effort to compete, resulting in fewer educational alternatives for students.
- Closure of institutions, programmes or disciplines that serve society well, satisfy a unique need, and provide students with real choice, but are expensive to run and are often cross-subsidised (The Futures Project 2001, p.2).

Dick Rosenbloom of Harvard Business School, an expert on the demise of Xerox, cautions that the “great thing about markets is that your customers can lead you over a cliff” (as cited in Slaughter, Kittay, and Duguid 2001). Similarly, one of the participants (30 American, Canadian and European university presidents, vice chancellors and rectors) at the seventh Transatlantic Dialogue noted, “The market is blind and focused on the short term. (By responding to market pressures), no one is attending to the long term” (Green, Eckel, and Barblan 2002).

These issues are all very relevant in the South African context, and although the 1997 Higher Education Act and its successive amendments provide for the existence of private higher education institutions, this Act and its amendments also provide a regulatory framework to ensure that all institutions, including private providers, are financially viable, have the necessary physical and human resources and that their academic programmes meet quality standards. All private providers of higher education have to submit their academic programmes for accreditation (Council on Higher Education 2003).

Between 1998 and May 2002, SAQA (the South African Qualification Authority) accredited 348 programmes of 89 providers. These programmes only had provisional accreditation until December 2002 and the institutions had to apply for re-accreditation to offer these programmes in 2003 (Council on Higher Education 2003). This process of the re-accreditation of private providers was carried out by the HEQC (Higher Education Quality Council) between May and December 2002 and provides the baseline data for the CHE’s 2003 report on *The State of Private Higher Education in South Africa* (Council on Higher Education 2003).

Fifty-eight multipurpose institutions submitted 216 (217 according to the CHE report) programmes for re-accreditation. Table 2.3 provides an overview of the programmes submitted by discipline / field of study. (This table differs from the one in the official report because the numbers in the tables in the official report do not correspond. The values indicated in the original report are indicated in brackets.)

Table 2.3: Discipline focus of programmes

Discipline	Number	Total %
Business administration	55	25.5 (25.3)
Religion	32	14.8 (14.7)
Information technology	30	13.9 (13.8)
Marketing and public relations	27	12.5 (12.4)
Communications and media	20	9.3 (9.2)
Education and training	16	7.4 (7.3)

Discipline	Number	Total %
Graphic and fashion design	14	6.5 (6.5)
Aromatherapy and others	9	4.2 (4.1)
Tourism and hospitality	5 (8)	2.3 (3.6)
Architecture and manufacturing	8 (6)	3.6 (2.7)
Total	216 (217)	100

It is interesting to compare the disciplines of the South African providers with those of the international providers listed in Table 2.1 in section 2.2.3.1. Overall, the same trends emerge with regard to the vocational nature of the programmes and the discipline foci, with business, technology, marketing and educational disciplines dominating. The one interesting exception in the South African context is that religion as a discipline features quite high on the list – even higher than Information Technology. This is an interesting phenomenon and its impact on traditional universities offering religious studies and theology deserves further investigation. The only provider in the USA that provided a liberal arts discipline focus, the Fathom Consortium, folded in 2001.

Despite the fact that the private providers are seemingly operating in relevant niche areas, the evaluators found in the re-accreditation process that there is an uncertain correlation between labour market requirements and programme offerings (Council on Higher Education 2003).

It is furthermore interesting to compare the types of certification offered by the private providers in South Africa with that of their counterparts discussed in the previous section. As we saw in section 2.2.3.2, 77% of the for-profit education providers in the USA are in the certificate and associate degree level market (Breneman, Pusser, and Turner 2000). Table 2.4 below gives an indication of the percentage of each type of certification offered:

Table 2.4: Levels of programmes submitted

Level	Number	%
Certificate	85	39.4
Diploma	93	43
Degree	27	12.5
Master's	6	2.8
Doctorate	5	2.3
Total	216	100

As can be seen from Table 2.4, 82.4% of the total number of programmes submitted by the private providers in South Africa are at the certificate and diploma level – even a higher percentage than in the USA. The 27 degree programmes are in the fields of Religion (2), Marketing (6), Business Administration (4), Graphic design and fashion (4), Communication media and journalism (4), Education and training (3), Information Technology (2) and Architecture (2). The more advanced degrees are in the fields of Religion (5 Master's and 5 Doctorate) and Architecture and Manufacturing (1 Master's).

It is therefore clear that, with regard to non-traditional providers, the South African situation is similar to that in the USA, in that both sets of providers:

- Operate in niche areas, focusing on vocational training, and
- Offer mostly non-degree qualifications.

The main difference between the two countries is the high prevalence of religious programmes offered by non-traditional providers in South Africa. What also differs is the strong role played by the government in the South African higher education system to regulate the new providers.

2.4.4 Response to both global and local drivers

The South African higher education system has to respond to these three global drivers, as well as to "redress past inequalities and to transform the higher education system to serve a new social order, to meet pressing national needs, and to respond to new realities and opportunities" (Department of Education 1997). The question that arises is to what extent the state should intervene in steering the higher education system to achieve these goals. In this regard, the CHE called for research to be done on "international comparative experiences on reconfiguring higher education systems, their rationale, modalities and outcomes and the lessons to be learnt from such experiences"(CHE 1999). What emerged from this research was the *National Plan for Higher Education* (Department of Education 2002), which provides the strategic framework for re-engineering the higher education system for the 21st century. This framework responds to both the international drivers mentioned in the first part of the chapter, as well as to national concerns. It therefore provides the framework for implementing and realising the following organisational issues:

1. Size and shape of institutions to respond to the new realities and opportunities created by the knowledge society, technology revolution and the new higher education competitors (Developing and global concerns),
2. Overall effectiveness, efficiency and accountability of the system and institutions (Developing country concern),

3. Quality of institutions, academic programmes and graduate output (developing country and global concerns),
4. Management, leadership and governance (developing country concern),
5. Equity of access (developing country concern),
6. Broadening the social base of students (developing country concern), and
7. An increase recruitment from SADC (African concern).

To achieve these goals, three principal steering mechanisms were suggested:

1. Planning, e.g. three-year institutional rolling plans,
2. The funding formula, and
3. Quality assurance mechanisms, e.g. institutional and programme accreditation (Department of Education 2002)

There is therefore a strong emphasis in South Africa on government intervention and steering to manage the impact of both the global drivers as well as the local concerns as a result of South Africa's apartheid past. Mala Singh further problematises the concept of accountability and "responsiveness" to local concerns, by distinguising between economic and social responsiveness. Whereas South African higher education should be responsive to the specific needs of the South African economy, higher education also plays an important role in the larger process of democratic reconstruction. She uses the concept "public good" to describe this idea of social responsiveness. She defines "public good" in general terms as "a set of societal interests that are not reducible to the sum of interests of individuals or groups of individuals and that demarcate a common space within which the content of moral and political goals like democracy and social justice can be negotiated and collectively pursued" (Singh 2001, p.9). This is in stark contrast to the institutions in the USA, where higher education institutions are left to focus on internal renewal as autonomous institutions.

Although the higher education sector in South Africa is therefore part of the global higher education scene, it also faces some unique African and South African challenges that necessitate country-specific responses to issues such as equity of access, effectiveness, efficiency, accountability and access to ICTs. Therefore, although South Africa has the best technological infrastructure in Africa, it cannot compete with the high speed Internet connectivity in the USA and Europe. This fact definitely impacts on the role ICTs can play in higher education institutions and, more specifically, in teaching and learning activities. The next chapter will focus on the potential value that can be added to teaching and learning activities through the effective integration of ICTs. This influence of the technological revolution on teaching and learning practice will be contextualised in the South African context in Chapter 4, by looking at the case study of the University of Stellenbosch.

CHAPTER 3: THE INTEGRATION OF ICTS INTO THE TEACHING AND LEARNING PROCESS TO PROMOTE STUDENT LEARNING

3.1 INTRODUCTION

After considering the changing higher education landscape in Chapter 2, I now turn my focus to the influence of the technological revolution on teaching and learning practice in higher education institutions. Various experts (Daniel 1998), (Gilbert 2000), (Twigg 2001) claim that ICTs will change teaching and learning profoundly. William Massy and Robert Zemsky (1995) compare the introduction of technology in teaching and learning to the influence of the printing press.

It is clear from the discussion in Chapter 2 that there are definite changes in the organisational and operational activities of the "traditional" university – also in the area of teaching and learning. Some would argue that these changes, e.g. the 24/7 availability of courses across geographical boundaries, the fact that residential universities are increasingly utilising ICTs in teaching and learning and the fact that students are now able to have a lifelong relationship with the university, constitute a paradigm shift in teaching and learning. These benefits of technology to cross boundaries of space and time are obvious advantages and are often cited in the literature. They are also important advantages leading to (in some cases) cost savings (reduced travel and residential costs) and lifelong learning opportunities for students. Students furthermore have access to enormous quantities of information via the Internet / online databases.

Although the integration of technology has enabled this shift in the delivery of teaching and learning programmes, many of these potential benefits are only focused on ICTs as archiving and delivery tools. There is of course nothing wrong with the focus on technology as a tool to expand the access to content and the reach of education – it just does not go far enough. I argue that one has to focus on the most important outcome of higher education: student learning and the potential of the integration of ICTs to promote student learning.

In this view, ICTs are not only defined in terms of their function as delivery tools, but also in terms of their potential to enhance the teaching and learning process. E-learning is therefore not merely defined in terms of space and time as "distance learning", but rather as the appropriate use of ICTs in all teaching and learning activities. This definition includes the integration of ICTs in teaching and learning activities at a residential university, but does not exclude "distance education"; it just blurs the distinction between residential and distance education.

The focus on student learning should be the biggest motivating factor for the integration of ICTs into teaching and learning, as well as for lecturers to change and become involved in using ICTs in teaching and learning activities. Some faculty members are skeptical of general statements indicating that they should change their way of teaching. They could rightly ask whether it is change for change's sake; Whether the technology drives the change; Whether the change is because of a metaphor push (becoming a “virtual university); or if it is as a result of politicians or administrators using “the need to change” as a pseudonym for reducing funding to the university or individual departments (Collis 1998). To respond to this skepticism, the focus should be on the basic principles of good teaching and learning (process, efficiency, effectiveness, good teaching and learning) and how ICTs can be used to enhance student learning.

As will become clear from the discussion that follows, the issue of how people learn in general is also a contested issue in the literature. A paradigm shift from an instructor (information transfer / depositing) to a student-centred (active knowledge generating / construction) model which facilitates deep learning[28] – the ultimate goal of the educational process – is currently taking place. Cognitive and brain research have shown that learning does not take place when information is “poured” into the heads of students. ICTs seen purely as access and information delivery tools furthermore reinforce this ineffective information-depositing teaching and learning paradigm. On the other hand, this type of use of technologies has amplified some of the institutional issues around teaching and learning. An unexpected benefit of this instructional technology debate is that it has moved the goal of improving teaching and learning from a distinctly peripheral position to the center of the university’s concerns (Newman and Scurry 2001).

In this regard, John Seeley Brown (2001) argues that “Learning technologies are not a panacea that resolve the many issues that higher education faces today. Instead, new technologies lead directly to institutional issues, starkly highlighting them in contrast to the widespread need for education and the possibilities technology presents to fill that need.” Teaching innovation (the shift from a teacher-centred to student-centred approach) itself is not new and not a result of the integration of ICTs. Faculty development initiatives have focused on the transformation of the teaching and learning process for decades. Steven Gilbert (2000) argues, however, that “Information technology can now be the excuse and the means to move closer to educational goals that we have been unable to achieve for decades – and to some new ones. With enough commitment of resources, thoughtful effort, patience, and luck, technology will help more than it hurts.” Technology can be used as a lever to promote transformational, learning-centred faculty development. It could be difficult, because the lecturer has to deal with the new technological

[28] The concept of “deeper learning” is discussed in section 3.3 “The new learning space: Focus on learning and learner-centredness” in this chapter.

challenges as well as the new learner-centred paradigm, but the new technology is often a “way into” a specific department to start a conversation about good teaching and learning practice (Buckley 2002).

The integration of information technology into the teaching and learning strategy can only be successful if it is carefully planned, managed and supported. Tony Bates (1997) emphasises that "New technologies are likely to remain marginal, despite high levels of capital investment, and will merely add costs to the system, if we do not at the same time deal with structural changes in our institutions and in *particular if we do not make fundamental changes to the ways we organize teaching*" (my emphasis added). Carol Twigg and Diana Oblinger (1996) support this by stating "that organizational change must occur given the changes in *what* students need to learn (curriculum and new types of skills needed), *how* students learn (process itself), *who* the students are (18 year olds and mature adult working students), *when* the students learn (time and place independence), *where* the students can learn (place independence), and what students can *access* while they learn (resources)". More specifically, the above authors describe a "need to create new ways of delivering higher education that overcome the shortcomings of our current one-size-fits-all approach to teaching".

If we therefore argue that ICTs have the power to transform higher education teaching and learning, the discussion should focus on three fundamental questions:

- With regard to the quality of teaching and learning programmes: How can the effective integration of ICTs into teaching and learning programmes create rich learning environments for deep learning experiences; thereby enhancing the quality of teaching and learning programmes?
- With regard to the enabling institutional environment: What would it take for IT to no longer be an experimental tool made available with minimal support to a few employees and students, but rather a “strategic asset” that can be used by the entire faculty, staff and student body to increase the productivity of mission-critical academic programs?[29] (Graves 1999)
- With regard to the enabling technological environment: What role do learning management systems (LMSs) play in providing a user-friendly teaching and learning Web environment?[30]

In order to answer these questions, I will first of all consider the current situation (“where we are now”) with regard to the integration of ICTs into teaching and learning at higher education

[29] The University of Stellenbosch institutional environment will be evaluated in Chapter 7, section 7.4.
[30] The University of Stellenbosch technological environment, and more specifically the use of WebCT as LMS will be evaluated in Chapter 7, section 7.5.

institutions. The question will be posed: Has the paradigm shift occurred in the teaching and learning process to take full advantage of the supposed transformational possibilities of the integration of ICTs? [31] I will then attempt to clarify what a new "learning space" with "rich learning environments for deep learning experiences" ("where do we want to be") could look like, paying special attention to the potential value added through the integration of ICTs. In this section will focus on the key principles of learning, best teaching and learning practice, the potential benefits of the integration of ICTs, new teaching and learning frameworks, as well as research about the possible value added through the effective integration of ICTs. In the third and fourth sections I will turn to the stakeholders, considering the role of the lecturers and the students in this new learning environment. In the fifth section I will critically analyse the enabling institutional environment, focusing on challenges associated with the integration of ICTs, possible institutional responses to facilitate the integration thereof and critical success factors for the technological benefits to be realised. In the last section I will focus on the enabling technological environment, specifically considering learning management systems (LMSs) as user friendly development environments to support teaching and learning activities on the web.

3.2 THE CURRENT STATUS: THE TRANSFORMATION OF THE LEARNING PROCESS AS A RESULT OF THE INTEGRATION OF ICTS

Change is good as long as everything stays the same….

It is important to firstly consider the current situation with regard to the integration of ICTs into teaching and learning at higher education institutions.

- Where are universities at this stage with regard to the integration of ICTs into teaching and learning?
- Has the paradigm shift occurred in the teaching and learning process to take full advantage of the supposed transformational possibilities of the integration of ICTs?
- What are the potential problems if the paradigm shift does not occur?
- What does the paradigm shift entail for the relationship between online and contact modi?

[31] These questions in relation to the University of Stellenbosch context will be addressed in Chapter 7, Section 7.6, in the overall assessment of the progress made at the University.

3.2.1 Three phases in the successful integration of ICTs

To determine the current status of the transformation of the learning process as a result of the integration of ICTs, it is useful to distinguish between three phases in the successful integration of ICTs into teaching and learning:

1. The establishment of institution-wide technological infrastructure and the bottom-up institution-wide adoption of ICTs in teaching and learning activities (mostly experimentation, often without real reflection on the impact of ICTs on student learning).
2. The pedagogical use of the infrastructure and the effective integration of ICTs into teaching and learning activities to improve learning (reflection on the entire teaching and learning process with an emphasis on student learning).
3. The strategic use of ICT with a view to the different target groups of higher education. The goal in this stage is to integrate the different elements of the technological enterprise into a “seamless educational enterprise” (Morrison and Oblinger 2002), (Collis and Van der Wende 2002).

The consensus of various reports and surveys (Collis and Van der Wende 2002), (Twigg 2001), (Weigel 2000), (Panel on the Future of Teaching and Learning 2000), done world wide is that universities are mostly still in the first phase of the transformation, with some evidence of second and third stage activities in individual universities. The surveys and reports further find that one institution can be in all three stages at once according to its own mission and strategy. In an interview with James L Morrison (2002), Diana Oblinger asserts that the third stage, the seamless integration, will be the focus of the next three to five years. She does not, however, imply that stages one and two will no longer exist.

A survey done by Betty Collis and Marijk van der Wende of Twente University[32] finds that in most cases institutions are now moving from the first phase of mostly bottom-up experimentation to a phase in which the institution-wide use of ICT is being encouraged. In many cases, the first stage of institution-wide ICT implementation, i.e. the establishment of institution-wide technological infrastructure, is now in place. However, in many cases, the second stage, i.e. rich pedagogical use of this infrastructure, is still in development. The report finds that, in most cases, the third stage has not yet been considered explicitly (Collis and Van der Wende 2002).

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[32] The survey was done by the Centre for Higher Education Policy Studies in the Netherlands, Germany, Norway, the United Kingdom, Australia, Finland and the USA. The aim of this study was to investigate which scenarios are emerging with respect to the use of ICT in higher education and how future developments can be predicted for strategic choices to be based on. The researchers sent out web-based questionnaires to three different response groups: decision makers, support staff and instructors. A total of 693 persons responded, which implies that 20-50% of the institutions in the various countries responded. The researchers also gathered institutional data.

Consistent with the first stage of technology adoption, the Twente ICT report found widespread use / adoption of ICTs in teaching and learning, as did Green (see Figure 2.1, Chapter 2) (especially e-mail, word-processing, PowerPoint and the Web), but they argue that this has not radically affected the nature of the teaching and learning process, as the lecture remains the “core medium” of teaching and learning and ICT serves as part of the blended learning approach (Collis and Van der Wende 2002).

Carol Twigg (2001) also argues that we are still within the first stage of the possible transformation process. According to her, not a lot (beyond the obvious 24/7 access across geographical boundaries) has changed in teaching and learning practice as a result of the integration of ICTs. She notes that all that has happened is that the traditional academic practices are migrating to the Internet, without any reflection on the capabilities of the application of information and communication technologies. The online courses are designed in exactly the same way as the campus-based courses – all that differs is the delivery medium. In very much the same way, the introduction of technology into residential courses has also, in most cases, been a way to “deliver” content, without any attention paid to the potential benefits of technology or a reflection on what should change in the face-to-face meetings as a result of the fact that all the notes are available on the Web.

Van Weigel (2000) concurs with Twigg (2001), and also argues that the most widely adopted approach to technology adoption is simply “porting the classroom to the Internet – making notes available for download via the Internet” (Weigel 2000). This approach is furthermore confirmed by a *Report by the Panel on the Future of Teaching and Learning*, which found that technology is mostly used for the linear transformation of current teaching and learning, without taking into account that students can learn differently with technology and that we can teach in different ways with technology (Panel on the Future of Teaching and Learning 2000).

Whereas there seems to be impatience in these experts’ appraisal of the influence of ICTs to transform teaching and learning activities, Brown (2000) urges those concerned to be patient with regard to the promise of technology to transform education. He argues that the World Wide Web will be as important as electricity as a transformative medium for social practices. He uses the invention of electricity as an analogy for the adoption of the World Wide Web in teaching and learning activities, and notes that a generation passed after Michael Faraday invented electricity in 1831 before an industrial version was built. Another 25 years passed before electrification starting to take place, but when the technology finally took hold, “everything changed – homes, work places, transportation, entertainment, architecture, what we ate, even when we went to bed. Worldwide, electricity became a transformative medium for social practices” (Brown 2000). He argues that, as with electricity, one has to be patient and not doubt the transformative power of the World Wide Web in education.

Lecturers will naturally feel more comfortable with "putting their lectures" on the Web, because with minimal change, they are just transferring their existing materials to the Internet (Chee 2002). Although critics are generally very critical about this approach, as we have seen in the preceding discussion, "putting notes on the Web" can also be seen as a very small first step in using technology in teaching and learning. Granted, it is not the most effective way, but on the other hand not all lecturers are technology experts and able to create highly interactive content. Institutions will also not invest huge amounts of money in technology experts to do the work for lecturers if they are not convinced of the sustainability of the efforts.

Many universities have adopted top-down strategies in which a minimum Web presence is required for each course to stimulate the development of e-Learning activities. Again, one should acknowledge that the flexible access to static reading material is only a first step and that the enhancement in teaching and learning is modest. But Twigg argues that it is an important first step to get faculty members involved and to provide a framework (baseline) for the further development of a teaching and learning environment. In the process of developing the "minimum presence", lecturers are also encouraged to make use of other activities (assessment, interactive tutorials, communication), which could add more value (Twigg 2001).

3.2.2 Potential problems with "unreflective" use of technology in teaching and learning

Although this first stage adoption can be seen as a first step in the right direction, there are at least two major reasons why this stage on its own is problematic:

1. If technology is used unreflectively as a delivery tool to transport the classroom to the Internet, outmoded approaches to learning (teacher-centred information transfer, instruction paradigm, transmission model) are enforced. As a consequence, the real transformative opportunities offered by technology will not be utilised and lecturers will not become "reflective practitioners".
2. Just an add-on of technology without a redesign of the course can be worse than only face-to-face teaching and learning and could add costs without any additional benefits.

Mitchel Resnick (2001) argues that, if technology is only used for the delivery of content, i.e. transporting the classroom model onto the Web without reflection, it simply reinforces outmoded approaches to learning. Although different critics have different names for these "outmoded approaches", ranging from teacher-centred information transfer (Bork 2000) to the transmission model (Laurillard 1993), these "outmoded" approaches boil down to the following description provided by Paulo Freire (as cited in Educom Review 1999):

> Education becomes an act of positing, in which the students are the depositories and the teacher is the depositor. Instead of communicating, the teacher issues communiqués and makes deposits which the students patiently receive, memorize and repeat. This is the banking concept of education … it is the people themselves who are filed away through the lack of creativity … For apart from inquiry … individuals cannot be truly human. Knowledge emerges only through invention and re-invention (Freire 1993).

Eisenstadt further elaborates on the difference between knowledge that cannot be "delivered" and content that is static and "deliverable" when he describes knowledge creation as a dynamic and social process:

> Now is knowledge the answer to what fits onto CD-ROMS, what "sits" on a file server, or what "travels" down the information highway? Most emphatically not! Knowledge is an emergent property which transcends the fixed-size-and-space concepts of media and information, just as it transcends the notion that you can impart it to students by "filling" them up from the teacher's "vessel"…. Knowledge is a dynamic process, a vibrant, living thing, resting on shared assumptions, beliefs, complex perceptions, sophisticated yet sometimes crazy logic, and the ability to go beyond the information given. "Knowledge" is the correct abstraction for describing what people communicate to one another. "Content" is not (as cited in Daniel 1998, p.105).

Laurillard (2001) finds that the dominant model is still the "transmission model", with the dominant learning technologies being the lecturer, the book and the marked assignment. She argues that, until the academic community has redefined what counts as "higher learning", the learning technology will only be used to transmit academic knowledge to the student. Technology will only be used in service of the transmission model of learning. She argues further that the academic community will cling to what it is comfortable with and what it knows. With respect to the professional practice of teaching, the university is therefore not a "reflective practicum". Academics are, according to her, reflective practitioners as researchers – living up to Schön's and Wenger's ideals of reflective practitioners – but not as teachers. In order to become reflective practitioners, lecturers will have to go beyond the transmission model (Laurillard 2001). Although the traditional transmission model still forms part of the teaching and learning process, it is only one part of a much more complex teaching and learning model (Daniel 1998).

John Seely Brown describes learning as a "social process".[33] He argues that learning does not occur as a response to teaching, but "rather as a result of a social framework that fosters learning" (Brown 2001). One therefore has to move beyond the traditional view of teaching as being only the delivery of information. Information and teaching are two crucial elements, but one

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[33] The "social" dimension of learning will be elaborated on in section 3.3.1.

cannot separate these two elements from the learning activities and situations in which they are used, including the social context, resources, background and information.

Critics (Daniel 1998), (Bork 2000), (Chee 2002), (Weigel 2000) agree that the use of technology just to provide access to content does not take full advantage of the possible transformative properties of technology.[34] The problem if no reflection and redesign take place is that the results produced when new technology is just used as an add-on, will be "as good as" or even worse than doing it without technology. The potential value of the integration of new technology in teaching and learning has to be realised for new approaches to be effective. Jim Wetherbe, Bobby G. Stevenson Chair in Information Technology at Texas Tech, remarks that "the biggest obstacle to innovation is thinking it can be done the old way" (as cited in Twigg 2001). As one example of this problem of "technique which lags behind technology", where innovators did not completely realise the full potential of the application of new technology, Twigg mentions the ATM example:

> The first ATM was located inside a bank and was available only during banking hours. Bankers viewed this technological innovation as an automated teller. Real innovation did not occur until ATMs were placed outside banks and in malls, grocery stores, and airports, available twenty–four hours a day (Twigg 2001, p.3).

If the use of technology is seen as separate of and in opposition to the traditional contact situation, instead of as being part of an integrated process, the benefits of online learning will also be determined in comparison with traditional face-to-face teaching. Face-to-face meetings are then seen as the "standard", with online facilitation used only for specialist uses (Mason 2001).

3.2.3 The alternative: The "blended" model focused on redesign and learning

In 2002, Betty Collis predicted in eLearn Magazine that the distinction between e-Learning and contact sessions would fade as technology was used as a tool for more efficient and professional learning support for all students (Neal 2002). The focus would rather be on a total redesign of courses, using a blend of the best aspects of both the traditional classroom and technological innovations. This blended ("hybrid", "stretching the mould") model broadens our view of a "high-quality learning experience, taking us beyond what is possible in a traditional classroom" (Twigg 2001) and holds the most promise for making changes on the scale needed to help quickly build a nation of learners (Broad and Rush 2002), (Collis and Van der Wende 2002).

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[34] Examples of these transformative abilities will be given in section 3.3.1.

Critics (Schank 2002), (Resnick 2001), (Twigg 2001) agree that, in order to make full use of the transformative possibilities of technologies, we have to rethink our approaches to learning and education and how technology can support them. We should not only focus on technology, but redesign the whole process of teaching and learning, focusing on a learner-centred approach. Roger Schank argues that the "e" in e-Learning is beside the point. He views e-Learning as "a Trojan horse" for his wider prescription for education. He declares that "school is broken" and that "the real headline about e-Learning is that it's about curriculum reform" (Phillips 2003). He further argues that e-Learning should not only be used to copy the classroom, but to change the curriculum and motivate students to harness the real possibilities of technology. But Schank argues that it all depends on what you mean by e-Learning – if it is just putting text on screen with quizzes, no value is added. He argues for a new approach that "harnesses the new medium's intrinsic capabilities rather than merely aping classroom teaching forms he considers bankrupt" (Phillips 2003).

Carol Barone (2003) argues that the use of technology on campus is ultimately for academic teaching and learning decisions and should not be driven by technology in isolation from other campus variables. These decisions must include multiple interrelationships among issues, governance conventions and key players. Technology should be seen as a tool to achieve better teaching and learning activities, and not as an end in itself.

Dan Scurry (as cited in Andersen 1999) distinguishes two types of technology users (developers): determinist and instrumentalist developers. The distinguishing characteristics of the two types are summarised in Table 3.1 below.

Table 3.1: Determinist vs instrumentalist developers[35]

Determinist developers	Instrumentalist developers
Driven by *superior product* and *process* that results in education from the use of new technologies	*Not* focused on technology Focused on the analysis of the needs, opinions and characteristics of the actors within the adoption site
Focus on *product*	Focus on the *context* and *integration* of the technology in context

Instrumentalist developers should drive the integration of ICTs at universities. The teaching and learning needs of the students and the learning outcomes of a specific course, and not the technology or the technological product itself, should be the driving force behind the use of technology. As Mark Milliron and Cindy Miles note, "After the "new toy" thrill wears off, most thoughtful educators find that best practices for the use of technology as a tool for learning correspond to best practices for education and learning in general" (Milliron and Miles 2000). In

[35] I will return to these two issues in chapter 7, section 7.6, when I discuss the overall assessment of the progress made at the University of Stellenbosch.

the next section I will specifically consider these “best practices for education and learning” and how technology can help to achieve them.

In an attempt to answer the questions posed at the beginning of section 3.2, we can summarise as follows:

- Most universities are still in the first phase (bottom-up, experimentation) of the successful integration of ICTs into teaching and learning, with some evidence of second phase (use of ICTs to improve learning) and third phase (strategic integration of ICTs into all university activities) activities.
- Lecturers feel comfortable about using ICTs to just transfer their face-to-face classroom activities to the Web without any changes.
- Whereas “putting the notes” on the Web is certainly not the most effective use of ICTs to promote student learning, it should not be dismissed in an unqualified manner. It is often the first step towards integrating ICTs effectively.
- There are, however, at least two problems with the unreflective use of ICTs in teaching and learning:
    - The outmoded “delivery” of information paradigm is reinforced by simply posting notes online without reflection.
    - This “transporting the classroom to the Web” approach could be worse than face-to-face teaching and learning and add costs without any real benefits.
- What should be considered is an emphasis on the redesign of the whole module / academic programme, moving to a blended model with a combination of best practice classroom and technological innovations.
- The integration of ICTs should be driven by academic concerns and not by the technology per se.

3.3 THE NEW LEARNING SPACE: FOCUS ON LEARNING AND LEARNER-CENTREDNESS

If one asserts that the integration of ICTs has the possibility to enhance teaching and learning practices, answers to the following questions should be found:

- What are the key principles of learning and best practice teaching and learning activities and how can technology support and enhance these learner-centred practices?

- What are the best practices for the implementation of these environments?
- What are the implications for teaching and learning environments?
- What does the research tell us about the possible value added through the integration of technology?

3.3.1 Key principles of learning, best practice and the potential benefits of the integration of ICTs

Although "learning" itself a contested research area, Colleen Carmean (2002) claims that the same evidence emerges throughout learning theory with regard to the conditions of and responses to the practice of learning. In an effort to define a rich learning environment, Carmean and fellow researchers collaborated on an NLII (National Learning Infrastructure Initiative) project to produce a map of the learner-centred learning space, *Mapping the Learning Space: Learner-Centered Principles for Higher Education*, which can be found at http://www.educause.edu/nlii/keythemes/lcp/. They used research on effective learning by various well-respected learning theorists (John Seely Brown, David Merrill, Arthur Chickering & Zelda Gamson, John Bransford and Theodore Marchese) to formulate five principles for deeper learning – "an engaged learning that results in meaningful understanding of material and content". These learning theorists all argue that deeper learning takes place when learning is:

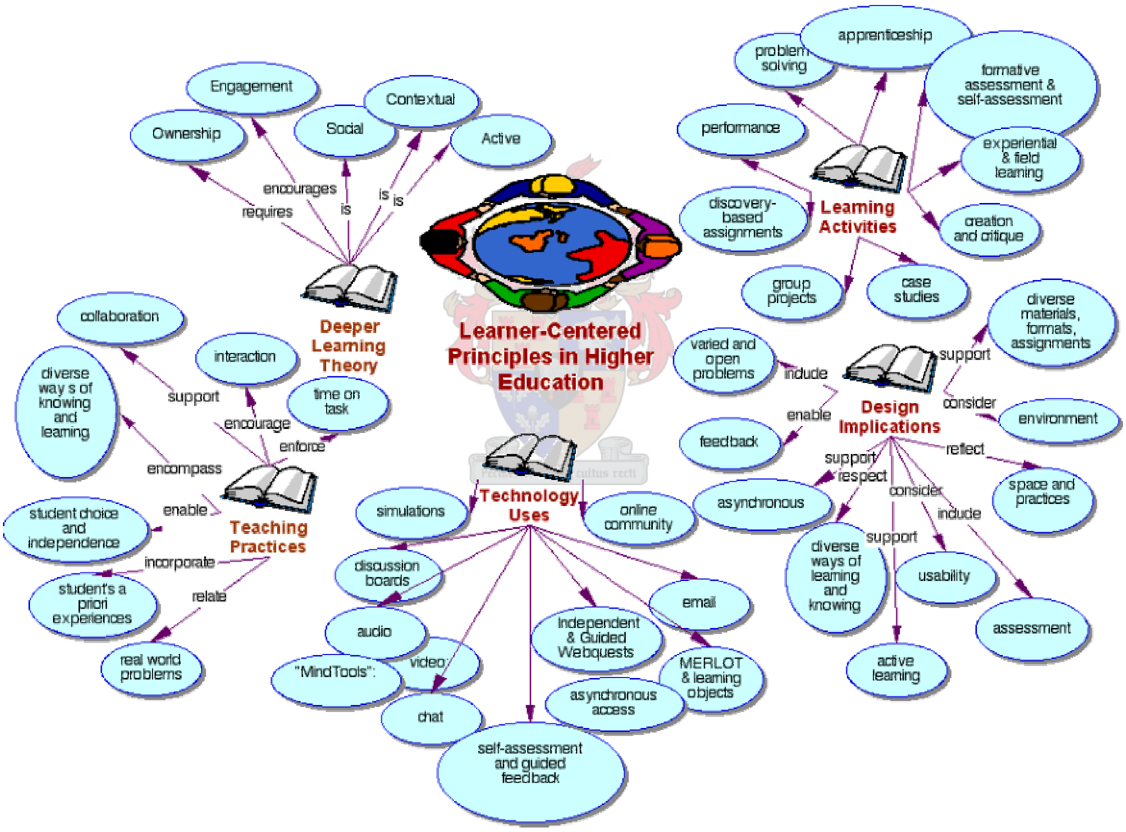
- Social
- Active
- Contextual
- Engaging and
- Student-owned (Brown and Duguid 1991), (Brown, Collins, and Duguid 1989), (Merrill 2001), (Chickering and Gamson 1987), (Bransford, Brown, and Cocking 2000), (Marchese 2000)

Carmean and fellow researchers (2002) claim that learning environments that "engage, motivate, and allow learners to take responsibility for and apply their learning continue to dominate the literature, old and new". These deeper learning environments are defined as "learner-centred" environments in which careful attention is paid to the knowledge, skills, attitudes and beliefs that learners bring to the classroom (Visible Knowledge Project 2002). The instructional design and teaching practices of these learner-centred environments are based on what we know about learning (a permanent change in capability) and cognition (the processes by which we receive information from the outside world, organise, retain and retrieve it) (Carmean 2002).

The project group (Carmean 2002) produced a very useful mapping (Figure 3.1) of the new learning space based on learner-centred practices with regard to:

1. Deeper learning theory,
2. The teaching practices required to facilitate deeper learning,
3. The technology uses that can enable and support this learning space,
4. The learning activities that should take place in this space, and
5. The design implications for the individual lecturer and instructional designer.

Figure 3.1: Mapping of the new learning space based on learner-centered practices



Source: (Carmean 2002) (http://www.educause.edu/nlii/keythemes/lcp/map.asp)

Although this mapping is useful in that it outlines and clusters all the different elements in the "deeper learning space", it does not show the interrelatedness of these different elements and clusters. Table 3.2 is an attempt to show the causal relationships between deeper learning theory, teaching practices, learning activities and possible uses of technology. The first two columns in Table 3.2 present a summary of the interrelationships between deeper learning theory and the other leading theorists (Brown, Merrill, Chickering & Gamson, Bransford and Marchese). The remaining columns are added to show a few of the possible relationships between the following elements:

- Good teaching practice and learning activities that could enable a deep learning environment,
- The potential of different technologies to facilitate these practices, and
- Examples of the concrete benefits to students in the teaching and learning environment.

The different technologies themselves do not guarantee deeper learning practice. But if technologies (column 5) are used to facilitate good teaching and learning practices (columns 3 and 4) around deeper learning principles (columns 1 and 2), potential benefits (column 6) can be realised. For instance, if discussion boards (technology, column 5) are used to encourage collaboration (column 3) through group projects (column 4), focused on social learning (column 1) via reciprocity and cooperation among students (column 2), then quiet, introverted students and non-native speakers, who might be reluctant to respond in a classroom, have more time to reflect on answers and can respond multiple times in online discussions (column 6).

Table 3.2: Causal relationships between deeper learning, best practice, technologies and potential benefits

Deeper learning (Carmean)	Best practice implies / involves (according to leading learning theorists)	Teaching practices should therefore:	Learning activities could therefore include:	Technologies that can facilitate teaching & learning activities	Potential benefits for learners / lecturers
Is social via…	• opportunities for cognitive apprenticeship - John Seeley Brown • reciprocity and cooperation among students - Chickering • prompt, rich, timely feedback - Chickering, Marchese • encouragement of contact between student and faculty - Chickering	• Encourage interaction • Support collaboration	• Apprenticeship • Formative assessment & self-assessment • Experiential & field learning • Creation and critique • Group projects	• Discussion boards • Chat • E-mail • Online community	• Students view technology as a social tool to support each other – a strong sense of community can be created in an online environment • Rich exchanges within discussion communities – lecturer becomes “guide on the side” • Cultivation of skill of working in a team (lifelong learning skill) • Students have more opportunities to develop their writing skills in online discussion forums • Quiet introverted students and non-native speakers, who might be reluctant to respond in a classroom, have more time to reflect on answers and can respond multiple times in online discussions • Class discussions are not only limited to class, but can continue after class • Students have more time for reflection on responses, which can increase the quality of the responses • The relative anonymity of online discussions lessens anxieties and fears of possible stigmatisation
Is active when…	• engaged in real-world tasks and solving real-world problems involvement in real-world tasks is emphasised - Merrill, Marchese • intertwined in judgment and exploration - John Seeley Brown • situated in action using active learning techniques - John Seeley Brown, Chickering • practice and reinforcement are emphasised - Marchese	• Encourage interaction • Relate real-world problems • Enforce time on task • Encompass diverse ways of knowing and learning	• Discovery-based assignments • Performance • Problem solving • Apprenticeship • Formative assessment & self-assessment • Experiential & field learning • Creation and critique • Case studies	• Simulations • Discussion boards • Audio • Video • MindTools • Chat • Self-assessment and guided feedback • Independent & guided Webquests • MERLOT & learning objects	• Simulations where costs, disability or danger make the “real thing” hard to do (e.g. simulations of dangerous experiments) can be done in a virtual environment • Abstract concepts can be taught interactively and visually • Students receive immediate feedback on their responses and can be directed to additional resources • Quizzes are automatically graded, saving the lecturer time, and lecturer can include more assessment opportunities • Enhanced feedback is possible through automatically graded quizzes • Renewed energy as students and lecturers create new ways of learning and thinking facilitated by

Deeper learning (Carmean)	Best practice implies / involves (according to leading learning theorists)	Teaching practices should therefore:	Learning activities could therefore include:	Technologies that can facilitate teaching & learning activities	Potential benefits for learners / lecturers
					technology applications
Is contextual as…	• new knowledge builds on the learner's existing knowledge and there is awareness that students come to the classroom with preconceptions - Bransford, Merrill • new knowledge is integrated into the learner's world - Merrill • new knowledge is demonstrated to the learner - Merrill • students have a deep foundation of factual knowledge - Bransford • it focuses on how the world works - Bransford • students understand facts and ideas in the context of a conceptual framework - Bransford • it is made concrete rather than abstract - John Seeley Brown	• Incorporate students' a priori experiences • Encompass diverse ways of knowing and learning • Relate real-world problems • Encourage interaction	• Discovery-based assignments • Performance • Problem solving • Apprenticeship • Experiential & field learning • Case studies	• Simulations • Discussion boards • Audio • Video • MindTools • Chat • Self-assessment and guided feedback • Independent & guided Webquests • Asynchronous access • MERLOT & learning objects • Subject-related technology applications	• Students can take part in real-world problem-solving activities • The specific learning elements are integrated and contextualised and students can be asked to add their own elements to the activities • Students have access to a variety of more accessible resources (the Web provides a window to the outside world) • The structured learning activities allow students to enter the activity based on his/her pre-existing knowledge • Students can organise new knowledge and get feedback from their peers • Students develop their own technology competencies in the process – especially in subject-related applications (e.g. CAD/CAM for architecture, GIS in geography and related subjects). This is a real-world necessity.
Encourages engagement when it…	• respects diverse talents and ways of learning - Chickering • communicates high expectations - Chickering • is done in high-challenge, low-threat environments - Marchese • emphasises intrinsic motivators and natural curiosities - Marchese	• Encompass diverse ways of knowing and learning • Enable student choice and independence • Incorporate students' a priori experiences • Encourage interaction • Relate real-world	• Discovery-based assignments • Performance • Problem solving • Apprenticeship • Experiential & field learning • Creation and critique • Case studies	• Simulations • Discussion boards • Audio • Video • MindTools • Chat • Self-assessment and guided feedback • Independent & Guided Webquests • Asynchronous access	• Each student has 24/7 access to all the activities and can choose the activities which suit his / her personal learning style / preference • Students can work in their own time and space, according to their personal abilities to complete certain activities (time- and self-management skills) • Continued assessment of student progress

Deeper learning (Carmean)	Best practice implies / involves (according to leading learning theorists)	Teaching practices should therefore:	Learning activities could therefore include:	Technologies that can facilitate teaching & learning activities	Potential benefits for learners / lecturers
		experience		• MERLOT & learning objects	
Requires ownership when…	• students organise knowledge in ways that facilitate retrieval and application - Bransford • students take control of their own learning: noting failures, planning ahead, apportioning time and memory to tasks - Bransford • it emphasises time on task - Chickering • it emphasises learner independence and choice - Marchese • it allows time for reflection - Marchese • it emphasises higher order thinking (synthesis and reflection) - Marchese	• Enforce time on task • Encompass diverse ways of knowing and learning • Enable student choice and independence • Incorporate students' a priori experiences • Encourage interaction • Relate real-world experience	• Discovery-based assignments • Performance • Problem solving • Apprenticeship • Formative assessment & self-assessment • Experiential & field learning • Creation and critique • Case studies	• Simulations • Discussion boards • Audio • Video • MindTools • Chat • Automated self-assessment and guided feedback • Independent & guided Webquests • Asynchronous access • MERLOT & learning objects	• Increased choice of materials and communication styles for learners • Flexible sequencing of material • A framework is created in which students can be autonomous learners • Students have greater control over the learning process as active learners • Students can pursue their academic work at any time and in any place (flexibility)

The potential benefits were summarised from the following sources: (Carmean 2002), (Kassop 2003), (Collis and Van der Wende 2002), (Challis, Lidgey, and Robertson 2003), (Taylor and Schmidtlein 2000), (Massy and Zemsky 1995), (Twigg 2001), (Newman and Scurry 2001), (Broad and Rush 2002), (Chickering and Ehrmann 1996), (Panel on the Future of Teaching and Learning 2000), (Benfield and Francis 2003), (Gilbert 2000)

Carol Twigg (2001) argues that, when we consider the use of technology, we have to focus on what we can do with IT that we cannot do without it to support and enhance learner-centred practices.

As can be seen from the examples and benefits provided in Table 3.2, technology can create environments that provide individualised learning approaches that serve each person in ways that he or she can most benefit. Twigg (2001) therefore views the individualisation of the learning experience for students enabled by technology as the key to moving beyond the phenomenon of "no significant difference" between the "classroom" and the "online environment". This individualisation includes when, where, how and what students want to learn.

She outlines five steps to achieve this:

1. Assessment of knowledge / skill level and learning style
2. An array of interactive materials and activities
3. Individualised study plans
4. Built-in continuous assessment
5. Appropriate, varied human interaction (Twigg 2001)

This type of environment corresponds to Bork's proposed shift to "tutorial learning" – an environment which he characterises as "highly interactive, individualised according to student problems, adaptive to the needs of the student, based on mastery instead of grades, creative and based on problem solving" (Bork 2000).

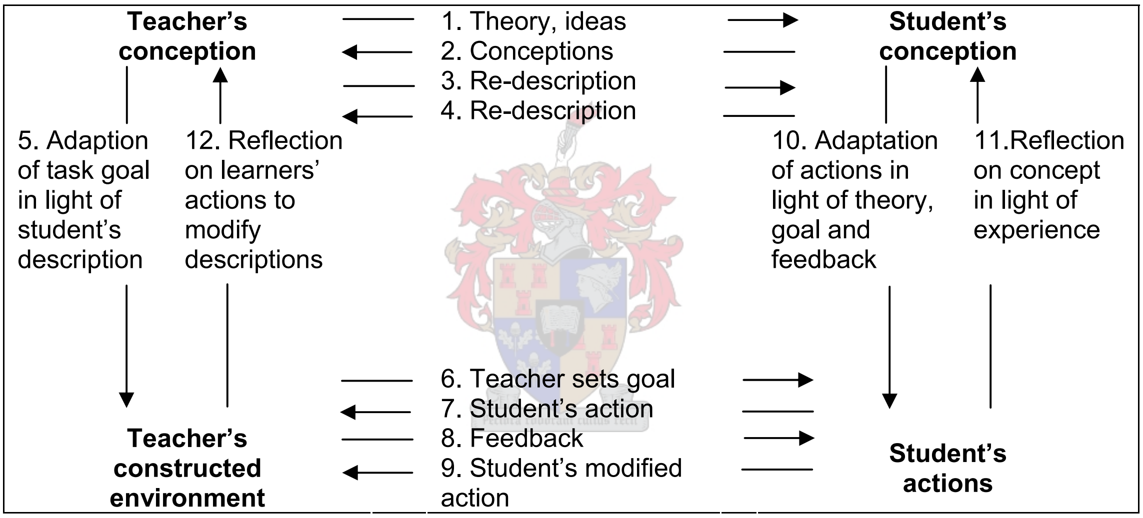
Another key goal in which technology can play a big role that emerges from Table 3.2 is engaging students in "active doing and sharing in the learning process – a move beyond merely reading a static text." Mitchel Resnick (2001) compares computers to "finger paint" instead of televisions – something computers are often compared with. He argues that computers, like finger paint, can be used for designing and creating things and it is in these design activities that computers offer new learning opportunities. He therefore argues for the extension of the use of computers, from searching on the internet, word processing and presentations, to constructing significant things with computers. He regards this capability as being "digitally fluent" and compares it with being fluent in a foreign language. If one is fluent in a foreign language it entails more than just knowing the basic grammar and language structures – it implies that one is able to articulate a complex idea or tell a story. This means that one must be able to "make things" with language. In the same way, if one is "digitally fluent" one will be able to construct significant things with digital technology (Resnick 2001, p.49). He therefore extends the move from an information society (1980s) to a knowledge society (1990s) to a creative society (2000). He argues that "the future will be based not on how much we know, but on our ability to think and act creatively" (Resnick 2001, p.62).

The focus should therefore be on choosing technologies to support activities, rather than focus only on outcomes. We should, according to Ehrmann (2001), "pick teaching-learning activities that (according to research or experience) tend to advance the educational outcomes you want". These include active learning, facilitation of better staff-student and student-student interaction, and enabling or attracting students to spend more time on their studies.

3.3.2 New teaching and learning frameworks

Diana Laurillard (2001) proposes a "conversational framework" (Figure 3.2 below) for learning to enable deep learning.

<u>Figure 3.2: Laurillard's conversational framework</u>



<u>Source:</u> (Laurillard 2001, p.144)

Laurillard argues in this framework for an "iterative dialogue" between lecturers and students that operates on two levels and is essential for students to understand:

1. Discursive, theoretical, conceptual level (teacher's conception – student's conception level at the top of the diagram)
2. Active, practical, experiential level (teacher's constructed environment – student's actions level at the bottom of the diagram)

These two levels are bridged by each participant engaging in the processes of adaptation (practice in relation to theory – 5 and 10 on diagram) and reflection (theory in the light of practice – 11 and 12 on diagram). She argues that these dialogic activities can be taken as the criteria for the “reflective practicum and the learning community” (Laurillard 2001). This iterative, active, learning matrix allows the teacher’s concepts and constructed environment to interact with student-specific concepts and student-specific actions. Laurillard suggests that the communicative, interactive and adaptive capabilities of technologies should be used to facilitate these different kinds of iterative dialogue, as indicated in Table 3.3 below.

Table 3.3: Technologies to facilitate the “conversational framework”

Media form	Explanation	Methods / Technologies
Narrative	Linear presentational, usually same “text” acquired simultaneously by many people	Lecture, video, book, CD, Web
Interactive	Non-linear presentational, searchable, filterable etc., but no feedback	Tutorial, library, CD, Web
Communicative	Conversation with other students, lecturer or self	Seminar, group, online conference
Adaptive	Feedback, learner control	Laboratory, field trip, simulation
Productive	Full learner control	Essay, product, animation
		Table is a summary made from Laurillard (2001)

These learning activities and technologies in Table 3.3, as well as the technology examples in Table 3.2 (column 5), can be used in any combination to facilitate this “conversational framework”. It will depend on the specific situation as to which technologies and activities will be used. Laurillard does, however, suggest a generic learning activity model (GLAM) that embodies good practice. This model, which can be used in different modules, consists of:

1. An exercise based on identification of certain process changes,
2. A guided investigation and analysis of the relations between digitised source materials, with model answers as feedback,
3. A digital-document discussion environment for any text or article, offering discussion around the structure of the article and defined general topics,
4. A digital-document discussion environment for a runnable simulation, offering discussion around the structure of the simulation and defined general topics, and
5. A synchronous discussion environment for a small group talking around a set of shared resources (Laurillard 2001).

Laurillard encourages the development of such models within specific universities, as diverse models will be needed for different academic programmes.

3.3.3 Research on the possible value added through the effective integration of ICTs

Research on whether technology can enhance the quality of teaching and learning programmes is also a contested area. Diana Oblinger and co-authors (Oblinger, Barone, and Hawkins 2001) state that the quality of the student body is often considered to be the prime determinant of the quality of education. Unfortunately, according to them, there are few answers to whether a specific student body is stronger because of online learning. But they also note, quite importantly, that there are few studies that measure “the effectiveness of textbooks and lecturers as an educational delivery system” (Oblinger, Barone, and Hawkins 2001).

Despite the fact that measures of learning and quality are controversial issues in higher education, the results of a survey done by Shouping Hu and George Kuh (2001) and of the Pew Learning and Technology Program are important to take note of. The results of the survey done by Hu and Kuh show that technology can add value to a learning environment. Hu and Kuh used three of the seven principles outlined by Chickering and Gamson (1987) (see Table 3.2, column 2 for a summary of the principles) as proxies for learning in a survey done at 71 American colleges and universities. The survey was completed by 18 844 students. They compared the responses of students at so-called “wired campuses” (listed by Yahoo) with those of the rest of the students to determine whether the presence of computing and information technology influenced the frequency of its use, other educational resources and the exposure to good educational practices. Their results show that the students at the more wired campuses reported more interaction with their professors (1st best practice), substantive more interaction with their peers (2nd best practice) and the same amount of active learning (3rd best practice). The “more wired students” also reported more frequent use of e-mail to communicate with lecturers and fellow students and more frequent searches of the Internet for relevant material.

The Pew Learning and Technology Program is an $8.8-million, four-year effort by the Center for Academic Transformation at Rensselaer Polytechnic Institute “to place the national discussion about the impact that new technologies are having on the nation’s campuses in the context of student learning and ways to achieve this learning cost-effectively” (http://www.center.rpi.edu/PewGrant.html).

In their Program in Course Redesign, sponsored by a grant from the Pew Charitable Trusts, researchers from the Center collaborated with 30 institutions to demonstrate how colleges and universities can redesign their instructional approaches using technology to achieve cost savings and quality enhancements (Twigg & Heterick, 2003).The emphasis was on the redesign of the specific courses: defining learning outcomes, applications, the content and the potential difficulties the students might encounter. The courses were not just put online as is (Twigg 2001). The projects focus mostly on large-enrolment, introductory courses, which have the potential to impact significant student numbers and generate substantial cost savings. The outcomes of these projects are as follows:

- The 30 institutions have reduced their costs by 40% on average (from 20% to 86%)
- Nineteen of the 30 projects reported improved learning (remaining 11: no significant difference)
- Other outcomes include increased course completion rates, improved retention, better student attitudes toward the subject matter, and increased student satisfaction with the mode of instruction compared to traditional formats (Twigg & Heterick, 2003).

The main points pertaining to the new learning space can be summarised as follows:

- Although what constitutes student learning is a contested research area, experts agree that deeper learning could take place when learning is:
  - Social
  - Active
  - Contextual
  - Engaging and
  - Student-owned
- The effective integration of ICTs into teaching and learning has potential benefits for both students and lecturers if these basic good practice teaching and learning principles are followed.
- The integration of ICTs into teaching and learning activities can lead to the creation of highly individualised learning environments that engage learners in active learning.
- This integration of ICTs gives rise to new teaching and learning frameworks, specifically Diana Laurillard's "conversational framework".
- The "conversational framework" emphasises the continuous interaction between students and lecturers at both a conceptual and experiential level. This interaction is accompanied by each of the participants engaging in adaptation and reflection with regard to practice and theory.
- Research shows that if courses (especially large-enrolment, introductory courses) are properly redesigned to integrate ICTs effectively, it can lead to improved learning and cost savings.

3.4 THE ROLE OF LECTURERS IN THE NEW LEARNING ENVIRONMENT

Turning to the first of the stakeholder groups in higher education, the lecturers, all of the changes in higher education outlined in Chapter 2, as well as the specific changes in teaching and learning practice with regard to the integration of ICTs, have a very definite impact on their role. Some lecturers feel that they will be "replaced" by technology and are strongly opposed to the integration of ICTs. Others see the new learning environment outlined in the previous section as a challenge and an opportunity to acquire new skills. I will now critically analyse the fears of lecturers, reflect on the redefinition of lecturers' roles, the potential concerns as well as the potential benefits of these changes for the lecturers themselves.

3.4.1 Technological change: Replacement of lecturers or a change in / redefinition of their roles?

David Noble, a professor at York University in Toronto, caused quite a stir in the late 1990s with four articles on the "digital diploma mills":

- Part I: The Automation of Higher Education (Noble 1997)
- Part II: The Coming Battle over Online Instruction (Noble 1998)
- Part III: The Bloom is Off the Rose (Noble 1998)
- Part IV: Rehearsal for a Revolution (Noble 1999)

In these articles, he argues that technology (and more specifically the Internet) is used to automate teaching and learning, leading to the "commodification" thereof. In the process, faculty members are eliminated from the educational experience. Noble claims:

> Once faculty put their course material online, the knowledge and course design skill embodied in that material is taken out of their possession, transferred to the machinery and placed in the hands of the administration. The administration is now in a position to hire less skilled, and hence cheaper, workers to deliver the technologically prepackaged course. It also allows the administration, which claims ownership of this commodity, to peddle the course elsewhere without the original designer's involvement or even knowledge, much less financial interest. The buyers of this packaged commodity, meanwhile, other academic institutions, are able thereby to contract out, and hence outsource, the work of their own employees and thus reduce their reliance upon their in-house teaching staff (Noble 1997).

He identifies a "managerialism" in universities, where the university administrators and commercial partners' market interests are in opposition to the academic interests of the students and teachers. Madeleine Green and co-authors (Green, Eckel, and Barblan 2002) also remark that the “managerial and entrepreneurial culture” created by “competition for students, staff, resources, and prestige requires institutions to be more aggressive and competitive” often conflicts with the more traditional and collegial academic culture.

The problem with Noble’s view is that he sees technology as something separate from the teaching and learning process and not shaped by the students’ and lecturers’ use thereof. Viewed on a more general, societal level, this is an oversimplified view of the interaction of technology and society. Castells (2000) argues that information technology is embodied in the social relationships of the Network Society. According to Martin Hall (2000), Castells “encourages us to view ICTs as the essence of the ecological relationships through which humans act on their environment, and on one another”. This view moves beyond the technological deterministic view of technology as an external tool to society, to an application that is embedded and shaped by the interactions within society.

If viewed only as a tool to deliver content to a large number of students, technology is separate from the learning process and a “one-size-fits-all” delivery approach can be followed.[36] If viewed however as an application used to enable students to create individualised learning experiences, the technology use is shaped and customised by both lecturers and students within the teaching and learning process. There is therefore also a fundamental misunderstanding of the teaching and learning process in Noble’s arguments. The real value of the teaching and learning process, especially in terms of Laurilliard’s “conversational framework” in section 3.3.2, lies in the interaction between lecturer and students, students with one another and students and material, and not in the static content.

Noble’s fear (shared by quite a few lecturers) of “being replaced” by a new technological innovation is not new. After the invention of the printing press, some faculty members also feared that they would lose their jobs. With all the knowledge in books, why would students still listen to them? This fear proved to be unfounded.

Although the lecturers’ fears of being replaced are largely unfounded, one cannot deny that faculty roles are changing as a result of technology. If lecturers define their value only in terms of the lectures they “deliver”, they might believe that they will be replaced. In the new teaching and learning environment outlined in the previous section, the lecturer is much more than just a content developer. The content of the course itself (although an important aspect) is no longer the competitive advantage. It is rather the value added by the lecturer to the student’s learning experience through the creation of “learning communities” that distinguishes one course from another and one lecturer from another (Twigg 2000).

[36] This view closely corresponds to the first phase of the integration of ICTs discussed in Chapter 2.

Lecturers are becoming designers, architects and managers of active, integrated learning environments, instead of being merely instructors (Chee 2002; Green, Eckel, and Barblan 2002). We find a shift in lecturers' roles from being the source of information to becoming the supervisor or coach of the learning process (Twigg 2002). It can be argued that this lecturer's role comes to resemble Socratic teaching, or the role of the Oxford tutor reviewing what the student has learned, challenging the student's interpretation and pointing to new materials. The Oxford system (a face-to-face teaching situation in a small class) is very expensive, whereas the technological mode, which allows for both individual and group attention, could be far less costly (Newman and Scurry 2001). New technologies can therefore contribute to student learning and enable radical redesigns by lecturers of student learning experiences (Twigg 2002).

However, this shift in lecturers' roles requires not only a greater mastery of content by the lecturers, but also an increased knowledge of learning styles and technological applications (Newman and Scurry 2001).

Twigg (2000) claims that faculty members have the following concerns[37] in this new environment:

1. Negative reactions to changing faculty roles and increasing competition in the higher education market (the Noble argument),
2. Unfamiliarity with the technology itself,
3. Worries about the ATM-MTV generation that may think, "I can do it myself without faculty guidance",
4. Stress over increased workload,
5. Dissatisfaction with compensation (i.e. faculty want financial rewards in the absence of other rewards),
6. A feeling that huge risks are involved in undertaking these pursuits,
7. Discomfort with the increased visibility and accountability of an online environment, and
8. Issues of job security and collaboration (where previously autonomous) (Twigg 2000).

The possible institutional responses to address these concerns will be addressed in section 3.6.2. What should be mentioned here is that enhanced training and support, as well as transformational and scalable faculty development initiatives, are fundamental to the success of the integration of ICTs into teaching and learning activities (Benfield and Francis 2003), (CVCP and HEFCE 2000), (Buckley 2002).

[37] We will discuss some of these concerns in more detail in section 3.6.2 on institutional challenges and barriers.

3.4.2 Potential rejuvenation of faculty members

Salmon (as cited in Marino 2002) proposes that lecturers should be willing to be trained and developed to become online learners themselves. She argues that:

> If people are stuck in the way they themselves learned and taught, that's the main problem…. Empathy with online learners – and one of the ways that you empathize is that you become one of them first of all. And most important, a willingness to be trained and developed in the role.

This type of faculty development can lead to the rejuvenation of both faculty members and the courses themselves. Mark Kassop, a lecturer with 30 years' experience, captures this potential new excitement when he observes that he is "thrilled to see and hear my colleagues venture into this new academic mode. Creating an online course takes them back to the excitement and work of creating a course for the first time"(Kassop 2003). While it is often more work, he remarks that some faculty members are also energised by the "creative process of achieving the same (and new) instructional goals in an entirely new format" (Kassop 2003). He argues that "The thinking, planning, research, learning, and effort that goes into constructing and teaching an online course has rejuvenated many faculty members who were frankly going through the motions after numerous years of teaching the same courses, semester after semester, in the same classroom environment" (Kassop 2003).

What has become clear in this discussion on the changing lecturer roles as a result of the integration of ICTs into teaching and learning activities is that:

- Lecturers' fears of being "replaced" by technology are mostly ungrounded.
- There are definite changes in the lecturer's role, from being only focused on content delivery to being a creator of learning communities.
- These changes, especially when these learning communities are online, require new skills with regard to both pedagogical and technological issues.
- Although these changes present real challenges which should also be addressed in the institutional environment, lecturers could view these changes as potential learning experiences whereby they can update their skills and rejuvenate the teaching and learning process.

3.5 THE CHANGES IN THE STUDENT BODY

The changing demographics of the student body is a reality higher education institutions have to deal with. Bizhan Nasseh (2000) argues that higher education institutions will have to deal with two different groups of students in the 21st century:

- The Internet generation, which includes the “traditional students” who are school leavers, and
- The adult learners, who are traditionally older and return to higher education institutions to update their skills or learn new ones.

With regard to the first group, Diane Harley (2002) argues that universities probably do not understand enough about their prospective students who, according to her, “have been weaned on peer-to-peer file swapping, Google searches, and wireless instant messaging”. She questions what type of expectations these students will have of learning environments at higher education institutions. On the other hand, institutions also have to deal with the second group of students - the mature, working, part-time learners who are part of the lifelong learning generation. [38] They have different abilities, expectations, needs and experiences, and present a different generation to the so-called “digital age kids” described in section 3.5.1 below.

3.5.1 The “digital age kids”

Jason Frand (2000) argues that the “digital kids” of today use “ICT to meet, play, date and learn”. A survey at some of the Ivy League campuses in the United States in 2000 showed that the average undergraduate student was spending up to six hours a day in cyberspace (Gilbert 2001). They therefore “expect it, it’s what they breathe, and it’s how they live” (Frand 2000). Frand identifies 10 attributes that reflect the values and behaviour of the “information age” mindset:

- Computers aren’t technology.
- The Internet is better than TV.
- Reality is no longer real.
- Doing is more important than knowing.
- Nintendo (trial-and-error; experimentation) is preferable to logic.
- Multitasking is a way of life.
- Typing is preferable to handwriting.

[38] The necessity of lifelong learning in the networked society and the possible impact thereof on higher education institutions are discussed in more detail in section 2.2.1 of Chapter 2.

- Staying connected is essential.
- There is zero tolerance for delays.
- The lines between consumer and creator are blurring (Frand 2000).

These digital age kids not only use ICTs as tools, but it has become a way of life. Carole Barone (2003) similarly argues that the digital world has had an impact on the cognitive functions of students. She argues that today's learners are more visual and social.

Brown (2000) suggests the dimensional shifts illustrated in Figure 3.3 as being significant of the children in the digital age.

Figure 3.3: Some cyberage shifts

Text	*Literacy* →	Text + Image	*Literacy* →	Information navigation
Being told (authority based)	*Learning* →	Discovery, Experiential		
Deductive (linear)	*Reasoning* →	Bricolage + Judgement (lateral)		
Don't know / Won't try	*Action* →	Don't know / Link, lurk & try		

~learning in situ is the key~

Source: (Brown 2001, p.71)

Brown (2000) argues that the first shift has to do with the evolving nature of literacy. Students must interpret multimedia texts and be able to communicate in "screen language", which consists of text and images. He notes that students have to be adept at surfing and judging the variety of sources on the Internet. The second shift has to do with a different way of learning that corresponds with the five attributes of learning discussed in section 3.3.1. The third shift links to the second shift, in that young learners are more comfortable with "bricolage", "a concept having to do with one's abilities to find something (perhaps a tool, some open source code, images, music, text) that can be used or transformed to build something new" (Brown 2000, p.71-72). The final shift has to do with how students will act. Instead of reading a manual or textbook, the focus will shift to active and social learning (Brown 2000).

This is true in developed countries that have high speed internet connections to households and schools. It is a different story in developing countries, where most households do not even have running water, let alone electricity and Internet access. One cannot, however, dismiss this generation in developed countries as being separate from the generation in developing countries – everybody will have to compete in a global networked society. Employers world wide expect graduates to be ICT literate, i.e. to be literate in the appropriate use of learning technologies. This could also lead to a lifelong partnership between students and university, as students continuously have to update their skills. The teaching "space" is no longer a physical place bound by the time boundaries of "formal study". Students expect to feel that they have more control over when, where, how and how fast they learn, again emphasising the five principles outlined in section 3.3.1.

3.5.2 The adult, mature part-time learners

As discussed in section 2.2.1 of Chapter 2, changes in the nature of work in the network society necessitate lifelong learning. Michal Beller and Ehud Or (1998) argue that "Increasing competition, the need to keep up-to-date professionally, along with a rising standard of living and more leisure time, have combined to make studying an ongoing process – lifelong learning".

The growing success of the University of Phoenix[39], which specifically targets working adult learners underscores the growth in the adult learning market. A National Center for Education Statistics found increased participation in adult education across virtually all the age groups in the USA from 1991 to 1999. The only exception was the 35 to 44 age group, which started high and stayed steady. The study found, as we have also concluded in the analysis of the non-traditional providers in Chapter 2, that the main growth is in vocational work-related courses (Creighton and Hudson 2002). Whereas, according to Dixon Hanna (1998), universities traditionally "focused upon serving the educational needs of youth to prepare for a lifetime of work", universities will now have to shift their focus to also cater for "a lifetime of learning in order to work". James D Duderstadt (2001) similarly argues that universities will have to adapt to respond to the "educational needs of adults as they seek to adapt to the needs of the high performance workplace". This demand for education throughout the life cycle is not just a North American or European phenomenon - Philip Altbach and Todd Davis identify it as an "issue cluster" that is relevant world wide (Altbach and Davis 1999).

The second group of learners are therefore different from the "digital age kids" in that they are generally older and have additional obligations, such as work and family. It is dangerous to generalise about the learning preferences of a specific group, although Bizhan Nasseh (2000) and James Kilmurray (2003) use the research of Knowles (1975), (1980), who is considered to be a world expert on adult learning, to formulate the following preferences. According to them, adult learners:

- Are more problemcentered and prefer self-directed learning processes and activities,
- Are more interested in the immediate application of their knowledge,

[39] A more detailed discussion of the University of Phoenix and its success is given in section 2.2.3.1 of Chapter 2.

- Have richer life experiences, which they value and want to share with fellow students,
- Are more motivated to succeed and compete successfully,
- Demand outcome-oriented education which will be worth their time and financial investment, and
- Are likely to be more unfamiliar with digital technology and need additional help in getting started in online education (Nasseh 2000), (Kilmurray 2003).

3.5.3 The integration of ICTs as a way to deal with both of these groups

The integration of ICTs can help in dealing with these two very diverse groups of students. Despite their diversity, both groups will, according to Duderstadt (2001), be likely to "demand a major shift in educational methods, away from passive classroom courses packaged into well-defined degree programs, and toward interactive, collaborate learning experiences, provided when and where the student needs the knowledge and skills".

As became clear in section 3.3.1, ICTs can be used to create flexible, highly individualised learning environments catering for the different expectations and needs of the different groups of students. With the mature adult students, who are generally considered to be not so technologically savvy as the "Internet generation", special provision has to made for additional training and support with regard to the use of ICTs. This could include orientation and training programmes in online education (Nasseh 2000).

3.6 THE ENABLING INSTITUTIONAL ENVIRONMENT: CHALLENGES AND RESPONSES

Tony Bates (1997) argues that major structural and organisational changes will have to take place for technological change to be effective. Universities need a clearly defined business plan and a strategy.[40] They cannot assume a "build it and they will come" philosophy (Hawkins 1999). In this institutional environment there are definite challenges / barriers, which Barone (2003) describes as the "powerful interplay of technology, pedagogy and behaviour". She argues that these forces necessitate more "fluid, responsive organizational structures and conventions". It is essential to understand the forces at work and the ways to guide these forces to create a new teaching and learning space.

[40] I will return to this issue in Chapter 4, where I discuss the approach followed at the University of Stellenbosch to formulate and implement a business plan and strategy.

When considering specific barriers or challenges within an institution and the possible institutional responses, it is useful to first of all look at a general theory of the adoption of innovation, and more specifically, the different adopter categories – each with its own characteristics and corresponding needs. From these general attributes of the different categories, I will identify a common set of challenges/barriers in the institutional environment and discuss possible institutional initiatives/interventions/strategies to address them successfully, as well as the necessary preconditions for these initiatives to be successful.

3.6.1 Adopter categories

Paul Hagner (2000) identifies three different waves with regard to the adopters of ICTs in teaching and learning. The lecturers in the first wave have little need for reward structures and their impetus for change is internally driven. They are interested in bettering the quality of education, standard academic incentives do not play a role in their enterprise and they also do not receive substantial returns on their initiatives from their institutions. They have sufficient expertise to proceed on their own (Hagner 2000).

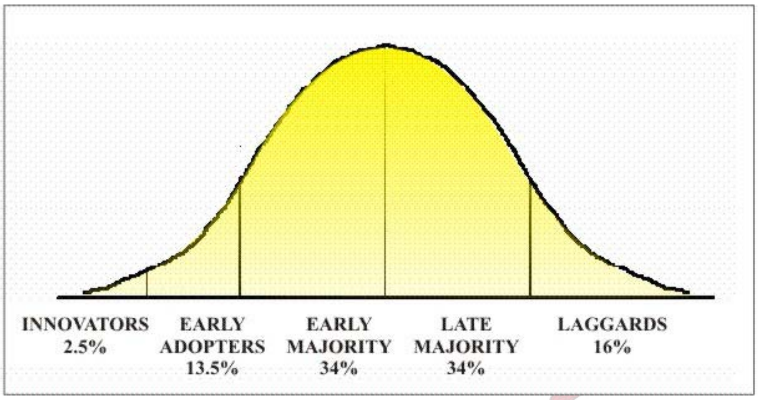
The adopters in the second wave, like the first, do not hesitate due to a lack of university rewards for learning innovations. They are like those in the first wave, also interested in the quality of teaching and learning, but are just more averse to risk (Hagner 2000).They are more wary of new approaches because of a fear of the unknown, which includes the length and dimension of the learning curve involved. They furthermore would argue "If it ain't broke, why fix it?" Although they might be very good lecturers, they could resist the integration of technology because:

- They are already doing a superior job, so why change,
- The know they are good educators, but unsure if their success will translate across a new presentation form,
- They fear that a "failed" attempt will affect the whole class, and
- Because they are not as adept with technology as the first wave, they might need more user-friendly levels of institutional support before experimenting with technology (Hagner 2000).

Hagner identifies the third wave as being even more wary. He speculates that this group will see the integration of technology as a way to advance their professional careers (Hagner 2000). He provides no further details and it is therefore necessary to compare these three waves with Everett Rogers's (1995) more extensive theory of innovation, and more specifically with his five adopter categories, to obtain a more complete picture of the different adopter categories.

Hagner's three waves correspond to a large extent to the five ideal adopter categories identified by Rogers. According to Rogers (1995), over time the cumulative percentages of the adopter groups distribute normally in the area under the curve shown in Figure 3.4 (As cited in Surry 1997).

Figure 3.4: Bell shaped curve showing categories of individual innovativeness and percentages within each category



Source: (Rogers as cited in Surry 1997)

Hagner's first wave of adopters corresponds to the innovators and early adopters identified by Rogers. The innovators, according to Rogers, are usually venturesome, risk takers, technologically inclined, can cope with a high degree of uncertainty, internally motivated and may or may not be respected by their peers. The second group, the early adopters, are normally respectable, more integrated into the local social system than the innovators, opinion leaders, make cautious innovation decisions, and are internally motivated. Hagner's second wave corresponds to Rogers's early majority group. The early majority group is deliberate, adopts innovations just before the average, follows others in adopting innovations, but seldom lead and are externally motivated. The last 50%, according to Rogers consists of the late majority (34%) and the laggards (16%) and could correspond to Hagner's third wave. The late majority is characterised by being skeptical, they adopt slightly later than average, they adopt for economic or peer pressure reasons, and not for usefulness, they are unwilling to risk scarce resources and are externally motivated. The laggards are traditional, the last group to adopt, have almost no opinion leadership, their point of reference is the past, they have limited resources and they are unwilling to take risks (Parker 1996).

The distinction between the different adopter categories and the characteristics of these adopters is useful in devising strategies to accommodate the concerns and expectations of lecturers who are not so-called early adopters. It is important to get to know all the faculty members and their special needs, not just the early adopters, to plan for the accommodation of all types of adopters

(Donovan 1998) – especially as regards faculty development and support, incentives and rewards.

3.6.2 The "enabling" environment: challenges and possible institutional responses

The most common challenges in connection with the integration of ICTs into teaching and learning mentioned by faculty members (differing in frequency depending on the adopter categories), and the different institutional responses / initiatives / interventions to address these challenges are summarised in Table 3.4 below. A discussion of the various items in the table follows after the table.

It is important to note that the success of the institutional initiatives to address these challenges will be directly related to:

- How well all of these responses / elements are integrated – either in one strategy or in cross-institutional strategies / policies,
- Visionary leadership and top management support,
- The level of communication of all of these initiatives to all stakeholders, and
- The timing of the interventions and the institutional readiness

These critical success factors will be described in section 3.6.3.

Table 3.4: Summary of lecturers' institutional concerns / barriers in relation to appropriate institutional responses to address the issues [41]

Lecturer / Institutional concern	Institutional response
1. Lack of commitment to change by faculty members as a result of: • the time investment to learn how to integrate ICTs effectively into teaching and learning activities • the time it takes to develop, maintain and participate in online learning activities • a lack of incentives and rewards for teaching and learning in general • a lack of reflection on teaching and learning itself • a lack of understanding of the potential benefits of ICTs for teaching and learning activities.	1. Develop policy(ies) on: • lecturer workload • professional practice and rewards for teaching • possible release time for the development of online learning environments • instructional development grants and stipends • recognition in terms of tenure, salary, and promotion decisions Do research on: • how students learn • what roles ICTs can play in supporting the learning environment • the use of ICTs in the specific institutional environment (e.g. adoption, barriers to adoption of ICTs, support needed, success stories) Canvas public commitment and support from top management for the use of ICTs in teaching and learning Encourage collaboration and sharing between faculty members • organise demonstrations and events where lecturers can share good practice

[41] We will assess whether these issues are also barriers in the University of Stellenbosch context in Chapter 7, section 7.3.1.5.

Lecturer / Institutional concern	Institutional response
	• regular communication amongst all stakeholders (support staff, lecturers, students, management) Encourage and facilitate a lecturer ethos which values experimentation and toleration of mistakes
2. Inadequate training and support (technical and pedagogical)	2. Develop a well-designed, scalable, individualised faculty development / consulting plan – both technical and pedagogy Recruit faculty members to help with demonstrations, training and support
3. Faculty ownership of digital material	3. Develop a flexible policy on intellectual property rights and ownership of online material
4. Inadequate infrastructure and the so-called digital divide	4. Build and support a flexible, reliable technological infrastructure with adequate access to hardware and software for lecturers and students Plan for ubiquitous student access to all the learning resources Develop faculty training programmes (technical and pedagogical) Provide for student computer and information literacy training
5. Costs	5. Develop an understanding of the required operational tasks Consider IT to be a strategic resource and fund it accordingly Make substantial resource commitments Develop a willingness to take risks Investigate partnerships for the development of online material

Source: (Panel on the Future of Teaching and Learning 2000), (Benfield and Francis 2003), (Hagner 2000), (Morrison 1999b), (Hawkins 1999), (Bonk 2001), (Oblinger and Verville 1999)

3.6.2.1 Faculty members' commitment to change

One of the main obstacles preventing the use of ICTs in teaching and learning is a perceived lack of commitment by faculty members to become involved. As can be seen from Table 3.4, this lack of commitment is the result of various factors.

Teaching and learning online are different from traditional face-to-face teaching and learning, and there are teaching skills that need to be developed in order to be effective in the medium (Mason 2001). In order to experiment with a new medium, faculty members will have to reflect on their personal approach to teaching and learning. It is necessary to understand how the teaching and learning process works in order to assess how ICTs can enhance the process. The problem is that most successful lecturers have never engaged in this form of reflection and self-evaluation and could be disinclined to do so.[42]

Robin Mason (2001) notes that one of the few areas on which there is little disagreement in the literature is that online learning materials are time-consuming to develop. We can speculate about whether or not this is just a short-term phenomenon or whether, as better development tools become available, it will be less time consuming (Mason 2001). The problem is not only "tool"

[42] This could also lead, as we described in section 3.2.1, to lecturers transporting their notes to the Web without any critical reflection on the redesign of the entire course (discussed in 3.2.3 and 3.2.3).

related, however. Thoughtful planning and allocation of resources are required for the development of quality online learning resources. If designed well, the specific course could save time in the long run, but significant time investments are needed, both with regard to the planning as well as the technical aspects in the initial stages of planning and development.

In most cases, the development of online activities is also not a once-off time investment. Good online activities need to be updated and revised continually. The rich communication possibilities (e-mail, online discussions, chat) discussed in sections 3.3.1 and 3.3.2 could be an additional element taking up lecturers' time and institutions should take this into account when determining lecturers' workloads.

In terms of Rogers and Hagner's adoption categories discussed in section 3.6.1, the first wave and the early adopters of technology will commit to this extra time investment without any external rewards or incentives. They are internally motivated and will do it anyway. It is for the later adopter types that incentives and monetary rewards become more important. However, it is difficult to generalise about the type of incentives needed – in some cases peer influences play a bigger role than monetary incentives. The types of incentives will ultimately vary between the different types of adopter, academic departments and institutions.

Institutions therefore have to pay careful attention to norms and rewards relating to teaching methods, academic autonomy and notions of productivity. Unfortunately, prevailing methods of evaluation and reward are mainly focused on research, which is carefully evaluated and rewarded, with little attention being paid to teaching and learning processes (Massy and Zemsky 1995). Martin Lazerson et al assert that "efforts to change teaching and improve learning are essentially battles over institutional values, rewards and behaviours" (Lazerson, Wagener, and Shumanis 2000).

These institutional values, where (mostly) research and not teaching and learning activities are valued and rewarded, need to change for the integration of ICTs to be successful. Laurillard argues for "a common understanding of the nature of learning at the university level, an acceptance that teachers must become reflective practitioners, and an intention by university management to create the conditions that foster and reward this rather different approach" (Laurillard 2001).

For this to happen, institutions should do research on the value that ICTs can add to teaching and learning activities, as well as the specific barriers and incentives that will work within their institutions. Twigg puts forward a case for a kind of "institutional research" to determine the most effective paths for individual learners and a greater focus on the monitoring and measuring of costs. With this continuous monitoring and feedback, adjustments can be made to learning designs: "The ultimate vision here is the kind of continuous quality improvement systems used by automated industrial production systems that are for the most part self-monitoring." She stresses the need for a continuous assessment loop keeping an eye on two things: “student learning outcomes and customer and student satisfaction with all experiences at the institution” (Twigg 2001).

These potential benefits should also be clearly communicated to all role players, with a strong commitment and support from top management for good teaching and learning practices with appropriate use of ICTs. Barone (2003) correctly argues that it is not enough to just talk about better teaching and learning practice, but that planning and budgeting need to be aligned to leadership rhetoric surrounding teaching and learning.

To demonstrate this top-down commitment, higher education institutions need to consider how they recognise online teaching efforts in promotion and tenure. They also could provide release time, instructional development grants, stipends and other forms of assistance to lecturers. Institutions should also encourage faculty members to collaborate and share material for and experiences with online teaching. The success and “good practice” of peers and their encouragement are often some the most important incentives for lecturers to start experimenting with online teaching methods.

3.6.2.2 Faculty development and support

Support and training initiatives for lecturers – both technical and pedagogical – are critical, especially for the faculty members who are not early adopters (Buckley 2002). Scalable faculty development practices grounded in sound pedagogical principles, accommodating all of the adopter types, are necessary to achieve systemic change (Buckley 2002) , (Barone 2003). A one-size-fits-all approach will not work and one could use Rogers’s categories of adopters to design specific faculty development opportunities for different segments of the faculty community. Different types of methods (face-to-face, e-mail, online) should be used in both training and support initiatives.

The University of Arizona has developed such a scalable online support system, called MOATS (Module Organizer and Teaching Suggester), which is a knowledge-based system built around learning principles. The system focuses on the “learning problem the faculty member wishes to address and then provides templates and uses case examples of how to employ the technology in accordance with the learning principle” (http://www.ic.arizona.edu/~teachorg/).

On a more general level, Donald Buckley (2002) makes the following suggestions for strategies to use in faculty development programmes:

1. Use authoring as a transformational experience – use entry level workshops on how to use authoring tools for change. Start small and use the simplest possible entry into technology-assisted worlds, but have them create their own projects.
2. Focus on pedagogical innovation and student learning – the goal is not to create technical experts, but allow faculty members to make use of the pedagogical possibilities of a particular product.
3. Keep the technology transparent – faculty members are not interested in the technology per se, and training should therefore make the technical aspects as easy as possible.
4. Emphasise faculty collaboration – faculty members might be more willing to take risks in groups. Furthermore, training could take place within a department to foster collaboration within the safe environment of the department.
5. Recruit faculty – demonstrations by faculty members for faculty members can be a very powerful tool. These demonstrations should emphasise a) the potential to foster active learning, b) opportunities to encourage motivation and mindful engagement of students, c) new insights about the cognitive development of learning that the technology could facilitate, d) the use of communication tools to promote cooperative learning, and e) the power of formative assessment tools to provide students with feedback and encouragement and to collect diagnostic clues about individual learning needs (Buckley 2002).

3.6.2.3 Faculty ownership of initiatives and intellectual property

In most institutions there currently is a dispute over the ownership of electronic, and especially online, teaching and learning materials. Faculty members can rightly ask why the institution would suddenly assert its ownership of something it has not really valued in the past. One obvious reason is, of course, the belief that online courses and course materials represent a potential source of revenue from which the institution could benefit (Twigg 2000).

> The growth of distance education and the widespread use of multimedia course materials have convinced some administrators and faculty members that they're sitting on gold mines: It might be possible to package college courses and sell them over the Internet or on disks (Guernsey and Young 1998).

As was seen in the second chapter, the pure content providers who expected to make big money from packaged content did not succeed. This "gold mine" view of online content and courses is therefore not accurate and administrators should rather encourage and support faculty members in the innovative integration of ICTs into teaching and learning programmes. As Twigg argues, “To encourage faculty to invest considerable time, thought, creativity, and energy in the development and delivery of technology-based instruction, institutions need to ensure faculty members that the results of their investment belong to them, and not the institution” (Twigg 2000, p.24).

Twigg therefore recommends that institutions should treat “technology innovations as original contributions to the betterment of education and should be generous and forward-thinking by offering attractive incentives for such activities” (Twigg 2000). The intellectual property policies should be frameworks for discussion and decision making and not be overly complicated. The default policy position should be that faculty members own the course materials that they created. These policies could have “trigger mechanisms” that trigger alternative policies in specific situations, e.g. if the material is commercialised by someone outside the university, the university could claim royalties of 5%, for example. The institution could also use an office for intellectual property for these purposes, but the approach should be: “If you need the institution’s help to do something or think that we can add value to the process, then come to us” (Twigg 2000, p.26).

Diana Oblinger and co-authors (Oblinger, Barone, and Hawkins 2001) summarise the responsibilities of institutions with regard to intellectual property policies as follows:

- Make clear what is intellectual property and the circumstances under which the institution will assume the costs of protecting intellectual property.
- Define inventor and author rights, including rights of revision and adaptation, reproduction, display and ownership.
- Spell out the role and rights of professional staff in the creative / technical process of course design and development.
- Identify when and how the institution can use intellectual property generated by faculty.
- Explain how faculty will be compensated for the development and preparation of distributed learning courses and how the parties will share in any royalties generated.
- Identify who will administer the institution’s intellectual property policies.
- Clarify how the inventor or author can use the institution’s trademarks (e.g. name and logos) when commercialising a work.

3.6.2.4 Technological infrastructure and the digital divide

Within a university context, the main issues with regard to physical infrastructure resources which could present barriers to the adoption of ICTs in teaching and learning activities are:

- Inadequate hardware and software for lecturers
- Inadequate access for students to computers and software
- Inadequate electronic classrooms (Bonk 2001)

The provision of physical resource, although critical for the successful adoption of technology, especially in developing countries, will not solve the so-called "digital divide". Mark Warshauer (2002) provides a useful critique of the traditional notion of the digital divide, which focuses only on the provision of hardware and software without paying enough attention to the human and social systems that must also change for technology to have an effect. He argues that ICT is "embedded in a complex array of factors encompassing physical, digital, human, and social resources and relationships. Content and language, literacy and education, and community and institutional structures must all be taken into account if meaningful access to new technologies is to be provided" (Warschauer 2002, p.49).

Resnick (2001) similarly argues that, whereas the "access gap" (to hardware and software) will narrow, the "fluency gap" (regarding computer and information literacy) could remain. Universities should therefore pay attention to both the physical infrastructure as well as the social practices – the types of literacies required to be "digitally fluent"[43]. The "digital fluency" of both lecturers and students can be addressed in workshops and as integrated parts of the curriculum.

3.6.2.5 Cost (lecturers and organisation)

The original hope was that there would be cost efficiencies attached to the investment in educational technologies. This has to a large extent not been realised.

A further complicating factor is that it is very difficult to measure the "cost efficiencies" of technology in relation to improved "effectiveness", "performance" or "quality", because of the disagreement on these terms in relation to teaching and learning activities. Jef Moonen (1997) identifies an additional four reasons why costs are so difficult to compute:

- There is disagreement about which costs should be taken into account,
- Reliable data is unavailable because it is not collected in a systematic manner,
- Recorded costs are unstable and evolving, and
- Some data is perceived as confidential and may not be made publicly available.

[43] Mitchel Resnick (2001) defines digital fluency as not only knowing "how to use digital technology, but also knowing how to construct things of significance with digital technology" (Resnick 2001, p.49)

Although difficult to accurately determine, there is relative consensus (CVCP and HEFCE 2000), (Taylor and Schmidtlein 2000) that the there are mainly three kinds of costs associated with instructional technology: developmental, operational and infrastructural. When taking this view, Sally Johnstone and Russell Poulin (2002) claim that the following very important issue is often overlooked in the costing of educational technology activities: People costs outweigh technology.

If technology is just added on to teaching and learning activities without any redesign of the specific course, it just adds costs and no value. It also means that the institution's high-priced academic member has to provide technical, logistical and academic support to students which is not the most effective way for the lecturer to spend his/her time. Twigg (2001) argues for a "disaggregation" of the different roles of an individual faculty member as designer, developer and learning theorist to determine whether one of these functions (e.g. the design of learning material) could not be dealt with at a central institutional level to produce cost savings. Michael Gallagher (2000) refers to this as "vertical disaggregation" of the different functions of course design, including curriculum development, teaching, student feedback, assessment and other customer services. Vlasceanu and Davies (2001) (quoting R Tadeusiewicz and J Melendéz) caution that this type of disaggregation of roles can have significant implications for generating teamwork and ensuring the quality of the final product in a potentially fragmented production chain.

To ensure efficiency, new organisational models are needed that take these different faculty roles into account. Institutions should also take note of all of the "hidden" costs (listed below) in their budgeting and develop a cost-effective business plan for the integration of ICTs into teaching and learning activities:

- Electronic interaction could add costs,
- Maintaining student communication and participation could add people costs to courses. Faculty members need to find effective ways to manage the increased electronic interaction (e.g. threaded discussion lists instead of individual e-mail messages),
- Student support services,
- Good course design coupled with a commitment of the entire institution to support students in teaching and learning activities are very important. Studies show (Johnstone and Poulin 2002) that there is a direct relation between student completion rates and the level and quality of mentoring / tutoring services,
- Scalability and course development costs are the two primary cost determinants, and
- The number of students served and the cost to develop courses are the two most important variables determining the cost of courses. Scalability can keep costs down, as

high development costs are compensated for by a large number of students using the material,[44]

- Sharing course development costs saves money, and
- Sharing of course material between departments and institutions can save money for individual departments / institutions (Johnstone and Poulin 2002, p.22-23).

3.6.3 Critical success factors

In September 2000, participants in the National Learning Infrastructure Initiative Focus Sessions (as cited in Oblinger, Barone, and Hawkins 2001) identified 12 conditions that are essential for e-Learning initiatives to be successful in a knowledge-based economy on an institutional level:[45]

Table 3.5: Twelve essential conditions for e-Learning initiatives to be successful

Condition	Description
Choices	Identifying a strategic direction and selecting a path to get there based on a clear sense of institutional mission.
Commitment	Allocating resources to enable the institution to adjust its course and to follow the path selected.
Courage	Energetic and focused leadership from the very highest level of administration.
Communication	Building a climate of trust by including the entire campus community in the transformation process through a carefully conceived and well-executed strategy for dissemination of information about extant and emerging services, plans, decisions, etc.
Cooperation	Collaborating across functions and throughout levels and constituencies to achieve a consistent and integrated set of support services for teaching and learning.
Community	Complementing the community of support nurtured through cross-functional collaboration with an equally cohesive community of faculty across disciplines.
Curriculum	Reconceptualising the curriculum to reflect its distributed, interdisciplinary and outcomes-oriented nature.
Consistency	Reflecting institutional commitment to transformation through consistent action and recognising the importance of standards, within both the technology industry and the institution.
Capacity	Developing the teaching and learning capacity of the institution (e.g. curriculum and faculty) to serve student achievement and outcomes.
Culture / Context	Understanding the culture, values and sensitivities of a given campus climate.
Complexity / Confusion	Overcoming the confusion associated with coping with transformation by adapting to the inherent complexity of the decision-making process by adopting more agile and responsive governance processes.
Creativity	Developing strategies and tactics that harmonise with the campus culture and context and recognising that this is a creative, not just a political process.

[44] Evidence for this exists in the Pew Grant Program in Course Redesign case studies.
[45] We will assess whether these conditions are met in the University of Stellenbosch context in Chapter 7.

These twelve conditions can, to a large extent, be summed up by emphasising the need for a strategy and leadership at the level of top management. The authors of the *Digital Rewards Report* summarise the need for a strategy and leadership for educational technology as follows:

> In short, as technology's impact on pedagogy becomes more profound, every university and college will need to develop a strategy for its use. Skillful leadership will be needed to help faculty and administrators cope with change and move forward. The faculty reward structure will not change. Higher education is in the digital rapids. And, as any whitewater veteran will tell you, in these circumstances, it is better to steer than drift (Newman and Scurry 2001).

John Hitt and Joel Hartman (2002) claim that transformational change can only take place when "institutional leaders articulate a clear, bold vision, demonstrate a broad understanding and acceptance of that view, apply a focused use of resources, and encourage widespread collaboration throughout the institution". They also claim that the following points should be on the action agenda of the leadership:

- Establish an institutional vision,
- Communicate executive leadership and support,
- Integrate IT into the institutional plan and budget,
- Own IT issues, and
- Develop the right leadership team (Hitt and Hartman 2002).

Arie Rip (1995) furthermore stresses the importance of the alignment of actors, both in the initial introduction of new technology as well as in the management process. He states, "To work effectively and get embedded, technologies are always composite: besides artefacts and production technology, there are also maintenance and user services, and in recent times monitoring and safeguard technologies. The whole package should be in order, i.e. internally and externally aligned" (Rip 1995). He argues that "(a)lignment (as an activity, and as a goal to be reached) is an important consideration for all actors. For the introducers of new technology, the notion of alignment, and the need to work towards it consciously, should replace the ideology of letting the market decide about the fate of the new technology (that will happen anyway in the end)" (Rip 1995, p.423). Rip furthermore suggests that there should be a macro-actor to realize the necessary alignment, and "if there is no existing body (organization / agency) to fulfill such a role, a macro-actor should be constructed" (Rip 1995).

The alignment of actors in the educational context is of extreme importance. Different divisions have different strategies and visions, but the aim is to align the actors to work towards the same goal: the creation of a rich e-Learning academic environment.

3.7 THE ENABLING TECHNOLOGICAL ENVIRONMENT: LEARNING MANAGEMENT SYSTEMS AS BACKBONE OF TEACHING AND LEARNING ACTIVITIES

In this last section I will consider the technological environment that forms the backbone of the integration of ICTs into teaching and learning. I will focus on the rise in the adoption of course (learning) management systems (LMS) in universities to specifically consider the questions: What is the relationship between the learning management system (the technology) and the learner-centred practices discussed in section 3.3.1? How are these systems developing? What is the influence of standards and open source initiatives on learning management systems?

The use of learning management systems (especially WebCT and Blackboard) as Web frameworks for higher education teaching and learning activities exploded in the late 1990s.

Judith V. Boettcher (2003) identifies four waves in the development of a course / learning management system: [46]

1. Technology used to organise the elements of a course and to communicate with students.
2. Rise of the "hybrid course", in which the best of Web interactions are integrated – using technology to make business as usual more efficient.
3. Creation of new systems that support efficiency in administration and delivery at the infrastructure and enterprise level supporting an online campus.
4. Design of standards (IMS / SCORM design standards), open source developments (OKI) and related content and learning object initiatives (MEROLT, OCW and Reusable Learning Objects Project at the University of Cambridge).

3.7.1 The first wave: Learning management systems to organise course elements

Learning management systems started out as systems that were used primarily to organise course elements and to communicate with students. They provide flexible, integrated Web environments with tools to deliver content, facilitate communication between students and lecturers and students amongst each other, as well as assessment and feedback. These environments are username and password controlled and only students registered for a specific course have access to them. In this way, lecturers can create personalized Web learning

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[46] These four waves are assessed in the University of Stellenbosch context in Chapter 7, Section 7.5.

environments using fairly user-friendly systems. Because of the user-friendly nature of these systems, lecturers find it relatively easy to develop and maintain their own courses online, thereby helping institutions in the start-up phase of the integration of ICTs into teaching and learning activities (Buckley 2002).

In the first wave, faculty members are largely committed to the idea because it provides a convenient, secure environment for content. As was discussed in section 3.2.1, many lecturers only use the Web environment for the delivery of content.

3.7.2 The second wave: Learning management systems as learning environments

In the second wave, we find institutions turning to the use of LMSs because they provide an online environment with good, tool-rich instructional design for active, anytime online learning (Carmean and Haefner 2002). They could also improve the productivity of lecturers in managing administrative data about their students and doing routine tasks related to teaching.

WebCT as a company claims that these learning management systems have the capabilities, impact on and value for the different stakeholders in higher education outlined in Table 3.6 below.

Table 3.6: Potential advantages of WebCT for different stakeholders

	Capability	Impact	Value
Administrators	+ Expands academic capacity + Student performance tracking	+ Student retention + New revenue streams - Expense management	+ Rapid ROI
Faculty	+ Course management + Content management + Assessment tools	- Preparation time + Content availability + Content sharing	+ Increased productivity
Students	+ Personalization + Academic support	+ Course completion + Grades	+ Improved learning
IT professionals	+ Scalability + Standards-based architecture	+ Campus-wide deployment + Integration	+ Increased efficiency

Source: (http://www.webct.com/transform/viewpage?name=transform_new_demands)

Although Table 3.6 does list “improved learning” as a value for students taking a course on a learning management system (in this case WebCT), it is not clear from this table how the tools of learning management systems succeed in supporting good practices for effective learner-centred instruction. Course completion and grades might be indicators of student learning, but certainly not the only ones.

To obtain a more complete picture of the possible uses of LMS tools to achieve improved learning, Table 3.7 below provides a comparison of the possible uses and advantages of WebCT's tools with a set of best practice teaching and learning principles as defined by Chickering and Gamson (1987).[47] Chickering and Gamson claim that best practice teaching and learning:

1. Encourages student-lecturer contact.

    Frequent student-lecturer contact in and out of classes is the most important factor in student motivation and involvement. Lecturer concern helps students get through rough times and keep on working. Knowing a few faculty members well enhances students' intellectual commitment and encourages them to think about their own values and future plans.

2. Encourages cooperation among students.

    Learning is enhanced when it is more like a team effort than a solo race. Good learning, like good work, is collaborative and social, not competitive and isolated. Working with others often increases involvement in learning. Sharing one's own ideas and responding to others' reactions improves thinking and deepens understanding.

3. Encourages active learning.

    Learning is not a spectator sport. Students do not learn much just sitting in classes listening to teachers, memorising pre-packaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences and apply it to their daily lives. They must make what they learn part of themselves.

4. Gives prompt feedback.

    Knowing what you know and don't know focuses learning. Students need appropriate feedback on performance to benefit from courses. In getting started, students need help in assessing existing knowledge and competence. In classes, students need frequent opportunities to perform and receive suggestions for improvement. At various points during college, and at the end, students need chances to reflect on what they have learned, what they still need to know, and how to assess themselves.

5. Emphasises time on task.

[47] These principles were also used in Table 3.2 on learner-centred best practice principles in section 3.3.1.

Time plus energy equals learning. There is no substitute for time on task. Learning to use one's time well is critical for students and professionals alike. Students need help in learning effective time management. Allocating realistic amounts of time means effective learning for students and effective teaching for lecturers. How an institution defines time expectations for students, lecturers, administrators and other professional staff can establish the basis for high performance for all.

6. Communicates high expectations.

Expect more and you will get it. High expectations are important for everyone – for the poorly prepared, for those unwilling to exert themselves, and for the bright and well motivated. Expecting students to perform well becomes a self-fulfilling prophecy when teachers and institutions hold high expectations of themselves and make extra efforts.

7. Respects diverse talents and ways of learning.

There are many roads to learning. People bring different talents and styles of learning to college. Brilliant students in the seminar room may be all thumbs in the laboratory or art studio. On the other hand, students rich in hands-on experience may not relate so well to theory. Students need the opportunity to show their talents and learn in those ways that work for them. This develops the self-confidence that encourages students to further explore learning in new ways that may at first seem difficult to them (Chickering & Ehrmann,1996).

The WebCT tools in Table 3.7 are grouped according to the following main purposes that LMS tools can be used for:

- Communication,
- Content delivery,
- Student activity and study, and
- Assessment.

Table 3.7: WebCT tools, uses and advantages, and good practice principles

WebCT "tool"	Uses and advantages	Good principle(s) for good teaching[48]
COMMUNICATION		
Module homepage	Good way of introducing lecturer to students, last minute changes, other resources	Student-lecturer contact
Bulletin board or Discussion tool (asynchronous)	One-to-many communication, moderated discussions, anonymous interaction, debate, peer assessment, group work, searches, quiet students can react, More writing by students as postings multiply, documents can be posted as attachments	Student-lecturer contact, cooperation among students
Chatrooms (synchronous)	One-to-many communication, brainstorm, virtual office hours, immediate feedback	Student-lecturer contact, cooperation among students, gives prompt feedback
Whiteboard (synchronous)	One-to-many communication, good for visual communication	Student-lecturer contact, cooperation among students
Calendar	Posting of target dates, reminders, last minute changes, global calendar available with dates of all modules' activities	Emphasises time on task, communicates high expectations, student-lecturer contact, cooperation among students
E-mail	One-to-one and one-to-many communication, private communication, reminders of specific dates, personal motivation, group work, searchable medium, documents can be sent as attachments	Student-lecturer contact, cooperation among students
Student homepages	Good way of introducing people, valuable database for students, helps in building a learning community	Cooperation among students
TOOLS FOR MAKING CONTENT AVAILABLE AND ENRICHING IT		
Content module: linked pages in a subdivision	Gives the feeling of flow, easier navigation, can add video, audio, graphics	Encourages active learning
Glossary	Can be attached or not to a content module, can contain hyperlinks to content module and vice versa, hyperlinks to other terminology in glossary, students do not have to guess the meaning of important terminology	Encourages active learning, respects diverse talents and ways of learning
Sound and video	Presentation of moving images and sound to make the module more interesting	Respects diverse talents and ways of learning, encourages active learning
Self-tests	Students can assess their own knowledge of the subject, lecturers can include detailed feedback, tests can be repeated until students are sure they have mastered it, drilling is good for memory	Encourages active learning, gives prompt feedback
"Take Notes"	Students can add their own notes while they are reading the content	Encourages active learning
Hyperlinks to other pages	Gives links to other resources, which can be interactive	Encourages active learning, respects diverse talents and ways of learning
References	Gives references to other resources that students can consult	Encourages active learning, respects diverse talents and ways of learning

[48] (Chickering and Gamson 1987)

WebCT "tool"	Uses and advantages	Good principle(s) for good teaching[48]
Single page	Used for non-linear material, examples, special resources, inclusion of text, graphics and hyperlinks for easier navigation, links to simulations, HTML, PDF, Word, PPT files	Encourages active learning, respects diverse talents and ways of learning
Syllabus (module outline)	Gives a description of the module content, lecturer information, outcomes, textbooks and expectations	Emphasises time on task, student-lecturer contact
Selective release of material per group or according to performance	Students can learn at own pace or can be forced to keep up. Can also make different materials available to different students at different times. Individualised learning environment based on own ability	Encourages active learning, emphasises time on task, respects diverse talents and ways of learning
STUDENT ACTIVITY AND STUDY TOOLS		
Search facility	Students can find material electronically	Encourages active learning, respects diverse talents and ways of learning
Progress tools and bookmarks	Students can evaluate how much time and effort they put into a module	Communicates high expectations, emphasises time on task
Grade tool	Students get their marks rapidly and can determine if they have to put in more effort for the module	Gives prompt feedback (depending on what and how much is made available), communicates high expectations
Comparison of class performance	Students can determine online where their performance lies in comparison to the rest of the class, which can be highly motivating	Communicates high expectations
Site map	Alternative way of navigating through the module – students can navigate at their own time and pace and access the activities according to personal preferences	Respects diverse talents and ways of learning, emphasises time on task
Help files	Explains to students what is necessary to be successful	Encourages active learning, gives prompt feedback
Surveys	Student can give feedback anonymously, lecturers get valuable feedback to change the course	Encourages active learning, gives prompt feedback
ASSESSMENT TOOLS		
Quizzes	Formative / summative assessment, Immediate feedback	Encourages active learning, communicates high expectations
Selective Release Quizzes	Quizzes are made available based on the performance of a student in a previous quiz or assignment within WebCT, quizzes are released to a predefined group of students	Communicates high expectations, respects diverse talents and ways of learning
Timed quizzes	Students must have mastered the work to complete it in the set time	Encourages active learning, emphasises time on task, gives prompt feedback
Proctored quizzes	Security settings on quizzes include IP address specifications and password protection	Communicates high expectations
Randomised quizzes	Students get different sets of questions, generated randomly from the question database	Communicates high expectations
Multiple attempts	Students have more than one opportunity to complete the quiz, formative assessment	Encourages active learning, respects diverse talents and ways of learning, gives prompt feedback
Assignment tool	Students can submit assignments electronically, Lecturers grade assignments and the grades and feedback are immediately available to students	Emphasises time on task, gives prompt feedback

WebCT "tool"	Uses and advantages	Good principle(s) for good teaching[48]
Group projects	Gives students the opportunity to help each other as they become aware of each other's strengths and weak points, prepares students for future jobs, in which group work is becoming more and more important	Cooperation among students

As can be seen from Table 3.7, there are definite potential advantages to the use of the different tools of WebCT. These potential advantages also correspond to different aspects of the seven principles of good teaching and learning practice defined by Chickering and Gamson. An LMS such as WebCT can therefore be used to support effective online learning environments.

A study done by Cheryl Bielema and Robert Keel at the University of Missouri, St Louis in 2003 supports this contention that the use of a learning management system can improve learning. They surveyed two groups of students – one made use of an LMS, the other did not. They asked the students how often they took part in certain important instructional activities. They found that the students who used the LMS extensively were more likely to report that they were involved in the good practice activities promoted by Chickering and Gamson (as cited in Ehrmann & Gilbert 2003).

3.7.3 The third wave: Integrated enterprise-wide learning management systems

Developers of learning management systems have extended their development aims in terms of Boettcher's third wave to not only focus on the learning environment, but also on enterprise-wide learning management solutions that integrate the pedagogical tools of learning management systems into existing campus infrastructure. Institutions are now looking to integrate their various information and management systems in order to support more flexibility in the future (Collis and Van der Wende 2002).

Collis and Van der Wende (2002) refer to Serban and Malone's research (2000) when they write, "Every higher education institution has a number of complex information systems running on different technical platforms, many with legacy applications that have been hand-coded for the institution over years" (Collis and Van der Wende 2002, p. 67). The authors of the Twente survey furthermore found "abundant evidence concerning the ad-hoc manner in which information management systems evolved within higher education institutions … each unit has developed or purchased an individual system to suit its own needs" (Collis and Van der Wende 2002, p.44-45). To increase efficiency and decrease costs, the move will have to be made to an integrated educational information management system and institutionwide systems for access rights and control to learning resources and environments. This could include a single log-in system, in which the user's log-in ID is linked not only to course access rights, but also to secondary services such as printing and costs for network access.

Learning management systems, and more specifically WebCT, are reacting to this need for integrated campus systems and are developing integrated systems that include:

- World-class teaching and learning tools,
- Robust content management capabilities,
- Complete personalisation of the learning experience,
- Dynamic learning information management, and
- Enterprise-class platform architecture.
(http://www.webct.com/transform/viewpage?name=transform_webct_vision)

3.7.4 The fourth wave: Standards and open-source developments

Technical interoperability is crucial for the transformation of teaching and learning. Global standards will ensure that learning objects can be shared and that collaboration between individuals and institutions can become a reality. Interoperability, according to Barone, is necessary to make the new teaching and learning methods "affordable, supportable, portable and robust" (Barone 2003). The IMS Global Learning Consortium, a worldwide non-profit organisation (www.imsproject.org), has taken the lead in defining these standards.

Standards help to ensure the five "abilities" mentioned below and to protect and even nurture e-Learning investments:

1. Interoperability - can the system work with any other system?
2. Re-usability - can courseware (learning objects, "chunks") be re-used?
3. Manageability - can a system track the appropriate information about the learner and the content?
4. Accessibility - can a learner access the appropriate content at the appropriate time?
5. Durability - will the technology evolve with the standards to avoid obsolescence? (Masie 2002)

It is therefore important for higher education institutions to take note of these standards to protect and increase the return on their investment in the learning technologies they purchase and in the learning content and services they develop. Researchers from the Masie Center contend that:

> Thousands, if not millions, of dollars will be spent on these technologies, content, and services to improve knowledge and skills. If the systems cannot grow, be sustained, maintained, and delivered to the learners, the investment will be wasted or seriously less effective on returning results (Masie 2002, p.8).

Traditionally, the commercial LMS (WebCT, Blackboard) is characterised by its "closed environment", with a lack of exportability of elements from one commercial LMS to another. This lack of interoperability or course exportability is understandable from the economic vantage point of vendors. They want a campus to standardise on their specific system and stay with it. Once the LMS is widely used at an institution, the campus is “stuck” with the particular LMS, because it is very difficult to export the courses within this LMS to another medium. This type of approach by vendors is not, however, very advantageous for the individual faculty member or institution that wants to share content or courses with other faculty members / institutions (Carmean and Haefner 2002).

This “closed nature” of most LMSs is a serious issue that has hampered the sharing of learning objects advocated by the IMS Global Learning Consortium, the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) (www.merlot.org) and the National Learning Infrastructure Initiative (NLII) Learning Objects Project (http://www.educause.edu/nlii/keythemes/LearningObjects.asp). Limited time and resources to develop online learning materials are very serious barriers to the adoption of online learning. Sharing between institutions and lecturers is facilitated when common standards are used in the development of learning objects that will allow these elements to be transferred from one course to another and shared between institutions. The learning elements within LMSs are also not easily exported to desktop-accessible formats. This causes faculty members to be reluctant to “lock-away” content from external (non-LMS, non-vendor-specific) access. If faculty members want to leave an institution, they will be unable to take the material with them. Carmean and Haefner (2002) argue that the Web-based learning management systems now common in higher education need to evolve to a new generation, with emphasis on speed, new tools, exportability and interoperability.

Open-source initiatives have largely been a response to the commercial LMS market, which has grown exponentially in the past few years. Open-source initiatives (free online content and development tools) are based on principles that allow people to read, improve, adapt or modify, fix, redistribute and use the software or content free of charge. In doing so, code improvements can be made at a much faster rate than when one institution is working on it alone (Moore 2002). As an example of content development, MERLOT (www.merlot.org) is a project where lecturers can create modularised content, peer-review them and store them in a searchable repository. MERLOT is built on lecturer values that support open exchanges and the peer review of materials.

MIT has launched free online content and development tools. MIT OpenCourseWare (http://ocw.mit.edu/index.html) is an initiative whereby MIT content is delivered online free of charge. This initiative, according to Phil Long, does not equal an MIT education. He argues that “[a]n MIT education requires a combination of the content in conjunction with a faculty member and the critical element, the students, mixed together in an environment that supports inquiry and provides first-rate facilities to support the pursuit of knowledge" (Gilbert and Long 2002). The OpenKnowledge initiative (http://web.mit.edu/oki/index.html) is a project by MIT and 11 other institutions to develop a modular and open-source learning management system that could integrate into a variety of different existing enterprise systems.

Carl Berger asserts that the open-source LMSs are not necessarily cheaper options than the commercial off-the-shelf products, such as Blackboard or WebCT. With open-source developments, institutions will have to invest as much in the support of the development and maintenance of the system itself as they would pay for a commercial solution. He argues that "(t)he main purpose of open source is not really to save on expenses, but it is there to get the things done that we need to and move the profession forward" (Boettcher and Berger 2003).

There are, however, advantages for universities that participate in these types of open-source developments. They include:

- Products that supplement and compete in healthy ways with proprietary products.
- Working together, which encourages the use of standards (Moore 2002).

The growth in the number of open-source learning management systems, of which the MIT initiative is just one, has an effect on commercial systems such as Blackboard and WebCT. The commercial systems are using some of the ideas that come out of the open-source movement, e.g. open APIs (Application Programming Interfaces), so that their systems can integrate with the open-source developments (Boettcher 2003). The authors of the Twente report argue that developers of learning management systems will need to develop more complex tools and support than are currently generally available, for:

- The re-use on demand of materials from a variety of sources,
- New search facilities, such as for non-text objects (simulations, applets, animations, images, segments of stored audio and video, etc.),
- The ability to set and pre-test competency criteria, as learners increasingly will come from different streams and backgrounds into a course or knowledge-unit activities; direct branching to appropriate remediation materials for those missing some required background,
- Tools to tailor and manage assignments, monitor learners, and for different forms of intervention and feedback,
- New feedback and communication tools, such as audio-feedback to provide effective feedback to students with many variations in their study programmes,
- Progress-tracking tools with views for learners, instructors, and mentors, and

- Support tools for all involved - institutional decision makers, institutional councillors, instructors and clients leading them through decisions in terms of flexibility options and the costs and implications of different combinations of options (Collis and Van der Wende 2002).

3.7.5 A final note of caution

A final note of caution: Although important, this technological architecture and design should not drive the adoption thereof. Learning management systems and the newest innovations in technology should not be adopted just because they are “cutting edge” and innovative. The teaching and learning process and activities, as well as the mission of a specific university, should drive the adoption. Vlasceanu and Davis (2001) allude to the danger that universities could emphasise technological aspects at the cost of the “educational, pedagogical, social, pastoral, and organizational aspects”. Ehrmann furthermore warns against a phenomenon he calls the “rapture of the technology”, whereby the technology itself is overemphasised, and the strategic ingredients needed for meeting the educational / institutional objectives neglected. He argues that this “(r)apture of the technology is self-defeating, like a tapeworm so greedy it kills its host” (Ehrmann 2001). Ehrmann emphasises long-term strategic planning and commitment to new technologies “for the long haul”. He argues that universities should “(b)uild cutting edge education on selected technology of yesterday, especially IT that’s been rapidly, incrementally improving for more than 5 years” (Ehrmann 2001).

3.8 SUMMARY

The key issues emerging from Chapter 3 can be summarised as follows. In order for ICTs to transform the higher education environment:

- The overall learning environment should be based on best practice teaching and learning principles that support deeper learning, which takes place when learning is:
    - Social
    - Active
    - Contextual
    - Engaging
    - Student-owned

- Learning theorists agree that, if these best practice principles are followed, student learning should take place.
- Technology applications should be used to realise these good teaching and learning principles for them to have any benefits for students and lecturers.
- The institutional environment should reward good teaching practice in general and provide incentives for innovation in teaching and learning.
- Institutions should have a clear plan and strategy for integrating ICTs, not only into teaching and learning practice, but into the university as a whole
- Institutions should invest in an enabling technological environment, looking specifically at Web learning management systems (LMS) as user-friendly Web environments that could support teaching and learning.

What has therefore become clear in Chapter 3 is that the formulation and implementation of an e-Learning strategy cannot be done in isolation from general teaching and learning issues and policies. The strategy should furthermore form part of a broader strategy to integrate ICTs into all aspects of the higher education institution. Rogers (1995) compares the introduction of an innovation, such as e-Learning, to moving one marble in a bowl of marbles. He claims that:

> No innovation comes without strings attached. The more technologically advanced an innovation is, the more likely its introduction is to produce many consequences, some of them anticipated, but others unintended and hidden. A system is like a bowl of marbles: Move any one of its elements and the positions of the others are inevitably changed also. The interdependency is often not fully understood by the adopters of an innovation, and may not be comprehended by the change agents who introduce a new idea in a system.

If an institution therefore wants to be successful in the introduction of e-Learning activities at institutional level, it has to take note of and make provision for all the interdependencies. This should be done as a coordinated effort to formulate and implement a strategy for the integration of ICTs into all aspects of the institution. To be successful in the integration of ICTs into teaching and learning activities, the institution has to take note of good teaching and learning practice, foster a supportive institutional environment that rewards innovation in teaching and learning practice and provide the necessary technological teaching and learning tools. Chapter 4 will outline the process undertaken at the University of Stellenbosch to formulate and implement an e-Learning strategy, both as part of a Teaching and Learning Strategy and as part of a broader e-Campus strategy that provides for the integration of ICTs into all aspects of the university.

CHAPTER 4: CASE STUDY OF THE UNIVERSITY OF STELLENBOSCH

There is no delicate matter to take in hand, nor more dangerous to conduct, nor more doubtful of success, than to step up as a leader in the introduction of change. For he who innovates will have for his enemies all those who are well off under the existing order of things, and only lukewarm support in those who might be better off under the new.

(Machiavelli, as cited in Duderstadt 1999)

4.1 INTRODUCTION

Responding to a question about how universities should prepare themselves for changes in the higher education context, Frank Newman named three actions that need to take place. He argues that there needs to be a campus conversation about the impact, promise and risks of technology. Second of all, there needs to be a faculty support group that can provide the diverse skills and knowledge so that faculty members can move to more comprehensive uses of technology. Thirdly, he argues that institutional budgets need to be restructured, with the recognition that “the investment in technology is not a one-time cost” (Morrison and Newman 2003). The third stage, the restructuring of budgets, cannot be done without a proper strategy, something that is not mentioned, but is probably implied by Newman. Tony Bates warns that the integration of ICTs without a well-defined strategy and changes in teaching and learning practice will only add costs to the system. He writes, "New technologies are likely to remain marginal, despite high levels of capital investment, and will merely add costs to the system, if we do not at the same time deal with structural changes in our institutions and in particular if we do not make fundamental changes to the ways we organize teaching" (Bates 1997, p.210).

At the University of Stellenbosch, the campus conversation about the integration of ICTs officially started in October 1999 with a two-day meeting at Rosenview. Although this was the first instance when all the stakeholders met around a table to discuss an integrated approach to the integration of ICTs into all aspects of the University, quite a few IT initiatives were already underway to provide the necessary infrastructure and support services before the conversation started.These included:

- The Information Technology division, which was established in 1986 to provide the necessary technological infrastructure and support,
- Individual lecturers, who acted as pioneers by experimenting with the use of ICTs in teaching and learning activities,
- The establishment of the division for University Education (Uni-Ed) in 1998, with the brief to accept responsibility for educational development, including the development and coordination of the use of multimedia in the University’s educational activities,

- The establishment of the division for Distance Education in 1998 (now Interactive Telematic Education) to coordinate the distance education activities of the University of Stellenbosch, and
- The adoption of WebCT as learning management system (LMS) at the beginning of 1999.

All of these initiatives provided the necessary basis to extend the integration of ICTs within the university. The exponential growth of the use of WebCT also played a role in necessitating an integrated strategy that would address all aspects, including adequate access, infrastructure, and support and training for both students and lecturers.

After the initial two-day discussion at Rosenview in 1999, an e-Campus Forum was formed in 2000 with the brief to formulate an e-Campus strategy. After faculty consultation from May to November 2001, the final document was approved by Senate in November 2001. In November 2001, the Council awarded special funding for a six-year period and the implementation of the e-Campus initiative, with the e-Learning project as one of its most prominent projects, started in February 2002. At the same time, the University also formulated a Strategy for Teaching and Learning. The e-Learning project forms part of both the e-Campus strategy and the Strategy for Teaching and Learning.

This chapter will contain a descriptive account of:

- The University of Stellenbosch and its context.
- The pre-strategy phase, which can be classified as a “bottom-up” approach to the adoption of technology. No special funding or incentives were provided during this phase and the (mostly) early adopters had to rely on the available infrastructure and support.
- The strategy formulation phase, which includes the first conversations, the work of the e-Campus Forum, the work of the Task Group for Teaching and Learning, wide consultation across the University, as well as the approval of and special funding for the e-Campus initiative.
- The strategy implementation phase (2002 and 2003), which can be classified as a “top-down” approach, with e-Learning targets, guidelines and special incentives and rewards for taking part in e-Learning activities. Although this phase and the previous phase can be classified as “top-down”, emphasis was placed throughout on consultation with as many stakeholders (especially academic staff) as possible to manage this process as transparently as possible.
- The changes associated with the shift from a “bottom-up” to a more “top-down” approach and ways to manage the challenges.

The e-Campus strategy and the Strategy for Teaching and Learning will not be discussed in detail. The focus will remain on the e-Learning project, specifically on the integration of ICTs into the teaching and learning process.

From this descriptive account of the e-Learning initiatives, I will derive three types of analytical frameworks: a programme theory, a logic model, as well as a theory of change. I will discuss these theoretical frameworks in more detail in Chapter 7, when the results of the retrospective assessment are given. Some key lessons learned will be included in the conclusion.

4.2 THE UNIVERSITY OF STELLENBOSCH AND ITS CONTEXT

The University of Stellenbosch has ten Faculties (Art, Science, Education, Agriculture & Forestry, Law, Theology, Economic & Management , Engineering, Health Sciences and Military Science) with a total student enrollment of 21 879 in 2003 (University of Stellenbosch 2004).

The University prides itself on its strong research-based culture with 34% of the total number of students in 2003 enrolled as postgraduate students. It is a historically white higher education institution that has experienced a slow but steady growth in the number of black[49] enrollments since 1994. Despite this drive to enrol more black students, the majority of the students (71% of all the 2003 registered students) are still white. Table 4.1 below gives the enrolments according to programme level and race.

[49] Including Coloured, Indian and African black.

Table 4.1: Enrolments according to programme level and race

Race/Programme level	2001		2002		2003	
	N	**Col %**	**N**	**Col %**	**N**	**Col %**
Undergraduate						
White	10552	82	10731	80	10963	79
Coloured	1385	11	1557	12	1806	13
Black	802	6	904	7	907	7
Asian	136	1	153	1	199	1
TOTAL	**12875**	**100**	**13345**	**100**	**13875**	**100**
Postgraduate						
White	4285	57	4244	56	4198	56
Coloured	725	10	718	9	703	9
Black	2281	30	2391	32	2285	31
Asian	190	3	257	3	272	4
TOTAL	**7481**	**100**	**7610**	**100**	**7458**	**100**
Special students (Students who are not enrolled for a degree programme, but only one or more modules)						
White	298	63	351	73	351	64
Coloured	106	22	55	11	78	14
Black	60	13	65	14	104	19
Asian	8	2	8	2	13	3
TOTAL	**472**	**100**	**479**	**100**	**546**	**100**
All students						
White	15135	73	15326	71	15512	71
Coloured	2216	11	2330	11	2587	12
Black	3143	15	3360	16	3296	15
Asian	334	1	418	2	484	2
TOTAL	**20828**	**100**	**21434**	**100**	**21879**	**100**

Source: (University of Stellenbosch 2004)

Stellenbosch University is well-resourced in terms of access to computers on campus with an average of 1 computer for every 11 students (see Chapter 5, Table 5.31). Students and lecturers are also relatively satisfied with the access to computers on campus (see Chapter 5, Figures 5.29 and 5.30). Access to computers off campus however remains a serious concern (see Chapter 5, Section 5.9.1.3: Student access off campus: Role of ICTs in the Stellenbosch/African context).

With regards to the computer literacy of the students, the results of the student survey reported in Chapter 6 clearly show that black students, and more specifically African black students, scored lower on the computer literacy index I created (see Table 6.9). The computer literacy index is an index composed of the responses to two questions: length of computer use and the students’ rating of their own computer skills. There is a significant difference between the race groups in both the length of computer use and in the students' own rating of their computer skills (Table 6.5). This difference is more pronounced in terms of the length of time students have had access to computers. Despite the equal access to computers on campus, it is clear that black students, especially coloured and African black students, come to university with some historical disadvantage with regards to access to computers.

With regards to the students' WebCT literacy there is also a significant difference between the different racial groups (see Table 6.15) with the white students scoring higher on the WebCT literacy index (combination of length of WebCT use and rating of WebCT skills). The difference is however not as pronounced as in the case of computer literacy. It is also not a case of length of WebCT use, but rather that the black students rated their skills to be poorer (see Table 6.12). WebCT is only used at University level and all students have equal access to WebCT resources on campus. No prior knowledge / use of WebCT is assumed nor required before entering university. However, prior computer experience and use will undoubtedly affect students' ratings of WebCT literacy.

Stellenbosch University is a residential university with the majority of students enrolled for "contact instruction" and only a very small percentage enrolled for Distance Education courses (see Table 4.2 below) (University of Stellenbosch 2004). Most of these Distance Education students are enrolled for the Faculty of Education's programmes that they offer in cooperation with the National Private Colleges. Table 4.2 clearly shows that there was a marked increase from 1999 to 2000 in the number of Distance Education students, followed by a steady decline from 2001 to 2003. This was largely the result of legislation and guidelines by the Department of Education regulating the offering of Distance Education programmes by residential universities.

Table 4.2: Enrollment according to year and mode of instruction

Year	All Enrollments	Distance Education*	Contact Instruction
1994	14462	0	14462
1995	14946	0	14946
1996	15555	0	15555
1997	16327	0	16327
1998	17200	352	16848
1999	18404	1067	17337
2000	20421	2331	18090
2001	20828	2097	18731
2002	21324	1987	19337
2003	21879	1576	20303
*Students who enrolled for the Faculty of Education's programmes offered in cooperation with National Private Colleges.			

Source: (University of Stellenbosch 2004)

4.3 INSTITUTIONAL ENVIRONMENT: PRE-STRATEGY PHASE (BOTTOM-UP)

In the pre-strategy phase, various initiatives were launched that were aimed at providing the necessary infrastructure, support and training framework for a campus-wide implementation of ICTs in all aspects of the University. The various initiatives included:

- The establishment of an Information Technology division in 1986 to provide the necessary technical infrastructure, user training and support,
- The presence of various early adopters, so-called “lone rangers”, who were willing to experiment with the use of ICTs in teaching and learning activities,
- The establishment of the Division for University Education (Uni-Ed) to provide educational faculty development initiatives,
- The establishment of the Division for Distance Education, with its focus on expanding the reach of the University in specific niche areas, and
- The adoption of WebCT as the Web learning management system (LMS).

Although all of the activities launched by these groups individually created the foundation for further developments, the specific limitations of each of these initiatives as a result of working in a relatively uncoordinated manner will be indicated.

4.3.1 Information Technology (IT) infrastructure

The University of Stellenbosch started investing in an ICT infrastructure and services environment that could support a distributive computing approach when the Information Technology division was established in 1986. In the pre-1986 era, the so-called mainframe era, the University had a computer centre that focused on the support of the mainframe computer system that could be accessed via a terminal. The emphasis in this pre-1986 era was on central control. In 1986, closely related to the general shift worldwide from the mainframe to the personal computer era, the University of Stellenbosch acknowledged that the user could be its own IT manager in a distributive environment, with the primary access to the mainframe no longer being a terminal, but rather the PC on the user’s desk (Dreijer and Van der Merwe 2003).

Another important shift occurred in the early 1990s (~1993). This shift entailed that the user no longer accessed the “mainframe” (computers) via his/her PC, but rather accessed “information sources”. This shift was again closely related to a worldwide shift in IT, from a focus on hardware to a focus on access to information sources (Dreijer and Van der Merwe 2003).

The IT strategy in the pre-e-Campus strategy phase was focused more on providing the necessary infrastructure and support for the administrative services and applications, e.g. human resources and student administration, than on providing e-Learning infrastructure. E-learning applications generally require higher service levels with regard to infrastructure, support and training, again emphasising the needs of the enduser rather than the hardware or information sources themselves. The latter are important, but are no longer the main focus.

With the formulation of the e-Campus strategy in 1999, the focus also shifted to the integration of all business processes, instead of being only on distinct elements of the system.[50]

The main shifts from pre-1986 to 1999 can be summarised as follows:

Table 4.3: Main IT shifts from pre-1986 to 1999

	Pre-1986	1986	1993	1999
Division	Computer centre	IT division	IT division	IT division
Era	Mainframe era	Distributive computing era (PCs)	Distributive computing (PCs)	PC / Mobile technology
Main focus	One mainframe	Distributive environment with various elements	Distributive environment with various elements	Integration between distinct business processes
Main access	Access to mainframe via terminal	Access to mainframe via PCs	Access to mainframe via PCs	Access to mainframe via PCs
Focus of access	Access to computers (hardware)	Access to computers (hardware)	Access to information sources	Access to information sources
Focus of support	Mainframe	Mainframe and PC environment	PC environment	End-user
Type of applications supported	Mostly Admin	Mostly Admin and Research	Mostly Admin and Research Some e-Learning applications	Admin, Research and e-Learning applications

Building on these shifts, the ICT technological infrastructure and technical support services therefore support the core functions of the university, namely research, teaching and community service.

The University of Stellenbosch IT system currently consists of the following elements:

- SUNET – the campus network,
- Micro-computers and peripheral devices,
- Micro-computer software,
- Central academic computer facilities,

[50] The reason for, and details of, this shift to a more integrated approach will be discussed in the next section.

- Central library computer facilities,
- Central library CD-ROM systems,
- Central administrative computer facilities,
- Central administrative database and development software,
- Central administrative information systems,
- Internet and e-mail services,
- Access control systems for photocopies, residence meals, laser printers and door access,
- Electronic learning and distance learning systems,
- Telephone systems,
- Helpdesk and support services,
- Training, and
- Information services (Information Technology Division 2002).

These main components were developed in the pre-strategy phase and provided the basic infrastructure for an e-Campus. They provided the foundation for further development, but were not sufficient on their own to support a full-scale e-Campus. The establishment of a full-scale e-Campus required further development of the technical infrastructure, support and operational services.

One of the main challenges in the pre-strategy phase was (and probably still is) adequate computer access for all students.[51] The university has six computer-user areas (four on the Stellenbosch campus, one at Tygerberg and one at Bellville Park) where students have access to computers 24 hours per day, seven days a week:

- Humarga for the Arts, Theology, Law and Education students
- Narga for the Science and Agricultural and Forestry students
- Firga for the Engineering students
- Fharga for the Economic and Business Sciences students
- Gerga for the Health Sciences students
- Bellville Park for the Graduate School of Business

[51] I will further discuss this challenge in the discussion of the lecturer and student survey results in Chapters 5 and 6 respectively.

These computer-user areas are managed by the deans of the different faculties and are the main areas where students access e-mail, the Internet, WebCT and other e-Learning activities. Although there is 24/7 access to computers, student support is only available from 8:00 to 17:00 on weekdays.

Before the e-Campus initiative was implemented, the computer:student ratio was one computer for every 10 students (Botha and Van der Merwe 2001). Some of the computers that were used in this calculation were, however, in electronic classrooms that are booked for lectures during the day. These computers are therefore not available to students who want to work independently. It is especially during peak times in the mornings that some students complain that they have to queue to get access to a computer.[52]

4.3.2 Early technology adopters

Even before any efforts were made to coordinate the integration of ICTs into teaching and learning activities, there were quite a few "early adopters" who did pioneering work with regard to the development of electronic and, in particular, multimedia teaching and learning material. Examples include the German department's multimedia applications for language learning, the Language Laboratory's Authorware applications and multimedia applications developed by the Ancient Studies department. Various departments in the Faculty of Engineering also used e-Learning applications quite extensively in their programmes. As was outlined in section 3.6.1 of Chapter 3, these early adopters are highly motivated, technologically inclined and need very little assistance to be successful.

Tony Bates (1998) refers to this type of approach as the "Lone Ranger and Tonto" approach – usually a lecturer and his/her trusted computer-skilled student assistant. Terry Andersen asserts that, although this model could work, it is not sustainable in the long run as it requires "a commitment, skill set and entrepreneurial bent that is only rarely found among academics" (Andersen 1999).

Wonderful innovative multimedia products were created by these "lone rangers", but it is important to take note of the following risks associated with this type of approach listed by Bates:

- The products created could be costly supplements to conventional teaching,
- It could increase the institution's unit costs,
- There is sometimes never a final product that can be used on a regular basis in the teaching context,

[52] One of the 2003 e-Campus projects is a computer capacity project that will, in its initial phase, do an analysis of the current status of student computer access on campus. I will use some of their preliminary statistics in Chapters 5 and 6.

- Graphics and interface are often poor, and
- The final product could be lacking in quality (Bates 1998, p.209).

This highly individualistic approach can also lead to the premature end of the project when the person who started with the development is no longer able to drive the development.

This type of model is also not scalable on a university-wide basis. As was discussed in Chapter 3 in relation to adopter categories, the groups of adopters that follow the early adopters are not as motivated or technologically savvy in the integration of ICTs into teaching and learning activities as are the early adopters. They need additional training and support, as well as some type of extrinsic motivation and reward to take part in integrating ICTs into teaching and learning activities.

4.3.3 The Division for University Education (Uni-Ed)

In January 1998, the University management established the Division for University Education (Uni-Ed). Its brief was to operate university wide and to accept responsibility for educational faculty development and support initiatives, including the coordination and development of the use of multimedia in all of the University's educational activities. The unit formulated the following vision in 1998: "The promotion of innovative university education of high quality" (Uni-Ed 2001). It is important to note in this regard that, although there was an emphasis on technology from the outset, it was always contextualised within the more general innovative teaching and learning arena. As was argued in Chapter 3, the integration of ICTs into teaching and learning activities should not be motivated by the technology itself, but should always focus on the fundamental issues of good teaching and learning practice.

The four principles that guided the formation of the faculty support model at the University of Washington in 1998 are also applicable to Uni-Ed. According to Mark Donovan, this support model had to:

- Substantially reduce the barriers to entry posed by an educator's initial foray into educational technology,
- Be flexible enough to adapt to changing technologies and the needs of educators,
- Be scalable campuswide, and
- Be sustainable with existing resources (Donovan 1998).

In order to adhere to these guiding principles mentioned by Donovan as far as possible, the University of Stellenbosch had a choice of two models to promote the use of ICTs in teaching and learning activities:

- The “drop off your ideas and come back in a few months to pick up the CD” model
- The “teach ‘em to fish” model

With the “drop off your ideas and come back in a few months to pick up the CD” model, the lecturer leaves his / her ideas with a developer who develops the ICT component (Andersen 1999). The lecturer is not, or only in a very limited sense, involved in the design of the module or the integration of the ICT component into the overall context of the module. With increasing demands on lecturers’ time and the technological and pedagogical learning curve involved in integrating ICTs effectively into teaching and learning activities, this often seems to be the most attractive option for lecturers.

However attractive, there are quite a number of risks attached to this approach. Andersen argues that "(this model) doesn't address the issues of trailability, observability and compatibility that are critical to the adoption of any innovation” (Andersen 1999). The developer is often a technical expert, with little or no pedagogical background, who does not know the broader context of the module or the academic programme. It could therefore be difficult for the developer to effectively integrate the ICT component with the other learning activities. Even if a team approach is followed in which a developer and an instructional designer are involved, the risk still exists that the lecturer who does not take an active part in the development is not happy with the final product and decides not to use it. This could have great cost implications for an institution. In another scenario, the lecturer might be satisfied with the final product, but not have the skills to update and maintain the specific module. Especially with online material and communication, regular updating and electronic interaction are of vital importance. If websites are not regularly updated and maintained, students might visit them once or twice and then lose interest. As I have argued in Chapter 3, it is the active engagement of students in online activities that could promote deeper learning that should be encouraged.

This type of model is also quite expensive, because a group of developers has to be employed by the university. The model is therefore not really scalable campuswide or sustainable in the long run.

To avoid some of these risks and to follow Donovan’s guiding principles listed above, Uni-Ed follows a “teach ‘em to fish approach”. This model is described by Terry Andersen as follows: "Instructional and technical experts guide and assist faculty members with the special skills needed and through a scaffolding and training model, help faculty to create and maintain their own teaching resources" (Andersen 1999).

In the University of Stellenbosch context, lecturers are encouraged by means of the “teach ‘em to fish” model to take ownership of, if not the development of the whole module, at least the instructional design and maintenance of the e-Learning activities. It is very important at the

University of Stellenbosch that lecturers take an active part in the instructional design of learning activities to promote an integrated hybrid approach to the integration of ICTs with the focus on the student's overall learning experience. Only the lecturer knows the broader context and outcomes of a specific module or academic programme – an outside developer who is not a subject expert can only have a limited understanding of the specific outcomes of a module.

Because no production services are provided in the "teach 'em to fish" model, it can only be successful if it is based on an extensive faculty development plan that not only includes technology training, but also workshops on pedagogical aspects. This provides quite a challenge to any institution. From 1996 to 2001, respondents to Kenneth Green's *Campus Computing Survey* rated "assisting faculty integrate technology into instruction" as the "single most important IT issue confronting their campuses" (as cited in Agee, Holisky, and Muir 2003).

The different adopter groups, each with their own specific needs as described in Chapter 3, present quite a challenge for the design of a faculty development plan. Furthermore, this faculty development plan should focus on integrating both the technological and pedagogical aspects of the integration of ICTs. The Uni-Ed advisers therefore provide needs-based information, advice and training to enable lecturers to develop and maintain their own online modules and programmes over a wide spectrum of teaching and learning activities that include:

- WebCT
- Powerpoint
- Teaching portfolios
- Learning outcomes
- Assessment
- Presentation skills
- Study guides (Uni-Ed 2003) (Uni-Ed's Programme for 2002 is attached as Addendum A)

Individual departments can also request special workshops that are tailor made to their specific needs and requirements. These workshops can include a variety of the topics mentioned above.

The technology workshops (Powerpoint, WebCT) are hands-on workshops with lecturers working on an online module. Although these workshops are therefore technical to some extent, a deliberate attempt is made to focus on the pedagogical aspects, as well providing ample time for questions and discussion.

The faculty development plan furthermore includes demonstrations in individual departments, during which lecturers are often asked to demonstrate and relate their own experiences with regard to the integration of ICTs into teaching and learning activities. The influence of peers should not be undervalued in the promotion of good practice teaching and learning activities. The use of "champions" and early adopters of technology as advocates for the use of technology can, however, also have negative effects. Donovan refers to these early adopters' "rampant enthusiasm" as a "double-edged sword": sometimes it is contagious, but, more often, it is perceived as techno-zealotry. This is off-putting to the majority of lecturers, who may resist the adoption of technology by saying, "I can't do that because I'm not like him/her (an early adopter)" (Donovan 1999).

Although it holds an inherent danger, collaboration amongst faculty members to share experiences and promote best practice should be encouraged. Dorothy Frayer (1999) explains the importance of these lecturer exchanges as follows: "Faculty are often able to make the conceptual leap required to see how a colleague's use of technology might apply in their own discipline … For this reason, it is quite helpful to create opportunities for faculty to learn about technology use by colleagues within their discipline…"

To further promote collaboration and sharing amongst peers, annual mini-conferences are held during which lecturers share their experiences with their peers. With regard to ICTs, an annual WebCT mini-conference is held that provides lecturers with the opportunity to share good practice and to learn about the newest developments in the integration of ICTs into teaching and learning. This mini-conference plays an important role as one of the deliberate attempts to "get the word out" about best practice and the support structures available. Paul Hagner asserts, quite correctly, that the faculty development efforts will not have an effect if particular attention is not paid to how the message about the available training and support is communicated. He emphasises that "Communication is vital to successful institutional transformation. Support centers must be able to publicize their services to the academic community, and perhaps more important, faculty experiences with and opinions of transformation must be shared" (Hagner 2000).

One of the main objectives of the faculty development plan is to encourage lecturers, departments, faculties and deans to take ownership of the ICT initiatives and to investigate and choose appropriate ICTs that would work for their specific modules and programmes. The ideal is that each department / faculty develops its own strategy as to how it can most effectively move forward with the integration of ICTs. The Uni-Ed personnel are therefore never prescriptive as to how ICTs should be integrated into teaching and learning activities. There is a strong awareness that what works for one lecturer / department / faculty might not work for another. The emphasis is always on the interpretation of trends in and research on effective teaching and learning practices and the demonstration of possible applications thereof. The lecturers can choose what works for their specific academic programme and their personal preference and style.

A further objective of the faculty development plan is to promote reflection on teaching and learning in general, with technology used as a lever. According to Tony Bates (2000), if a lecturer has to adapt to the new technological environment, he/she has to have “Some basic understanding of the teaching and learning process, and in particular the different kinds of teaching approaches and the goals that they are meant to achieve, need to be understood” (Bates 2000, p.102-103). Successful teachers are often naturally good communicators and some of them have never really reflected on or engaged in analysing what constitutes good teaching and learning. To integrate ICTs effectively, lecturers now have to, sometimes for the first time, reflect on the outcomes they want to achieve and how ICTs can help them to achieve these outcomes.

This type of reflective practice and faculty development can result in transformational learning, according to Kathleen P. King. King uses Mezirow’s original explanation of transformational learning as a theory that “conceptualizes and describes learning as a process of critical reflection and self-examination of one’s worldview in light of new knowledge and a fundamental reorganization of one’s perspective or frame of reference” (King 2002). She argues that the introduction of technology as a possible new teaching and learning space has the potential to trigger this process of “critical reflection and self-examination”. In the Stellenbosch context, this type of transformational learning can manifest itself in a rethinking and redesign of academic modules and/or programmes.

The challenge in a faculty development plan remains, however, to stimulate this type of reflection on teaching practice in general. I would argue that it can only happen if the faculty development plan is closely aligned with the strategic objectives of the institution and if good teaching and learning practice is generally recognised and rewarded. The faculty development plan on its own is not enough. As the authors of the Report on Teaching and Learning note:

"Faculty and instructor review and promotion are the real test of an institutional commitment to the integration of technology at the instructional level. (…) One message is clear: failing to award tenure to or promote faculty who invest time and effort in this area sends a chilling message about the university's commitment to technology in instruction and scholarship" (Gotwals et al. 1997). This policy and strategy environment will be elaborated further in the second section of this chapter.

4.3.4 Division for Distance Education (now Interactive Telematic Education)

A separate Division for Distance Education was established in January 1998, exactly at the same time as Uni-Ed. At the end of 1997, the University decided to broaden its modes of delivery to include distance education. The mission of the unit was to make “the University of Stellenbosch accessible to a geographically dispersed student population” (De Coning 1998). The core values of the unit include quality academic products, integrity in service rendering and accessibility.

With this specific emphasis on accessibility, especially in the African context, the following factors are considered in the selection of technologies:

- Technological literacy of the students,
- Student access to technology,
- Whether students will be able to afford the technology, and
- Specific teaching goals and strategies of the various programmes – which provide indicators for the technology, or combination of technologies, appropriate to a specific programme

The following modi are therefore used to deliver academic programmes:

- Internet
- Satellite interactive television broadcasts (one-way image with interactive audio) to 20 electronic classrooms in South Africa (De Coning 1998).

4.3.5 Adoption of WebCT in 1999

In October 1998, the University of Stellenbosch, in cooperation with the Universities of Pretoria and Potchefstroom, started evaluating possible Web learning management systems (LMS). The three universities collaborated to develop an extensive list of criteria to evaluate Blackboard, WebCT and Online Learning (a locally developed LMS). Both the Universities of Stellenbosch and Pretoria decided to implement WebCT at the beginning of 1999, whereas the University of Potchefstroom decided to start with the development of its own product, as it was felt that not one of the three products conformed to their specifications.

The University of Stellenbosch experienced an exponential growth in the use of WebCT from 1999 to 2000. The number of students using WebCT for some aspect of their studies increased from about 50 to 5 000. At the end of 2001, a problem with the WebCT student database and considerable advances made by Blackboard in the learning management system product market prompted the University to re-evaluate Blackboard, WebCT and Varsity (the product developed by the University of Potchefstroom) to determine whether WebCT was still the right choice. In 2001, as in 1999, the following three considerations were the most important in the University of Stellenbosch context:

- The product has to be user friendly. As was discussed in section 4.3.3, the University of Stellenbosch decided on a “teach ‘em to fish” faculty development model, in terms of which lecturers receive training, advice and support to do the development and maintenance of online activities themselves or, where necessary, with the help of assistants. Even when assistants are used, the lecturer still has to have a basic understanding of the technological environment to update and maintain the module when the assistant is no longer available. It is therefore of the utmost importance that it should be possible for lecturers to master the learning management system with the necessary training and support.
- The product must be adaptable and flexible enough to accommodate varying levels of technological expertise, as well as different types of instructional design of Web modules, within a learner-centred approach to teaching and learning. With regard to the varying levels of technological expertise, the learning management system must be accessible to novice users, but should also not frustrate more advanced users who want more advanced features with limited choice. It is especially important that the product should give the user the opportunity to grow with the system. The University of Stellenbosch advocates an incremental approach to the design of online modules. A lecturer might start with a homepage or electronic discussion area, but, as he/she becomes more familiar with the product, more online learning activities might be included. The system has to support this type of incremental design. With regard to the different types of instructional design, it is important to keep in mind that there are 10 faculties at the University of Stellenbosch, each with individual departments and individual lecturers who have their own unique needs within their own disciplines.
- The product has to be affordable and stable and it should be possible to integrate it within the local information technology infrastructure. Quite a few learning management systems are geared towards the corporate market and, as a result, are simply too expensive to use in the academic environment. Although the technical considerations were not the most important considerations in the evaluation, it remains important that the chosen product can be integrated into the existing technological architecture on campus. This is especially important as the University moves towards a portal environment that will aim to integrate all the different systems on campus. With regard to the technical requirements, the product itself should be stable and have a proven track record at other

comparable higher education institutions. Careful consideration is also given to the company/vendor profile. To acquire a learning management system is a substantial financial investment, not only in terms of the actual software, but also in the time investment to implement the system and train lecturers to use it. Care was therefore taken to determine whether the company/vendor was financially stable and whether it would still be in business in the forseeable future (Van der Merwe, Pool, and Adendorff 2002).

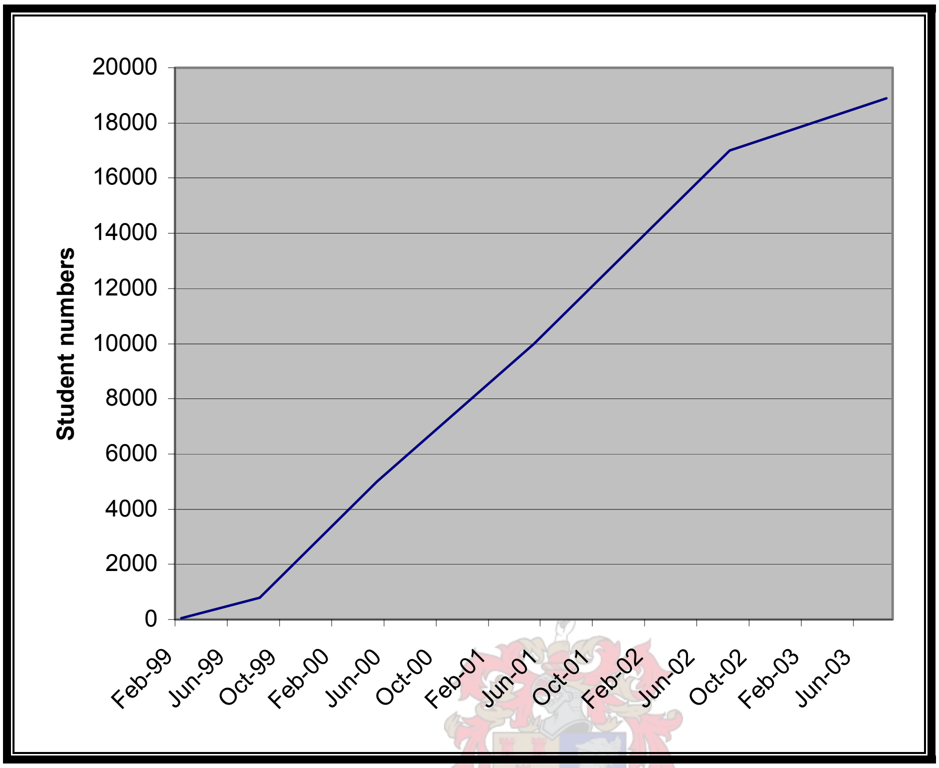
After carefully considering all three products at the end of 2001, the evaluation team recommended that WebCT should still be used at the University of Stellenbosch. They based the recommendation mainly on the following academic considerations:

- WebCT has more facilities and functions, e.g. “selective release” of module elements,
- WebCT provides more advanced assessment possibilities,
- WebCT is more flexible in its approach to module design, and
- It is easier to customise different elements within WebCT (Van der Merwe, Pool, and Adendorff 2002).

A further consideration included the number of users of WebCT. High levels of expertise with regard to the software, the administration and technical aspects were already established on campus. Although these were not necessarily the main considerations to retain WebCT, the human and financial resources invested in the existing support and training infrastructure could not be underestimated. The evaluation team felt that, for the University to switch to an alternative system, the new system would had to have distinct advantages (Van der Merwe, Pool, and Adendorff 2002).

The use of the system kept growing exponentially and, by August 2002, just about every student at the University of Stellenbosch had aspects of at least one module on WebCT. Figure 4.1 below indicates the growth in the number of students using WebCT from February 1999 to August 2003. As can be seen from Figure 4.1, the number of WebCT users is stabilising and was maintained in 2003.

Figure 4.1: Growth in the number of students using WebCT from February 1999 to August 2003



Although the numbers reflected in Figure 4.1 are quite impressive and reflect a large-scale adoption of WebCT as an LMS at the University of Stellenbosch, the challenge remains to transform the use of WebCT into an effective learning environment beyond its use as a content delivery tool. The question remains: Is WebCT used only to enforce the teacher-centred information delivery model outlined in Chapter 3 or is it used to transform the educational experience to promote deeper student learning? [53]

As illustrated in Figure 4.1, the growth in the use of the Internet has gone far beyond the fairly limited use of multimedia in learning and teaching envisaged at the inception of Uni-Ed in January 1998. This, coupled with the restructuring of the national higher education system with regards to academic planning and quality assurance, led to an expansion of Uni-Ed's brief in 2000.The new brief entailed that Uni-Ed had to:

a) develop and facilitate the process of quality assurance in the area of learning and teaching,

[53] This will be elaborated further in the retrospective assessment of the situation at the University of Stellenbosch in Chapters 5, 6 and 7.

b) serve as anchor point for the processes of the design, approval, accreditation and registration of instructional programmes,

c) initiate and facilitate policy development in the area of learning and teaching,

d) disseminate innovation and good practice in learning, teaching and assessment,

e) provide information, advice and training in e-Learning,

f) facilitate and support instructional design,

g) administer the system of student feedback,

h) train academic staff (notably newly appointed academics) for their task as lecturers, and

i) undertake needs-based research in higher education (Uni-Ed 2001).

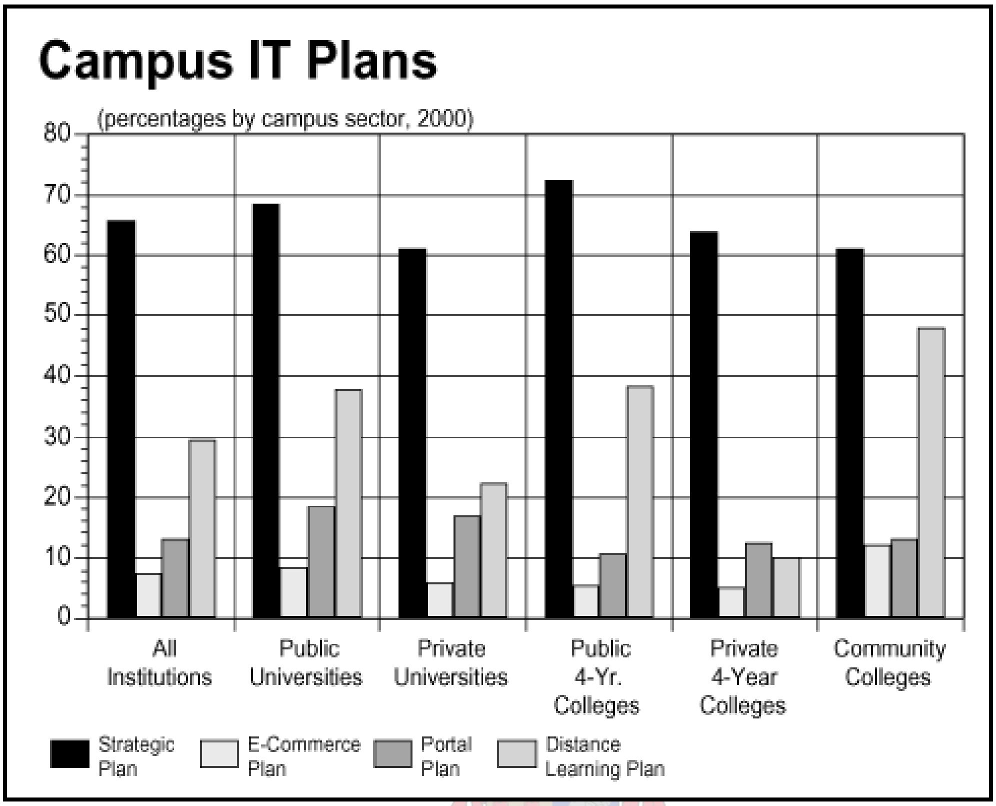
Although the retrospective assessment of this phase will be done in Chapter 7, it can be said, in **summary**, that with regard to IT infrastructure, technical training and support, the presence of early adopters of technology, educational faculty development initiatives, distance education and WebCT, the University of Stellenbosch made great strides in the integration of ICTs in the pre-strategy phase. These types of initiatives definitely formed an important part of the further planning of the integration of ICTs. Although necessary, these initiatives are not sufficient to ensure the successful integration of ICTs at a University. Changes have to be made at the strategic and policy level to reward the use of the infrastructure, faculty development plan and LMS to move beyond the initial, early adopters of technology phase.

4.4 INSTITUTIONAL ENVIRONMENT: STRATEGY PHASE (TOP-DOWN)

Whereas the previous section focuses on the loosely coordinated "best practices" established at the University of Stellenbosch, Paul Hagner emphasises that the focus should rather be on "best systems" (Hagner 2000). An integrated systems approach is furthermore of the utmost importance to promote cost efficiencies and avoid duplication. As Sally Johnstone (2000) asserts, "For these resources to be effective and efficient, there must be involvement and commitment from the whole institution".

According to the *Campus Computing Survey* done annually in the USA, two-thirds (65.8 percent) of the campus officials participating in the *2000 Campus Computing Survey* (Green 2000) reported that their institution had a strategic plan for information technology. However, Green reports that some key components, including e-commerce, portal and distance learning plans are often not included.

Figure 4.2: Campus IT plans



Source: (Green 2000)

Green argues that these issues should be core components of a real IT strategic plan. But, as can be seen in Figure 4.2, the data of the *2002 Campus Computing Survey* reveal that less than a tenth (7.3 percent) of the campuses participating in the 2000 survey had a strategic plan for electronic commerce; only a twelfth (13.2 percent) had a plan for campus portal services, and less than one-third (29.3 percent) had a strategic plan for distance education (Green 2000).

There are different theories on how these integrated system should be created, what the strategy should be, what the most important elements are, who should formulate the strategy and who should drive this integration process. Michael Beller and Ehud Or (1998) state that the integration of information technology can either be

- an evolutionary process ("bottom-up") that relies mainly on local initiatives and the personal motivation of individual faculty members (as we have seen in the previous section) or
- top management driven (the focus of this section).

Both these processes are at work at the University of Stellenbosch and, although the "top- down" approach is described after the evolutionary process ("bottom-up"), it should not be assumed that the evolutionary process stopped once the top-down process started. Furthermore, although “top-down”, a special effort was made throughout the process to consult as widely as possible with all stakeholders – especially academic staff.

At the University of Stellenbosch, this top-down process, the strategy formulation phase, included four aspects that were considered crucial for the process to be successful:

- The integration of ICTs should be part of the overall policy framework and planning process of the university,
- A campus-wide conversation, with all role players involved, should take place,
- The e-Learning strategy should be embedded in a campus-wide technology planning project, with strong faculty member involvement, and
- The e-Learning strategy had to be embedded in a sound teaching and learning strategy with strong faculty member involvement

Each of these four aspects will be discussed in more detail below.

4.4.1 University of Stellenbosch policy environment

The University of Stellenbosch started with a comprehensive strategic planning process in December 1997. The product of this process is a document entitled *A Strategic Framework for the Turn of the Century and Beyond*. In this document, the University commits itself to the following vision for research (SF, §4.2.1):

> “A strongly research-oriented university, sought-after for the training of quality researchers, who are acknowledged as world leaders of research in selected niche areas.”

To realise this vision, the University also committed itself to creating a technological environment that provides the necessary support. In this regard, the University identifies as one of the strategic priorities:

4.2.2.2 developing the financing, infrastructure and technology for research

With regard to teaching and learning, the University commits itself to the following vision (SF, §4.3.1):

> “A university characterised by quality teaching, by the constant renewal of teaching and learning programmes, and by the creation of effective opportunities for learning/study.”

To realise this vision, the University identifies the following strategic priorities with regard to the approach followed, the role of technology and the process followed:

4.3.2.2 fostering a student-centred learning ethos;

4.3.2.3 innovative facilitation of learning/study, inter alia by bringing into play appropriate modes of delivery and technology, including decentralised teaching and learning;

4.3.2.4 the establishment of University-wide ownership – backed by opportunities for effective sharing in decision making – of all actions through which the University attempts to renew its teaching and learning processes.

In both the vision and strategic priorities for research, teaching and learning, the University of Stellenbosch therefore commits itself to integrating ICTs to enhance the quality of these initiatives. With regard to the teaching and learning process, special emphasis is placed on "innovative facilitation" within a "student-centred learning ethos". The University furthermore commits itself to the establishment of University-wide ownership and the participation of all role players in the renewal of its teaching and learning processes. These issues - innovation in teaching and learning, a student-centred learning ethos and the issue of faculty ownership of teaching and learning renewal - were also some of the main motivating factors for the creation of Uni-Ed. The fact that a division such as Uni-Ed was created and funded by the University furthermore demonstrates the University's overall commitment to the renewal of teaching and learning practice.

4.4.2 The campus-wide e-Campus conversation starts: Rosenview, October 1999

Although, as outlined in section 4.3, information and communication technologies were already widely used in support of the University's academic activities in the pre-strategy phase, most of these activities were loosely coordinated or not at all. The e-campus initiative, a six-year project (2002-2007), is an organised and coordinated effort to not only further these activities, but to make a quantum leap to ensure that the University remains internationally competitive as a research-oriented university.

The first initiative to plan an e-Campus took place at a two day design session on the 13th and 14th of October 1999. Representatives from the service organisations, as well as a number of the early adopters of technology, participated in this work session. The early adopters demonstrated their use of ICTs in teaching and learning, whereas representatives from the various service organisations gave an overview of the infrastructure, support and training initiatives already in place to support the e-Campus.

The group formulated the following vision for an "e-Campus":

> The University of Stellenbosch strives to establish and further an academic environment of excellence where information and communication technology is effectively integrated (Uni-Ed 1999).

The term “e-Campus” was defined as an inclusive working definition to include all the activities of the University that utilise ICTs to a lesser or greater extent (Uni-Ed 1999).

The group furthermore defined 14 strategic areas to which attention had to be paid in the development of this e-Campus. These areas were:

1. Management of the initiative
2. Infrastructure
3. Support
4. Training
5. Standards and guidelines for the production of e-Learning content
6. Electronic learning and teaching material
7. Resources
8. Communication (synchronous and asynchronous)
9. Self-assessment (for formative purposes)
10. Monitoring and quality assurance
11. Administration (student payment, registration and marks)
12. Funding (including a business plan)
13. Security
14. Collaboration and consortia

Most of these areas were only mentioned and no details were given. The recommendations for further action included that:

- A report about this meeting should be presented to the General Management Meeting
- An advisory committee should be constituted after a conversation with the senior management of the University (Uni-Ed 1999).

Although some of these performance areas were only vaguely defined and there was overlap between areas (e.g. areas 5 and 6), the importance of this first conversation should not be underestimated. This was the first opportunity where all groups met around a table to discuss and formulate a vision for an “e-Campus” at the University of Stellenbosch. In many instances, during the discussion on the different elements that could constitute an e-Campus, the service organisations realised that they were planning similar projects, which could lead to duplication. The decision was made that they would cooperate to ensure technological compatibility and sharing between these different portal environments. There was a strong realisation after this meeting that cooperation between divisions, as well as a shared vision and strategy, could lead to economies of scale and savings for the University.

The meeting also gave the lecturers who are "early adopters" of technology a platform to voice their frustrations and challenges with regard to their experience of using ICTs in teaching and learning. Many of the participants at the meeting were unaware of the pioneering work done by these early adopters and their presentations gave an indication of the extent to which ICTs were already being used for teaching and learning activities on campus. The continued input from the lecturers in the further planning process was also confirmed at this meeting.

4.4.3 The e-Campus Forum and the strategy formulation process

An e-Campus Forum, with the Vice-Rector (Teaching) as chairperson, was formed in June 2000 to further the e-Campus initiative. The forum consisted of the three vice-rectors, faculty and student representatives, the assistant registrar, the directors of Information Technology, Library Services, Uni-Ed and Distance Education, and the Adviser: Digital Teaching and Learning from Uni-Ed.

The main aim of the e-Campus Forum was to establish an integrated e-Campus framework for 2002-2004[54], which included a vision, critical performance areas and concrete action plans. This framework would ultimately serve as the basis of the e-Campus initiative, launched in February 2002. The first draft of an e-Campus framework was completed in May 2001. The framework was compiled using the strategic documents of the relevant service organisations, consultations with the directors of the service organisations and regular meetings of the e-Campus Forum to discuss the framework and suggest changes.

The e-Campus project was designed as a three-year project (2002-2004) with its primary point of departure being the mission of the University of Stellenbosch. The development of the e-Campus is driven by the University of Stellenbosch's raison d'être, which is to "create and sustain, in commitment to the academic ideal of excellent scholarly and scientific practice, an environment within which knowledge can be discovered, can be shared, and can be applied to the benefit of the community" (University of Stellenbosch 2000).

[54] The e-Campus project was originally envisaged as a three-year project. The Council of the University decided that it should be a six-year project.

The term "e-Campus" is used as an overarching concept for all the information and communication technology activities of the University. The main aim of the project is a “networked” university, with its core functions and support systems being integrated with the help of information and communication networks to promote greater efficiency. This has the following implications for the University:

- The initiative touches all the activities of the University to a lesser or greater extent.
- All of the University’s core functions are adapted and integrated into information and communication networks.
- The development envisages a mixed model, also known as the so-called “brick-and-click model”, with both contact and online teaching and learning activities being offered.
- The e-Campus is not a virtual campus that replaces the residential campus.
- Learning opportunities that use ICTs do not replace classroom “contact” teaching and learning. Contact and interaction are complemented and enriched in order to meet the requirements of a student-centred learning and teaching approach in the context of increasing enrolment figures.
- Learning and teaching activities of the e-Campus therefore do not only consist of online programmes (“click”), but still include contact sessions with students (“brick”).
- The e-Campus does, however, provide for the delivery of fully online Distance Education programmes (only “click”).

The specific value statements regarding the e-Campus are therefore:

- a mixed “brick-and-click” model,
- an integrated incorporation of technology in the learning and teaching activities of the University,
- a student-centred approach, and
- an instrumental or process approach, rather than a deterministic approach to the use of technology (Botha and Van der Merwe 2001).

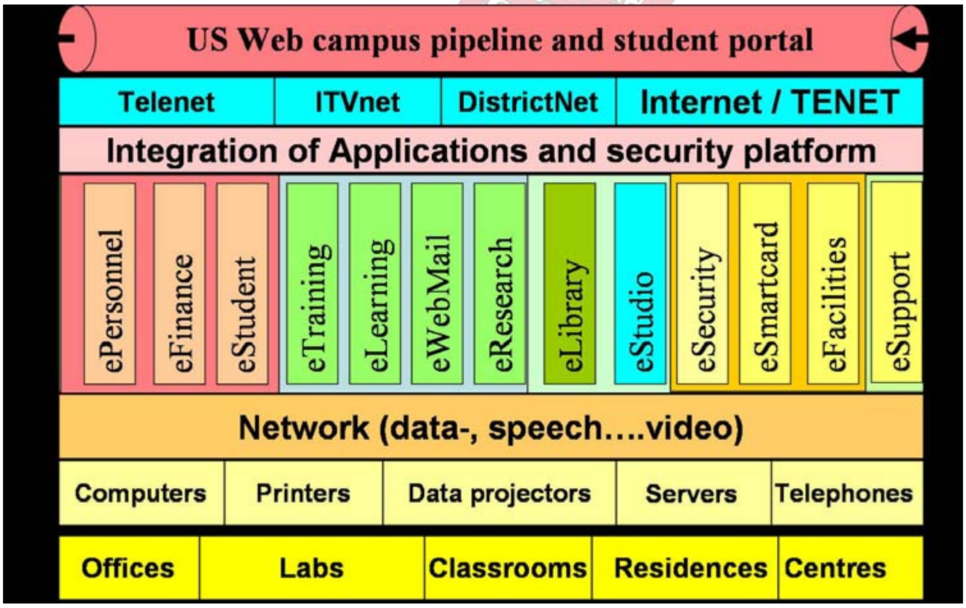
A document entitled “A Quantum leap in the further development of an e-Campus”, which contained all these suggestions and recommendations, was submitted to the General Management meeting on 19 June 2001. This meeting decided that the document should be circulated to the students’ Academic Affairs Council of the students and the faculties for comment. This was a very important part of the whole process. To obtain buy-in from all stakeholders and to consult as widely as possible were of utmost importance for the success of the initiative.

From the comments received it appeared that all the faculties agreed, in principle, with the suggestions and recommendations of the e-Campus Forum. The faculties also requested that they be consulted on a regular basis during the future development of the e-Campus.

The strategy formulation and consultation phase was completed by October 2001 and the Senate approved the final e-Campus document. After more than a year of consultation across the spectrum of the university community, this final proposal, as approved by the Senate, was put before the University Council in November 2001 for special funding. The Council acknowledged the strategic importance of the initiative and approved the allocation of R14 million per year for a period of six years for the project. The Council felt that the original three-year timeframe (2002-2004) was not sufficient for the scope of the initiative. For this reason, they decided to approve the funding for six years, with the provision that feedback on the progress of the project be given at each Council meeting.

The following visual representation was presented to both the Senate and the Council to indicate the integration of all the e-Campus elements into one system.

Figure 4.3: Infrastructure and business systems: Administration, Management, Teaching and Learning, and Research



Source: (Adapted from presentation to Council by Stumpf et al. 2001)

Figure 4.3 gives a good visual presentation of how the e-Campus project planned to integrate all the separate elements of the pre-strategy phase at the University of Stellenbosch by means of a University of Stellenbosch Web campus pipeline and student portal. Level one (offices, labs, classrooms, etc.) outlines the different technology access points. Level two outlines the different hardware and peripheral components of the system. These different infrastructure components are all integrated within a network environment that includes data, speech and video, amongst others. This network supports the different applications needed for ePersonnel, eFinance, etc. All of these applications are, in turn, integrated on one security platform and users have different access routes via Telenet, ITVnet, etc. On the highest level, all of these access routes are integrated into a campus portal, where users have access to all of the applications through one access point within a single sign-on environment. This implies that the user no longer has different log-in procedures (usernames and passwords) and different access points for different applications. Once the user has logged on to the portal environment, he/she views only the applications and services available to him/her. The user can furthermore customise his/her environment according to his/her personal preferences.

4.4.4 Task Group for Teaching and Learning

At more or less the same time as the e-Campus Forum started formulating a strategy for an e-Campus, another very important initiative took place. To realise the University's vision for teaching and learning as defined in its Strategic Framework, a Task Group for Learning and Teaching was formed in August 1999 to:

- Develop an institutional strategy for learning and teaching at the University of Stellenbosch,
- Develop (in close collaboration with the deans and existing management structures within the faculties) a strategy for learning and teaching in each faculty, and
- To play an active role in the implementation of the institutional strategy, as well as in the faculty strategies for teaching and learning (Task Group for Teaching and Learning 2001).

This task group consisted of a senior member of each faculty, a member of the Students Representative Council and representatives from Uni-Ed. The task group defined the following five institutional priorities with regard to teaching and learning for the University of Stellenbosch:

- Implementing outcomes-based instructional programmes,
- Developing students' generic competencies,
- Supporting a more diverse student population, with the goal of increasing the rate of admission as well as the rate of retention and throughput/progress within all groups,
- Promoting the symbiotic relationship between research and teaching, and

- Utilising the potential of information and communication technologies to support the realisation of priorities 1-4 (i.e. developing an e-Campus for the University of Stellenbosch) (Task Group for Teaching and Learning 2001).

As can be seen in this list of priorities, the e-Campus initiative is mentioned in the last point as the platform that supports all the teaching and learning initiatives. This explicit mention of the e-Campus initiative underscores the fact that the initiative was always envisaged as the platform on which all of these activities would be integrated.

The final document of the task group, The Strategy for Teaching and Learning (2002 – 2004) contains 11 institutional action plans to support and supplement the strategies formulated by the individual faculties. Two of the action plans have direct relevance for the e-Learning project as part of the e-Campus initiative:

- Action plan 6.2. Outcomes for all programmes and modules
- Action plan 6.6 e-Learning

A minimum electronic presence is planned for all modules (graduate and postgraduate). This entails that:

- The framework of the module is available on the Web, and
- Some form of electronic interaction on the Web is established for the module and is used for communication between the lecturers and the students and/or between the students themselves (e.g. via e-mail or the electronic bulletin board) (Task Group for Teaching and Learning 2001).

The objectives of Action plan 6.6 are also the objectives of the e-Learning project as part of the e-Campus initiative, which are discussed in section 4.5.2 below. It was also envisaged that Action plans 6.6 and 6.2 would be implemented in tandem: After the lecturers had formulated and/or revised their module outcomes and included them in their module frameworks (Action plan 6.2), they would make these frameworks available to their students on the Web (Action plan 6.6).

Of further special interest is action plan 6.11 of the Strategy for Teaching and Learning, which refers specifically to the revision of all policy documents and regulations to ensure that “they will reflect and enhance the student-centred approach to learning and teaching adopted by the University of Stellenbosch” (Task Group for Teaching and Learning 2001). Special mention is made of the forms used for the performance appraisal of academics, the criteria used to appoint and promote academics and the criteria used for the ad hominem promotion of academics. As was argued previously, the effective promotion of innovative learning and teaching strategies relies on policies that ensure recognition and reward for academics that are willing to take time to do it. Without these extrinsic motivators, it is often very difficult to convince some academics to experiment with the use of ICTs in teaching and learning.

Because the e-Campus Forum and the Task Group for Teaching and Learning worked on their respective strategy documents at the same time, it was decided to submit the documents at the same time to Senate in October 2001. This was done in a conscious effort to emphasise that the e-Learning project, as part of the e-Campus initiative, was not driven by technological, but rather by sound teaching and learning, considerations. This also enforced one of the core values of the e-Campus initiative, namely that it is aimed at improving the core functions of the University, namely research, teaching and learning, and community service.

Summary

Although the e-Campus initiative could be seen as a “top-down management-driven” initiative, it is important to note that, from the first conversation at Rosenview to the last approval of the document by Senate and the money being approved by Council, every effort was made to consult as widely as possible, with faculty members playing a central role. Mark Siegel (1997) reminds us that, if we want to ensure the success of an initiative which requires the transformation of an organisation, it is crucial that faculty members play a central role in the process. He writes, "The successful adoption of an instructional technology infrastructure by a college or university will cause fundamental changes in the culture of the organization. The transformation must involve the entire academic community, with the faculty occupying the central stakeholder role” (Siegel 1997).

It is also important to note that the definition of the e-Campus strategy was not driven by technological concerns, but rather by the Strategic Framework of the University and the Strategy for Teaching and Learning.[55] The e-Campus strategy definition was therefore driven by the core functions of the University and how the integration of technology as application can enhance these functions. This is not to say that the technology is not important – it is of course of crucial importance to take the technological infrastructure and access issues into account to ensure interoperability and scalability in the implementation of the e-Campus on a campus-wide scale. Throughout the strategy formulation part, the focus remained, however, on how technology as an application can support and enhance the core functions of the University – research, teaching and learning and community service.

[55] See discussion under sections 4.3.1 and 4.3.4.

4.5 IMPLEMENTATION OF E-CAMPUS STRATEGY AND E-LEARNING PROJECT

After the funding for the e-Campus initiative was approved in November 2001, the six-year initiative formally started in 2002. To realise the 16 key performance areas defined in the strategy, nine components entailing 26 projects were defined. The e-Learning project, a three-year project, is one of the 26 projects that started in 2002. Specific general e-Learning targets were defined for the three years in consultation with the deans and faculties.

The first year of any project is a challenge and the e-Campus Forum learnt many lessons in the process. In September 2002, the e-Campus Forum instructed PriceWaterhouseCoopers to undertake an independent project risk assessment of the e-Campus initiative. PriceWaterhouseCoopers did an evaluation of the project management environment and identified risks at the initiative level. They also conducted interviews with all project managers to identify individual project risks. As a result of their recommendations, specific changes were made to the management environment in 2003. The individual faculties also submitted detailed evaluation reports and feedback at the end of year one (2002). This feedback was taken into account in the implementation of the e-Learning project in 2003.

4.5.1 Year one: e-Campus project

Nine core components, comprising 26 projects, were identified for 2002. Many of these projects were already active in the pre-strategy phase as discussed in section 4.3, but from 2002 onwards, these projects received special funding, were grouped under the e-Campus initiative banner, and were coordinated by the e-Campus Forum. The final management of the projects still remained with the responsible line managers.

Figure 4.4: Nine components with respective projects

MANAGEMENT	Communication	Evaluation		
INFRASTRUCTURE	Network bandwidth	Backup routes	WebCT servers	Kiosks
	Meta directory	Data projectors	Video conference	
	Portal	Network points	CD ROM access	
SUPPORT	Helpdesk			
TRAINING	Office Automisation			
E-LEARNING	E-Learning & Teaching			
E-INFORMATION	E-Information resources	Virtual Information space		
E-STUD ADMIN	E-Applications	E-Registration	E-Yearbook	
E-RESEARCH	Virtual Research Portal			
E-SERVICES	E-Infrastructure	E-Finances	E-Human Resources	
	Student systems		E-Management info	

Source: (Pool and Van der Merwe 2002)

The nine components, as can be seen in Figure 4.4, were: Management, Infrastructure, Support, Training, e-Learning, e-Information, e-Student Administration, e-Research and e-Services. For the purposes of this section, I will only focus on the components and projects most closely related to the e-Learning and Teaching project. These components are:

- Management
- Infrastructure
- Support

With regard to the management component, the main management body in 2002 was the e-Campus Forum, which was also responsible for the formulation of the strategy. In 2002, its membership was extended to include one representative from each faculty (as appointed by the dean), more members from the service organisations (IT, University Education, Registrar, Library Services, Distance Education, Corporate Affairs, Research Development) and more students (one representative each from the Academic Affairs Council and Students' Representative Council). These members were included in addition to the core e-Campus Forum that consisted of the Rector, the Vice-Rectors and the directors of the service organisations. The Rector was the chairman until October 2002, when Professor Liesbeth Botha was appointed as Manager: Innovation and took over the management of the e-Campus initiative as part of her portfolio.

The e-Campus Forum was, in 2002, mainly responsible for coordinating and monitoring the activities of the e-Campus initiative at a central level and for the provision of regular reports to the University Council. The e-Campus Forum was not responsible for the implementation of the projects. Although many of the projects (e.g. the portal project) span many divisions, one project manager was identified to take responsibility for the management of the project.

An e-Campus executive, consisting of a few core members of the e-Campus Forum, did the day-to-day management of the initiative.

The second component that is of critical importance for the e-Learning project is the infrastructure component. Two specific projects, the WebCT server and network points projects, have direct relevance for the e-Learning project. Many of the lecturers choose WebCT as their Web teaching and learning environment and the WebCT server project ensures that the necessary reliable and stable technological environment is available. The main objective of the network points project is to install network points in residence rooms for students. As we saw in the pre-strategy phase, the University of Stellenbosch has four on-campus computer-user areas where students have 24/7 access to computers. As was outlined in section 4.3.1, this access is not really adequate at peak times. Furthermore, because of safety reasons, female students often do not want to walk on campus late at night to visit these computer-user areas. Access in their residence rooms provides an answer to this problem. Students can bring their own computers to university and have network and Internet access from their residence rooms.

The third component that is of importance for the e-Learning project is the support component. In 2002, the support component focused on providing a WebCT helpdesk for students. This helpdesk (physical point, e-mail and telephone support) is available weekdays from 08:00 to 17:00 and provides help with general login and password problems.

4.5.2 Year one: E-learning project

The use of the Web in teaching and learning, and more specifically the use of WebCT, has been growing exponentially since 1999, when WebCT was first implemented. This has been the result of a voluntary “bottom-up” approach. As was outlined in the discussion on the pre-strategy phase, the group of lecturers who started using WebCT were mostly early adopters who were eager to use new technology in teaching and learning. The e-Learning project provided a concrete framework for the further expansion of Web-based e-Learning in 2002.

As outlined in sections 4.4.3 and 4.4.4, the e-Learning project is unique in the sense that it is not only defined within the e-Campus initiative, but also in the Strategy for Teaching and Learning (Action plans 6.2 and 6.6). The implementation of the Strategy for Teaching and Learning also began in 2002. Whereas the e-Campus project was largely driven by the service organisations and a few academics and students, the Strategy for Teaching and Learning was a process largely driven by academics.

The policy for implementing the e-Learning project was formulated and approved by the Senate in March 2002. This policy provided for monetary incentives for lecturers to attain “e-Learning targets” as defined in the project. These e-Learning targets were formulated as follows:

- By the end of 2002, 30% of all modules will have a “minimum electronic presence”
- By the end of 2003, a further 40% of all modules will have a “minimum electronic presence”
- The remaining 30% of the modules will have a “minimum electronic presence” by the end of 2004.

The “minimum electronic presence” was defined as a module outline (with outcomes) on the Web and some form of electronic interaction or communication (e.g. e-mail or a bulletin board) (Uni-Ed 2002).

It is important to note that lecturers do not have to use WebCT to attain this minimum presence - they can use any software, but only WebCT is centrally supported as LMS.

During the approval process of this policy, the deans of the individual faculties emphasised that they wanted to retain ownership of the e-Learning project in their faculties, instead of the project being managed centrally. Central support would still be available, but every dean would have access to the funds awarded to his faculty and could plan his own strategy.

This led to diverse strategies to award funding, different timelines and different e-Learning targets within each faculty. Although a decentralised process was followed, the following conditions for funding were set out in the policy:

- The lecturer accepts responsibility for the instructional design of the module(s) (especially revision of outcomes).
- The lecturer accepts responsibility to maintain and update the Web learning environment.
- The lecturer will manage the electronic interaction.
- The lecturer will participate in a peer evaluation of the module(s) within a year of project approval.
- The lecturer will participate in Uni-Ed workshop(s) (instructional design, use of Web in teaching & learning, WebCT) (Uni-Ed 2002).

It was furthermore stipulated that the funding can only be used for:

- Teaching assistance if the lecturer wants to do the e-Learning development him/herself.

- An e-Learning assistant to do the development work for the lecturer or to assist the lecturer in some tasks.
- Payment to the lecturer if the lecturer wants to do the development him/herself (Uni-Ed 2002).

The conditions and the stipulations for funding were formulated to encourage lecturers to build capacity within departments and to encourage lecturers to become involved in the development and maintenance of the e-Learning opportunities created. If lecturers are not actively involved in the development process and encouraged to take ownership of the e-Learning module as *their* intellectual property, it is much easier for them not to use or maintain it.[56] This does not imply that it was expected of the lecturers to do everything themselves, as they could appoint an assistant to help them. It only meant that they should be involved in the process to gain the necessary expertise to actively participate in electronic communication and to maintain the module once the assistant was not available anymore.

Although the management of the process was decentralised, feedback to Uni-Ed and the e-Campus Forum was formalised. Each dean appointed an e-Learning coordinator in his faculty. Uni-Ed liaised with and supported these coordinators on a regular basis. These coordinators furthermore had representation on the e-Campus Forum and regularly reported back on the process within their faculties. Most of the faculties also made e-Learning and the e-Campus initiative a fixed point on the agendas of their monthly meetings. The deans furthermore have to report (via the Committee for Teaching and Learning) to Senate about the progress and spending within their faculties on an annual basis. Two reports were submitted to the Committee for Teaching and Learning, one in August 2001 (Uni-Ed 2001) and the other in February 2002 (Uni-Ed 2002). A final report was submitted to Senate via the Committee for Teaching and Learning in May 2003 (Uni-Ed 2003).

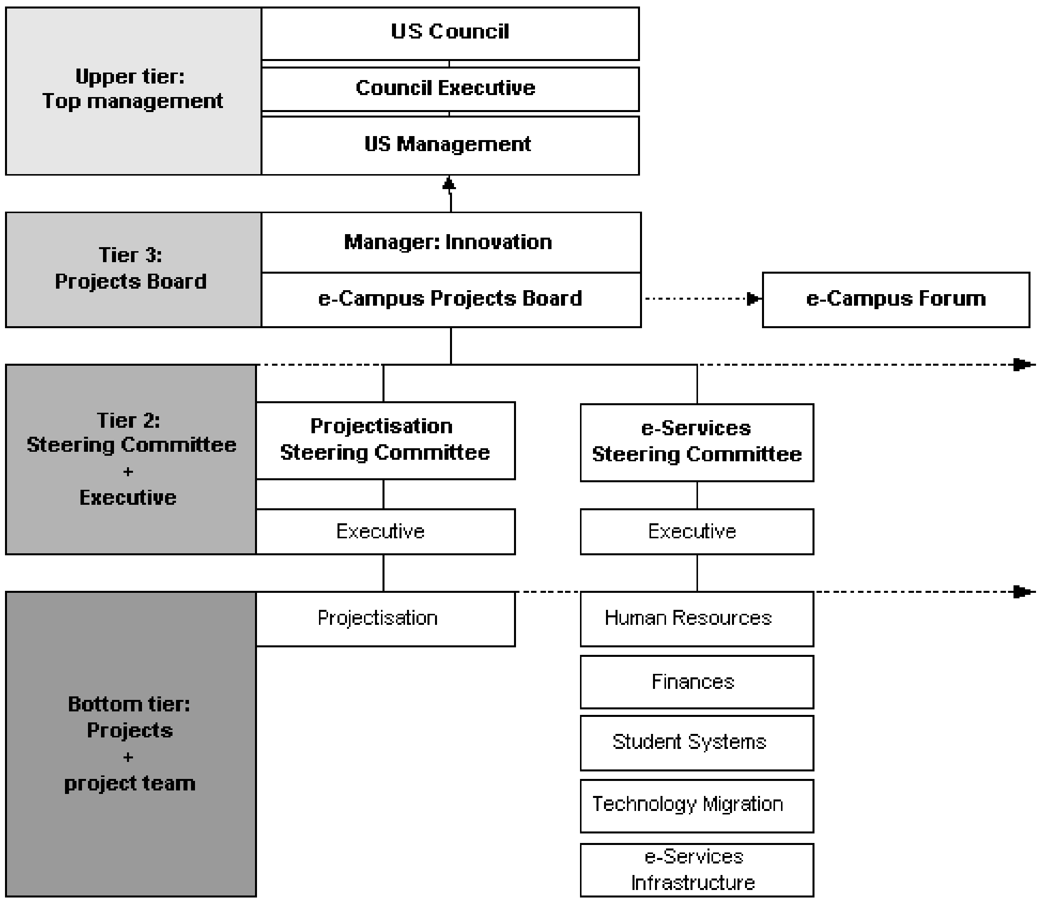
Within the general e-Learning framework, very diverse strategies were followed. Two faculties decided that they wanted to achieve the 100% minimum presence in 2002 and spend the money for 2003 and 2004 on other e-Learning goals, e.g. rich e-Learning content and e-assessment strategies. One faculty set very clear guidelines on how proposals for funding would be evaluated and awarded, whereas the other faculties decided to first view individual project applications before making any decisions.

[56] The risks associated with a full production model in which lecturers do not play an active role in the development of the e-Learning activities are discussed in more detail in Chapter 3, section 3.2.2.

4.5.3 Year two: Changes in e-Campus project management

The final risk assessment report compiled by PriceWaterhouseCoopers in September 2002 highlighted the risk that, although the overall e-Campus initiative was managed well, it was a risk that all the projects did not follow a uniform project management methodology. The results of this report and the appointment of Prof. Liesbeth Botha as the Manager: Innovation as the new project sponsor of the e-Campus initiative, led to the decision to formulate and implement a more uniform project management methodology in 2003. A projects office, Projektus, was tasked in 2003 to develop a uniform e-Campus project methodology. To implement this new project management methodology, a new e-Campus management structure was adopted. Figure 4.5 is a presentation of this new e-Campus management structure.

Figure 4.5: Diagram of the e-Campus management structure



Source: (Pool 2003)

As can be seen in Figure 4.5, the e-Campus initiative still ultimately reports to the upper tier, consisting of the University Council, Council executive and University of Stellenbosch management. What did change in the third tier, however, is that the Projects Board replaced the e-Campus Forum as the main body that prioritises funding and reports to Council. This Projects Board only consists of Vice-Rectors, the chairpersons of the steering committees and key stakeholders. The Projects Board meets once a month to define strategy, initiate projects, monitor progress and spending, and to prioritise resource allocation. The e-Campus Forum, with its wider representation of members, still exists, but only meets once a term for wider consultation and communication.

The second tier consists of steering committees for either one project (as is the case with the e-Learning and Projectisation projects, for example) or a group of projects (as is the case with the e-Service Steering Committee, with five projects reporting to it). The steering committees decide on the strategic direction of projects, prioritise within their specific area and address problems within their specific area.

On the bottom tier, each project has a project sponsor, a project manager, a project administrator and a project team. Each project manager has to submit a project charter defining the main objectives and target dates to receive funding. Regular status reports are submitted to the Projects Board via the steering committees. The Manager: Innovation, as sponsor of the e-Campus initiative, ultimately reports to the Council.

4.5.4 Year two: Changes in e-Learning project management and implementation

These changes in the overall e-Campus project management, as well as the detailed feedback from faculties about the e-Learning project in 2002, led to adjustments in the management and implementation of the e-Learning project in 2003.

With regard to the new uniform project methodology, the e-Learning project manager prepared a project charter for the e-Learning project, containing the project's:

- Objectives
- Deliverables
- Target dates
- Resources needed
- Budget
- Restrictions

- Dependencies
- Risks and
- Risk management suggestions (Botman and Van der Merwe 2003)

The e-Learning management structure consists of the Vice-Rector (Teaching) as project sponsor and the senior adviser: e-Learning as project manager. Each faculty has two e-Learning coordinators (one academic and one administrative), who are appointed by the dean.

The detailed feedback received from faculties throughout 2002 and 2003 (Uni-Ed 2001), (Uni-Ed 2002), (Uni-Ed 2003) was discussed by the e-Learning steering committee and the decision was made to manage the e-Learning funding system more flexibly in 2003, with greater decision-making powers for the deans on how funding should be awarded within their faculties. Table 4.4 provides a comparison of the management of the e-Learning project in 2002 and 2003 and gives an indication of the adjustments made in 2003.

Table 4.4: Comparison of the management of the e-Learning project in 2002 and 2003

2002	2003
1.1 Target for minimum presence: 30%	Target for minimum presence (baseline presence): An additional 40%
1.2 Focus on “minimum presence” and where already achieved, “innovative e-Learning projects”	Focus on “minimum presence” (baseline presence) and, where already achieved, “innovative e-Learning projects”
2.1 Deans manage the process in cooperation with an e-Learning representative	Deans manage the process in cooperation with two e-Learning representatives (one academic and one administrative)
2.2 Faculties have full access to the different e-Learning costing points	Faculties have full access to the different e-Learning costing points
3.1 Funds may only be paid out as remuneration for lecturers and e-Learning assistants	Funds can be paid out as remuneration or used to buy hardware and software needed for e-Learning activities as long as the minimum presence has been achieved. The various departments accept responsibility for the maintenance and updating of the hardware and software bought with the e-Learning funding.
3.2 Funds may not be transferred from the e-Learning costing point to departmental costing points.	Funds may still not be transferred from the e-Learning costing point to departmental costing points, but the money may now be used, in addition to remuneration, for the purchasing of hardware and software needed for e-Learning activities.
3.3 Lecturers accept responsibility for the maintenance and updating of the “minimum presence” of e-Learning projects	Lecturers accept responsibility for the maintenance and updating of the “minimum presence” of e-Learning projects
4.1 Evaluation of all modules is done by means of peer-evaluation and an evaluation template	Deans decide how they want to do the evaluation of the modules that received funding
4.2 Deans report in May 2003 to Senate (via the Committee for Teaching and Learning and the Academic Planning Committee) about the spending and progress within their faculties	Deans report in May 2004 to Senate (via the Committee for Teaching and Learning and the Academic Planning Committee) about the spending and progress within their faculties

Source: (Botman and Van der Merwe 2003)

With regard to the first point in Table 4.4, the targets for 2002 and 2003, the decision was made that the original baseline "minimum presence" target for 2003 of an additional 40% would be maintained. Some of the faculties indicated in their 2002 feedback that they had already reached or exceeded the 2003 target of an additional 40%. The steering committee decided that "innovative e-Learning activities" should be the focus of 2003, and even more so in 2004, when the target for the "minimum presence" was the remaining 30%.

With regard to the management of the initiative within faculties, point 2 of table 4.4, the decision was made that the deans would manage the process in 2003 with the help of two e-Learning coordinators – one administrative and one academic. It was evident from the 2002 feedback that one e-Learning coordinator was not sufficient to drive the academic merit of the project and do the administrative tasks associated with the project. The deans were furthermore encouraged in 2003 to formulate faculty-specific strategies, with their own target dates and payment of funding. This was done to a limited extent in some faculties in 2002. Where it was done, the faculties were very successful in their e-Learning planning.

With regard to point three, the guidelines for the payment of funds, it was decided that the requirement that the funding may only be used for remuneration would no longer apply in 2003. The funds could now be used to buy hardware and software if the following conditions were met:

- The minimum presence target had been achieved,
- The hardware and software applications were used for e-Learning activities, and
- The department/faculty accepts responsibility for the maintenance and updating of the hardware and software.

As in 2002, the lecturers assume responsibility for the updating and maintenance of the "minimum presence" of the projects for which they received funding.

The evaluation process and target dates are set within faculties for 2003. The only fixed target date is May 2004, when all the deans have to report back to Senate on the progress and spending within each of their faculties.[57]

The following points can be **summarised** with regard to the implementation of both the e-Campus initiative and the e-Learning project:

- Year one of the implementation was, to a large extent, still an experimentation phase.
- The flexible non-uniform project management system used in 2002 was not adequate to achieve the outcomes of the various projects.

[57] The details of the assessment to date will be provided in Chapter 7.

- A more uniform project management methodology was adopted in 2003.
- This uniform project management methodology was also applied to the e-Learning project, where applicable.
- The feedback from the faculties at the end of 2002 was acknowledged and more flexible guidelines for the payment of funds were followed in 2003

4.6 THE CHANGES ASSOCIATED WITH THE SHIFT FROM A "BOTTOM-UP" (PRE-STRATEGY) TO A MORE "TOP-DOWN" (STRATEGY) APPROACH

When reflecting on the two stages, the pre-strategy phase with a "bottom-up" approach to the integration of ICTs into teaching and learning activities and the strategy phase with a more "top-down" approach to the integration of ICTs, one can discern very definite changes, especially in the attitudes of lecturers and the faculty development plan needed to train and support lecturers.

Although the e-Learning policy states that the lecturers do not have to make use of WebCT to develop the "minimum presence", the majority of the departments have started to explore the possibility of using WebCT to achieve the minimum presence. As outlined in section 4.3.5, the use of WebCT has grown exponentially over five years. Figure 4.1 in section 4.3.5 shows the increase in students using WebCT over the past four years. This has largely been a bottom-up approach, with lecturers hearing about WebCT and attending the workshops as advertised by Uni-Ed. Although there was already some movement in 2001, before the e-Learning project started, to more departments requesting special departmental workshops instead of only individuals, it was not as extreme as in 2002.

In 2002, an additional 20 workshops were organised for specific departments. It was no longer adequate to have the eight scheduled workshops normally planned for a year. The first immediate effect of the change from a bottom-up to a top-down approach was therefore an increased demand for WebCT workshops. The second change relates more to the attitude of the lecturers attending these workshops. Although the majority of the lecturers attending the workshops as part of a departmental strategy are positive about e-Learning, this attendance is no longer strictly voluntary, as was the case before the implementation of the e-Learning project.

The fact that the lecturers are now sometimes compelled by either their deans or department heads to attend a WebCT workshop, does cause some of them to question why they have to be there. Furthermore, it is no longer only the early adopters, who are eager to use technology, who attend. Some of the lecturers attending are in the late majority and laggard categories identified by Rogers (1995).[58] For them to be convinced to take part, one has to show very clearly how the integration of ICT can add value to what they are already doing in class. The late majority and laggard categories of users also need more basic support and are often reluctant to ask questions in a general workshop. To address this, Uni-Ed organises "one-on-ones" with lecturers in their offices to assist them with the basic tasks required if they request it.

The differences between a bottom-up and top-down approach can therefore be summarised as in Table 4.5:

Table 4.5: Summary of differences between a bottom-up and top-down approach

Bottom-up	Top-down
Voluntary participation in workshops	Compulsory participation in workshops
Early adopters of technology	Early and late majority and even laggard adopter categories
Smiling faces in workshops	Irritated, even hostile attitudes in workshops
Support focused on advanced skills	Support focused on basic and advanced skills
Users are forgiving of mistakes	Users are hypercritical
Scheduled workshops are enough	Workshops scheduled on demand
Capacity planning (training and support) is possible	Difficult to do capacity planning (training and support)

4.6.1 The advantages associated with implementing Web-based e-Learning as part of a broader e-Campus initiative

Though these changes present unique challenges, which will be discussed in the next section, there are also definite advantages associated with implementing Web-based e-Learning as part of a broader e-Campus initiative. The e-Campus initiative first of all provides a concrete framework for the expansion of e-Learning at the University of Stellenbosch. Although there were already many e-Learning initiatives in the pre-strategy phase, it is the first time that e-Learning is driven from the top down. This top management support raises the profile of e-Learning as an important strategic priority at the University of Stellenbosch.

The e-Learning project plan further provides monetary incentives for lecturers to start e-Learning initiatives. Lecturers often need special incentives to get started and, although money is not always the most effective incentive, it does help.

Many more lecturers are also "exposed" to the idea of e-Learning during the compulsory workshops. Many of them would never have attended a workshop voluntarily. These workshops provide a platform to clear up misconceptions about e-Learning. Lecturers get the opportunity to see exemplary examples of how ICTs can be integrated into teaching and learning activities. This

[58] For a more complete discussion of the different adopter types, see section 3.6.1 of Chapter 3.

could stimulate reflection on how they might integrate ICTs into their own teaching and learning activities. The workshops furthermore give lecturers an opportunity to voice their reservations about the integration of ICTs into their specific subject or discipline. These reservations can then be addressed within the departmental context in a non-threatening workshop environment.

The focus on infrastructure, especially the WebCT server, the student network points and the WebCT helpdesk projects as part of the e-Campus initiative, formalise the long-term financial and infrastructure commitment and support for e-Learning initiatives at the University of Stellenbosch.

4.6.2 The challenges associated with implementing Web-based e-Learning as part of a broader e-Campus initiative

Although there are obvious advantages associated with the e-Learning project as part of the e-Campus initiative, implementing a "generic" minimum presence for a university is quite a challenge. The University of Stellenbosch has 10 faculties with countless disciplines, each with its own different needs and priorities. It remains a challenge to first of all formulate a "generic" minimum presence and, once formulated, it is even more tricky to "sell" this idea to a diverse group of lecturers and students.

This diversity includes, amongst others, various levels of computer literacy, which causes disagreement on the merits of providing monetary incentives for the development of e-Learning activities. Some lecturers who are very computer literate claim that the monetary incentives are too much and they do not need it. Lecturers who are not computer literate, however, claim that the money is not enough. The less computer literate lecturers also have to go through a steep learning curve with a large time investment to achieve the minimum presence.

The requirement that workshops are "compulsory" also meets with quite a lot of resistance from the lecturers. Some lecturers perceive e-Learning as a new and often foreign way of doing things. Uni-Ed tries to deal with this challenge by being as flexible as possible and working with the individual departments and lecturers to tailor make a workshop suited to their needs. Uni-Ed also emphasises that it is not necessary to use WebCT and that, if individuals feel that they not need to attend a workshop to achieve the minimum presence, they do not have to. Lecturers, overall, have responded quite positively to these workshops.[59] Once they see the possible ways in which they can add value to what they are already doing by means of the integration of ICT, the resistance decreases.

Even if there is no resistance to e-Learning, it remains a challenge for lecturers to find time to do the e-Learning development work. The University of Stellenbosch does not have a central unit

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[59] Reflected in their workshop feedback and in the observations of the e-Learning project manager.

that develops e-Learning modules for lecturers. With the necessary training and support provided, it is expected of lecturers to do it themselves. Training and continued support are therefore of the utmost importance. With the e-Learning project, money is furthermore made available for e-Learning assistants. Lecturers are encouraged to use senior students within their departments as assistants.

Support for students using WebCT also became a reality in 2002. The Support project, one of the e-Campus initiative projects, focuses specifically on a helpdesk for students. This helpdesk (physical helpdesk, telephone support, e-mail support) is available from 08h00 to 17h00 on weekdays.

The decentralised approach to funding, where every faculty takes responsibility for its own funding, has made the coordination of the project quite a challenge. There is no uniformity in the guidelines, the allocation of funding and timelines. The only way to manage this is to offer help and support where needed. Frequent communication between Uni-Ed and the e-Learning coordinators is essential to make sure that all the projects are on track.

4.6.3 Approaches to manage these challenges: Strategy to provide training and support for a campus-wide implementation of Web-based e-Learning

Because the University of Stellenbosch follows the "teach 'em to fish" model, according to which lecturers (and their assistants) are expected to do the e-Learning development themselves, a scalable, flexible faculty development plan is in place, as discussed in section 4.3.3. The following changes and additions were made to Uni-Ed's regular programme:

- **Short departmental demonstrations**

During these demonstrations, lecturers see exemplary examples of WebCT modules and they have the opportunity to ask questions within departmental context. Where possible, faculty members who are already using e-Learning activities are used to demonstrate their applications to the rest of the department. The aim of these demonstrations is to motivate lecturers to use WebCT and to obtain buy-in for the e-Learning project. The presenter furthermore emphasises the importance of planning, the instructional design of modules and that ICT should not be seen as an add-on, but as an integrated part of the module. These demonstrations often also serve as a planning session at which the department plans for a follow-up workshop.

- **Departmental workshops**

Workshops are tailor made for departmental needs and usually follow either a departmental demonstration or a detailed discussion with members of the department. These workshops consist of a combination of the following elements, according to the needs of the specific department:

- WebCT basics (module framework and bulletin board)
- WebCT advanced (content, communication, assessment and management)
- Outcomes and WebCT
- Assessment and WebCT

Lecturers do not want to spend hours in workshops and special care is taken to limit the length of workshops as far as possible. Conscious attempts are also made to limit the number of workshop participants and to create a non-threatening workshop atmosphere.

- **WebCT one-on-ones**

Some lecturers are reluctant to attend workshops or they feel that they need additional personal attention after completing training workshops. Special “one-on-one” training sessions are arranged for these lecturers in their offices. These sessions are quite time and person power intensive, because a Uni-Ed staff member spends a considerable amount of time with the lecturer to get him/her started. However, this strategy has been extremely effective to get lecturers started who feel that they might not have the necessary skills or time to attend a workshop.

- **Increased support**

Two full-time technical assistants are mostly responsible for telephone and e-mail support for lecturers. Uni-Ed has also developed a paper-based WebCT manual. An online tutorial is still under development. With regard to support, the principle of “WINIWINI” – “What you need, when you need it” – is applied.

- **WebCT mini-conference**

The annual mini-conference, during which lecturers share their experiences with WebCT with their colleagues, has been very successful in communicating the overall aims and outcomes of the integration of ICTs into teaching and learning activities

Summary

Many of the short-term challenges associated with moving from a bottom-up to a more top-down approach are also long-term advantages. The most important is the fact that lecturers are now "forced" to take notice of e-Learning as an alternative method to structure teaching and learning activities. Whereas it has led to some resentment and negative perceptions, it has also led to some lecturers realising the advantages of this approach for their specific discipline and students. To achieve these advantages, the need for a flexible faculty development plan to deal with different types of adopters, an effective support system and a stable reliable infrastructure cannot be overemphasised in an attempt to build overall confidence in the system.

4.7 INTEGRATED THEORETICAL FRAMEWORK OF THE THREE STAGES

From this narrative account of the three phases, it is now possible to construct the following three theoretical models to outline the process at the University of Stellenbosch:

- Programme theory
- Logic model
- Model of change

Before considering these models in detail, it is useful to clarify my theoretical position. It has become clear in the first three chapters, as well as in the preceding narrative account of what is happening at the University of Stellenbosch, that, although the account is structured in a linear and chronological manner, it is impossible to study ICTs as an external ("exogenous") factor and therefore to just consider their effects on the University of Stellenbosch and the higher education sector in general in a linear fashion. I am rather arguing from a theoretical approach that Arie Rip refers to as "endogenizing technology". According to these theories, which view technology as "endogenous", processes of technological change and their outcomes are taken as part of what has to be understood and explained. In this theoretical approach it is therefore not only the technology and its effects that should be studied, but also the co-evolution of technology and society and the patterns of this co-evolution (Rip 2002). Rip further clarifies the concept of co-evolution by breaking it up into two parts:

- Processes of technological change (in context), and
- Their outcomes (in terms of configurations that work).

He furthermore moves away from a deterministic approach by specifying that these outcomes are often not the ultimate goal or outcome, but merely cross-sections, at time t, of ongoing processes of technological and social change (Rip 2002). The outcomes in the theoretical models of the process at the University of Stellenbosch presented below should also be seen as ongoing processes and not as the final outcome.

This, of course, begs the question that, if one argues for this type of co-evolution of technology and society, can we guide the integration of ICTs at the University of Stellenbosch in preferred directions? Can interventions such as the e-Campus initiative, the e-Learning project or the other interventions to promote e-Learning at the University of Stellenbosch direct or influence change for the better? Can one even go so far as to specify specific outcomes for the interventions? Rip and Schot (1999) argue that guiding change is possible if one takes “a better understanding of the patterns in the dynamics of technological development” as the key entrance point. They propose that one should shift one’s perspective from “one of guaranteeing the achievement of a desired goal”, to a position of “modulating ongoing dynamics in the hope of getting closer to one’s goals” (Rip and Schot 1999, p.2). It is therefore very important to understand the dynamics of the development and the changes to identify opportunities for intervention, as well as to determine in what way the interventions can be productive.

I consider these three theoretical models (constructed below) to be useful analytical tools to understand the dynamics of the e-Learning developments at the University of Stellenbosch, in that the logic model contains the goal, all the objectives, inputs, activities, outputs and outcomes of the e-Learning initiatives at the University of Stellenbosch as I understand the process currently. The programme theory and change model contain the same information, but in a more concise format with clustered activities and outcomes. My understanding of the embedding of ICTs into the university, and more specifically teaching and learning activities, is, in this case, essentially retrospective. Rip and Schot warn that the “patterns and regularities found in this way may be extrapolated into the future, but at risk: circumstances may be different, and in fact, will be different already because of preceding technological developments and their dynamics” (Rip and Schot 1999, p. 2).

Keeping this inherent risk of constructing these three models retrospectively in mind, these models are nevertheless important tools to identify the points at which there are opportunities for additional interventions. I will also use these models to do a retrospective assessment in Chapter 7, which will clarify which interventions were productive and where additional activities could be useful.

Programme Theory of e-Learning initiatives

The core **“Programme theory”** of the e-Learning initiatives can be formulated as follows:

IF (OVERALL GOAL)

The University of Stellenbosch effectively integrates ICTs into its business processes and, more specifically, into its teaching and learning activities to promote deep learning experiences for students

THROUGH (INTERMEDIATE GOALS)

1. Providing the **necessary stable IT infrastructure and support systems** to enable lecturers and students to use ICTs in teaching and learning activities

2. Establishing a shared **campus-wide e-Learning culture** for the **sustainable** integration of ICTs

3. Providing an **enabling institutional environment** to **encourage** lecturers to engage in e-Learning activities

4. **Supporting** lecturers to integrate ICTs into their teaching and learning activities

THEN (OUTCOMES)

1.1 All staff and students have stable access to the necessary stable 24/7 IT infrastructure, support and training programmes

2.1 All stakeholders are better informed about what other divisions are planning

2.2 All stakeholders have a shared vision

2.3 Top management is strongly committed to the idea of an e-Campus

3.1 Faculties receive money for e-Learning initiatives

3.2 A minimum online presence has been established

- 3.2.1 Online module frameworks with revised outcomes are available
- 3.2.2 Students and lecturers engage in electronic interaction in their teaching and learning activities

3.3 Lecturers are better informed about the goals of the e-Learning project

3.4 Faculties take ownership of/buy into the e-Learning project/e-Learning initiatives

3.5 Lecturers reflect on how to integrate ICTs into teaching and learning activities

4.1 Lecturers are more competent in using WebCT

4.2 Lecturers are more aware of the possible benefits of the integration of ICTs into teaching and learning activities

4.3 Lecturers are more aware of the effective use of ICTs in teaching and learning activities

4.4 Lecturers are able to do the development of online activities themselves

4.5 Lecturers are able to do the updating of online activities themselves (or with the help of an assistant)

4.6 Lecturers take greater responsibility for the design and development of the "minimum presence" and innovative projects

4.7 Lecturers regularly share good practice

4.8 Lecturers reflect more often on teaching and learning activities in general

4.9 Lecturers more often redesign their modules/programmes

WHICH WILL LEAD TO (SHORT-TERM IMPACT)

4.10 The integration of ICTs in teaching and learning activities becoming "business as usual"/part of a lecturer's normal activities

ULTIMATELY LEADING TO (LONG-TERM IMPACT)

ICTs becoming a "strategic asset" that can be used by all faculty and students to increase the quality of academic programmes and graduates

ELSE

The real transformative opportunities offered by ICTs will not be utilised

ICTs as "add-ons" will be worse than just face-to-face teaching and learning and could add costs without any additional benefits

Logic Model and Change Model of e-Learning initiatives

Whereas the programme theory in the previous section presents the interrelated assumptions, principles and/or propositions to explain the e-Learning interventions (Owen and Rogers 1999), the logic model (Table 4.6 below) and Change Model (Figure 4.6) orders the events in such a way that one event or action leads to or causes the subsequent events (Owen and Rogers 1999). The interrelationships between the goals, objectives, inputs, activities, outputs and outcomes are clearly indicated in table format (Table 4.6) by clustering the different elements. The causal relationship is indicated in the change model (Figure 4.6) by using arrows to show the flow between the different events.

Table 4.6: Logic Model of e-Learning initiatives

GOAL: To effectively integrates ICTs into the University of Stellenbosch business processes and, more specifically, into teaching and learning activities to promote deep learning experiences for students.

Ac = Action, S = Skills, At = Attitude, Aw = Awareness, B = Behaviour

Im = Immediate outcome, *Int* = Intermediate outcome, *Lt* = Long-term outcome

Intermediate Goals	Objectives	Inputs	Activities	Outputs	Outcomes
1. To provide the **necessary stable IT infrastructure and support systems** to enable lecturers and students to use ICTs in teaching and learning activities	1.1. To maintain a central IT division 1.2. To provide adequate computer access for students 24/7	1. University funding for: 1.1. Central IT infrastructure and support for lecturers and students (student computer-user areas, Internet, network, hardware and software) 1.2. Learning management system (WebCT) 1.3. Central unit (Uni-Ed) to support e-Learning initiatives and do faculty development 1.4. e-Learning project	1. The IT division provides: 1.1. A stable central IT infrastructure (networks, library services, Internet, e-mail, admin systems etc.) for students and staff 1.2. Software support and training (staff) 1.3. Hardware support and maintenance (staff) 1.4. The technical support for student computer-user areas where students can access computers (the management of these facilities resides in each faculty)	1. A central IT infrastructure exists that includes: 1.1. Networks, library services, Internet, e-mail and admin systems etc. 1.2. A central helpdesk that provides staff support (hardware and software) 1.3. A training programme for all staff 1.4. Central faculty student computer-user areas (Humarga, Narga, Fharga, Firga, Gerga) are open 24/7	1.1. All staff and students have stable access to the necessary stable 24/7 IT infrastructure, support and training programmes (Ac)
2. To establish a shared **campus-wide e-Learning culture** for the **sustainable** integration of ICTs	2.1. To inform all stakeholders of the benefits of cooperation	2. Human resources 2.1. IT personnel 2.2. Two dedicated IT personnel to manage and maintain the WebCT infrastructure 2.3. Computer-user area managers 2.4. Uni-Ed personnel	2. The Vice-Rector (Teaching) organises a two-day design session for the e-Campus (Oct 1999) 2.1. Lecturers give demonstrations of what they are already doing with WebCT	2. The campus-wide conversation takes place 2.1. Presentations by lecturers as to how they are using ICTs in	2.1. All stakeholders are better informed about what other divisions are planning

Intermediate Goals	Objectives	Inputs	Activities	Outputs	Outcomes
		2.5. Three dedicated Uni-Ed personnel to manage and support WebCT (pedagogical and technical) 2.6. e-learning coordinators (two in each faculty)	2.1.1. The service organisation representatives give an overview of the infrastructure already in place	teaching and learning 2.1.1. Presentations of service organisations on what type of infrastructure is available	(Aw)
	2.2. To establish a shared vision between all stakeholders for an e-Learning project	2.7. e-Learning project sponsor (Vice-Rector)	2.2. The participants formulate a vision for an "e-Campus" and e-Learning at the design session	2.2. Draft Rosenview planning document	2.2. All stakeholders have a shared vision (At/B)
	2.3. To obtain top management's commitment to the e-Learning project	2.8. e-Learning project manager (Uni-Ed) 2.9. e-Learning project steering committee	2.3. e-Campus Forum strategy formulation activities	2.3. Draft e-Campus quantum leap strategy document	2.3. Top management is strongly committed to the idea of an e-Campus (B)
		2.10. e-Learning project management committee 2.11. e-Campus Forum (2002, 2003) 2.12. e-Campus Projects Board (2003) 2.13. Academic Affairs Council (Students)	2.3.1. All stakeholders formulate a six-year strategy 2.3.2. The Vice-Rector (Teaching) presents the draft documentation to the General Management meeting 2.3.3. The Vice-Rector circulates the documentation to the AAC and faculties for comment	2.3.1. Concept documentation 2.3.2. Approved draft documentation 2.3.3. Comments from AAC and faculties	
		3. Policy documents 3.1. of the University 3.2. of the various service organisations	2.3.4. All stakeholders discuss and incorporate the suggestions	2.3.4. Final e-Campus quantum leap documentation	
			2.3.5. The Vice-Rector (Teaching) presents documentation to Senate 2.3.6. The Vice-Rector (Teaching) submits the proposal	2.3.5. Approved final e-Campus document 2.3.6. Council funding of R14 million for 2002-	

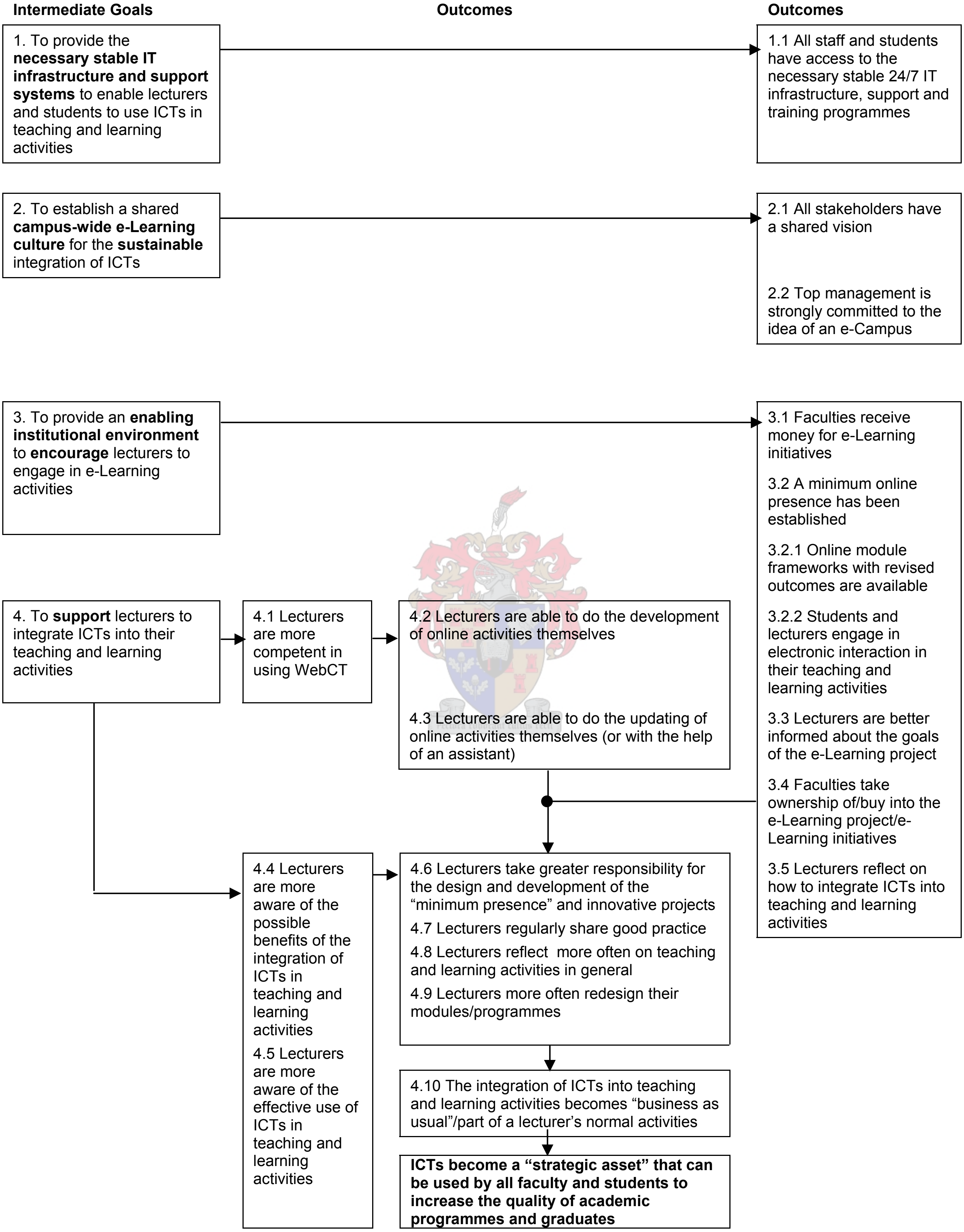
Intermediate Goals	Objectives	Inputs	Activities	Outputs	Outcomes
			to Council for funding	2007 (R1.5 million for e-Learning project)	
3. To provide an **enabling institutional environment** to **encourage** lecturers to engage in e-Learning activities			3. The e-Learning project manager with steering committee formulate and implement an e-Learning plan:	3. Approved e-Learning plan	
	3.1. To provide special funding for e-Learning activities divided between the faculties		3.1. Divide the money awarded between the faculties according to general guidelines	3.1. Money allocated to faculties	3.1. Faculties receive money for e-Learning initiatives (Ac)
	3.2. To establish a minimum electronic presence (online module framework and electronic interaction) for all modules 3.2.1. 2002 = 30% of all modules have a minimum presence 3.2.2. 2003 = additional 40% of all modules 3.2.3. 2004 = remaining 30%		3.2. The lecturers create the minimum electronic presence in all modules	3.2. Revised learning outcomes for all modules 3.2.1. Revised module frameworks for all modules 3.2.2. An electronic communication facility within every module	3.2. A minimum online presence has been established 3.2.1 Online module frameworks with revised outcomes are available 3.2.2. Students and lecturers engage in electronic interaction as part of their teaching and learning activities (B)
	3.3. To inform lecturers centrally about the e-Learning project		3.3. The project manager communicates regularly with the e-Learning coordinators	3.3. Regular e-mails to e-Learning coordinators	3.3. Lecturers are better informed about the goals of the e-Learning project (Aw)
	3.4. To assist faculties to take ownership of/buy-in for the e-Learning initiatives within faculties (students and staff)		3.4. The steering committee selects e-Learning coordinators within each faculty 3.4.1. The project manager encourages e-Learning	3.4. 2 Faculty coordinators per faculty 3.4.1. Faculty-specific guidelines	3.4. Faculties take ownership of/buy into the e-Learning project/e-Learning initiatives (B)

Intermediate Goals	Objectives	Inputs	Activities	Outputs	Outcomes
			coordinators to devise specific faculty guidelines for money allocation		
			3.4.2. The Task Group for Teaching & Learning defines the e-Learning project as two action plans (module framework and electronic communication) in the Strategy for Teaching & Learning	3.4.2. Strategy for T&L (2002-2004) documentation	
			3.4.3. Faculty representatives formulate T&L strategies	3.4.3. A strategy for T&L for each faculty	
			3.4.4. The steering committee submits the Strategy to Senate for approval (Oct 2001)	3.4.4. Approved STL	
	3.5. To promote reflection about the use of ICTs in teaching and learning activities		3.5. The project manager develops a general e-Learning project process (including self-evaluation form)	3.5. A set of general e-Learning guidelines	3.5. Lecturers reflect on how to integrate ICTs into teaching and learning activities (B)
			3.5.1. The project manager prompts e-Learning coordinators for faculty reports	3.5.1. Peer evaluation of e-Learning initiatives take place	
			3.5.2. The project manager collates faculty reports in one report	3.5.2. Reports to Committee for Teaching and Learning	
			3.5.3. The project manager submits the report to the Committee for T&L and Projects Board		

Intermediate Goals	Objectives	Inputs	Activities	Outputs	Outcomes
4. To **support** lecturers to integrate ICTs into their teaching and learning activities	4.1. To select a suitable Web LMS for teaching and learning activities 4.2. To provide training (technical and pedagogical) 4.3. To provide support (technical and pedagogical) 4.4. To give advice (technical and pedagogical) 4.5. To create awareness of the possible benefits of the integration of ICTs into teaching & learning activities		4. Uni-Ed (a central faculty development unit): 4.1. Selects WebCT as LMS for lecturers and students 4.2. Offers training workshops (technical & pedagogical) to lecturers 4.3. Provides support (technical & pedagogical) to lecturers 4.4. Provides one-on-one consultations to lecturers 4.5. Gives demonstrations to lecturers of how ICTs can be used in teaching and learning activities 4.6. Produces publications for lecturers	4. Uni-Ed exists as faculty support unit 4.1. WebCT is the standard supported LMS at S’bosch Univ. 4.2. Faculty development plan with training workshops 4.3. E-mail, telephone support 4.4. One-on-one consultations 4.5. Demonstrations 4.6. Publications, Web resources, manuals	4.1. Lecturers are more competent in using WebCT (S) (*Im)* 4.2. Lecturers are more aware of the possible benefits of the integration of ICTs into teaching and learning activities (Aw) (*Im)* 4.3. Lecturers are more aware of the effective use of ICTs in teaching and learning activities (Aw) (*Im)* 4.4. Lecturers are able to do the development of online activities themselves (S) (*Int*) 4.5. Lecturers are able to do the updating of online activities themselves (or with the help of an assistant) (S) (*Int*) 4.6. Lecturers take greater responsibility for the design and development of the “minimum presence” and innovative projects (B) (*Int*) 4.7. Lecturers regularly share good practice (B) 4.8. Lecturers reflect more often on teaching and learning activities in general

Intermediate Goals	Objectives	Inputs	Activities	Outputs	Outcomes
					(B) (*Int*) 4.9. Lecturers more often redesign their modules/ programmes (B) (*Int*) 4.10. The integration of ICTs into teaching and learning activities becomes "business as usual"/part of a lecturer's normal activities (B) (*Lt*)

Figure 4.6: Change Model of the e-Learning initiatives



4.8 KEY LESSONS LEARNED

Quite a number of key lessons have been learnt so far in the process of integrating ICTs into teaching and learning activities.[60] For the University of Stellenbosch to be successful in its e-Learning and e-Campus initiatives it was necessary to:

- Start a campus-wide conversation about e-Learning and the broader e-Campus initiative. During this conversation, special attention was paid to:
    - The type of policy environment
    - The existing champions
    - The type of infrastructure and resources available
- Get a strategy for both e-Learning and the e-Campus initiative approved that focused on adding value to the core functions of the University, namely research, teaching and learning and community service
- Secure special funding for the individual projects of the initiative
- Follow an integrated approach, with special emphasis on infrastructure, support and continuous communication and consultation with all stakeholders to secure buy-in
- Have a strong "e-Campus champion" at top management level to drive the initiative top-down.

With regard to the e-Learning project specifically, it was important to:

- Embed the project in the University's Strategy for Teaching and Learning
- Follow an incremental approach by starting with a "minimum online presence" (module framework and some form of electronic interaction)
- Establish ownership of the e-Learning project within the individual faculties. The deans are ultimately responsible for the management of the project within their faculties, with strong support from e-Learning coordinators who are responsible for the coordination of the faculty initiatives. Although the project is decentralised, central guidelines, support and coordination are made available
- Get buy-in from faculty members and students for the e-Learning project by:
    - Showing how the integration of ICTs can add value to teaching and learning activities

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[60] It should be kept in mind that this is what worked at the University of Stellenbosch and, although some of the ideas can be extrapolated to other higher education contexts, the context of the specific higher education institution should be taken into account.

- Ensuring recognition and reward for innovative projects
- Using faculty members to demonstrate their innovative applications of ICTs at departmental demonstrations and university-wide mini-conferences
- Building confidence in the system and people involved through a flexible faculty development plan, excellent support and a reliable, stable infrastructure
- Scheduling workshops and one-on-ones tailor made to their specific needs and specifications when they need it

The main lesson learnt with regard to the integration of ICTs in the University of Stellenbosch context is that, although the pre-strategy phase provided the basis on which the e-Campus could be built, this bottom-up growth is not sustainable and cost effective without an integrated top-down strategy. Similarly, the bottom-up growth in e-Learning could not be sustained without the broader e-Campus strategy and the broader policy environment.

Rogers (1995) captures this interconnectedness of all the e-Campus projects as follows when he writes:

> No innovation comes without strings attached. The more technologically advanced an innovation is, the more likely its introduction is to produce many consequences, some of them anticipated, but others unintended and hidden. *A system is like a bowl of marbles: Move any one of its elements and the positions of the others are inevitably changed also.* (My emphasis added) The interdependency is often not fully understood by the adopters of an innovation, and may not be comprehended by the change agents who introduce a new idea in a system. Unanticipated consequences represent a lack of understanding of how an innovation functions and of the internal and external forces at work in a social system (p. 419).

In the same way, the change agents introducing e-Learning as an innovation into a system are also not always aware of all the changes associated with the introduction thereof. Whereas the e-Learning strategy is first and foremost driven by teaching and learning considerations and encouraged as a bottom-up voluntary initiative, therefore also embedded in the Strategy for Teaching and Learning, it is also necessary to anticipate consequences at a systems level. It is, however, not enough to only anticipate these consequences, as a coordinated strategy is needed to make provision for adequate infrastructure, integration between systems, training and support at a central level. This central strategy should also not be driven by technological considerations, but rather, as I discussed, by the core functions of the University, namely research, teaching and learning and community service.

CHAPTER 5: RESULTS OF WEBCT QUESTIONNAIRE (LECTURERS)

5.1 INTRODUCTION

There has been an exponential growth in the use of WebCT since its introduction at the University of Stellenbosch in 1999. This is the result of both the evolutionary bottom-up initiatives by lecturers as well as the e-Learning project described in Chapter 4. Figures 5.1 to 5.3 give the analysed requests for the server for the following two time periods:

- 14 February 2002, 21.21 to 1 October 2002, 02.02 (228.2 days)
- 2 January 2003, 9:06 to 25 October 2003, 02:06 (295.71 days)

Figure 5.1: Average successful WebCT requests per day

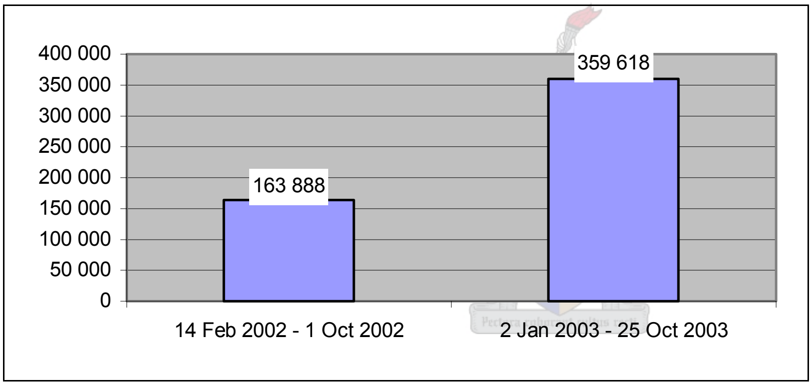


Figure 5.2: Average WebCT data transferred per day (in gigabytes)

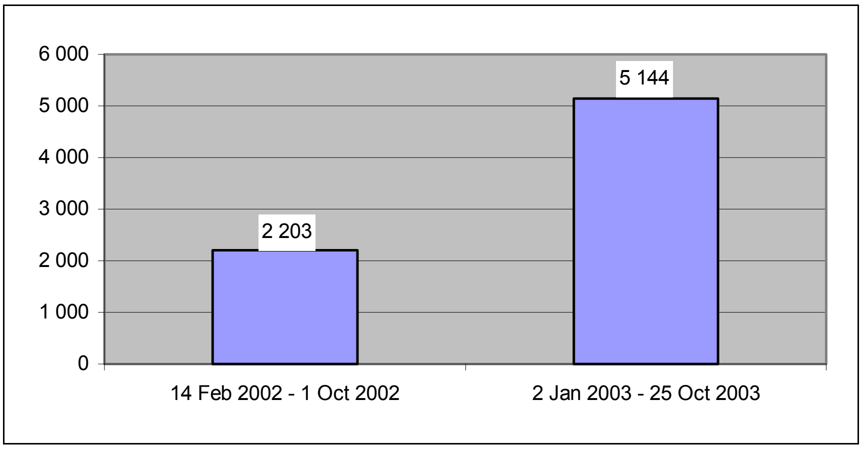
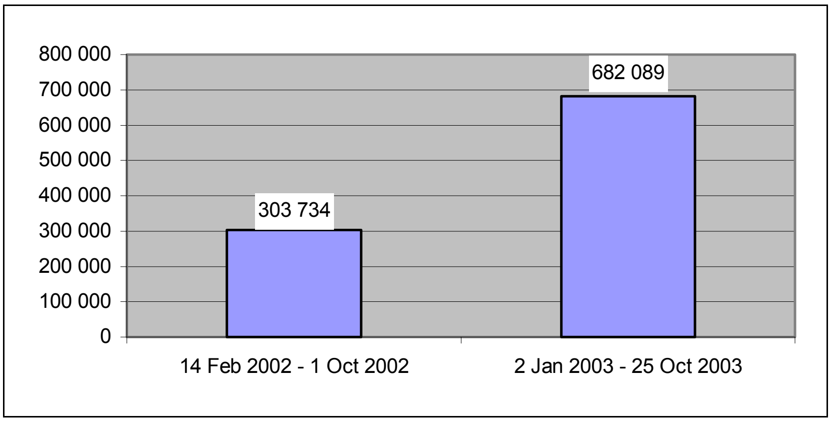


Figure 5.3: Distinct WebCT files requested



Although useful in that these statistics illustrate that the use of WebCT is increasing, these statistics do not give an indication of how lecturers and students use WebCT, whether the use of WebCT adds value to teaching and learning activities in general, what type of barriers lecturers experience and what type of incentives are necessary for lecturers to get started and increase their use of WebCT.

The e-Learning project described in Chapter 4 provides monetary incentives for lecturers to get started with the integration of ICTs into their teaching and learning activities. The question that remains, however, is whether this “top-down strategy”, with its monetary incentives, is successful or not.

To obtain a more complete picture of the use of WebCT beyond mere server statistics and to discover whether the e-Learning project is successful in its aims, the following questions need to be answered:

- What are the lecturers using WebCT for? Is it only for the distribution of content? Are there changes in usage patterns?
- How often do the lecturers update content material and communicate with their students? Do they think it is sufficient and how does that correlate with the students’ perceptions?
- Are the users satisfied with WebCT as LMS? What do they perceive to be the advantages and disadvantages of using it?
- Are the users satisfied with the infrastructure, support and training programme? Do they feel they are able to do the development and updating of their modules themselves?
- Are the lecturers aware of the possible benefits of the integration of ICTs (and the use of WebCT) to enhance the quality of teaching and learning practice? Do they find that any of these benefits manifest in their teaching and learning activities as a result of their use of WebCT?

- What do the lecturers consider to be barriers/challenges with regard to the integration of ICTs into teaching and learning activities?
- What type of incentives are important for lecturers to get started and to increase their use of ICTs (and of WebCT specifically)? What type of institutional incentives is valued and, more specifically, do lecturers feel that special monetary incentives for e-Learning activities, as specified in the e-Learning project, are necessary?

Two Web-based surveys were administered to obtain answers to these questions: one for lecturers and one for the students who use WebCT. This chapter reports on the results of the lecturers' survey to find possible answers to some of the questions mentioned above. Before the questions are addressed, a brief outline is given of the methodology followed, as well as the demographics and computer/WebCT literacy of the group surveyed.

5.2 METHODOLOGY

5.2.1 The survey instrument

The lecturers' survey questionnaire[61] consists of 36 questions relating to the following issues:

- How long lecturers have been using computers and WebCT
- How lecturers perceive their computer and WebCT skills
- Lecturers' patterns of WebCT usage, e.g. what type of WebCT tools they use, how frequently they update content and how frequently they communicate electronically with students
- The lecturers' general satisfaction with WebCT as tool, i.e. what they perceive to be the major advantages and disadvantages of the tool
- The lecturers' training and support patterns and preferences
- The lecturers' awareness of the potential benefits of the integration of ICTs
- The lecturers' perceived barriers and challenges with regard to the use of ICTs in teaching and learning activities
- The type of incentives that could prompt lecturers to start using ICTs as well as to expand their use of ICTs in teaching and learning activities.

[61] Attached as Annexure B.

5.2.2 Development of a sampling frame

The WebCT user statistics as on 17 August 2003 (Table 5.1 below) were used to draw the sample. WebCT 2003 and Tygerberg 2003 are the two WebCT production servers used for teaching and learning activities, whereas WebCT Dev is the development server used for training and development purposes. No students have access to WebCT Dev.

As can be seen from Table 5.1, a distinction is made between all designers and primary designers. WebCT allows the administrator of the system to define a primary designer for each module, as well as multiple shared designers. The primary and shared designers have the same development rights within the system, but it was important for the selection of the sample that only the primary designers could complete the survey. Some modules have up to 10 shared designers, which could skew the data.

Table 5.1: WebCT user statistics on 17 August 2003

Server	All designers	Primary designers	Modules	Students
WebCT 2003	755	418	~700	14 324
Tygerberg 2003	189	91	~100	2 260
WebCT Dev	547	540	~650	0

The survey sample therefore consisted of 509 primary designers on WebCT 2003 and Tygerberg 2003. The primary designers of "WebCT Dev" were not included, because it is too difficult to determine whether the primary designers on WebCT Dev are doing development or have just attended a training session.

5.2.3 Development and implementation of a Web-based survey system

A Web-based survey approach was followed in terms of which the respondents could complete the questionnaire online, with the responses captured to a database. I sent personalised e-mails with a covering letter and a hyperlink to the survey to all the WebCT primary designers. Only these primary designers could gain access to and complete the questionnaire by entering their personnel number. I used these personnel numbers to relate the respondents' responses to the demographic data of the respondents extracted from the human resources database of the University.

5.2.4 Questionnaire submission rates

A total of 232 completed questionnaires were received. Table 5.2 summarises the response rate.

Table 5.2: Questionnaires submitted

Primary designers	Invalid e-mail	Left University	Not actively involved in development	Responses (n)	Response (%)
509	1	7	16	232	46%

Of the 509 primary designers, one e-mail was returned with a message that the e-mail address was invalid. Seven lecturers indicated that they had left the University, whereas 16 lecturers indicated that they were no longer actively involved in WebCT development and could therefore not make a useful contribution. The response rate of 46% is regarded as satisfactory and is comparable with good practice in Web-based surveys.

5.3 REPRESENTIVITY OF THE SAMPLE

I will now consider 11 figures (Figures 5.4 to 5.14) to show how representative the sample is. These figures show the comparison between the demographic data of the population (509) and the sample (232).

Figure 5.4: Age distribution

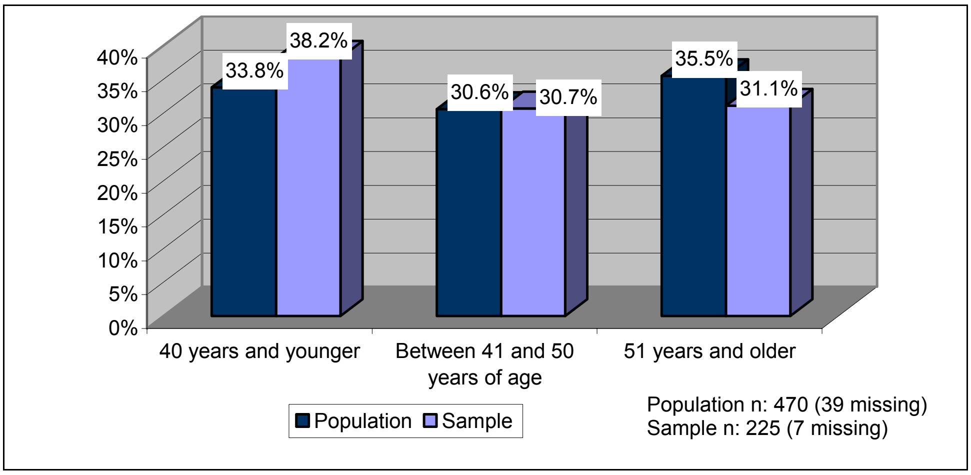


Figure 5.5: Race distribution

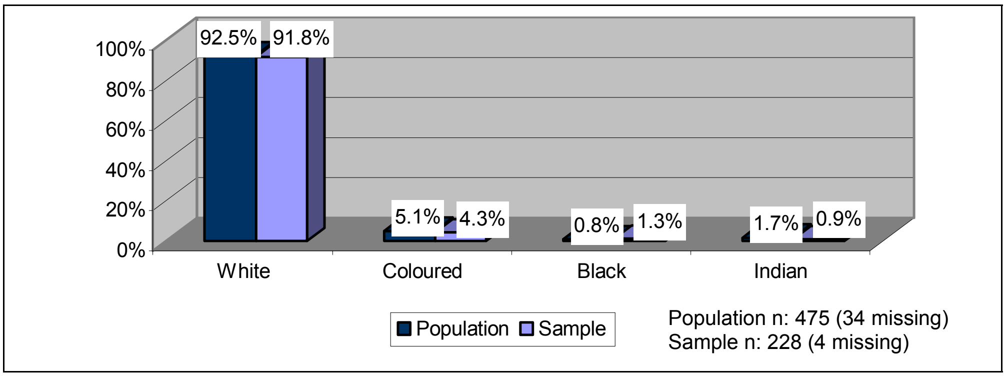


Figure 5.6: Language distribution

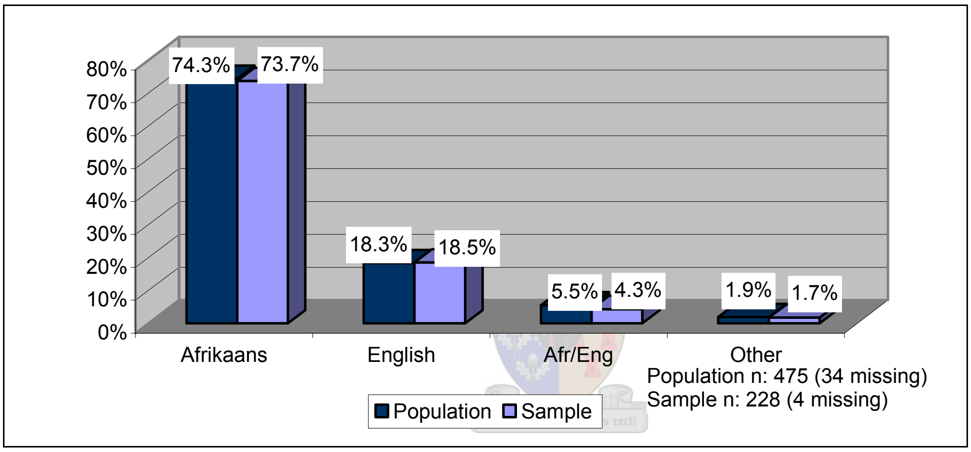


Figure 5.7: Sex distribution

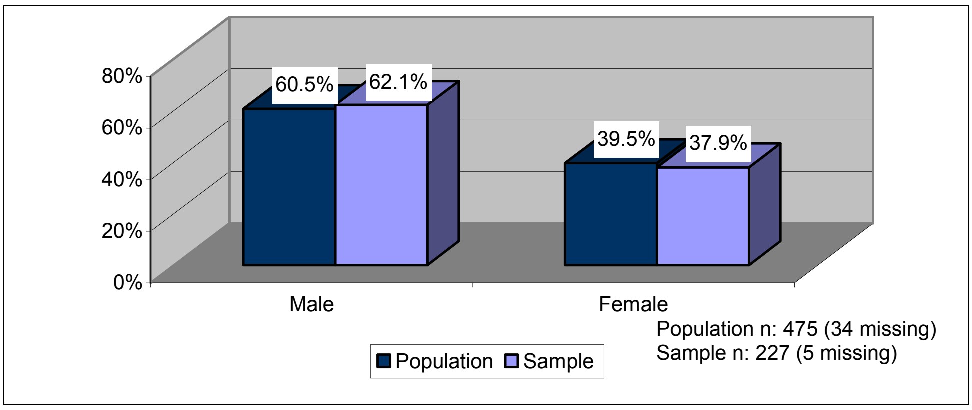


Figure 5.8: Highest qualification

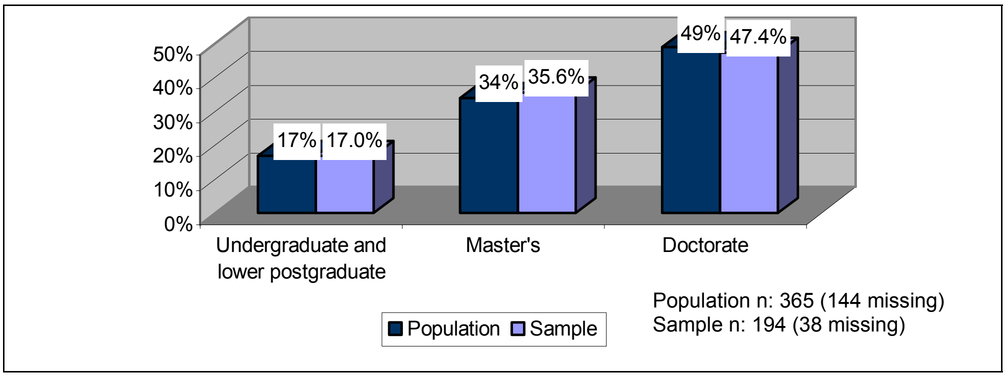


Figure 5.9: Faculty

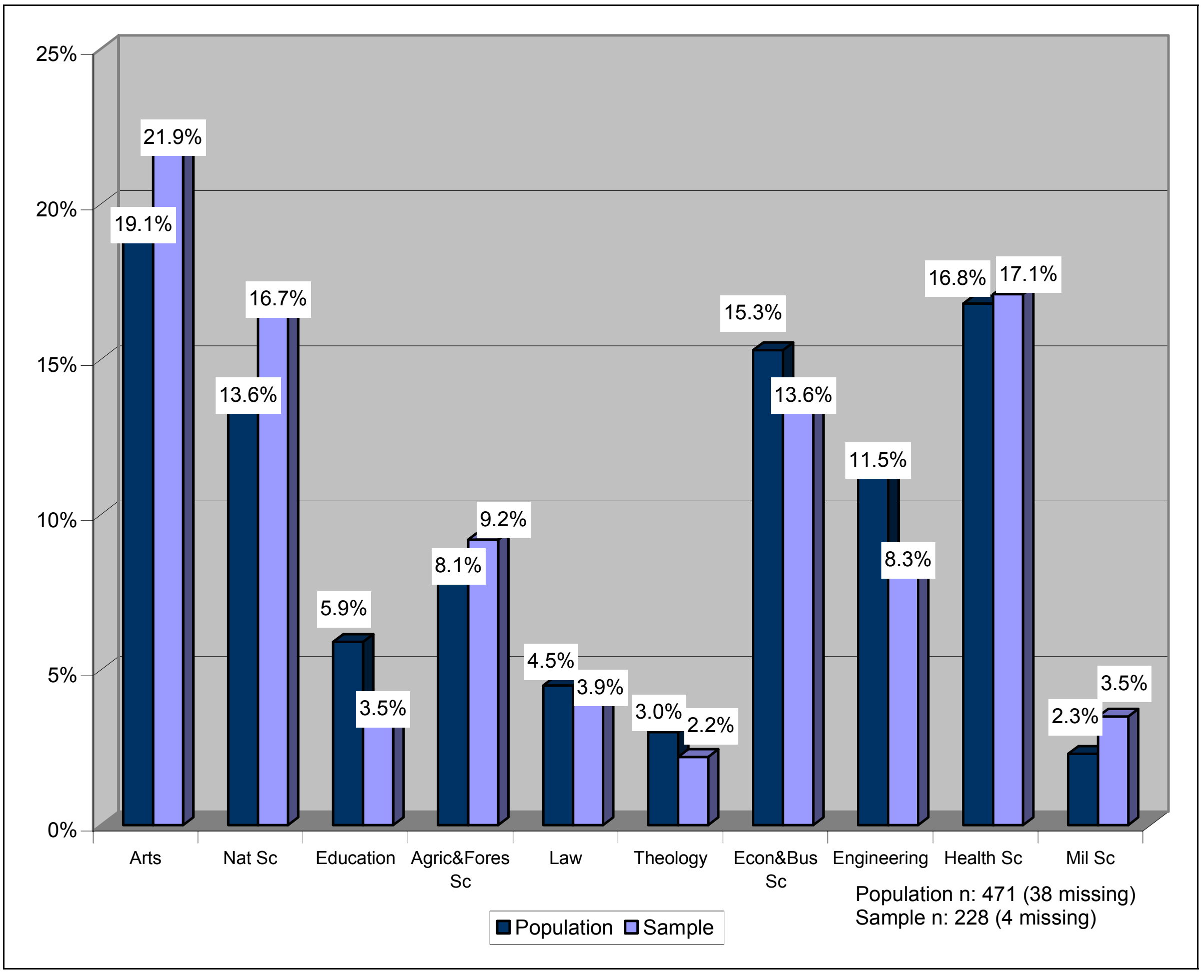


Figure 5.10: Rank

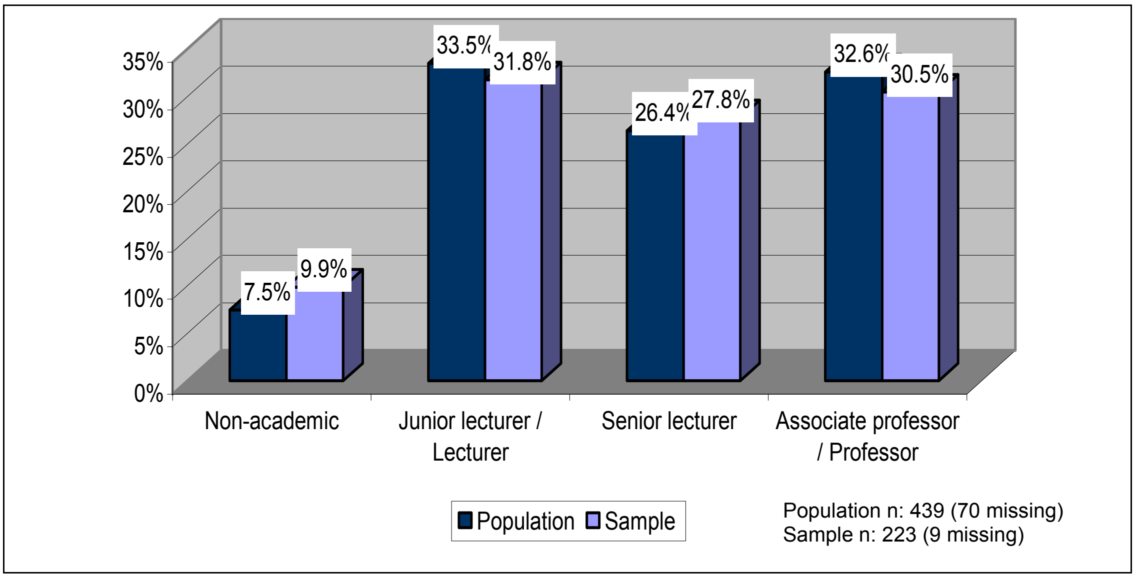


Figure 5.11: Number of years at the university

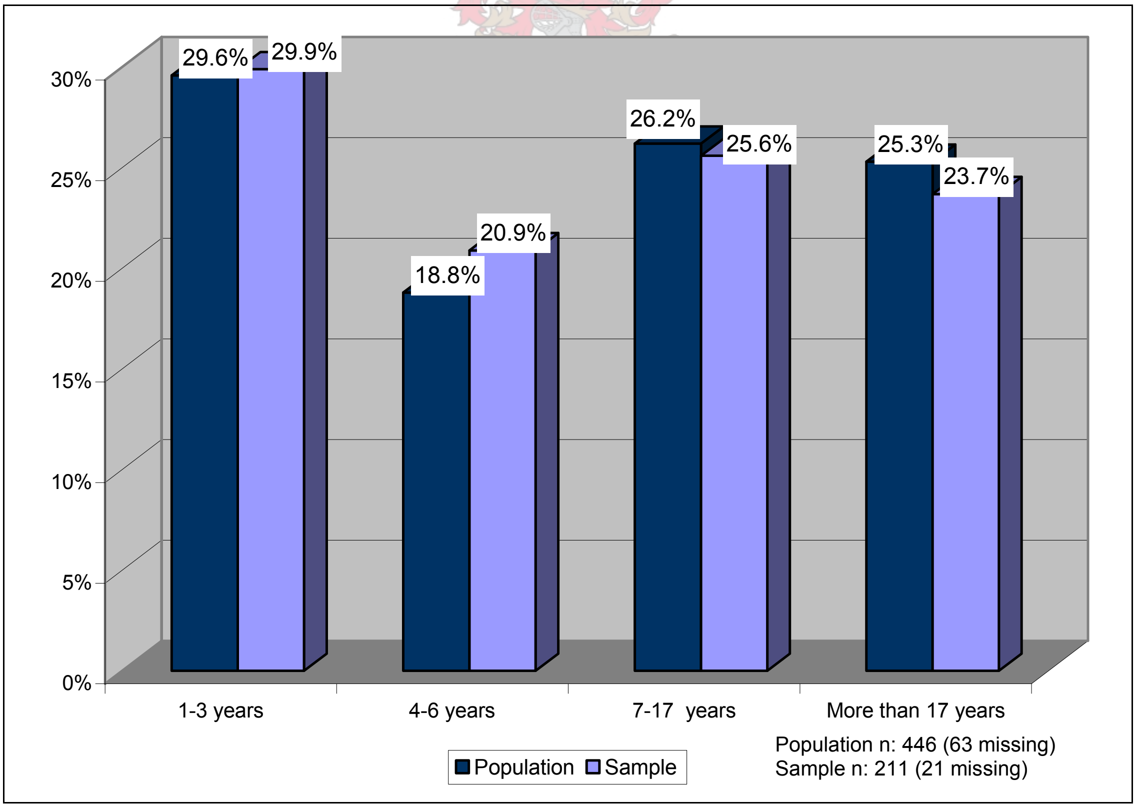


Figure 5.12: Personnel category

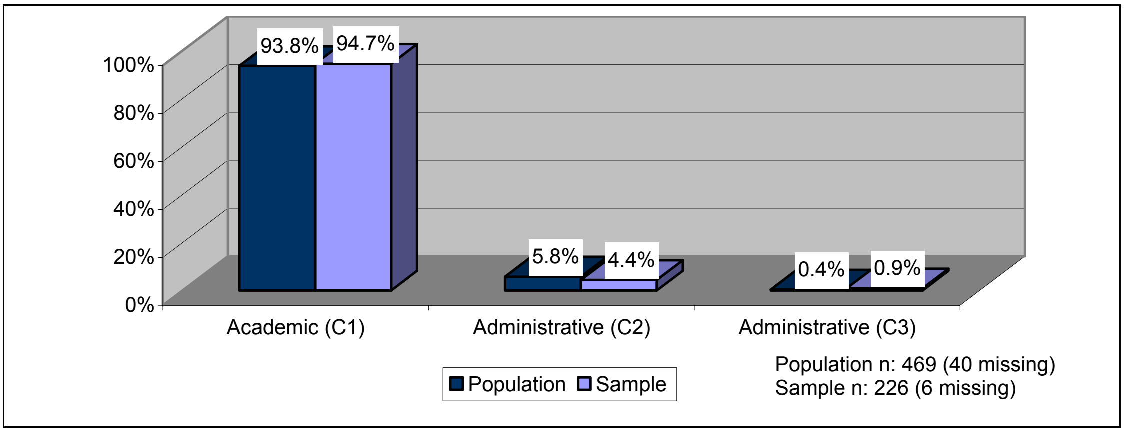


Figure 5.13: Permanent/Temporary

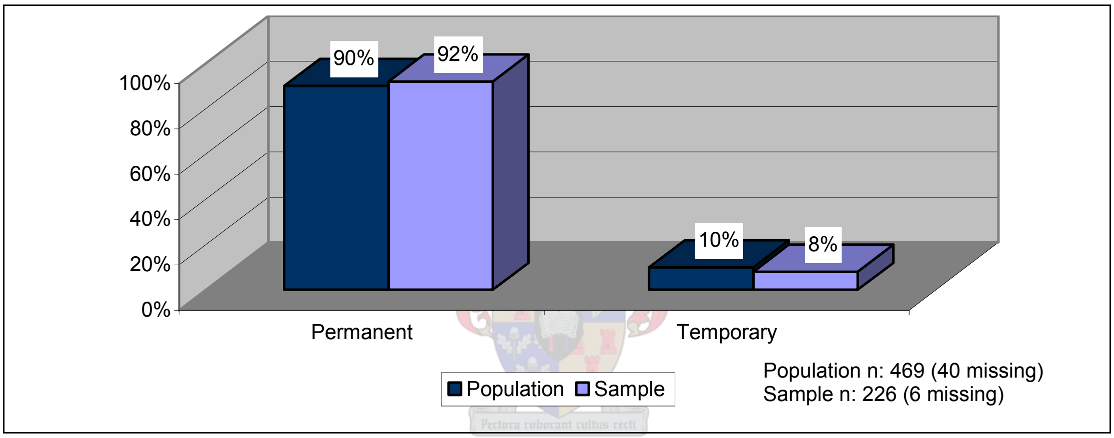
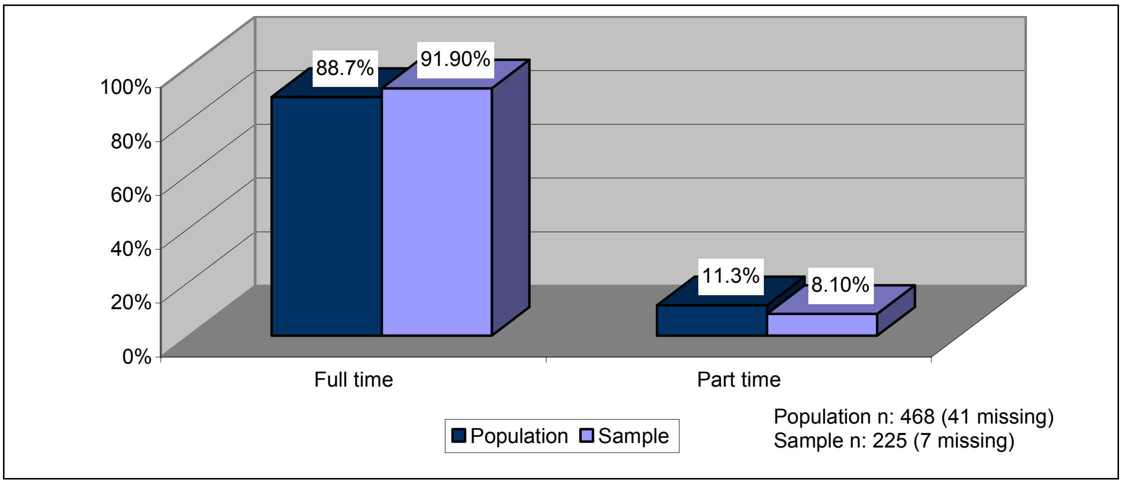


Figure 5.14: Full time/Part time



It is clear from these figures that the demographic profile of the sample group is highly similar to that of the population. This close correlation between the profiles of the two groups is taken as an indicator of the representativeness of the sample. The sample differs from the population only in terms of faculties with:

- Slightly higher representations in the Arts and Natural Sciences Faculties
- Slightly lower representations in the Education and Engineering Faculties

These differences are sufficiently small that – together with the rather large response rate (46%) and the adequate sample size (N = 232) – we can accept the survey responses as a very good indication of the views of all the WebCT users at the University of Stellenbosch.

In summary then, Figures 5.4 to 5.14 show that the respondents are mostly:

- 40 years and younger (38.2%),
- Afrikaans speaking (75.1%),
- Male (62.1%),
- Holding a Doctorate (47.4%),
- In the Faculty of Arts (21.9%),
- Junior lecturers/lecturers (31.8%) and associate professors/professors (30.5%),
- At the University from 1 to 3 years (29.9%),
- C1 academic personnel (94.7%),
- Permanent staff (92%), and
- Full-time staff (91.1%).

5.4 COMPUTER AND WEBCT LITERACY

To ascertain the respondents' computer and WebCT literacy, the respondents were asked how long they had been using computers, specifically WebCT, as well as how they rate their computer and WebCT skills. In order to correlate these responses with other variables, such as faculty, sex and age, I constructed two separate indices, one for computer literacy and one for WebCT literacy. The distributions of the responses, the construction of the indices as well as the cross-tabulations between these indices and three demographic variables (faculty, sex and age) are discussed below.

5.4.1 Computer literacy

Table 5.3 gives the profile of the respondents in terms of the number of years they had been using computers. It is interesting to note that the majority of the respondents (59%) had been using computers for more than 10 years.

Table 5.3: Length of computer use

	Frequency	Percent	Valid Percent	Cumulative Percent
1-2 years	5	2.2	2.2	2.2
3-4 years	11	4.7	4.7	6.9
5-6 years	26	11.2	11.2	18.1
7-10 years	54	23.3	23.3	41.4
More than 10 years	136	58.6	58.6	100.0
Total	232	100.0	100.0	

Table 5.4 shows the lecturers' rating of their own computer skills. Although the majority of the respondents had been using computers for more than 10 years, only 13.4% rated their computer skills at the expert level. The majority of the respondents rated their computer skills as Intermediate.

Table 5.4: Rating of computer skills

	Frequency	Percent	Valid Percent	Cumulative Percent
2_Beginner	2	.9	.9	.9
3_Beginner	13	5.6	5.6	6.5
4_Intermediate	79	34.1	34.2	40.7
5_Intermediate	62	26.7	26.8	67.5
6_Intermediate	44	19.0	19.0	86.6
Expert	31	13.4	13.4	100.0
Total	231	99.6	100.0	
Missing	1	.4		
Total	**232**	**100.0**		

5.4.2 Computer literacy index

In order to create a computer literacy index, the length of computer use and as the respondents' rating of their own computer skills were combined. The procedure entailed three steps.

First of all, I reduced the six categories of length of computer use (Table 5.3) to four categories and the six categories of rating of computer skills (Table 5.4) to five categories. This resulted in two new variables, with distributions as summarised in Table 5.5 below.

Table 5.5: Recoded variables used to create the computer literacy index

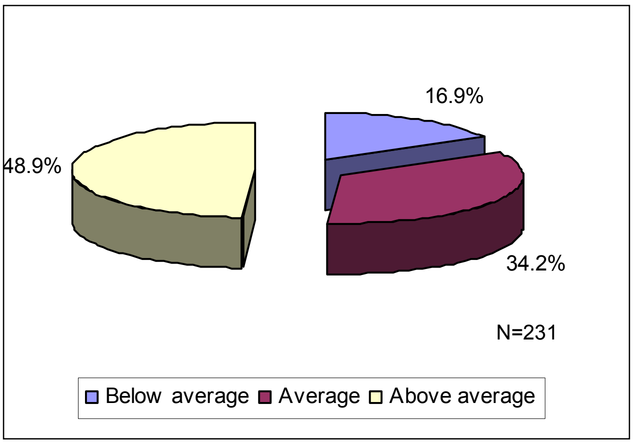
Variable	Frequency	Valid Percent	Value assigned
Length of computer use (N = 232)			
4 years and less	16	6.9	0
5-6 years	26	11.2	1
7-10 years	54	23.3	2
More than 10 years	136	58.6	3
Rating of computer skills (N = 231)			
Beginner	15	6.5	0
Lower Intermediate	79	34.2	1
Middle Intermediate	62	26.8	2
Upper Intermediate	44	19.0	3
Expert	31	13.4	4

Secondly, I assigned a value to each variable category (lowest category = 0, see Table 5.5) and summed these values across variables to yield a single score for each respondent. The scores ranged from 0 to 7. The distribution of the scores is shown in Table 5.6.

Table 5.6: Distribution of computer literacy scores

Score	Frequency	Valid Percent	Cumulative Percent
0	4	1.7	1.7
1	13	5.6	7.4
2	22	9.5	16.9
3	25	10.8	27.7
4	54	23.4	51.1
5	53	22.9	74.0
6	35	15.2	89.2
7	25	10.8	100.0
Total	**231**	**100.0**	
System	1		

Figure 5.15: Computer literacy index



Lastly, to produce a convenient number of categories for cross-tabulations, I reduced the seven scores in the following way:

- Below average (0-2)
- Average (3-4)
- Above average (5-7)

The resultant computer literacy index is presented in Figure 5.15.

The distribution shown in Figure 5.15 is to be expected if one takes into account that the length of computer use is one of the variables, with the majority of the respondents reporting that they have been using computers for more than 10 years.

The distribution in Figure 5.15 is furthermore confirmed by the reported frequency of usage of standard computer applications as displayed in Table 5.7.

Table 5.7: Frequency of usage of standard computer applications

	Daily		About once a week		A few times a month		Once a semester or less		Never		Total
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**
E-mail	231	99.6	1	.4							232
Microsoft office	197	86.8	13	5.7	8	3.5	2	.8	7	3.1	227
Internet	169	72.8	43	18.5	17	7.3	3	1.3			232
WebCT	61	26.3	75	32.3	51	22	35	15	10	4.3	232

It is clear from Table 5.7 that just about all the respondents use e-mail daily. The majority of the respondents also use the Internet (73%) and Microsoft Office (87%) daily. Although WebCT is not used as frequently as the other applications, the majority of the respondents (59%) use it at least once a week.

5.4.3 Cross-tabulating the computer literacy index with key demographic data

The cross-tabulation between the computer literacy index and faculty, sex and age is shown in Table 5.8. In order to do the cross-tabulation between the computer literacy index and faculty, I recoded the faculties as follows to avoid too many small cells:

- The Faculties of Arts, Education, Law and Theology were recoded as the Human and Social Sciences
- The Faculties of Natural Sciences, Engineering and Agricultural & Forestry Sciences were recoded as Natural Sciences & Engineering
- The Faculties of Economic and Business Sciences and Health Sciences were left as separate categories
- The Faculty of Military Science was recoded as a missing variable and not included in the cross-tabulation

These recoded categories are used in Table 5.8 and all further cross-tabulations that include faculty.

Table 5.8: Cross-tabulation between demographic variables (faculties, sex and age) and computer literacy index

Comparison	Computer literacy index						Total	Statistics
	Below average		Average		Above average			
	N	%	N	%	N	%	N	
Faculties								
Human & Social Sciences	16	22.2	27	37.5	29	40.3	72	Chi-square = 9.015
Natural Sciences & Engineering	8	10.4	23	29.9	46	59.7	77	p = .173
Economic & Business Sciences	6	19.4	8	25.8	17	54.8	31	
Health Sciences	7	17.9	18	46.2	14	35.9	39	
TOTAL	37	**16.9**	76	**34.7**	106	**48.4**	219	
Sex								
Male	19	13.6	46	32.9	75	53.6	140	Chi-square = 4.868
Female	20	23.3	31	36	35	40.7	86	p = .088
TOTAL	39	**17.3**	77	**34.1**	110	**48.7**	226	
Age								
40 years and younger	8	9.4	31	36.5	46	54.1	85	Chi-square = 7.061
Between 41 and 50 years of age	15	21.7	20	29	34	49.3	69	p = .133
51 years and older	16	22.9	25	35.7	29	41.4	70	
TOTAL	39	**17.4**	76	**33.9**	109	**48.7**	224	

It is important to keep in mind that the computer literacy index is a self-reporting index based on how respondents rate themselves and not based on some objective computer literacy measure or test. Although Table 5.8 clearly shows that more of the respondents from the faculties of Natural Sciences and Engineering and Economic and Business Sciences score higher on the computer literacy index than the respondents from the faculties of Human and Social Sciences and Health Sciences, this does not imply that the respondents from these faculties are, in actual fact, more computer literate than their colleagues from other faculties. One can only infer that they feel more comfortable with the use of technology in that they rate their skills higher than that of their counterparts. The same principle applies to the difference between the male and female ratings, with significantly more male respondents falling in the above average segment of the index. Again, this does not imply that females are less computer literate than their male counterparts. The only salient point with regard to the cross-tabulation between age and the computer literacy index is that, compared to the other two age categories, a lower percentage of the younger respondents (40 years and younger) fall in the below average segment of the computer literacy index.

5.4.4 WebCT literacy

WebCT was introduced at the University of Stellenbosch at the beginning of 1999 and it is therefore to be expected that the majority of the respondents only started using WebCT in 2002, when the application was more established on campus (Table 5.9). The e-Learning project, with e-Learning targets and monetary incentives, also started in 2002, resulting in a sharp increase in WebCT users. This could also account for the considerable difference in lecturers starting to use WebCT between 2001 and 2002.

Table 5.9: Length of WebCT use

	Frequency	Percent	Valid Percent	Cumulative Percent
Since 1999	16	6.9	7.0	7.0
Since 2000	22	9.5	9.6	16.7
Since 2001	38	16.4	16.7	33.3
Since 2002	90	38.8	39.5	72.8
Since 2003	62	26.7	27.2	100.0
Total	**228**	**98.3**	**100.0**	
System	4	1.7		

Table 5.10 summarises how the respondents rate their WebCT skills. The majority of the respondents (32%) rate their skills as intermediate, with only 2.2% in the expert category.

Table 5.10: WebCT skills

	Frequency	Percent	Valid Percent	Cumulative Percent
1_Beginner	46	19.8	19.9	19.9
2_Beginner	29	12.5	12.6	32.5
3_Beginner	41	17.7	17.7	50.2
4_Intermediate	74	31.9	32.0	82.3
5_Intermediate	20	8.6	8.7	90.9
6_Intermediate	16	6.9	6.9	97.8
Expert	5	2.2	2.2	100.0
Total	231	99.6	100.0	
Missing	1	.4		
Total	232	100.0		

5.4.5 WebCT literacy index

In order to create a WebCT literacy index, the length of WebCT use as well as the respondents' rating of their own WebCT skills were combined. The procedure entailed three steps.

First of all, I reduced the five categories of length of WebCT use (Table 5.9) to four categories and the seven categories of rating of WebCT skills (Table 5.10) to five categories. This resulted in two new variables, with distributions as summarised in Table 5.11 below.

Table 5.11: Recoded variables used to create the WebCT literacy index

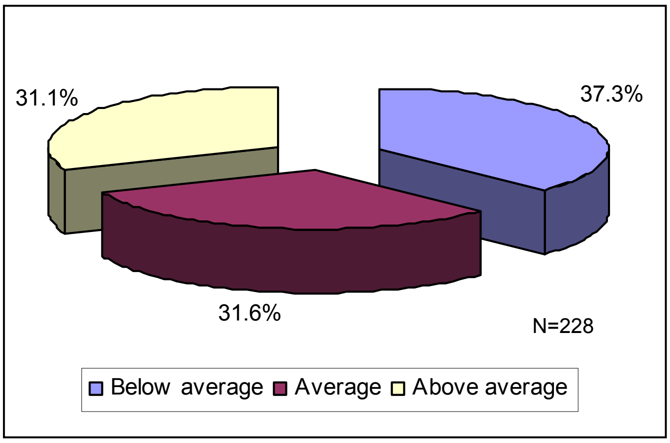
Variable	Frequency	Valid Percent	Value assigned
Length of WebCT use (N = 228)			
Since 2003	62	27.2	0
Since 2002	90	39.5	1
Since 2001	38	16.7	2
Since 1999/2000	38	16.7	3
Rating of WebCT skills (N = 231)			
1_Beginner	15	6.5	0
2_Beginner	79	34.2	1
3_Beginner	62	26.8	2
4_Intermediate	44	19.0	3
5,6_Intermediate/Expert	31	13.4	4

Secondly, a value was assigned to each variable category (lowest category = 0, see Table 5.11) and these values were summed across variables to yield a single score for each respondent. The scores ranged from 0 to 7. The distribution of the scores is shown in Table 5.12.

Table 5.12: Distribution of WebCT literacy scores

Score	Frequency	Valid Percent	Cumulative Percent
0	24	10.5	10.5
1	26	11.4	21.9
2	35	15.4	37.3
3	24	10.5	47.8
4	48	21.1	68.9
5	28	12.3	81.1
6	24	10.5	91.7
7	19	8.3	100.0
Total	**228**	**100.0**	
System	**4**		

Figure 5.16: WebCT literacy index



Lastly, to produce a convenient number of categories for cross-tabulations, the seven scores were reduced to three in the following way:

- Below average (0-2)
- Average (3-4)
- Above average (5-7)

The resultant WebCT literacy index is summarised in Figure 5.16.

5.4.6 Cross-tabulating the WebCT literacy index with key demographic data

Table 5.13 shows the cross-tabulation between demographic variables (faculties, sex and age) and the WebCT literacy index. I used the same recoded faculties that were used in Table 5.8 (cross-tabulation between demographic variables and computer literacy index) in Table 5.13.

Table 5.13: Cross-tabulation of demographic variables (faculties, sex and age) and WebCT literacy index

Comparison	**WebCT literacy index**						**Total**	**Statistics**
	Below average		**Average**		**Above average**			
	N	%	N	%	N	%	N	
Faculties								
Human & Social Sciences	25	34.7	25	34.7	22	30.6	72	Chi-square = 4.637
Natural Sciences & Engineering	32	42.7	21	28	22	29.3	75	p = .591
Economic & Business Sciences	9	29	9	29	13	41.9	31	
Health Sciences	18	47.4	11	28.9	9	23.7	38	
TOTAL	84	**38.9**	66	**30.6**	66	**30.6**	216	
Sex								
Male	57	41	40	28.8	42	30.2	139	Chi-square = 1.754
Female	27	32.1	28	33.3	29	34.5	84	p = .416
TOTAL	84	**37.7**	68	**30.5**	71	**31.8**	223	
Age								
40 years and younger	22	25.6	28	32.6	36	41.9	86	Chi-square = 11.555
Between 41 and 50 years of age	31	46.3	18	26.9	18	26.9	67	p = .0211
51 years and older	31	45.6	22	32.4	15	22.1	68	
TOTAL	84	**38**	68	**30.8**	69	**31.2**	221	

It is important to keep in mind that the WebCT literacy index, similar to the computer literacy index, is based on the respondents' opinion of their WebCT literacy and not based on some objective WebCT literacy measure or test.

An inspection of Table 5.13 shows that no statistically significant differences exist between the percentages of respondents within each segment of the WebCT literacy index for the faculties and sex variables. As far as age is concerned, those respondents younger than 40 on average rated themselves more WebCT literate than their older colleagues.

5.4.7 Number of WebCT courses

Table 5.14: Number of WebCT courses

Courses	Frequency	Percent	Valid Percent	Cumulative Percent
1	97	41.8	41.8	41.8
2	54	23.3	23.3	65.1
3	37	15.9	15.9	81.0
4	19	8.2	8.2	89.2
5	14	6.0	6.0	95.3
6	3	1.3	1.3	96.6
7	2	.9	.9	97.4
8	1	.4	.4	97.8
9	3	1.3	1.3	99.1
10	1	.4	.4	99.6
12	1	.4	.4	100.0
Total	232	100.0	100.0	

The majority of the respondents, 42%, have only one course on WebCT (Table 5.14). It is important to note that a WebCT "course" is defined according to the specific lecturer's need. A WebCT course could consist of a complete programme, a combination of modules, one module or even part of a module.

<u>To summarise:</u> With regard to the lecturers' computer literacy, the majority of the respondents fall in the above average category of the computer literacy index. When the computer literacy index is correlated with the demographic variables (sex, faculties and age), the cross-tabulations, although not statistically significant, reveal the following interesting results:

- The lecturers from the Natural Sciences and Engineering and Economic and Business Sciences Faculties rate themselves higher than the respondents from the Human and Social Sciences and Health Science Faculties
- The male respondents reported higher computer literacy than the female respondents

None of these trends are reflected when the WebCT literacy index is correlated with the same demographic variables. The only significant result is:

- The younger respondents (40 years and younger) rate themselves higher than the older respondents on WebCT skills

5.5 PATTERN OF WEBCT USAGE

In this section, I will present the results of the usage patterns of WebCT, specifically the

- Type of WebCT tools lecturers use, and
- Types of teaching and learning activities for which they are using the tools.

I next present the results and discuss how frequently lecturers update content material and communicate with their students. The quantitative data will be complemented with the qualitative data gathered through the survey.

5.5.1 Use of WebCT Tools

Table 5.15: Teaching and learning activities for which WebCT is used

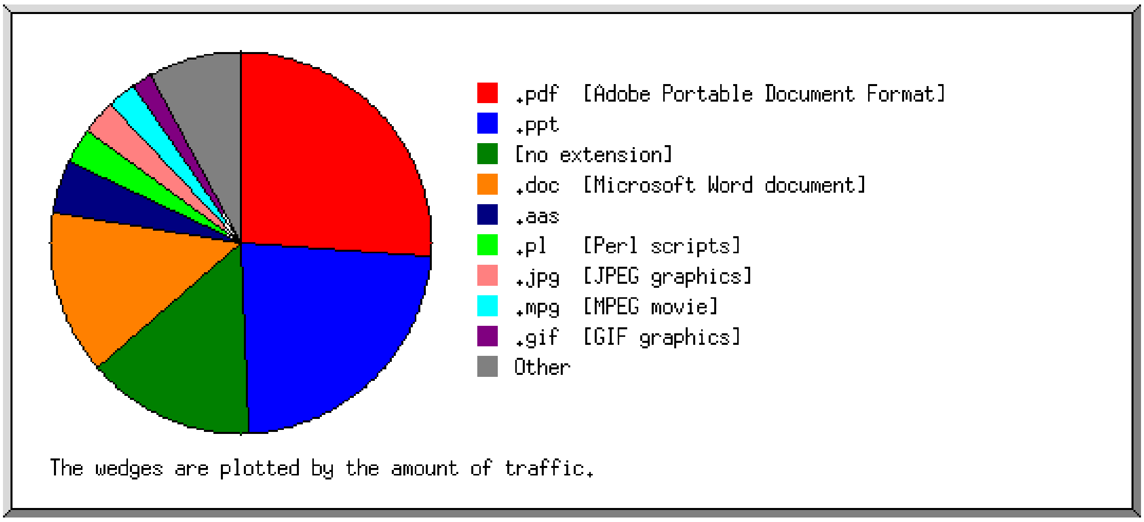
	No		Yes	
	Count	**%**	**Count**	**%**
Module homepage	39	16.8%	193	83.2%
Module framework	47	20.3%	185	79.7%
Static module content files (Word, Powerpoint, Excel, pdf etc.)	63	27.2%	169	72.8%
Communication (e.g. bulletin board, chat rooms, e-mail)	109	47.0%	123	53.0%
Tutorial/practical tests	175	75.4%	57	24.6%
Interactive content	183	78.9%	49	21.1%
Gradebook	189	81.5%	43	18.5%
Self-assessment tests that students can complete at their own convenience	197	84.9%	35	15.1%
Class tests	198	85.3%	34	14.7%
Electronic submission of assignments	198	85.3%	34	14.7%
Semester tests	216	93.1%	16	6.9%
Exams	217	93.5%	15	6.5%

The results show (Table 5.15) that WebCT is mostly used for homepages and static file content (module homepage, static module content files and module framework). Only about half of the respondents indicate that they use WebCT to communicate with their students. The frequency and nature of this communication will be discussed further in section 5.5.3 below.

It is also evident that the requirement of a "minimum presence" (a module framework and a bulletin board) for all modules as defined by the e-Learning project[62] has also had an effect on the use of WebCT. Four out of five of the respondents indicate that they use WebCT to display their module framework and more than half (53%) indicate that they use the bulletin board tool within WebCT.

The server statistics of the type of file content (See Figure 5.17 below) on the WebCT server corroborate the results displayed in Table 5.15. The wedges are plotted according to the amount of traffic the different file types generate. Adobe Acrobat (.pdf), Powerpoint (.ppt) and Microsoft Word documents (.doc) – all static file content - represent most of the traffic generated.

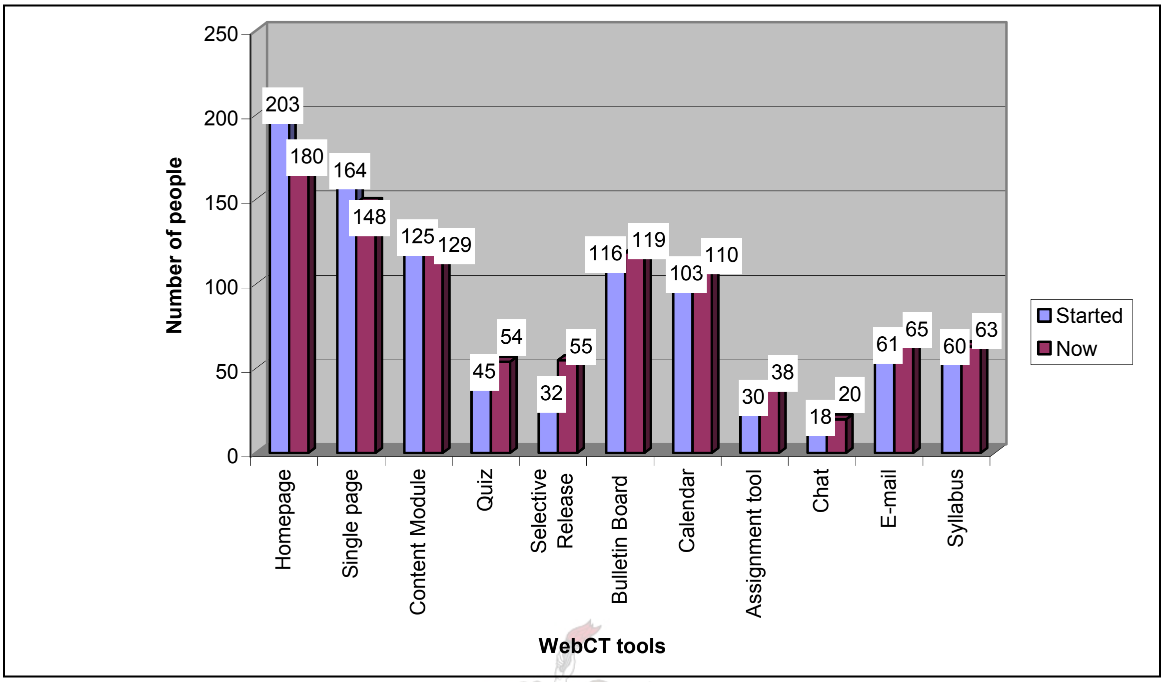
Figure 5.17: Type of Content on WebCT server



To ascertain whether there are changes in the type of usage of WebCT as lecturers become more comfortable with the tool and see more applications in their teaching and learning practice, respondents were asked to indicate what type of tools they used when they started using WebCT and the type of tools they now use. The results are displayed in Figure 5.18.

[62] Discussed in detail in Chapter 4.

Figure 5.18: Comparison of the changes in WebCT tool usage



Although Table 5.15 and Figure 5.17 show that the majority of the teaching and learning activities are content related, one can discern a move away from only static content (Started) to more interactive activities (Now) in Figure 5.18. This is reflected in the following trends:

- Lecturers indicate that they are using the *Single Page* tool (used for the display of static content pages) less
- There is a noticeable increase in the use of *Quizzes* and the *Selective Release* function

The Selective Release function allows the designer to select certain aspects of his/her module and to make it available based on a specific date and time or the performance of a specific student in a quiz within WebCT.

With regard to using WebCT for assessment, one quarter of the respondents are already using WebCT for tutorial tests (Table 5.15). We also notice that the quiz tool was not used initially by most WebCT users, but that they indicate that they now use it (Figure 5.18). It is technically one of the more difficult tools to use.

This University of Stellenbosch lecturers' use of mostly static content, with some electronic interaction and assessment, corresponds with the findings of studies done world wide (Collis and Van der Wende 2002) that were discussed in Chapter 3. As was also found in these studies, there is still a strong trend at the University of Stellenbosch to use WebCT mostly to make notes available to students. But again, as argued in Chapter 3, this should not be summarily dismissed as ineffective, but rather should be seen as the first (and sometimes necessary) step in the integration of ICTs into teaching and learning activities.

The value of content being accessible 24/7 should also not be underestimated. Both the lecturers and students comment on this in their open responses at the end of their respective surveys. One of the lecturers states the following:

> *WebCT het baie voordele. Onder meer is dinge wat op reserwe geplaas moet word vinniger op reserwe, en beskikbaar vir almal sonder dat materiaal verdwyn.*

But the same lecturer also believes that the fact that the content is now on WebCT encourages students to not attend class:

> *WebCT moedig egter studente aan om nie klas by te woon nie. Alles is tog op WebCT beskikbaar. Daarmee saam aanvaar studente toenemend dat alles vir hulle gegee en gedoen moet word.*

One might question the assumption that class attendance is affected because the content is on WebCT and no longer on reserve in the library. In both cases the students receive the content – the only difference is the mode of distribution. The issue of a drop in class attendance and "students expecting notes" as "a result of their use of WebCT" and, more specifically, the display of content on WebCT is quite sensitive and will be discussed in more detail in the following section.

Another lecturer highlights a more valid problem with the display of content on WebCT without any reflection on the redesign of the module.[63] He states:

> *WebCT makes it too easy for lecturers just to upload their notes in PPT or PDF – it does not really force people to change their sometimes old fashioned ways of teaching.*

This comment made about the unreflective use of technology again highlights the two major reasons why the "display of content on its own" phase of the adoption of ICTs in teaching and learning activities is problematic:

a) If technology is used unreflectively as a delivery tool to transport the classroom to the Internet, outmoded approaches to learning (teacher-centred information transfer, instruction paradigm, transmission model) are enforced. As a consequence, the real transformative opportunities offered by technology will not be utilised and lecturers will not become "reflective practitioners".
b) Just an add-on of technology without a redesign of the course can be worse than only face-to-face teaching and learning and could add costs without any additional benefits.

[63] This issue is also discussed in Chapter 4.

5.5.2 Updating of content/material

Lecturers had to indicate in the survey how often they update their module content on WebCT. Table 5.16 presents the results.

Table 5.16: How often does a lecturer/an assistant/a secretary update the module content on WebCT?

	Frequency	Percent	Valid Percent	Cumulative Percent
More than once a week	23	9.9	10.1	10.1
About once a week	66	28.4	29.1	39.2
A few times a month	53	22.8	23.3	62.6
Once a semester	32	13.8	14.1	76.7
Once a year	35	15.1	15.4	92.1
Never	4	1.7	1.8	93.8
Other	14	6.0	6.2	100.0
Total	227	97.8	100.0	
System	5	2.2		
	232	100.0		

Updating of WebCT modules is of the utmost importance for success. The lecturers' time investment does not stop with the development of the module, but a continuous process is needed to keep the module updated. If the lecturer does not do this, the students download the notes once and then never visit the WebCT module again. One of the lecturers relates his experience in this regard as follows:

> *Die skep van 'n WebCT module is uit my ervaring 'n tydrowende proses en stop geensins na die aanvanklike ontwikkeling daarvan nie. Sodra dit staties is verloor studente belangstelling. Die skep van 'n module moet waarde toe voeg tot bestaande materiaal en nie net klasnotas wees nie!*

This statement is backed up by quite a few comments by students, who complain that they become impatient with lecturers who do not update their modules regularly. For them, the frequency of updating as reflected in Table 5.16 is obviously not enough. It is of course dangerous to apply these remarks to all lecturers and, while admitting that it is probably not the case with all lecturers, one of the students remarks:

> *Die grootste probleem wat ek het is dat dosente baie traag is om te reageer op probleme wat ons dalk het, bv beloftes om inligting op WebCT te sit en dan 2 weke daarvoor te wag. Dit hang seker af van dosent tot dosent.*

This impatience of some students in turn leads to resentment in some of the lecturers, who view the students' insistence on new content and the updating of content as a way to avoid going to the library or to attend class. One of the lecturers expresses his resentment in the following way:

> *I don't like the way students increasingly expect lecture notes, overheads, and readings to be available on WebCT. They seem to use it as an alternative to going to the library and/or attending lectures.*

This sentiment is echoed by quite a few lecturers and is often used as a reason for not using WebCT at all. The argument could, however, be made that if the meeting time is only used to convey content that could be placed on WebCT, why should students come to class if it is only to obtain the content that can be made available on WebCT?

To solve the issue of a decline in class attendance as a hypothetical result of the use of WebCT, one of the students suggests that WebCT should be used to add value to teaching and learning activities and that it should be integrated into the class activities. She argues that the material on WebCT should not only be a repetition of what happens in class. If WebCT is used in this way, according to the student, WebCT will not be used as an alternative to class attendance:

> *Persoonlik voel ek as 'n dosent sy/haar kursus 'n WebCT komponent wil gee, MOET die komponent aansluit by die klasse en nie net 'n herhaling wees van wat in die klas gesê word nie. Dit help net "bunkers", nie studente wat getrou klas bywoon nie.*

It is ultimately the lecturer's responsibility whether WebCT as a tool is used well or not. One of the students rightly asserts:

> *My module content largely depends on how the LECTURER chooses to use it. If he/she doesn't place certain content on WebCT or does not present the content properly the whole WebCT concept will not function as expected. For example one lecturer would use WebCT to put up everything I need, where another would only partially use it or have a disorganised website for the module where content is hard to find. This might lead to a negative feeling towards WebCT, when it's actually the lecturer's methods.*

However, it is not only important to establish how often the module is updated, but also to ascertain who updates the module content. As outlined in Chapter 4, the University of Stellenbosch follows a "teach 'em to fish" model, in terms of which a lecturer is expected to take responsibility for the design and development of his/her online component. It does not mean that they have to do everything themselves, but it does presuppose that they take an active part in updating of content and communicating with the students.

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It is encouraging to note that the lecturers mostly take responsibility for the updating (albeit not that frequently) of their module content (Table 5.17). One of the lecturers suggested that the updating of WebCT modules should become part of the routine of every lecturer. This, according to him, can be achieved if the lecturers' buy-in to taking part in the development and updating of the module is obtained. The lecturer writes:

Table 5.17: Who mostly updates the module content on WebCT?

	Frequency	Percent	Valid Percent
A lecturer	167	72.0	73.6
An assistant	32	13.8	14.1
A secretary	20	8.6	8.8
Other	8	3.4	3.5
Total	227	97.8	100.0
System	5	2.2	
	232	100.0	

> *Dosente moet persoonlik inkoop op die idee en verkieslik self die samestelling en opdatering van 'n module doen, dit moet deel word van jou roetine.*

5.5.3 Frequency and type/nature of communication

Two of the seven principles of good practice outlined by Chickering and Gamson (1987) refer directly to the importance of regular communication between the lecturer and students, as well as between the students themselves. [64] Electronic communication is also part of the minimum presence requirement defined in the e-Learning project.[65] It would, however, be possible to have a bulletin board on WebCT, but never use it. To determine whether this is the case, lecturers were asked how often they or their assistants or secretaries communicate electronically with their students.

Table 5.18: How often does a lecturer/an assistant/a secretary communicate electronically (e-mail, bulletin board) with the students?

	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	23	9.9	11.1	11.1
About once a month	59	25.4	28.4	39.4
A few times a month	46	19.8	22.1	61.5
Once a semester	13	5.6	6.3	67.8
Once a year	3	1.3	1.4	69.2
Never	50	21.6	24.0	93.3
Other	14	6.0	6.7	100.0
Total	208	89.7	100.0	
System	24	10.3		
	232	100.0		

[64] These seven principles are discussed in more detail in Chapter 3.
[65] The e-Learning project is discussed in Chapter 4.

It is apparent from Table 5.18 that, according to the lecturers, electronic communication does not take place on a regular base with one out of four of the respondents reporting that they never communicate electronically with their students.

Students, on the other hand, consider electronic communication to be a very important part of their interaction with lecturers. One of the students asserts that WebCT can only be a success if lecturers answer students' questions regularly on the bulletin board:

> *WebCT is net 'n sukses indien alle dosente met modules op WebCT wel deeglik gebruik maak daarvan, spesifiek studente se vrae op discussionborde.*

Another student also expressed his frustration at the lack of reaction from lecturers on the bulletin board:

> *Sommige dosente antwoord nie op bulletin board nie en dis 'n reuse frustrasie. Hulle moet dit of volledig gebruik of glad nie, dis aaklig as jy 'n vraag "post" en nooit geantwoord word nie. Die forums is een van die grootste voordele van WebCT. Dit is net frustrerend as studente (ek let dit gereeld op) vrae stel en die dosente vat 'n week om dit te beantwoord.*

A further aspect of the electronic communication between students and lecturers and between students amongst each other relates to the nature of their interaction. Is it purely social interaction or only in response to administrative issues? Or is an electronic conversation space created where students can engage in academic exchanges? To answer these questions, lecturers were asked to rate the frequency of different types of electronic communication on WebCT. The results are displayed in Table 5.19.

Table 5.19: Rate the frequency of the following types of electronic communication according to the number of postings on the bulletin board within WebCT

	Daily or about once a week		A few times a month		Once a semester or less		Never		Total
	Count	%	Count	%	Count	%	Count	%	Count
Q's[66] about content	18	11.9	47	31.1	20	13.2	66	43.7	151
Q's about assignments	25	16.4	44	28.8	18	11.8	66	43.1	153
Q's about admin issues	38	24.1	45	28.5	20	12.6	55	34.8	158
Q's about exam/test issues	21	13.6	41	26.5	38	24.5	55	35.5	155
Queries about technical difficulties	8	5.5	29	20.0	21	14.5	87	60.0	145
Challenging problems posted by lecturer	13	9	22	15.3	25	17.4	84	58.3	144
Social interaction	19	12.9	19	12.9	15	10.2	94	63.9	147

[66] Questions

If one reads Tables 5.18 and 5.19 together, it becomes quite clear that the bulletin board is not used to its full potential. If it is used at all (Table 5.18), it is mostly used for questions about administrative issues and content (Table 5.19). Only a very small number of the respondents (15%) indicate that they use it to post challenging problems a few times a month.

Again, it is students who stress the value of the bulletin board to inform them of important issues, as well as to get feedback from lecturers. The comment from the student below also indicates the disappointment experienced by this particular student because the lecturer does not use it effectively:

> *Dit sal help as dosente meer gebruik maak van WebCT. Dis 'n baie maklike manier om ons in kennis te stel van 'n verskeidenheid van dinge, maar tog doen hulle dit nie. Of hulle kyk nooit na die boodskappe op die bulletin board nie, selfs die wat aan hulle gerig is, en geen terugvoer word dus verkry nie. Die idee is dus fantasties en meeste studente maak alreeds gebruik daarvan, maar die dosente lyk nie of hulle veel belangstelling toon nie.*

The students also make useful suggestions with regard to the responsibility of the lecture to guide the conversations on the bulletin board:

> *WebCT is a very good and usable way of learning. It allows interaction and exchange of ideas among the follow students. So, keep it up! However, I experienced that some lecturers leave the discussion on WebCT to students only and as a result, students raise some irrelevant issues. So, the roles of the lecturers are still important. And I think, WebCT is only effective if the modules are structured and the lecturers are participating effectively by posting feedbacks and leading topics/questions for discussions through out the semester and they need to keep the outlines of the module in order.*

The need for the lecturer to take an active role in electronic communication is a recurring theme in the students' comments, as reflected in the example below:

> *'n Dosent kan 'n 'perfekte' WebCT ruimte hê, maar as dit nie daagliks aktief benut word nie, en as die nodige leierskap dus nie geneem word om dit te laat werk nie (bv. om met entoesiasme inhoude of gesprekke met studente te deel nie), is die sukses wat mens daarmee het en gepaardgaande persepsies daaroor, direk eweredig aan jou insette.*

<u>In summarising</u> this section on the patterns of WebCT usage, the following salient points emerge:

- WebCT is mostly used for content distribution, although there seems to be a move towards more interaction.
- The content material is not updated as regularly as students would like it to be.

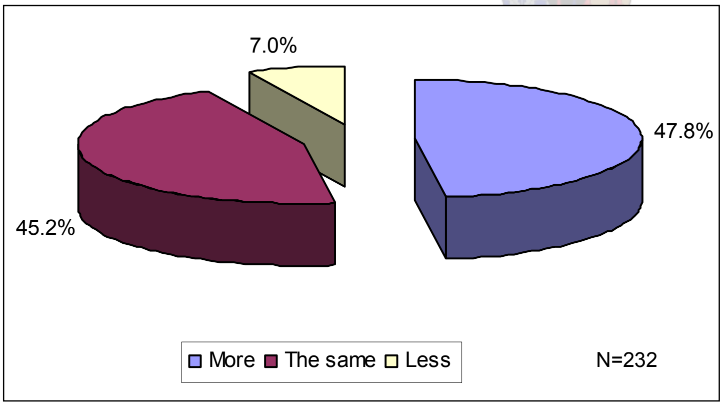
- Lecturers feel that an increased use of WebCT will lead to a drop in class attendance because there is no real integration between the content presented online and the in-class activities.
- Although many lecturers use the WebCT bulletin board tool, it is not used to its full potential with regard to frequency of postings and types of postings.
- The students would like to see more frequent updating of content and more effective use of the bulletin board.

5.6 SATISFACTION WITH WEBCT AS TOOL

The perceptions of the major advantages and disadvantages of the use of WebCT as tool are discussed in this section. Factor analyses were performed on the value statements relating to the advantages and disadvantages of WebCT. The results of the factor analysis of the disadvantages are reported and cross-tabulated with the demographic data.

5.6.1 Major advantages of WebCT as tool

Figure 5.19: Compared to when you started using WebCT, would you say your current usage of WebCT is:



A definite indicator of whether lecturers are satisfied with WebCT as tool is whether they use it more, the same or less than when they started (Figure 5.19).

About half of the WebCT users use WebCT more than when they started, with only 16 users (7%) indicating that they use it less.

Respondents were furthermore asked to rate their level of agreement with seven value statements pertaining to possible WebCT advantages (Table 5.20).

Table 5.20: What do you think are the major advantages of using WebCT? Please rate the extent to which you agree with these statements

	Agree or Strongly agree		Neutral		Disagree or Strongly disagree		Total
	Count	%	Count	%	Count	%	Count
Provides organisational framework for module materials	158	73.8%	37	17.3%	19	8.9%	214
Provides useful communication tools	149	70.6%	47	22.3%	15	7.1%	211
Provides useful tools for students	135	64.0%	67	31.8%	9	4.3%	211
Provides module security	117	56.3%	69	33.2%	22	10.6%	208
Discussion area (BB) allows me to answer stud. questions more efficiently	88	47.1%	73	39.0%	26	13.9%	187
Provides convenient online testing environment	73	41.0%	83	46.6%	22	12.4%	178
Provides convenient gradebook	67	37.0%	95	52.5%	19	10.5%	181

These statistics on what WebCT users consider to be the major advantages validate the trend that WebCT is mainly used for the organisation of content discussed in the previous section, with the majority of respondents (74%) agreeing or strongly agreeing with the statement that WebCT provides an organisational framework for module content. Although it became clear in the previous section that the bulletin board is not used to its fullest potential in teaching and learning activities, 71% of the respondents nevertheless agreed or strongly agreed with the statement that WebCT provides useful communication tools. This trend at the University of Stellenbosch corresponds with the first of the four waves in the development of the use of learning management systems described by Judith V Boettcher (2003). This first wave, according to Boettcher, is when a learning management system (such as WebCT) is used to organise the elements of a course and to communicate with students.[67]

A further advantage of the use of WebCT that is related to the organisation of module material within WebCT is the notion that WebCT provides a uniform interface for modules. Although one advanced user commented that this user interface is "primitive", he still sees the value of the uniformity of layout. He states:

> *The minor disadvantage of a rather primitive user interface saves me the hassle of maintaining my own web-page, and helps the students to have a similar layout for all courses.*

The seven "Advantages of WebCT" value statements were subjected to a factor analysis in order to identify the underlying dimensions or components. A principal component analysis was performed, with a varimax rotation. The latent root criterion (eigen values greater than 1) was

[67] These four waves are discussed in more detail in Chapter 3.

specified, which resulted in only one component being extracted. This result shows that the set of items are highly intercorrelated.

5.6.2 Major disadvantages of WebCT as tool

The WebCT users were also asked what they considered to be WebCT's major disadvantages and indicate the extent of agreement with the eight disadvantage value statements provided.

Table 5.21: What do you think are the major disadvantages of using WebCT? Please rate the extent to which you agree with these statements

	Agree or Strongly agree		Neutral		Disagree or Strongly disagree		Total
	Count	%	Count	%	Count	%	Count
WebCT is too time consuming to use	82	38.3%	51	23.8%	81	37.9%	214
WebCT is not user-friendly enough	56	26.0%	64	29.8%	95	44.2%	215
WebCT is unsuited for learning outcomes of specific module	48	23.0%	66	31.6%	95	45.5%	209
WebCT is too inflexible	44	20.9%	97	46.0%	70	33.2%	211
Students do not like WebCT	35	17.2%	74	36.5%	94	46.3%	203
WebCT is too limited in functionality	36	17.1%	87	41.2%	88	41.7%	211
WebCT is too structured	27	12.8%	93	44.1%	91	43.1%	211
WebCT gets in the way of good teaching & learning practice	23	11.0%	56	26.7%	131	62.4%	210

The lecturers generally seem to perceive few disadvantages in the use of WebCT, with the majority of the respondents disagreeing or strongly disagreeing with the disadvantages listed in the value statements. The only exception is the time issue, with which 38% of the respondents agree or strongly agree. The issue of limited time will be discussed in more detail in section 5.9, Barriers and challenges.

Although not specifically included as one of the value statements, the lack of integration and convergence between technology systems (specifically communication and document management) on campus was identified as one of the constraints on the use of WebCT and ICTs in general in the open response. One of the lecturers contends:

> *Die feit dat WebCT nie met MS Outlook kan praat nie is 'n groot beperking. Ek bedryf gemiddeld 4-5 kursusse gelyktydig. Ek kan nie altyd spesiaal WebCT se e-pos en bulletinborde monitor vir e-pos nie. Dit behoort gekanaliseer te word na Outlook toe. Ek verkies ook dat Word formaat dokumente netso gebruik moet kan word vir kursusuiteensettings, soos Powerpoint gebruik kan word. Konvergensie en integrasie is dus nodig. Voor dit nie gebeur nie, voorsien ek nie dat die gebruik van WebCT dramaties*

> *sal toeneem onder dosente nie. Ek gebruik dit tans teensinnig omdat die bedryf daarvan te veel ekstra tyd in beslag neem, al het dit 'n goeie potensiaal vir studente.*

This call for more convergence and integration corresponds with the third wave in the use of learning management systems identified by Boettcher (2003), when the focus is no longer only on the learning management system, but also on how these systems integrate with existing campus infrastructure. Betty Collis and Marijk van der Wende (2002) found in their survey, *"An international comparative survey on the current and future use of ICT in Higher Education",* that institutions world wide are now looking to integrate their various information and management systems in order to support more flexibility in the future. The e-Campus initiative at the University of Stellenbosch, described in Chapter 4 is the University's attempt to integrate all the systems on campus.

The importance of the reusability of content also emerges in the open responses with regard to WebCT's disadvantages. Boettcher (2003) identifies re-usability of content as one of the elements in the fourth wave of learning management system development. One of the lecturers complains that he is unable to use some of his files on WebCT because WebCT is "capital sensitive":

> *Die enigste probleme wat ek ondervind het met materiaal op WebCT beskikbaar maak is dat van die HTML-materiaal wat ek reeds lankal ontwikkel het (en voorheen op CD aan studente beskikbaar gemaak het) NIE effektief op WebCT werk nie (skakels is onaktief) omdat WebCT wat HTML-dokumente betref STRENG "Capital-sensitive" is, terwyl gewone Browsers soos IE en netscape GLAD NIE "cap-sensitive" is nie.*

As discussed in Chapter 3, technical interoperability is crucial for the transformation of teaching and learning. Lecturers have to be able to move their material from one system to another with limited effort. The type of technical issue mentioned by this lecturer needs to be addressed by the developers of learning management systems for the systems to have the maximum impact on campus.

5.6.3 Factor Analysis: WebCT disadvantages

To identify the underlying dimensions or components, the eight value statements pertaining to the disadvantages were subjected to a factor analysis. I performed a principal component analysis with a varimax rotation. The latent root criterion (eigen values greater than 1) was specified as stopping criterion, resulting in two factors being extracted, explaining about 64% of the variance in the statement responses. The results of the factor analysis are summarised in Table 5.22.

Table 5.22: Results of the factor analysis of the disadvantages

Statement	2 Factors	
	F1	F2
WebCT is not user-friendly enough	.866	.181
WebCT is too inflexible	.826	.150
WebCT is too structured	.738	.367
WebCT is too limited in functionality	.674	.518
WebCT gets in the way of good teaching and learning practice	.146	.801
WebCT is unsuited for learning outcomes of specific module	.218	.773
WebCT is too time consuming to use	.248	.694
Students do not like WebCT	.240	.600
Total variance explained	**64%**	

I assigned the following labels to the factors after inspecting the pattern of loading and as the statement content:

- Factor 1: Structural weaknesses of WebCT as tool
- Factor 2: Suitability of WebCT for teaching and learning purposes

I used the factor scores calculated for each respondent according to the regression method in a series of comparison procedures (t-test and one-way ANOVAs).

Table 5.23: Cross-tabulation between factor scores and sex, age and faculty

Comparison		N	Mean	Std Dev	Statistics
Sex					
Structural weaknesses of WebCT as tool	Male	130	55.58	20.856	t = -.897
	Female	72	58.25	19.137	p = .371
Suitability of WebCT for teaching and learning purposes	Male	126	57.89	19.735	t = -.516
	Female	70	59.38	18.606	p = .606
Age					
Structural weaknesses of WebCT as tool	40 yrs and younger	78	57.69	20.444	F = .606
	Between 41 and 50 yrs	63	57.64	19.098	p = .547
	51 yrs and older	59	54.24	20.711	Eta squared = .006
Suitability of WebCT for teaching and learning purposes	40 yrs and younger	77	59.50	19.439	F = .319
	Between 41 and 50 yrs	57	57.79	17.807	p = .727
	51 yrs and older	60	56.88	21.302	Eta squared = .003
Faculty					
Structural weaknesses of WebCT as tool	Human & Social Sciences	66	54.36	18.572	F = .763
	Natural Sciences & Engineering	65	58.46	18.894	p = .516
	Economic & Business Sciences	29	57.76	23.365	Eta squared = .012
	Health Sciences	35	53.21	22.554	
Suitability of WebCT for teaching and learning purposes	Human & Social Sciences	65	55.96	19.214	F = .290
	Natural Sciences & Engineering	60	57.50	18.151	p = .832
	Economic & Business Sciences	29	58.62	21.742	Eta squared = .005
	Health Sciences	35	59.46	19.375	

Table 5.23 clearly shows that no significant statistical differences exist between the factor scores with regard to sex, age and faculty. This, together with the fact that all the mean scores are above 50%, indicating disagreement with the possible disadvantages pertaining to structural and suitability concerns, signifies widespread agreement amongst staff on the value of WebCT.

To summarise the common trends with regard to the general satisfaction of lecturers with WebCT as a tool, it can be said that:

- There is a general level of satisfaction amongst lecturers with regard to WebCT as a tool, as well as with regard to its suitability for teaching and learning purposes.
- This general satisfaction is supported by the fact that the respondents mostly agree or strongly agree with WebCT's possible advantages and mostly disagree or strongly disagree with WebCT's possible disadvantages.
- The factor analysis of the disadvantages further supports the claim that most of the users are satisfied with the structure of WebCT as tool, as well as with its suitability for teaching and learning purposes.
- There are no significant statistical differences between the factor scores for the disadvantages with regard to sex, age and faculty, which signifies widespread agreement amongst academic staff on the value of WebCT.

5.7 TRAINING AND SUPPORT PATTERNS

As discussed in Chapter 4, the University of Stellenbosch uses a "teach 'em to fish" model, in terms of which workshops and training opportunities are of the utmost importance to ensure that lecturers are able to do the development and maintenance of their e-Learning activities themselves. It is therefore first of all important to determine:

- What type of workshops lecturers are attending,
- How many workshops lecturers are attending,
- If they do not attend workshops, how do they get started with using ICTs in teaching and learning activities, and
- What type of training and support they prefer.

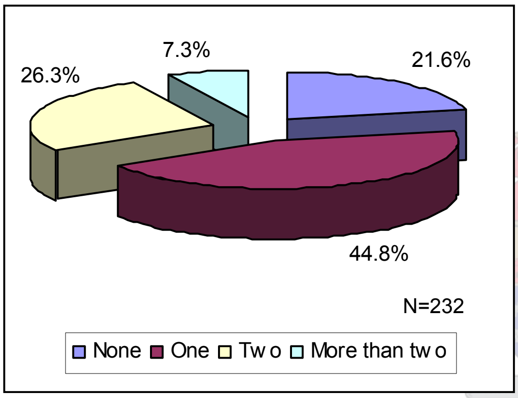
It is also important to establish whether the lecturers feel that they can do the development and updating of their modules themselves. I will also look at whether there is cross-tabulation between these two issues, i.e. whether the number of workshops attended has a positive effect on the lecturers' perceptions of whether they are able to do the development of their modules themselves.

5.7.1 Workshops attended/getting started

Uni-Ed offers three WebCT workshops:

- WebCT basic (homepage, content, bulletin board, limited course management)
- WebCT advanced (More advanced content, Quizzes, Course Management)
- Creating Dreamweaver pages for WebCT (since the beginning of 2003)

Figure 5.20: Number of WebCT workshops attended



Looking at Figure 5.20 and Tables 5.24, 5.25 and 5.26 together, the following aspects emerge clearly:

- 45% of the respondents indicated that they have attended one WebCT workshop (Figure 5.20), with 73% of the respondents indicating that they have attended a WebCT basic workshop (Table 5.24). The WebCT basic workshop is a very popular two-hour workshop that serves as an introduction to all the basic functions of WebCT. During the workshop, a conscious effort is made to share best practice using WebCT examples created by other academics.
- Despite the fact that online training is becoming a worldwide trend, nine out of ten respondents rated face-to-face training and support as very important or important (Table 5.25).
- Peer influence in training and support should not be underestimated, as 14.7% of the respondents indicated that one of their colleagues had helped them to get started with WebCT (Table 5.26).

Table 5.24: Types of workshops attended

	No		Yes		Total
	Count	%	Count	%	Count
Basic	170	73.3%	62	26.7%	232
Advanced	43	18.5%	189	81.5%	232
Dreamweaver	8	3.4%	224	96.6%	232

Table 5.25: Type of training and support preferred

	Very important or Important		Not important or Not important at all		Total
	Count	%	Count	%	Count
Face-to-face	193	88.5%	25	11.5%	218
E-mail	164	78.8%	44	21.2%	208
Online	142	70.0%	61	30.0%	203
Telephone	139	65.9%	72	34.1%	211

Table 5.26: If not attended training, how did you get started

	Yes		No		Total
	Count	%	Count	%	Count
One of my colleagues helped me to get started	34	14.7%	198	85.3%	232
I taught myself	27	11.6%	205	88.4%	232
One of the Uni-Ed personnel helped me to get started	19	8.2%	213	91.8%	232

Despite the good attendance of the workshops and the general level of satisfaction with the training and support, time to attend these workshops remains an issue. The general feeling that lecturers could benefit from more one-on-one assistance in his/her office to implement ideas in the online environment is reflected in one of the lecturers' comments. She writes:

> *Ek is ongelukkig nie goed genoeg toegerus vir al die moontlikhede wat IKTs bied nie --- nie tyd (of lus) om ure-lange workshops by te woon nie. Ek het vreeslik baie goeie idees waarby studente sal baat --- dit sal wonderlik wees as iemand saam met my kan werk en hierdie idees tot praktiese uitvoering te bring.*

Whereas it is of course the ideal to have a dedicated person training and working on a one-on-one basis with a lecturer, it is unfortunately not an option for the University in terms of cost.

Another lecturer expressed a more realistic request for continuing assistance within the academic environment as an extension of the face-to-face workshops and training:

> *For me finance is not a motivation at all; I am glad to learn something that empowers me but I need to have access or availability in a form that fits in with the available fragments of time and with the way I learn best. For me I think that this would involve a combination of regular beginner-type (basic steps) contact sessions/workshops so that I could go*

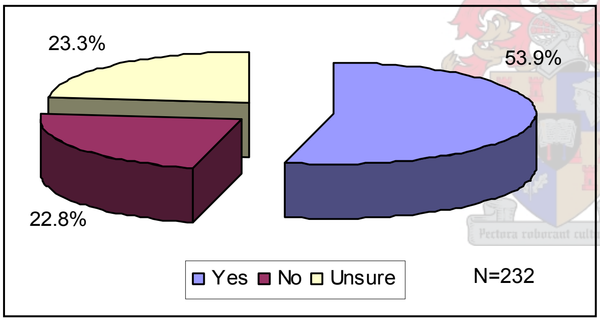
away and try something out; then go back and retrace my footsteps if I wasn't sure ... PLUS some sort of ongoing service available in my nearby environment (e.g. a person in our faculty) to whom I could turn frequently for help, by way of demonstration or advice. One of the ways I also learn best is by following a well explained example or model. I like a face-to-face setting for part of the process because I feel that I can express my own questions then. This is not always possible in an on-line situation.

Although a conscious effort is made in all WebCT workshops to combine pedagogical and technical issues, one of the lecturers specifically asked for more pedagogical workshops:

Die US moet die dosente ook opleiding in pedagogiese aspekte gee, en nie net die IKTs ontplooi en dosente dit laat gebruik nie. Bv. watter ander leerstyle kan ek oorweeg as ek 'n module ontwerp vir WebCT? Of moet dosente self hierdie goed bestudeer?

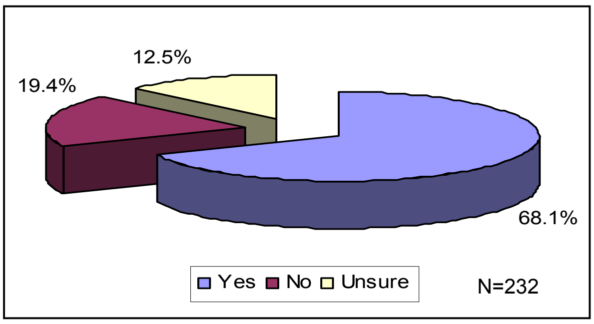
5.7.2 Able to do development and updating

Figure 5.21: Do you feel you are able to do the WebCT development of your modules yourself?



Lecturers were asked whether they feel that they are able to do the development and updating of their modules themselves. It becomes clear when looking at Figures 5.21 and 5.22 that the lecturers feel relatively confident to do this themselves. It is to be expected that they feel more at ease with the updating (68%) than with the development (54%). The initial development of a WebCT module requires conceptual and technical skills that are more extensive than merely updating the WebCT module on a continuous basis.

Figure 5.22: Do you you feel you are able to do the updating of your WebCT module?



Although the lecturers report that they feel relatively confident to do the development and updating of their material on WebCT, some of the students feel that the lecturers are not fully equipped to use WebCT effectively. Various comments from students in the open response section of their questionnaire (discussed in more detail in Chapter 6) include requests for more training for lecturers in the use of WebCT so that the lecturers can use it more effectively. Three examples of these responses that also include requests for more frequent updating of modules are given below:

> *Teach the lectures how to use WebCT properly. The infrastructure is all there but we are missing out because they are not always confident in using it. If you want students to buy into using WebCT then it starts with lectures buying into it, the students will follow.*

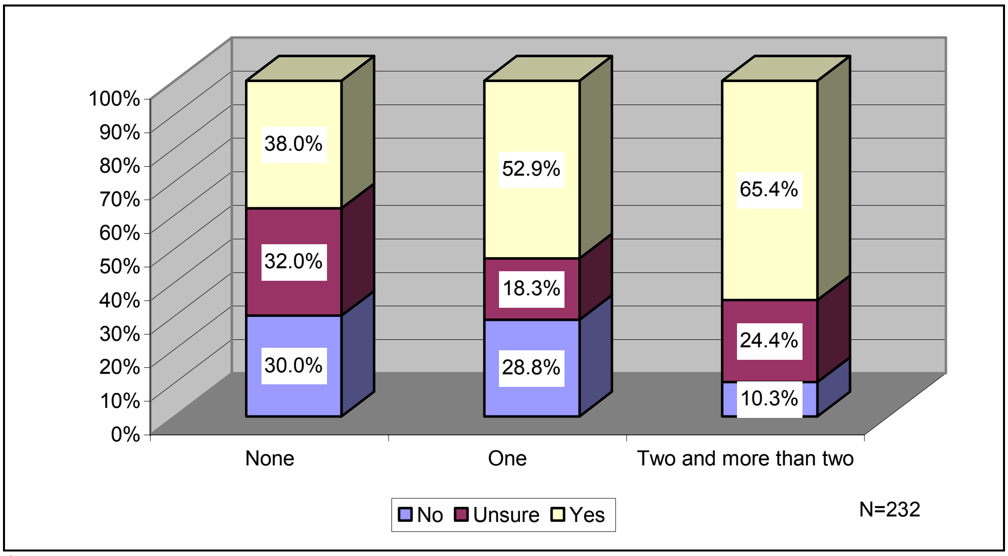
> *Die dosente is ook nie altyd op hoogte van hoe om WebCT te gebruik nie, en dus is daar niks aktiwiteit op die program nie. Verder is hulle meer geneig om maar notas op borde ens. te los eerder as op WebCT. Ek dink dit kan baie effektief gebruik word as almal die nodige opleiding kry en eenvoudig gedwing word om dit te gebruik.*

> *Sou dit graag verkies dat sommige personeel opleiding kry met die gebruik van WebCT, sommige van my modules is in WebCT maar het nog nie verander vanaf die begin van die jaar af nie, myns insiens, waarskynlik dat sommige personeel nie weet hoe om dit te gebruik nie*

5.7.3 Correlation between WebCT workshops and development

It is apparent from the three comments above that these students believe that the updating of modules is linked to the amount of training received by the lecturers. To test this assumption, a correlation was done between the number of workshops attended by the lecturers and whether they feel they are able to do the WebCT development themselves. The results of this correlation are displayed in Figure 5.23.

Figure 5.23: Cross-tabulation between the number of WebCT workshops attended and "Do you feel you are able to do the WebCT development yourself"



Chi-square = 15.240 p = .004

It can be inferred from Figure 5.23 that the number of workshops attended is strongly correlated with the confidence level of the lecturers. The percentage of respondents indicating "Yes" to the question whether they feel they are able to do the WebCT development themselves increases from 38% (no workshop attended) to 53% (one workshop attended) to 65% (two and more than two workshops attended).

To summarise:

- The lecturers seem to be quite satisfied with the training and support offered.
- The lecturers prefer face-to-face workshops, with requests for continued assistance in their specific departments/faculties.
- The majority of the lecturers feel confident that they are able to do the development and updating of their modules themselves.
- Their appears to be a positive cross-tabulation between the number of workshops a lecturer has attended and his/her perception of how able he/she is to do WebCT development him/herself.

5.8 AWARENESS OF POSSIBLE BENEFITS OF THE INTEGRATION OF ICTS

The fact that lecturers are using WebCT and attending training workshops, as discussed in the previous sections, does not imply that the lecturers are aware of the possible benefits of the integration of ICTs into teaching and learning activities and that they are integrating ICTs in such a way that they add value to teaching and learning activities. In this section I will first consider which teaching and learning activities motivate lecturers to use WebCT. Second, I focus on whether the lecturers feel that anything has changed in their teaching and learning practice with regard to contact and active engagement and whether they are aware of the possibilities offered with regard to increased interactivity and the accommodation of diverse learning styles and levels of preparation. The ultimate test of whether ICTs are effectively integrated into a module is whether the complete module has been redesigned. This is quite a comprehensive and potentially time-consuming process and, as will become clear in the second part of this section, not many lecturers engage in this process. What does become clear, however, is that, although this module redesign process is not taking place on a large scale, there is a definite awareness that the roles of the lecturer and student are changing. This change and the lecturers' response to it are discussed in the final part of this section.

5.8.1 Good teaching and learning practice as motivator

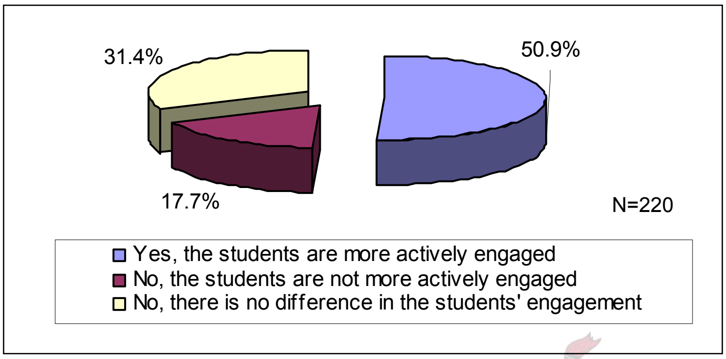
Table 5.27: Which teaching and learning activities motivate you to use WebCT in your teaching?

	Very applicable or Applicable		Not applicable or Not applicable at all		Total
	Count	%	Count	%	Count
Post lecture material online	185	83.3%	37	16.7%	222
Post additional material to challenge students	155	70.1%	66	29.9%	221
Encourage active learning	153	69.2%	68	30.8%	221
Increase contact with students	140	64.5%	77	35.5%	217
Provide more prompt feedback to students	136	62.1%	83	37.9%	219
Accommodate various student learning styles and preferences	129	59.4%	88	40.6%	217
Increase student-student contact and cooperation	110	51.4%	104	48.6%	214
Provide self-assessment opportunities	90	41.9%	125	58.1%	215
Emphasise time on task	78	36.1%	138	63.9%	216

Table 5.27 once again confirms that WebCT is mostly used for posting content, with the majority of the respondents (83%) indicating that the statement on posting lecture material online is very applicable or applicable with regard to their use of WebCT. As argued previously, posting content

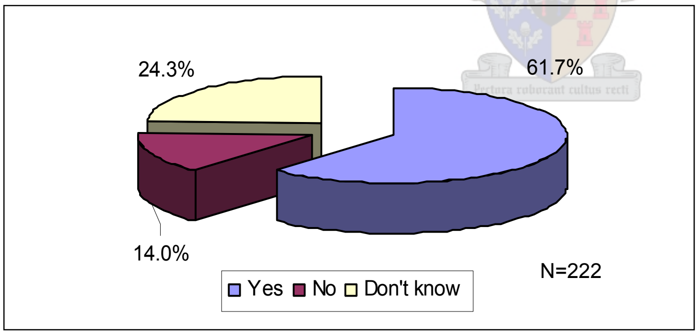
(also reflected in the 70% indicating that posting additional material to challenge students is very applicable or applicable to their use of WebCT) should not be disregarded as meaningless without further consideration of how it could add value to the teaching and learning situation. Furthermore, it is clear from Table 5.27 that "Encourage active learning" and "Increase contact with students" also score very high.

Figure 5.24: Do you think your students are more actively engaged with your module material as a result of you posting it online?



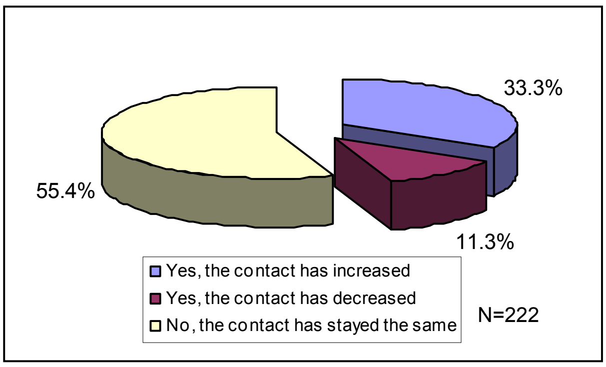
It becomes evident, when looking at Figures 5.24 and 5.25, that the majority of the respondents (51%) believe that the students are more actively engaged with the module material as a result of it being online, while 62% of the respondents believe that WebCT has the potential to include more interactive activities in their class and/or class materials.

Figure 5.25: Do you think WebCT has the potential to include interactive activities in your class/class materials?



Whereas quite a large number of respondents (65% in Table 5.27) indicate that the statement "To increase contact with your students" is very applicable or applicable in their use of WebCT, it is not supported by their perception of whether their contact with their students increased, as reflected in Figure 5.26.

Figure 5.26: Do you think the use of WebCT has had an effect on the amount of contact you have with your students?



The results displayed in Figure 5.26 further support the claim made in section 5.5.3, that the communication features of WebCT, and more specifically those of the bulletin board, are not used to their full potential, with only one third of the respondents indicating that the contact has increased.

I further specified WebCT's potential to accommodate more diverse learning styles/levels of preparation (Table 5.27) by listing its possible components. Lecturers were asked to rate the level of potential of each of the individual components. The results are shown in Table 5.28.

Table 5.28: Do you think WebCT has the potential to provide a way for you to accommodate more diverse learning styles/levels of preparation of your students with regard to the following statements?

	Strong potential		Some potential		No potential at all		Total
	Count	%	Count	%	Count	%	Count
Students can review additional/remedial material if necessary	139	64.1%	60	27.6%	18	8.3%	217
Students have access to more advanced content	136	63.6%	61	28.5%	17	7.9%	214
Variety of format of module material	131	60.4%	74	34.1%	12	5.5%	217
Students work at own pace	112	51.9%	74	34.3%	30	13.9%	216

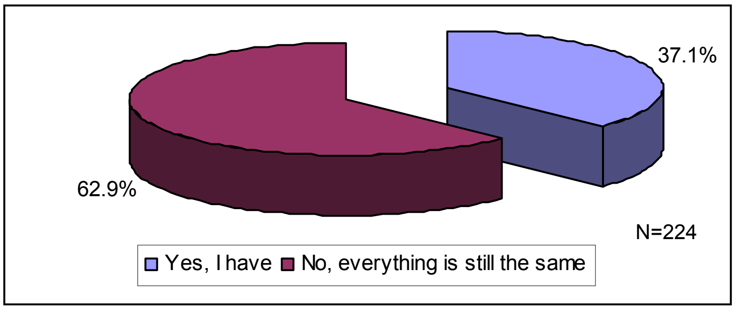
Table 5.28 shows that there seems to be general agreement that WebCT has the potential to accommodate various learning styles with regard to the individual components listed.

Whereas it has become clear in this discussion of Tables 5.27 and 5.28 and Figures 5.24 to 5.26 that there is general awareness of the potential of ICTs, one lecturer still questioned the value added through the integration on ICTs. He asks for a clearer policy with regard to the relationship between "traditional learning" and the "new model":

> *Gebrek aan 'n duidelike beleid tov die relasie tussen die tradisonele wyse van leer en die nuwe model. Wat is die winste daarvan, wat is die pedagogiek/didaktiek onderliggend daaraan? Dosente kan nie hiermee voorgaan as daar nie duidelike antwoorde/riglyne is nie. Kortom, ek is tans nie oortuig van die voordeel hiervan nie. Hieroor dink ek almal het lig nodig.*

5.8.2 Redesign of module/programme

Figure 5.27: Have you redesigned your module/programme as a result of your use of WebCT?



Despite the general awareness of the potential value added by the integration of ICTs, only about a third (37% in Figure 5.27) of the lecturers have redesigned their modules and programmes. I have argued before that, for the integration of ICTs to really add value to teaching and learning activities, ICTs should not only be used as an add-on, but attention should be paid to the redesign of the entire module/programme to ensure effective integration thereof.

In a follow-up question, the lecturers were asked what they did change if they had changed anything.

Table 5.29: If you have changed anything what did you change?

	No		Yes		Total
	Count	%	Count	%	Count
Changes in content/Additional (reference) material	215	92.7%	17	7.3%	232
Better structure and logic	221	95.3%	11	4.7%	232
(Formal) Assessment/self-eval exercises	222	95.7%	10	4.3%	232
Change in contact time/tutorials/more discussion	222	95.7%	10	4.3%	232
New curriculum/overall change	223	96.1%	9	3.9%	232
Multimedia/Visual presentations/Powerpoint	225	97.0%	7	3.0%	232
Planning & handing in of assignments	227	97.8%	5	2.2%	232
Better goals outcomes	228	98.3%	4	1.7%	232
Improved access	230	99.1%	2	.9%	232
Self study focus shift	230	99.1%	2	.9%	232

Again, changes in content is the most dominant element changed.

5.8.3 Role of lecturer/student: change

The potential problems relating to not redesigning modules or programmes, but just using ICTs as an add-on, become evident in the open responses of the lecturers. The most dominant problem that emerges in the University of Stellenbosch context is the fear that class attendance will drop if the lecturers use WebCT. The second issue is that although the lecturers recognise the potential benefits of ICTs, they feel very strongly that the use of ICTs cannot replace their face-to-face contact with students. Lastly, some of the lecturers feel that the use of ICTs is more applicable in a distance university setting and not as applicable in a residential university setting.

The first issue, the perceived drop in class attendance, highlights one of the potential problems of directly transporting in-class activities to the online environment and not changing the overall design of the module or programme. If the students are able to access all the material on WebCT, and if this material is merely repeated in the contact session, they might not see the need to attend class. One of the lecturers remarks:

> *Die gevaar bestaan dat sommige studente slegs op WebCT begin staatmaak indien die omvang van kursusmateriaal op WebCT baie omvattend is. Hierdie is steeds 'n residensiele universiteit en klasbywoning is veronderstel om deel te wees van modulevereistes. Die gevaar bestaan ook dat studente al hoe minder self lees indien die omvang van kursusmateriaal op WebCT baie omvattend is.*

If one looks critically at this comment, one could question whether the fact that the University of Stellenbosch is a residential university should be the only motivating factor for students to attend class, as this lecturer asserts. The other concern raised in this comment, namely that students no longer read because the material is on WebCT, is also not quite valid. WebCT is just another mode of delivery and should not have a direct influence on the amount of reading students do. The mode of delivery, whether the notes are handed out in class, placed on reserve in the library or placed within a WebCT course, should not have an effect on the amount of reading done by students.

Whereas the drop in class attendance could be, on the one hand, the result of the duplication of the class online and students not seeing the value of attending class, students, on the other hand, could also sometimes be mistaken in their assumption that it is enough to only study the online material without attending any classes.The comment below speaks to this more valid concern with regard to class attendance: Students assume that studying the material on WebCT is sufficient for passing the course in instances when it is not the case.

> *Die gevaar bestaan wel dat studente onder die wanindruk verkeer dat hul toegang tot lesingmateriaal kontaksessies vervang. Selfs al beklemtoon mens dat dit nie die geval is nie, verkeer sommige steeds onder hierdie illusie en kom dan gewoonlik te laat hul fout agter.*

One of the lecturers identifies junior undergraduate students as a particular group that believes they can get by with a poor work ethic:

> *My ervaring by sommige junior voorgraadse studente is dat WebCT hulle laat dink hulle kan met slegte werksetiek wegkom: speel nou en leer later, omdat die inligting in elk geval op WebCT is. Hulle raak egter net so ver agter dat hulle nie 'n kans het om in te haal nie.*

The students have picked up on the concern of lecturers that they will not attend class because of the use of WebCT. One of the students remarks in the open response of the survey:

> *Dosente gebruik nie die potensiaal van WebCT nie. Hulle lyk skrikkerig vir die tegnologie om dat hulle dink dat "studente dan nie meer klas gaan bywoon nie". WebCT is 'n wonderlike tool wat heeltemal onderbenut word deur die regsfakulteit DEUR DIE BANK. Ek het nog geen kursus gedoen wat die dosent waarlik WebCT benut nie.*

Another student clarifies why WebCT has the potential to help students who cannot attend classes because of valid reasons:

> *Party studente kan nie al die klasse bywoon a.g.v. botsings. Dit is net baie gemakliker om sommer die toets datums en ekstra notas op WebCT te kry. Steeds is daar dosente wat die inligting weerhou om klasbywoning te verseker. Dit is ook onodige moeite om dan in so 'n geval elke keer persoonlik die dosent te gaan sien oor die datums en dan is hy somtyds nie eers op kantoor nie. Die geriewe is mos nou daar so gebruik dit asb.*

With regard to the second issue, whether ICTs should replace face-to-face sessions, some lecturers feel that this is not possible. One of the lecturers makes a very strong case for face-to-face interactive teaching activities because they are necessary in specific disciplines:

> *WebCT is a valuable resource in the lecturer's toolkit. While efforts to enhance its capabilities as a supportive learning/teaching resource should be increased, it must not be seen as a replacement or substitute for other interactive teaching activities which may be more germane to some disciplines than others.*

This particular lecturer raises a very legitimate point about using WebCT only when it is appropriate. This issue is also emphasised in the implications of the development of an e-Campus in the official e-Campus strategy of the US.[68] With regard to teaching and learning activities within the e-Campus, the following implications are explicitly stated:

- The development envisages a mixed model, also known as the so-called “brick and click model”, where both contact and online teaching and learning activities are offered.
- The e-Campus is therefore not a virtual campus that replaces the residential campus.
- Learning opportunities that use ICTs do not replace classroom “contact” teaching and learning. Contact and interaction are complemented and enriched in order to meet the

[68] Discussed in more detail in Chapter 4.

requirements of a student-centred learning and teaching approach in the context of increasing enrolment figures.

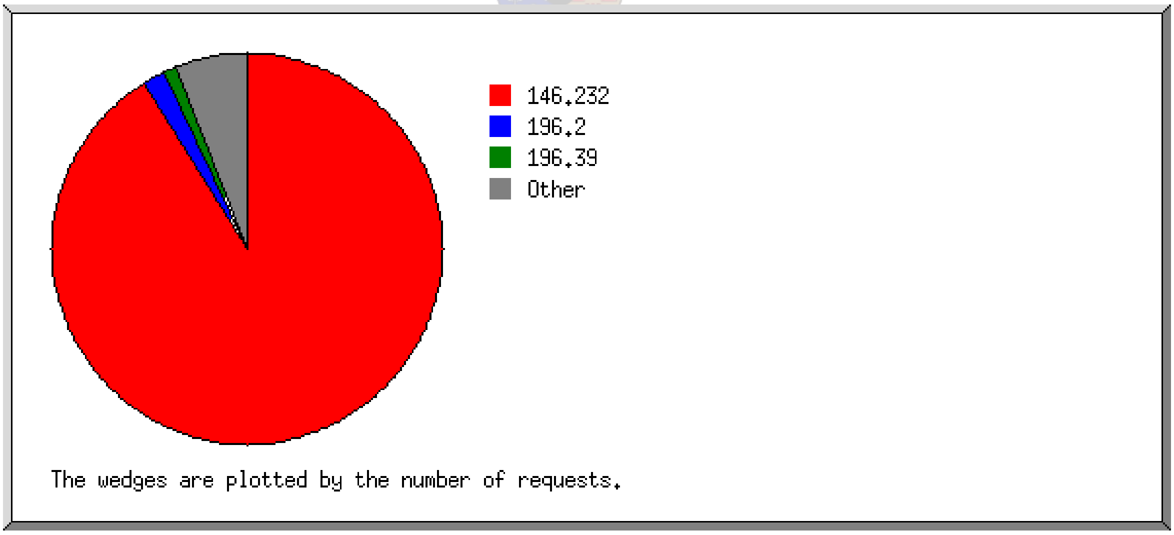
- Learning and teaching activities of the e-Campus therefore do not only consist of online programmes (“click”), but still include contact sessions with students (“brick”).
- The e-Campus does, however, provide for the delivery of fully online programmes.

These implications outlined in the e-Campus strategy also apply to the last concern raised with regard to the changing role of the lecturer and student as a result of the integration of ICTs into teaching and learning activities, namely the concern that the University of Stellenbosch will become a distance/correspondence institution. One of the lecturers remarks:

> *Daar is 'n baie sterk sentiment (onder van my kollegas) dat ons nie primêr 'n afstandsonderrig instansie is nie en WebCT wel van ons so 'n instelling maak.*

As can be seen from the implications of the e-Campus listed above, it is clear that distance education is not the primary driver of the e-Campus initiative, or of the e-Learning project and the use of WebCT. WebCT is used (with a handful of exceptions) almost exclusively for residential modules and programmes. The WebCT organisation report below (Figure 5.28) clearly shows that the requests for transactions on the WebCT server is mostly from on-campus computers (146.232).

<u>Figure 5.28: WebCT organisation report: Thu-02-Jan-2003 09:06 to Sat-25-Oct-2003 02:06</u>



<u>To summarise:</u>

- It has become clear that lecturers are on the whole quite aware of the potential benefits of the use of ICTs, specifically WebCT, in teaching and learning activities.

- This awareness does not necessarily lead to reflection on how they are using ICTs and how modules and programmes need to be redesigned to increase the effectiveness of the integration and realise the potential benefits.
- The integration of ICTs into teaching and learning activities has led to a change in the role of the lecturers and students, with reports of a drop in class attendance.
- I argued that the drop in class attendance could be the result of transporting what happens in class to the online environment without any redesign of the module or programme.
- Some of the lecturers are concerned that the use of ICTs will replace face-to-face teaching and learning and that the University of Stellenbosch will become a distance education institution. Although this is not the intention of the e-Campus initiative or the e-Learning project, it remains a concern that needs to be addressed.

5.9 BARRIERS/CHALLENGES

This section repors on the lecturers' perceptions of what they experience to be the general barriers/ challenges with regard to the use of ICTs, and more specifically the use of WebCT. I then turn to a discussion of some of the possible individual barriers. These are:

- Time
- Students' access to computers and printers (on-campus)
- Computer access for students off campus
- Teaching and learning practice is not valued
- Infrastructure (lecturers)
- WebCT training

To conclude, I perform a factor analysis to determine the underlying components and structures of the list of barriers and correlate these components with demographic data.

5.9.1 Barriers in general

Table 5.30: Barriers/challenges to the use of WebCT and ICTs in general

	Strongly agree or Agree		Neutral		Disagree or Strongly disagree		Total
	Count	%	Count	%	Count	%	Count
Too time consuming to communicate online	12	57.5%	34	15.9%	57	26.6%	214
Too time consuming to develop online material	124	56.4%	36	16.4%	60	27.3%	220
Students off-campus do not have access to computers after hours	107	53.2%	45	22.4%	49	24.4%	201
Students report problems with printing in computer-user areas	106	52.7%	46	22.9%	49	24.4%	201
Teaching practice not valued and rewarded	103	48.1%	49	22.9%	62	29.0%	214
Network too slow	72	34.1%	44	20.9%	95	45.0%	211
Students do not have adequate access to computers in computer-user areas	73	34.1%	42	19.6%	99	46.3%	214
Technological infrastructure for lecturers not adequate	48	22.9%	39	18.6%	123	58.6%	210
Students find WebCT too difficult to use	41	19.8%	51	24.6%	115	55.6%	207
Students not computer literate	39	18.5%	51	24.2%	121	57.3%	211
IT technical support not adequate	29	14.4%	60	29.9%	112	55.7%	201
WebCT training is not adequate	19	9.5%	49	24.6%	131	65.8%	199
WebCT technical support not adequate	15	7.2%	51	24.4%	143	68.4%	209

The following main aspects emerge from Table 5.30:

- Time to both communicate online and develop material seems to be the biggest potential barrier, with the biggest percentage of the respondents, 58% and 56% respectively, strongly agreeing or agreeing with these statements.
- With regard to computer and printer access for students, the respondents seem to be more concerned about off-campus access (53% strongly agreeing or agreeing) than on-campus access (34% strongly agreeing or agreeing). If one includes problems reported with printing as one of the elements of on-campus access for students, we find that 53% of the respondents strongly agree or agree that printing problems could be a possible barrier.
- Nearly half of the respondents, 48%, strongly agree or agree with the statement that teaching and learning practice is not valued. The significance of this number and the specific aspects related to this issue will be discussed below.

- The respondents seem to be relatively satisfied with the technological infrastructure and WebCT training and technical support available to them. They also do not seem to think that WebCT is too difficult for students to use or that students are not computer literate.

5.9.1.1 Time

The lack of time as a barrier to the integration of ICTs into teaching and learning activities should not be underestimated.[69] Most of the lecturers want to teach well and they are aware of the potential benefits of the integration of ICTs, but lack the time and energy to do it. One of the lecturers remarks in this regard:

> *Die groot probleem waarom dosente dikwels nie sover kom om hul modules op WebCT te ontwikkel nie, het min kere te make met 'n gebrek aan wil of begrip vir die belang daarvan, maar meer kere met 'n gebrek aan tyd en energie, omdat ander administratiewe take hulle aandag so opeis.*

Another lecturer notes that, although ICTs have great potential, it will remain a low level application in most cases. Only if the lecturers are very keen on ICTs will they take the time to invest in higher level applications.

> *IKTs hou onmeetbare moontlikhede in, maar solank as wat daar te veel aansprake op dosente se tyd is, sal dit bly by laevlak toepassing, behalwe in uitsonderlike gevalle waar 'n dosent byvoorbeeld 'n spesifieke voorliefde vir IKTs het en ter wille van die genoegdoening tyd daarin investeer.*

If one reflects on this statement in connection with Rogers's (1995) adoption of technology curve[70], this lecturer is referring to lecturers in the early adopter category who are, according to Rogers, usually venturesome, risk takers, technologically inclined, can cope with a high degree of uncertainty and are internally motivated.

As we have seen in Chapter 4, however, we are not only dealing with the early adopters of technology in the University of Stellenbosch context. To manage the time issues specifically associated with the development of online material and an online presence, an incremental approach is recommended, in which lecturers develop a specific module on a continuous basis when they have time available to do so. There is a keen awareness of the limited time available to lecturers to take part in e-Learning initiatives and the expectation is not that they should do it all

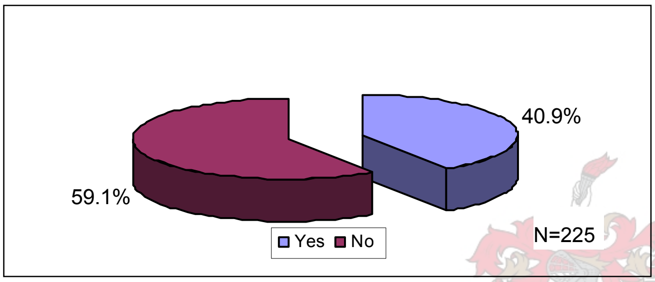
[69] Time was also identified as one of the major barriers in studies world wide. These studies are discussed in more detail in Chapter 3.
[70] Discussed in Chapter 3.

at once. The remark of the lecturer below supports this type of approach as he acknowledges that he has to proceed incrementally on an annual basis:

> *Tans het ek nog nie die vlak van integrasie bereik wat deur die tegnologie moontlik is nie. Dit is bloot 'n kwessie van tyd, opleiding en geleentheid. Ek wil self baie graag die volle potensiaal van WebCT benut, maar het nie werklik die tyd beskikbaar om dit vinnig te realiseer nie. Dit moet dus jaarliks inkrementeel gedoen word.*

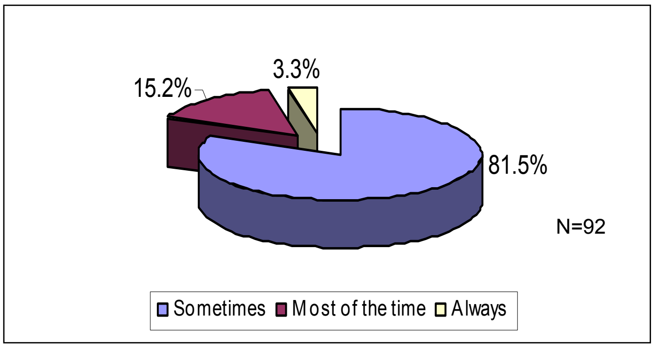
5.9.1.2 Student access to computers and printers (on-campus)

Figure 5.29: Do your students complain that they cannot get access to a computer in a CUA (Computer-user area)?



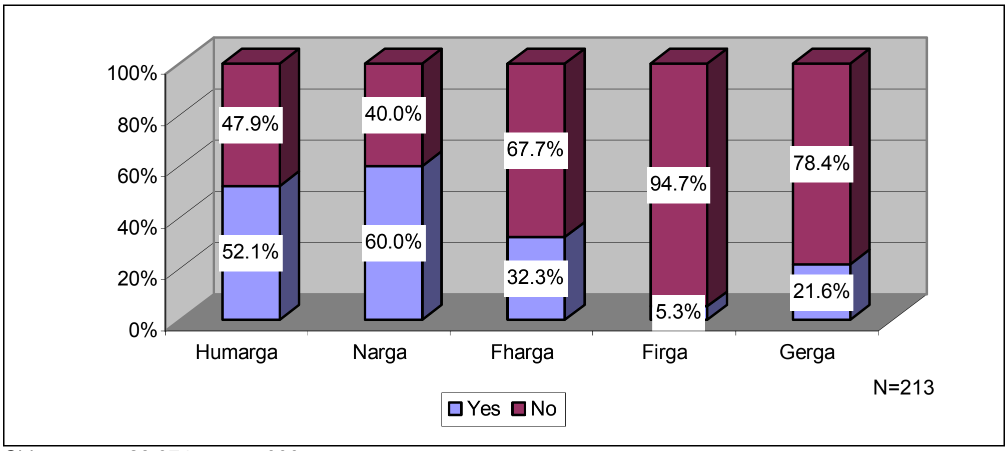
When considering Figures 5.29 and 5.30 together, one could infer that on-campus access to computers is not a problem for students with only 41% of the respondents reporting that their students complain that they cannot get access to a computer in a computer-user area. Of this 41%, the greater majority (82%) only sometimes complain, with a very small percentage (3%) always complaining.

Figure 5.30: If yes, how often?



However, if one correlates these student complaints with the respective computer-user areas, it emerges that the complaints are mostly from students who have access to specific user areas. To do this cross-tabulation, the lecturers' faculty affiliations were recoded according to the computer-user areas to which their students have access.

Figure 5.31: Cross-tabulation between "Do your students complain that they cannot get access to a computer in a computer-user area" and the computer-user areas



Chi-square = 28.374   p = .000

The inclination of students predominately from Humarga and Narga to complain about computer access is clearly displayed in Figure 5.31. This tendency can be explained if one considers the student:computer ratio in the different computer-user areas (Table 5.31). When computing the student:computer ratio, one cannot take all the computers into account, because, as shown in Table 5.31, not all of them are in an open area where all students have access to them. The distinction has to be made between the computers in the electronic classrooms, which are mostly occupied by classes during the day, and computers in the open area that are available for student use.

It is clear from Table 5.31 that the 21:1 and 18:1 student:computer ratios of Humarga and Narga respectively cannot be adequate. The Gerga student:computer ratio (23:1) is also quite high, but lecturers in the Health Sciences do not make as much use of e-Learning as their colleagues in the Human & Social Sciences (Humarga) and Natural Sciences (Narga).

Table 5.31: Computer:Student ratio in computer-user areas on campus

	GERGA	FHARGA	FIRGA	HUMARGA	NARGA	TOTAL
All computers	225	400	180	403	285	**1493**
Computers in open area	120	313	107	281	151	**972**
Registered CUA users	2700	4160	1300	6000	2650	**16810**
Student:computer ratio (all computers)	13	10	7	15	9	**11**
Student:computer ratio (open areas)	23	13	12	21	18	**17**

The e-Campus initiative (described in Chapter 4) had as one of its 2003 projects, a “Capacity gap analysis” with regard to student computer access on campus. The statistics displayed in Table 5.31 were supplied by the project manager. The results of this capacity gap analysis will be used to do future planning for computer access for students on campus.

If one looks at the hourly access of the WebCT server, shown in Figure 5.32, one can assume (even without having the final report of the capacity gap analysis project) that student computer access is especially a problem in Narga and Humarga between 9:00 and 15:00, because these are the obvious peak times. One cannot imagine that the 18:1 (Narga) and 21:1 (Humarga) student:computer ratio (calculated using only the computers in the open areas) can be adequate during these times.

<u>Figure 5.32: WebCT hourly access: Thu-02-Jan-2003 09:06 to Sat-25-Oct-2003 02:06 (295.71 days).</u>

Each unit () represents 5,000 requests for pages or part thereof.

hour:	reqs:	pages:
0:	672268:	19709:
1:	282108:	14355:
2:	144447:	12655:
3:	70916:	11400:
4:	56276:	11081:
5:	56531:	11216:
6:	141021:	12961:
7:	1344015:	31150:
8:	5431153:	93401:
9:	10349422:	154562:
10:	12723403:	169252:
11:	12380238:	173892:
12:	9097141:	137522:
13:	8984843:	138218:
14:	9182124:	142499:
15:	8775325:	137853:
16:	6323492:	110552:
17:	3749782:	67154:
18:	2878408:	56180:
19:	3625980:	66031:
20:	3539894:	64933:
21:	3060586:	58279:
22:	2118387:	42865:
23:	1354494:	30603:

5.9.1.3 Student access off campus: Role of ICTs in the Stellenbosch/ African context

The fact that many students do not have access to computers after hours is considered to be a major barrier, with 53% of the respondents strongly agreeing or agreeing with the statement. Some lecturers feel that the use of ICTs could potentially exclude students who do not have access to computers after hours – especially those who travel by train and have to leave before dark because of security reasons. A call is made by one lecturer to do more research on the appropriate amount of ICT use in teaching and learning so as not to sideline these students:

> *Indien wel, wie/hoe word bepaal watter persentasie IKT kan in SA of Stellenbosch se unieke situasie suksesvol aangewend word? Teen watter tempo verander hierdie situasie? Hoe gaan ons reageer wanneer dit teen ons begin tel - dat die tegnologie deur die universiteit gebruik word om diegene wat nie toegang na ure tot rekenaars het nie te "sideline"? Ek weet van heelwat studente wat daagliks met die trein na Stellenbosch reis.*

The question whether integration of ICTs into teaching and learning activities in a South African context is an exclusionary measure is contested by some lecturers, who argue that the use of ICTs promote diversity:

> *It [WebCT] has opened new avenues for diversification in our teaching and outreach philosophies.*

> *This University MUST keep up with progress in ICT; doing that gives the University a DISTINCT advantage and MOST importantly it helps diversity development very significantly.*

The notion of using ICT as a competitive advantage adds another dimension to the conversation – not only in terms of competing with other universities, but also in terms of producing graduates who have the necessary skills to be competitive in the job market. One of the students recognises the potential future advantages of acquiring computer skills in the following way:

> *WebCT is baie belangrik vir die sukses wat ek behaal in my kursus. Dit is 'n ongelooflike hulpmiddel, en vergemaklik die leer-proses. Ek spandeer baie tyd in die RGA's, en ek voel dat dit tyd is wat goed gebruik word. Ek leer vaardighede wat my gaan help in die toekoms, en daar is altyd hulp as ek sukkel.*
> *Baie dankie vir WebCT!*

If one takes access to the library to off-campus students as an analogy to access to computers to off-campus students, one should therefore also, as with ICTs, not promote any activities or assignments that require the students to go the library. I am not arguing that the availability of computers to off campus students is not a possible barrier. I am just suggesting that a more nuanced approach should be followed that seeks solutions to overcome the barrier instead of dismissing the use of ICTs altogether as a result of this barrier.

5.9.1.4 Teaching and learning practice not valued

Most lecturers, excluding the early technology adopters who are very technology literate, will only invest time and effort in the integration of ICTs into teaching and learning activities if they feel that teaching practice in general is valued and rewarded. Research and teaching are often seen as activities that are in competition with one another. The perception exists that research activities, and more specifically research output in the form of publications, are valued and rewarded, whereas teaching activities do not have the same prestige, especially when it comes to appointments and promotions.

> *WebCT is tydrowend en onderrig aan die US tel presies 'n koelronde nul. Enige aanstellings en/of bevorderings vra nie eers vrae oor onderrig nie - dit is net navorsing. (Jy kon strate gevee het, solank jy net gepubliseer het, sal jy die job kry.) Dit is beter vir jou loopbaan om tyd aan navorsing af te staan as om tyd aan onderrig af te staan. So ek vermoed dat indien dit by 'n afruiling van tyd kom die meeste dosente teen (tydrowende) onderrig sal kies.*

This sentiment is echoed by another lecturer, who feels that it is inevitable that, when lecturers have to prioritise activities under time pressure, they will devote more time to the (research) activities they feel are rewarded.

> *Met onmenslike druk op dosente se tyd, moet 'n mens aktiwiteite prioritiseer. Dit wat die meeste potensiële beloning inhou/erkenning ontvang (byvoorbeeld by bevordering, toekennings, ens.) geniet die hoogste prioriteit in die klein mate van tydsbestuur wat 'n mens kan uitoefen. Omdat onderrig reeds baie tyd neem en boonop onderwaardeer word in vergelyking met navorsing, bly die tydrowende ontwikkeling van e-leer 'n lae prioriteit.*

Whereas the e-Learning financial incentives partially address the issue of reward, ad hoc measures to reward lecturers separately do not suffice. Suggestions for changes at an institutional level with regard to the University of Stellenbosch Performance Evaluation are made in the following comment by a lecturer:

> *Committment to teaching excellence and accessibility to students are currently inadequately rewarded in the US Performance Evaluation system, thus are not reflected in staff members' financial rewards or career developement. Separate incentives for WebCT would redress this (partially).*

5.9.1.5 Importance of good infrastructure

Table 5.30 reflects the lecturers' general level of satisfaction with the current technological infrastructure and support systems as critical components of the overall success of WebCT. This is supported by comments such as:

> *You can not stop progress. Good infrastructure and support systems (technical & pedagogical) are essential to be at the forefront. Keep up the good work!*

Although there is a general satisfaction with the infrastructure, support and assistance, there are still suggestions for additional infrastructure (especially as regards digital equipment) as well as development and educational design assistance:

> *WebCT is a valuable teaching tool, though one that must not replace contact teaching. There are other more important e-Learning devices that should take priority over WebCT at this stage, such as adequate digital equipment for contact teaching (ALL lecture theatres must be equipped with data projectors, video and DVD players, network points, etc.). In order to design effective interactive study material for WebCT, one needs to learn multimedia software programmes (Web design, video streaming, etc.), or have access to people who can design the material. The latter option is not currently available within the University and too costly to afford if one had to have this professionally designed. Once an adequate e-Learning infrastructure has been set in place on the campus, I suggest that educational design should be made a priority where experienced designers are employed to assist teaching staff with the design of their material. It is pointless using WebCT merely as a dumping ground for lecture notes or poorly-designed PowerPoint presentations.*

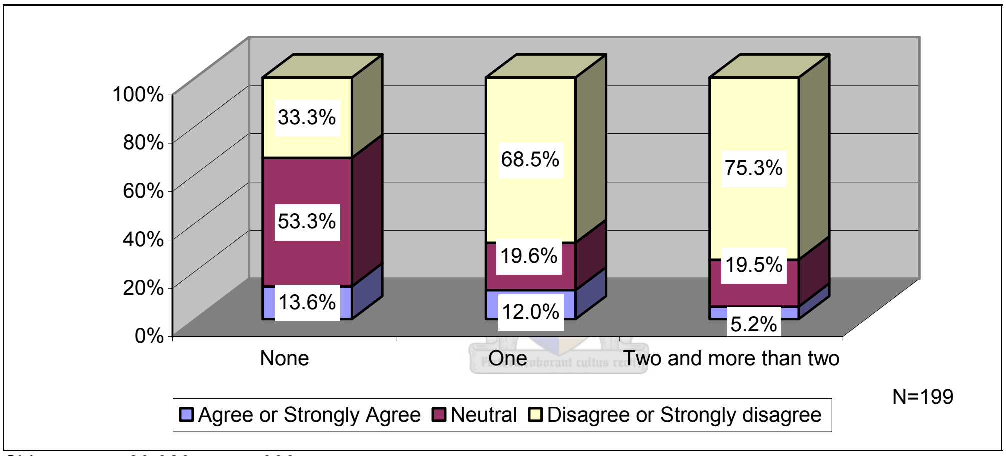
Another lecturer calls for expensive software packages to be made available on the network so that lecturers can share the applications and costs associated with them.

> *It would help a great deal if software like Photoshop, Dreamweaver, Cooledit and Authorware were available on the network. Departments can't all afford to purchase these. It also seems a waste of money as one does not use them all the time. A number of licences could actually serve many departments.*

5.9.1.6 WebCT training

Looking at Table 5.30, it does not appear as if inadequate training is a significant barrier to the integration of WebCT into teaching and learning activities, with nearly two thirds of the respondents disagreeing or disagreeing strongly with the statement “WebCT training is not adequate”. The overall feedback solicited after WebCT workshops is also overwhelmingly positive. To further investigate the relationship between the number of WebCT workshops attended and inadequate WebCT training, I did a cross-tabulation between these two variables (Figure 5.33). The hypothesis is that the more workshops the lecturers attend, i.e. the more they are exposed to training, the more likely they are to disagree or strongly disagree with the statement that the WebCT training is not adequate.

Figure 5.33: Cross-tabulation between “How many WebCT workshops have you attended?” and “WebCT training is not adequate”



Chi-square = 20.328 p = .000

It is clear from Figure 5.33 that the number of workshops attended is definitely related to the respondents’ perceptions of whether inadequate WebCT training is a barrier or not. The figure shows the biggest increase in the Disagree or Strongly disagree category being between no and one workshop attended (33% to 69%).

5.9.2 Factor analysis: Barriers/challenges

To identify the underlying dimensions or components, the 13 value statements about the possible barriers were subjected to two factor analyses. In both I performed a principal component analysis with a varimax rotation. In the first factor analysis the latent root criterion (eigen values greater than 1) was specified as stopping criterion, resulting in four factors being extracted, which explains about 63% of the variance in the statement responses. As a result of the statement, “Teaching and learning practice, not valued and rewarded” not loading well on either of the four factors, I performed a second factor analysis excluding this particular value statement. In the second factor analysis, the latent root criterion (eigen values greater than 1) was again specified as stopping criterion, resulting in four factors being extracted, explaining about 67% of the variance in the statement responses. Table 5.32 provides a summary of the second factor analysis.

Table 5.32: Results of the second factor analysis of the possible barriers

Statement	4 Factors			
	F1	**F2**	**F3**	**F4**
Students not computer literate	.787	.261	-7.940E-02	.123
Students do not have adequate access to computers in computer-user areas	.740	.155	.265	-2.573E-02
Students find WebCT too difficult to use	.739	.243	-3.281E-02	.237
Students off-campus do not have access to computers after hours	.716	-.119	.211	-1.088E-02
Students report problems with printing in CUAs	.639	-8.661E-02	.311	2.954E-03
WebCT technical support not adequate	8.959E-02	.847	.129	.166
WebCT training is not adequate	8.527E-02	.818	.144	8.109E-02
Techno infrastructure for lecturers not adequate	4.878E-02	.207	.796	6.274E-02
Network too slow	.260	-1.280E-02	.734	.113
IT technical support not adequate	.180	.455	.602	-.127
Too time consuming to communicate online	-2.093E-02	.122	.101	.882
Too time consuming to develop online material	.186	7.720E-02	-5.104E-03	.853
Total variance explained	**67%**			

Inspection of the patterns of loading as well as of the statement content, resulted in the following labels being assigned to the factors:

- Factor 1: Student-related issues
- Factor 2: WebCT training and support
- Factor 3: IT infrastructure and support
- Factor 4: Time constraints

Factor scores were calculated for each respondent according to the regression method. I used these factor scores in a series of comparison procedures (t-test and one-way ANOVAs), with sex, age and faculty as the independent variables. The results are summarised in Table 5.33.

Table 5.33: Factor scores x sex, age and faculty

Comparison		N	Mean	Std Dev	Statistics
Sex					
Student-related issues	Male	113	51.73	22.438	t = -.483
	Female	69	53.33	20.681	p = .630
WebCT training & Support	Male	118	70.23	22.463	t = -1.677
	Female	78	75.80	23.175	p = .095
IT infrastructure & Support	Male	119	59.24	20.975	t = -1.668
	Female	72	64.81	24.515	p = .097
Time constraints	Male	131	36.64	26.457	t = -1.687
	Female	77	43.18	27.917	p = .093
Age					
Student-related issues	40 yrs and younger	71	54.01	22.194	F = .848
	Between 41 and 50 yrs	57	49.21	21.377	p = .430
	51 yrs and older	52	53.37	21.979	Eta squared = .009
WebCT training & Support	40 yrs and younger	78	74.84	24.714	F = .933
	Between 41 and 50 yrs	63	71.63	22.361	p = .395
	51 yrs and older	53	69.34	21.451	Eta squared = .010
IT infrastructure & Support	40 yrs and younger	75	61.33	22.951	F = .102
	Between 41 and 50 yrs	59	61.02	22.661	p = .903
	51 yrs and older	54	62.81	21.882	Eta squared = .001
Time constraints	40 yrs and younger	82	46.95	27.538	F = 6.903
	Between 41 and 50 yrs	65	34.62	26.679	p = .001
	51 yrs and older	59	31.78	23.708	Eta squared = 0.064
Faculty					
Student-related issues	Human & Social Sciences	61	51.23	21.788	F = .863
	Natural Sciences & Engineering	60	50.92	22.634	p = .461
	Economic & Business Sciences	23	58.91	25.089	Eta squared = .015
	Health Sciences	32	53.96	18.697	
WebCT training & Support	Human & Social Sciences	63	71.63	23.675	F = .544
	Natural Sciences & Engineering	63	71.03	21.747	p = .653
	Economic & Business Sciences	27	68.52	28.456	Eta squared = .009
	Health Sciences	36	75.69	20.032	
IT infrastructure & Support	Human & Social Sciences	61	58.8	21.830	F = 1.344
	Natural Sciences & Engineering	57	59.5	22.737	p = .262
	Economic & Business Sciences	29	62.93	22.337	Eta squared = .022
	Health Sciences	37	67.57	24.039	
Time constraints	Human & Social Sciences	68	38.42	24.369	F = .491
	Natural Sciences & Engineering	69	35.51	27.672	p = .689
	Economic & Business Sciences	28	41.52	30.249	Eta squared = .007
	Health Sciences	36	40.97	28.600	

It is evident from the factor analysis that there are no meaningful statistical differences between sex and faculty. However, as reflected in Table 5.33, there are statistically significant differences between the three age groups pertaining to whether time constraints (insufficient time) present a barrier. The older the respondents, the more they experience that time constraints are a barrier, with the “40 years and younger group” at the higher end of the scale, followed by the “Between 41 and 50 years of age group” and the “51 years and older group” having the lowest mean score.

To summarise the discussion on the barriers and challenges:

- Insufficient time to implement e-Learning activities emerges as the number one barrier in both the discussion of the barriers in general and in the factor analysis.
- From the factor analysis it becomes clear that insufficient time becomes more of a barrier as the age of the respondents increases.
- Related to the time issue is the perception that teaching and learning practice in general is not valued as much as research, so why spend time on it.
- Students' on-campus access to computers appears to be a concern, especially in Humarga and Narga. This will be discussed further in the next chapter, which presents the results from the students' survey.
- Lecturers have valid concerns about students' access to computers off-campus, but there are no clear answers as to whether the use of ICTs serve as an exclusionary measure or whether it can actually promote diversity.
- There seems to be general levels of satisfaction with regard to infrastructure and training, and none of these issues presents significant barriers to the use of WebCT and ICTs in general.

5.10 PROMPTERS/INCENTIVES TO GET STARTED/INCREASE USAGE

After considering the barriers and challenges in the previous section, we now turn our attention to the type of incentives that:

- Prompt or persuade lecturers to start using WebCT, and
- Motivate them to increase their usage of WebCT.

We will then turn our attention to the institutional environment in an attempt to determine which institutional incentives are effective motivators for lecturers to become involved in e-Learning initiatives. In this discussion, I will specifically focus on whether the award of monetary incentives for e-Learning projects, as is the case with the e-Learning project, is a good institutional strategy to follow to promote innovation in teaching and learning. Lastly, I look at the respondents' rating of the importance of three prominent institutional incentives.

5.10.1 Factors that prompt lecturers to use WebCT

Table 5.34 shows the results of the lecturers' ratings of the role certain factors played in persuading or prompting them to use WebCT.

Table 5.34: Please rate the extent to which you believe that these factors persuaded or prompted you to use WebCT

	Very important or Important		Not important or Not important at all		Total
	Count	%	Count	%	Count
A WebCT training workshop	127	73.8%	45	26.2%	172
You were faced with a specific teaching problem or challenge	121	68.4%	56	31.6%	177
Departmental chair or dean requesting you to use it	110	65.5%	58	34.5%	168
Recommendation from peers	109	59.2%	75	40.8%	184
Student requests	73	52.5%	66	47.5%	139
The examples of WebCT modules shown at a demonstration within your department	65	48.1%	70	51.9%	135
The demonstrations of peers at the annual WebCT mini-conference	54	47.4%	60	52.6%	114
You received money as part of the e-Learning project	61	45.2%	74	54.8%	135

Close inspection of Table 5.34 reveals that nearly three out of four of the respondents rated a WebCT training workshop as very important or important. It is encouraging to note that two thirds of the respondents were prompted by a specific teaching problem or challenge. It is also revealing that receiving money from the e-Learning project rated the lowest of all the factors, with more than half of the respondents rating it as not important or not important at all. I will return to this issue when I discuss money as an institutional incentive in the last part of this section.

To further investigate WebCT basic training workshops as possible prompters, a cross-tabulation was done between whether the lecturers attended a basic WebCT workshop or not and their rating of the importance of a WebCT training workshop as a prompter.

Table 5.35: Cross-tabulation between "Attended basic WebCT workshop" and Factors that persuaded or prompted you to use WebCT

		A WebCT training workshop		Total
		Very important or Important	**Not important or Not important at all**	
No	Count	7	11	18
	% within Basic	38.9%	61.1%	100.0%
Yes	Count	120	34	154
	% within Basic	77.9%	22.1%	100.0%
	Count	127	45	172
	% within Basic	**73.8%**	**26.2%**	100.0%

Chi-square = 12.711 p = .000

Table 5.35 shows a clear cross-tabulation between the two issues. Nearly four out of five of the lecturers who have attended a basic workshop rate it as very important or important, whereas only two out of five of those that did not attend a workshop rate it as very important or important. The WebCT basic workshop clearly serves a very useful purpose as a means to prompt lecturers to start using WebCT.

5.10.2 Factor analysis: Possible prompters to start using WebCT

To identify the underlying dimensions or components, I performed a factor analysis on the nine value statements about the possible prompters. I used a principal component analysis with a varimax rotation. The latent root criterion (eigen values greater than 1) was specified as stopping criterion, resulting in two factors being extracted, and explaining about 58% of the variance in the statement responses. The results of the factor analysis are shown in Table 5.36.

Table 5.36: Results of the factor analysis: Possible prompters to get started with WebCT

Statement	**2 Factors**	
	F1	**F2**
The examples of WebCT modules shown at a demonstration within your department	.822	7.718E-05
Student requests	.707	-3.576E-02
You were faced with a specific teaching problem or challenge	.674	-.361
A WebCT training workshop	.633	.299
The demonstrations of peers at the annual WebCT mini-conference	.583	.520
Recommendation from peers	.552	.138
You received money as part of the e-Learning project	3.280E-02	.811
Departmental chair or dean requesting you to use it	-1.813E-04	.836
Total variance explained	**58%**	

I interpreted these factor loadings to reflect a difference between intrinsic and external motives:

- Factor 1: Intrinsic prompters ("Bottom up")
- Factor 2: External rewards/pressures ("Top down")

The issues of "bottom up" and "top down" in relation to the integration of ICTs into teaching and learning practice are discussed in detail in Chapter 4.

Factor scores were calculated for each respondent according to the regression method and used in a series of comparison procedures (t-test and one-way ANOVAs), with sex, age and faculty as the independent variables. The results are summarised in Table 5.37.

Table 5.37: Cross-tabulation between possible prompter factor scores and sex, age and faculty

Comparison		N	Mean	Std Dev	Statistics
Sex					
Intrinsic prompters	Male	57	54.68	20.217	t = 1.313
	Female	15	46.67	24.015	p = .194
Extrinsic prompters	Male	75	56.00	28.028	t = 1.308
	Female	37	48.65	27.883	p = .194
Age					
Intrinsic prompters	40 yrs and younger	21	52.38	21.486	F = .263
	Between 41 and 50 yrs	26	55.34	19.782	p = .770
	51 yrs and older	25	51.11	22.794	Eta squared = .008
Extrinsic prompters	40 yrs and younger	37	51.80	27.995	F = .243
	Between 41 and 50 yrs	37	56.31	27.597	p = .785
	51 yrs and older	38	53.95	27.790	Eta squared = .004
Faculty					
Intrinsic prompters	Human & Social Sciences	28	47.50	17.977	F = 2.935
	Natural Sciences & Engineering	25	62.22	20.633	p = .04
	Economic & Business Sciences	12	51.85	25.219	Eta squared = .116
	Health Sciences	6	53.70	19.458	
Extrinsic prompters	Human & Social Sciences	40	47.50	25.473	F = 1.310
	Natural Sciences & Engineering	43	56.20	29.327	p = .275
	Economic & Business Sciences	16	53.13	29.950	Eta squared = .035
	Health Sciences	14	63.10	27.095	

Table 5.37 reveals that there are no statistically significant differences between faculties pertaining to intrinsic prompters. Although noticeable differences do exist between the means in Natural Sciences and Engineering and Human and Social Sciences, the number of respondents is too small to consider it to be significant.

5.10.3 Factors that motivate lecturers to increase usage of WebCT

Table 5.38: If your usage is more, please rate the following factors according to their importance in contributing to your increased usage of WebCT

	Very important or Important		**Not important or Not important at all**		**Total**
	Count	%	Count	%	Count
You see increased uses in your teaching	100	95.2%	5	4.8%	105
You see benefits for your students	93	90.3%	10	9.7%	103
Feel more comfortable with technology to use it in new ways	82	85.4%	14	14.6%	96
Specific teaching problem/challenge	69	71.9%	27	28.1%	96
Saw more examples of how other lecturers are using it	62	69.7%	27	30.3%	89
Recommendation from peers	42	48.3%	45	51.7%	87
Received more training	37	46.8%	42	53.2%	79
React to students requests to use it more	33	46.5%	38	53.5%	71
Received monetary incentives from e-Learning project	32	46.4%	37	53.6%	69
Received additional assistance	26	43.3%	34	56.7%	60
Dept chair/dean requested you to use it more	31	41.3%	44	58.7%	75

If one looks at Tables 5.34 and 5.38 together, it is apparent that, once lecturers start using WebCT, extrinsic motivators such as training become less important, with intrinsic teaching motivators, such as increased uses in teaching and benefits for students, becoming the main factors that contribute to increased usage. Although about half of the respondents rated “Received more training” as very important or important, 86% rated “Increased comfort with technology” as very important or important. These two factors in combination show that continuous training and support, albeit not formal workshops, remain important factors, also with regard to increased usage.

Because intrinsic teaching and learning considerations become increasingly important once lecturers have started using ICTs, lecturers increasingly make more requests for demonstrations and examples of how other lecturers are using ICTs effectively.

> *Practical ICT demonstrations at faculty and maybe departmental levels might add to create and build more positive ICT environments.*

> *Would be useful to know more about what others are doing, and to know who could help me to do it too.*

As discussed in Chapter 4, Uni-Ed already makes extensive use of lecturers giving demonstrations within their own faculties and departments of how they are using ICTs in teaching and learning activities. This is done to obtain buy-in from lecturers. Table 5.38 clearly shows that, if lecturers are convinced that the integration of ICTs has benefits for their students (90.3%) and improves the quality of the module, they will increase their usage. One of the lecturers also suggests this as a possible strategy instead of giving financial incentives:

> *Daar moet eerder 'n poging wees om die groeiende mate van wantroue af te breek sodat dosente "inkoop" in hulle werk, en werklik oortuig is dat dit bydra tot die effektiwiteit en gehalte van hul kursus, dan sal hulle dit self doen.*

I also wanted to establish the correlation between the workshops attended by lecturers and their rating of the importance of receiving more training. In this instance, I cross-tabulated the number of workshops attended and how the respondents rated the importance of receiving more training.

Table 5.39: Cross-tabulation between "How many WebCT workshops have you attended?" and "Received more training"

		Received more training		**Total**
		Very important or Important	Not important or Not important at all	
None	Count	2	7	9
	% within number of workshops attended	22.2%	77.8%	100.0%
One	Count	9	23	32
	% within number of workshops attended	28.1%	71.9%	100.0%
Two and more than two	Count	26	12	38
	% within number of workshops attended	68.4%	31.6%	100.0%
	Count	37	42	79
Total	% within number of workshops attended	**46.8%**	**53.2%**	100.0%

Chi-square = 13.799 p=.001

The result that there is no significant difference in the ratings of the respondents who attended none and one workshop is to be expected. The first basic workshop serves as a prompter (illustrated in Table 5.34). It is the subsequent workshops that play an important role in the increased usage of WebCT. This is clearly shown in Table 5.39, with the respondents strongly agreeing or agreeing increasing from 28% (attended one workshop) to 68% (attended two and more than two workshops).

The factor analysis on the eleven value statements about the possible reasons for increased usage did not produce any statistically meaningful results.

5.10.4 Institutional incentives as motivators

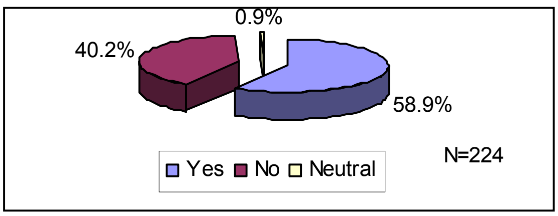
After considering the factors that motivate lecturers to get started and to increase their usage, I now consider the institutional factors and incentives that motivate lecturers to use WebCT.

Table 5.40: Please rate the extent to which you believe that these institutional factors/ incentives will motivate you to use WebCT

	Very important or Important		**Not important or Not important at all**		**Total**
	Count	%	Count	%	Count
Demonstrated student benefits	191	89.7%	22	10.3%	213
Less administrative demands on my time	183	88.4%	24	11.6%	207
Money to pay an assistant to help with development of online material	165	79.7%	42	20.3%	207
More recognition for good teaching practice in general	162	77.9%	46	22.1%	208
Release time from teaching to create online modules	155	75.2%	51	24.8%	206
More pedagogical training in effective use of WebCT	158	75.2%	52	24.8%	210
Better IT infrastructure for students	151	74.8%	51	25.2%	202
Money for hardware and software	154	74.4%	53	25.6%	207
Better IT infrastructure for lecturers	141	69.8%	61	30.2%	202
More technical training	135	64.0%	76	36.0%	211
More support (technical and pedagogical)	131	63.3%	76	36.7%	207
Additional remuneration to lecturers	116	58.9%	81	41.1%	197
Possibility of promotion	108	55.4%	87	44.6%	195

Demonstrated student benefits as a motivating factor is again, as in Table 5.38, the key motivating factor within the institutional context. Interestingly enough, lecturers prefer money to be paid to an assistant (80%) or for hardware and software (74%), rather than as additional remuneration for themselves. Lecturers do not see a direct relationship between more recognition for good teaching practice in general and the possibility of promotion, because a significantly higher percentage of respondents (78%) rate recognition for good teaching practice in general to be very important or important, compared to the 55% that rate the possibility of promotion very important or important.

Figure 5.34: Do you think special financial incentives should be given to lecturers to integrate ICTs?



Respondents are fairly divided about the necessity or desirablility of monetary incentives (Figure 5.34 adjacent). The e-

Learning project (discussed in Chapter 4) provides for special monetary incentives whereby every lecturer receives money for the so-called “minimum presence” and other innovative projects. I did cross-tabulations to establish whether these differences in opinion manifest within sex, age and faculty categories (Table 5.41).

Table 5.41: Cross-tabulation between demographic variables (faculties, sex and age) and monetary incentives

Comparison	Faculty incentives						Total	Statistics
	Yes		No		Neutral			
	N	%	N	%	N	%	N	
Faculties								
Human & Social Sciences	50	69.4	21	29.2	1	1.4	72	Chi-square = 8.018
Natural Sciences & Engineering	35	47.9	37	50.7	1	1.4	73	p = .237
Economic & Business Sciences	17	56.7	13	43.3			30	
Health Sciences	22	59.5	15	40.5			37	
TOTAL	124	**58.5**	86	**40.6**	2	**.9**	212	
Sex								
Male	75	54.7	61	44.5	1	.7	137	Chi-square = 2.353
Female	53	64.6	28	34.1	1	1.2	82	p = .308
TOTAL	128	**58.4**	89	**40.6**	2	**.9**	219	
Age								
40 years and younger	55	64	31	36			86	Chi-square = 2.810
Between 41 and 50 years of age	37	56.1	28	42.4	1	1.5	66	p = .590
51 years and older	35	53.8	29	44.6	1	1.5	65	
TOTAL	127	**58.5**	88	40.6	2	.9	217	

Although there are no statistically significant differences within the categories, the following salient issues emerge from Table 5.41:

- More of the female respondents (65%) than the male respondents (55%) feel that monetary incentives are necessary.
- With regard to age, the only clear difference exists between the 40 years and younger (64% indicating yes) and 51 years and older categories (54% indicating yes).
- There is quite a definite difference between Human and Social Sciences and Natural Sciences and Engineering, with 69% compared to only 48% of the respondents indicating that monetary incentives are important.

When asked to motivate their yes or no to the question whether monetary incentives should be given, a few noteworthy reasons emerged in the comments (displayed in Table 5.42).

Table 5.42: Motivation for special financial incentives or not

	Frequency	Percent	Valid Percent
Yes, need compensation/reward for time, effort, expertise, resources, skills	67	28.9	39.0
No, part of my job/responsibility/professional development/good teaching and learning	39	16.8	22.7
Money does serve as motivation/incentive to get lecturers started	14	6.0	8.1
Should have choice to use incentives or not	12	5.2	7.0
Compensation does not buy time	7	3.0	4.1
Compensation should rather be awarded for overall improvement of teaching and learning	7	3.0	4.1
Adding value to teaching and learning activities is enough reward	6	2.6	3.5
Difficult to manage funding/cost effectiveness	4	1.7	2.3
Establish sustainable funding model for continued assistance	2	.9	1.2
Money should rather be given for hardware/infrastructure	2	.9	1.2
Rather general recognition than money	2	.9	1.2
Not convinced that e-Learning is better, so why give money	2	.9	1.2
External motivation leads to improvement of product	1	.4	.6
Importance of capacity building of lecturers through funding	1	.4	.6
Presedent for funding - cannot be removed	1	.4	.6
Money rather for student infrastructure	1	.4	.6
Creation of more focused environment	1	.4	.6
E-learning funding works well	1	.4	.6
Experiment and find out if it motivates	1	.4	.6
Total	172	74.1	100.0
System	60	25.9	
	232	100.0	

I will now elaborate on the six issues mentioned most frequently.

<u>Yes, need compensation/reward for time, effort, expertise, resources, skills (39%) vs money does not buy time (4.1%)</u>

Although seven lecturers feel that compensation cannot buy time, a significantly greater number of respondents (67) indicate that financial rewards are needed for the extra time spent on e-Learning activities. This is supported by comments such as:

> *Dit vat baie tyd wat bestee kan word aan navorsing en klasvoorbereiding of kursusontwerp. Vir hierdie tyd en moeite MOET daar gekompenseer word!*
>
> *It does take extra time to prepare the modules which implies MUCH extra work at least to start off with. If it was not for the financial support we have received (thank you) we would not have made any progress really. We bought lecturers time to get where we are now.*

<u>No, part of my job/responsibility/professional development/good teaching and learning</u>

Whereas these comments clearly illustrate that these lecturers value the monetary incentives for the extra effort invested, another large group of lecturers (39) feel that the integration of ICTs is part of one's job and that it is part of the continued professional development as lecturer.

> *Ons werk in 'n omgewing wat vinning verander. Trouens ons leer studente om met verandering rekening te hou in hul loopbane, as hulle dit nie doen nie, sal hulle nie werk kry nie. Vir 'n dosent is dit net so belangrik. Dit is sy professionele verantwoordelikheid om homself/haarself voortdurend beter te bekwaam om beter diens te kan lewer. Dis waarvoor jy 'n salaris kry! Dit vra nie verdere insentiewe nie.*

> *Deel van 'n dosent se taak is om onderrig te gee en dit moet na die beste van sy/haar vermoë geskied. As dit WebCT insluit dan is dit deel van 'n dosent se werk om die medium te gebruik - mense wat weier moet gepenaliseer word - mense wat dit WebCT gebruik voldoen net aan hulle posbeskrywings. Die geld kan eerder uitbetaal word aan mense wat goed presteer op onderrig, navorsing en uitreikingsgebiede.*

These two comments are echoed by a lecturer who feels that, although incentives might serve a purpose to overcome resistance to new initiatives, the integration of ICTs should simply be done, because this is the way educational methodology is developing:

> *Weerstand teen verandering noodsaak sulke insentiewe, maar aan die ander kant dink ek nie dosente behoort keuses te kry in die verband nie. Dit moet eenvoudig gedoen word, omdat dit die rigting is waarin onderrigmetodologie ontwikkel.*

Another lecturer states clearly that the main motivation should be the improvement of teaching and learning in general and questions whether financial incentives will lead to the appropriate use of ICTs on campus.

> *It should be seen as part of your job. Motivation should be that ICTs improve your teaching, if applicable. Institutionally there should then be more recognition of "better" teaching, be that promotion or salary or opportunities. To directly reimburse or "financially incentivise" for using ICTs will not lead to appropriate development of their use on campus. (For example dishing out money for ensuring your course had an "e-presence" last year resulted in people doing minimal work to meet an end that they did not necessarily believe in. (At least in our department.) That is not sustainable.*

Money does serve as motivation/incentive to get lecturers started

Although some lecturers feel that benefits for students should be enough of a motivator, some lecturers do feel that that awarding monetary incentives demonstrates the institutional commitment to using ICTs in teaching and learning.

> *Lecturers feel they are 'giving up time' that could be spent on research, applying for funding, etc. on something they don't necessarily see the results of. If the University attached financial value to ICTs it implies that they attach importance to it - not just in word but in deed (i.e. "put their money where their mouths are"!).*

Other lecturers feel that some of the lecturers would never have taken the time to use ICTs if it was not for the monetary incentives.

> *Alhoewel IKTs 'n bruikbare instrument in onderrig is, neem dit nogtans tyd in beslag. Die feit dat dosente/individue die afgelope tyd betaal is om WebCT te ontwikkel, het my, en ander kollegas gemotiveer om WebCT meer doelmatig te gebruik - andersins is dit as net nog 'n administratiewe meulsteen gesien.*

This comment is supported by another lecturer who comments that monetary incentives work particularly well for lecturers who would traditionally resist new developments and the use of new technologies.

> *Integrating ICTs into teaching and learning activities does take time and a certain level of expertise. I think this needs to be rewarded. I also feel there should be some motivation to integrate ICTs because of a tendency to resist new technologies and new developments.*

Should have choice to use incentives or not

Whereas there appears to be a tendency that money does serve as a motivator, various comments indicated that lecturers should have a choice whether they want to use ICTs or not in their teaching and learning activities and that they will only use it when appropriate. There is a very strong sentiment that the use of ICTs should not be compulsory.

> *WebCT should not be a compulsory method of teaching. Although it has many advantages, and people should be encouraged to use it where it suits that particular module, people should not be forced to use WebCT over other efficient teaching methods. Other teaching methods are also effective where WebCT may not always be.*

> *The use of ICT's should not be forced on lecturers. And because certain subjects lend themselves to WebCT more than others, lecturers whose subjects are less amenable to WebCT should not be penalised. Financial incentives should only be coupled to the*

> *effective transfer of knowledge to students, irrespective of what methods are used to facilitate this transfer.*

One of the lecturers even experiences it as discriminatory if incentives are provided for a certain mode of teaching that might not be appropriate for all modules.

> *Not all modules or subjects are appropriate for WebCT - if you provide incentives, then you discriminate against those.*

It is especially with regard to class sizes and personal teaching style that some lecturers feel the use of ICTs, specifically WebCT, might not be appropriate. It is particularly the lecturers who teach small classes with ample contact time who feel that WebCT and, principally electronic communication via WebCT, might not be appropriate.

> *Met klein hoeveelhede studente is persoon-persoon terugvoer ook baie makliker en meer suksesvol. Die punt wat ek wil maak is dat WebCT nie noodwendig so belangrik is in departemente met klein hoeveelhede studente as in ander departemente, en behoort dus nie 'n verpligting te wees nie.*

> *The course I teach is relatively small usually between 10 and 15 students. In these cases the use of WebCT is of lesser relevance to a larger class. Also my teaching style and the way I have built in group work and practical tasks into formal class and practical time means that I have fairly good interaction with the students.*

There also seems to be disagreement whether WebCT is suited for large classes. One of the lecturers comments:

> *Deur ervarings wat ek gehad het, voel ek al meer dat veral groter klasse nie baat vind by WebCT nie -- dit demotiveer studente om klas te by te woon en vermeerder 'n dosent se werk, aangesien notas dubbeld beskikbaar gestel moet word, en studente wat nie klas bywoon nie en afkondigings so misloop, onnodige vrae op die bulletin board vra, en in terugvoer kla as dit nie flink beantwoord word nie. Vir finansiële insentiewe sit baie dosente onnodige goed op hul WebCT module -- vir 'n student met 5 of meer vakke beteken dit dat hy daagliks op elke module moet ingaan as dit lyk of daar iets nuuts is: 'n tydrowende proses, terwyl ons reduserend probeer te werk gaan, sodat hulle by al die vakke kan uitkom! Ek is glad nie meer 'n WebCT voorstaander vir groter groepe nie.*

This is a relatively isolated comment and there are many counter examples of lecturers who have had great success using WebCT for large classes.

> *Baie dankie vir die WebCT fasiliteit. Met ons groot getalle is dit ondenkbaar dat ons nie oor die fasiliteit beskik nie.*

> *Personally I think it is a wonderful medium to use in teaching, it allows good communication especially with big classes. I am now able to show students on-line advanced aspects of a disease such as x-rays of various diseases which was not possible in the past unless you get these from a hospital and if a patient is available with such a complaint.*

This last comment also shows how this lecturer is successfully using WebCT for the display of visual material.

<u>Compensation should rather be awarded for overall improvement of teaching and learning</u>

Connected to the issue that lecturers should have a choice as to whether they want to use ICTs is the feeling that teaching and learning practice in general, instead of just one isolated element, namely “e-Learning”, should be rewarded.

> *Moenie die gebruik van IKTs forseer nie. IKT het 'n rol, maar dit kan baie addisionele tyd van die dosent en die student neem, en baie klein rendemente lewer. Gee erkenning aan goeie onderrig (in bv. die oorweging van bevorderings en nie net in die rektor se prys vir voortreflike onderrig nie) en dan sal dosente self oordeel waar IKT die moeite werd in die onderrigsituasie is.*

> *Alhoewel dit 'n voordeel is, voel ek nie dat dit behoort gegee te word nie. Ons taak is om effektiewe onderrig te bewerkstellig en INDIEN IKTs bydra tot hierdie doelwit, is dit alreeds ondervang in ons salarisse (dit is natuurlik 'n ander debat!)*

All of these divergent views on whether monetary incentives are necessary once again highlight how problematic it is to formulate an e-Learning strategy with specific targets and incentives for a very diverse university.[71]

5.10.5 Factor analysis: Institutional incentives

To identify the underlying dimensions or components, the 13 value statements about the possible institutional incentives were subjected to two factor analyses. In both I performed a principal component analysis with a varimax rotation. In the first factor analysis the latent root criterion

[71] Discussed in more detail in Chapter 4.

(eigen values greater than 1) was specified as stopping criterion, resulting in three factors being extracted, which explains about 63% of the variance in the statement responses. The statement "Demonstrated student benefits" did not load well and I excluded this statement in the second analysis. In the second factor analysis the latent root criterion (eigen values greater than 1) was again specified as stopping criterion, resulting in three factors being extracted, and explaining about 65% of the variance in the statement responses. Table 5.43 provides a summary of the second factor analysis.

Table 5.43: Results of the second factor analysis of the possible institutional incentives

	3 Factors		
	F1	**F2**	**F3**
Possibility of promotion	.756	-3.357E-02	.228
Release time from teaching to create online modules	.749	.272	-3.035E-02
Additional remuneration to lecturers	.710	.171	9.881E-02
Less administrative demands on my time	.694	-8.025E-03	.127
More recognition for good teaching practice in general	.670	7.030E-02	.197
Money to pay an assistant to help with devlpt of online material	.652	.200	6.258E-02
More technical training	.111	.876	.221
More pedagogical training in effective use of WebCT	.110	.857	.198
More support (technical and pedagogical)	.216	.760	.321
Better IT infrastructure for lecturers	7.053E-02	.292	.847
Better IT infrastructure for students	.130	.243	.836
Money for hardware and software	.423	.207	.653
Total variance explained	**65%**		

After examining the pattern of loading, I assigned the following three labels to the factors:

- Factor 1: Institutional recognition and reward
- Factor 2: Training and support
- Factor 3: IT infrastructure and hardware and software

Factor scores were calculated for each respondent according to the regression method. These factor scores were also used in a series of comparison procedures (t-test and one-way ANOVAs), with sex, age and faculty as the independent variables. The results are summarised in Table 5.44.

Table 5.44: Cross-tabulation between "Institutional incentives" factor scores and sex, age and faculty

Comparison		N	Mean	Std Dev	Statistics
Sex					
Institutional recognition and reward	Male	107	36.45	20.135	t = 2.584
	Female	65	28.55	18.238	p = .011
Training and support	Male	126	43.56	23.248	t = 2.979
	Female	74	33.48	22.859	p = .003
IT infrastructure & hardware and software	Male	122	37.80	23.760	t = 2.116
	Female	73	30.59	21.658	P = .036
Age					
Institutional recognition and reward	40 yrs and younger	75	32.07	2.196	F =3.139
	Between 41 and 50 yrs	45	29.51	2.671	P = .46
	51 yrs and older	50	39.11	3.139	Eta squared = .036
Training and support	40 yrs and younger	80	40.97	2.582	F = .339
	Between 41 and 50 yrs	60	37.78	3.025	P = .713
	51 yrs and older	58	40.42	3.207	Eta squared = .003
IT infrastructure & hardware and software	40 yrs and younger	82	34.15	2.656	F = .227
	Between 41 and 50 yrs	57	35.67	2.750	P = .797
	51 yrs and older	54	36.83	3.282	Eta squared = .002
Faculty					
Institutional recognition and reward	Human & Social Sciences	56	29.46	20.265	F = 1.471
	Natural Sciences & Engineering	56	36.61	20.889	P = .225
	Economic & Business Sciences	27	37.45	20.301	Eta squared = .026
	Health Sciences	28	33.93	20.305	
Training and support	Human & Social Sciences	67	31.51	21.677	F = 6.061
	Natural Sciences & Engineering	62	45.88	21.621	P = .001
	Economic & Business Sciences	29	48.66	26.643	Eta squared = .088
	Health Sciences	35	37.14	23.484	
IT infrastructure & hardware and software	Human & Social Sciences	65	32.99	21.061	F = 1.851
	Natural Sciences & Engineering	65	34.19	23.431	P = .139
	Economic & Business Sciences	25	45.33	29.383	Eta squared = .029
	Health Sciences	33	36.70	21.243	

The following significant points emerge from Table 5.44:

- With regard to sex, women regard training and support and IT infrastructure more important as institutional motivators than men
- Respondents from Economic and Business Sciences and Natural Sciences and Engineering consider training and support as less important as institutional incentives than Human and Social Sciences respondents.

5.10.6 Overall rating of three current institutional interventions

Lastly, the respondents were asked to rate three institutional interventions with regard to their importance for them personally.

Table 5.45: Please rate the institutional interventions with regard to their importance for you personally:

	Very important and important		**Not important and Not important at all**		**Total**
	Count	%	Count	%	Count
Language	172	81.9%	38	18.1%	210
e-Campus	168	80.4%	41	19.6%	209
Diversity	168	79.6%	43	20.4%	211

Even though the majority of the respondents rate these three institutional initiatives as very important or important, the feeling still exists amongst some lecturers that they were not consulted enough in the e-Campus process. Although, as outlined in Chapter 4, every effort was made to consult as widely as possible during the e-Campus initiative formulation phase, some lecturers experience the initiative as a "top-down" initiative from Administration. This, according to the lecturer quoted below, also causes lecturers to be negative about WebCT.

> *Die Administrasie het ook ongelukkig hulself finansieel verbind tot die E-Kampusinisiatief sonder om vooraf beraadslaging daaroor met akademiese personeellede, wie uiteraard verantwoordelik is vir die uitvoering daarvan, te doen.Gevolglik word die E-Kampus inisiatief meestal as 'n meulsteen, nog 'n ekstra werkslas, wat 'van bo af' deurgegee word, geag. Akademici is om daardie rede baie keer negatief teenoor WebCT.*

The students, on the other hand, welcome the strategy and the minimum presence requirement of the e-Learning project, even if it is only creates an electronic space for them to interact with one other:

> *Dit is irriterend as al jou vakke behalwe een op WebCT is. Elke vak behoort 'n basiese WebCT raamwerk te hê. Selfs al is dit net vir die studente om vrae onder mekaar uit te figure.*

Another student would like a complete presence of all modules on WebCT as a standard policy.

> *Alhoewel al my vakke teenwoordig is op WebCT, neem dit nog steeds spesiale aanvraag aan, veral ouer dosente, om iets op daardie bladsy te sit. Ek sou verkies dat 'n volkome*

teenwoordiging van alle kursusse op WebCT 'n standaardbeleid word van die Universiteit. Dis veral hulpsaam wanneer jy bv. jou notas verloor, en dringend weer moet kry, maar die biblioteek is toe (bv. oor 'n naweek).

<u>To summarise:</u>

- The main prompter to get lecturers started with using WebCT or ICTs in general is WebCT training workshops.
- There is furthermore a clear correlation between whether the respondents attended a WebCT basic workshop and whether they rated a WebCT training workshop as very important or important as a prompter.
- Analysis of the results of what motivates respondents to increase their usage of WebCT reveals that intrinsic teaching and learning issues (such as increased benefits for students) become more important than extrinsic issues (such as training workshops) in the motivation phase.
- This also holds true for the institutional incentives, where demonstrated student benefits are again rated as the most important institutional incentive.
- There appears to be no consensus amongst the lecturers as to whether money should be given as an institutional incentive or not, with 59% of the respondents feeling it is necessary and 40% feeling that monetary incentives are not important.
- With regard to monetary incentives, a noticeable difference exists between the faculties of Human and Social Sciences and Sciences and Engineering. Forty percent of the Human and Social Sciences respondents compared to 28% of the Sciences and Engineering respondents answered yes to the question whether special incentives are necessary. This again highlights the difficulty in formulating one strategy for a very diverse group of faculties within the University.
- Comments gathered in open responses on the questionnaire also bear evidence of the disagreement between lecturers about monetary incentives, with some arguing that the integration of ICTs is part of one's job as lecturer and others feeling that it takes extra time and expertise that should be rewarded separately. The issue of choice as to whether to use ICTs is also a prominent feature in many of the open responses.
- Whereas most of the lecturers are relatively positive about Language, the e-Campus and Diversity as institutional incentives, they do feel that additional debate and consultation with regard to the e-Campus initiative are necessary for it to be successful.

5.11 CONCLUSION

The WebCT Web-based questionnaire for lecturers was administered without any technical problems, with a good overall response rate (46%). A comparison of the demographic data of the population group and sample groups revealed that the sample group is highly similar to the population. This close correlation between the profiles of the two groups is taken as an indicator of the representativeness of the sample.

The following trends emerge from our analysis of the data:

- Most of the respondents perceive themselves to be very computer and WebCT literate. The majority of the respondents scored above average on the computer literacy index, with a more even spread of respondents on the WebCT literacy index. With regard to the computer literacy index, the Natural Sciences and Engineering and Economic and Business Faculties scored higher than the Human Sciences and Health Science Faculties. The male group scores were also higher than the female group scores on the computer literacy index. The only significant result pertaining to the correlation between the WebCT literacy index and the demographic variables was that the 40 years and younger cohort scored higher than the two older categories. It should, however, be kept in mind that these indexes are based on the length of computer/WebCT usage and the lecturers' perceptions of their literacy and not on some objective test.
- The lecturers are using WebCT mostly for the distribution of content, although a move towards interaction can be discerned. This corresponds with the current worldwide trend that lecturers typically start with that which they feel most comfortable with – transporting the classroom online unchanged.
- Lecturers do not use the bulletin board to its fullest potential, both in terms of the frequency and type of messages posted. Students find this frustrating and also complain that content is not updated on a regular basis. Lecturers, on the other hand, have the perception that their use of WebCT, and more specifically the display of content within WebCT, leads to a drop in class attendance.
- There seems to be a general satisfaction with WebCT as tool, with most of the respondents disagreeing with the possible disadvantages and agreeing with the possible advantages.
- The lecturers seem to be quite satisfied with the training and support offered, with a positive correlation between the number of workshops a lecturer has attended and his/her perception of how able he/she is to do WebCT development him/herself. Despite the worldwide trend to more online training, the lecturers' overall preference remains for face-to-face workshops, with the suggestion to extend support within faculties.

- Although the results clearly indicate that the lecturers are quite aware of the possible benefits of the integration of ICTs to enhance the quality of teaching and learning practice, it does not seem as if this is necessarily leading to reflection on how they are using ICTs and redesigning modules/programmes to ensure their effective integration. Unfortunately this has the effect that mostly content is posted, which the students can study without coming to class, leading to a drop in class attendance in some cases.
- Time remains the number one barrier to the integration of ICTs, with it becoming more of a barrier the older the cohort. The other main barriers are the perception that teaching and learning in general are not rewarded, student access to computers on campus (especially Narga and Humarga) and student access to computers off campus. Inadequate infrastructure (lecturers), training and support do not appear to present significant barriers to the use of WebCT and ICTs in general.
- A clear shift from extrinsic to intrinsic factors can be discerned when one considers the prompters to get started with WebCT and to increase WebCT usage together. The results show that the main prompter to get started with WebCT is training and, although training still remains important in the motivation to increase phase, the most important incentives to increase usage are related to intrinsic teaching and learning issues, such as increased benefits for students. This also holds true for the institutional incentives, where demonstrated student benefits are again rated as the most important institutional incentive.
- There appears to be no consensus amongst the lecturers as to whether money should be given as an institutional incentive or not, with 59% of the respondents feeling it is necessary and 40% feeling that monetary incentives are not important. If one looks at a breakdown of these statistics at the faculty level, a clear difference exists between Human and Social Sciences and Sciences and Engineering, with a higher percentage of the Human and Social Sciences respondents (40%) compared to the Sciences and Engineering respondents (28%) having the opinion that monetary incentives should be given.
- Whereas most of the lecturers are relatively positive about Language, e-Campus and Diversity as institutional incentives, they do feel that additional debate and consultation with regard to the e-Campus initiative is necessary for it to be successful.

Overall, these results correlate with the worldwide trend and show that we are still very much in the first phase of implementation of e-Learning, which entails a focus on content distribution and classroom teaching being “transported” online without any real reflection. However, there are exceptions and one can discern a trend within the Stellenbosch context towards more sophisticated applications of ICTs, with the necessary reflection on how they change teaching and learning in general. It becomes clear, when looking at the survey results that the lecturers are aware of the possible benefits, but that this does not necessarily translate into their teaching and learning practice. In this regard, time to attend workshops, develop and update online material and communicate with students online emerge as the biggest barriers. It is not that the lecturers do not want to teach well or do not have ideas of how to improve their teaching and learning – they just do not always have the time to do so because of increasing research and administrative responsibilities.

Adding value to teaching and learning activities through the integration of ICTs is impossible to do without the proper tool, which has to be supported by stable IT infrastructure and flexible support and training programmes for both lecturers and students. These issues, especially training, are identified as some of the important incentives to get lecturers started and increase their usage of WebCT. It is encouraging to note in this regard that, overall, the respondents are quite satisfied with all of these aspects and make suggestions to localise support initiatives within faculties. The only exception to this general level of satisfaction, is the valid concerns raised with regard to inadequate student access to computers, both on and off campus.

Although there seems to be disagreement whether there should be monetary incentives for e-Learning initiatives, ample evidence was found in the responses that monetary incentives are appreciated as a reward for extra effort and that they could serve as a motivator for lecturers who otherwise would never have thought about using ICTs in teaching and learning activities. This disagreement highlights the difficulty of formulating one strategy for a very diverse group of faculties within the University.

The biggest incentive to use ICTs in teaching and learning remains rewards for teaching and learning in general, especially on the same level as research, as well as proof that the integration of ICTs does add value to teaching and learning and has benefits for students. In this regard it is recommended that the University of Stellenbosch makes a conscious effort to identify best practice examples of e-Learning applications and does research on the possible benefits for students. The e-Learning part of the module/programme should, however, not be studied in isolation, but a conscious effort should be made to study how the use of ICTs integrates with other types of methods.

Lastly, lecturers feel strongly that they should have a choice about whether the use of ICTs is appropriate for their specific module/programme and that they should have an opportunity to give more input on the e-Campus initiative as a whole. They feel that they are not necessarily opposed to the idea of an e-Campus, but that they can play a bigger role in defining the aims and objectives of the overall process. It became clear that there are still many misconceptions about what the aims of the e-Campus are, e.g. that the e-Campus and the integration of WebCT will make the University of Stellenbosch a distance education institution. It is explicitly stated in the e-

Campus documentation that this is not a driver of the initiative. In this regard, it is recommended that more lecturers are included in the planning and implementation of the e-Campus initiative and that special attention is given to the communication of the e-Campus message.

CHAPTER 6: RESULTS OF WEBCT QUESTIONNAIRE (STUDENTS)

6.1 INTRODUCTION

There has been an exponential growth in the use of WebCT since its introduction at the University of Stellenbosch in 1999. This is the result of both the evolutionary bottom-up initiatives by lecturers as well as the e-Learning project described in Chapter 4. Figures 6.1 to 6.3 give the analysed requests for the server for the following two time periods:

- 14 February 2002, 21.21 to 1 October 2002, 02.02 (228.2 days)
- 2 January 2003, 9:06 to 25 October 2003, 02:06 (295.71 days)

Figure 6.1: Average successful WebCT requests per day

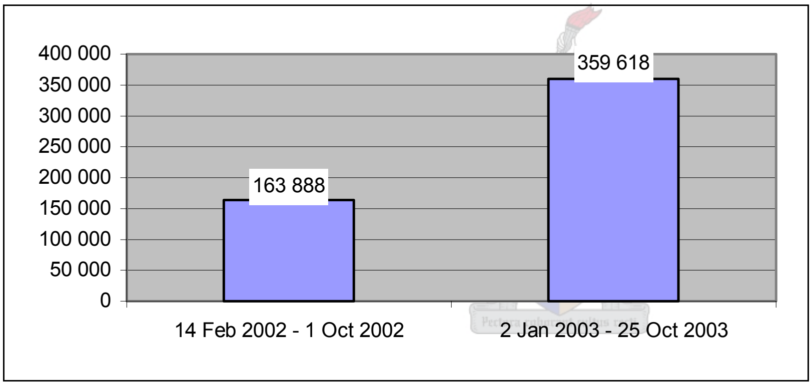


Figure 6.2: Average WebCT data transferred per day (in gigabytes)

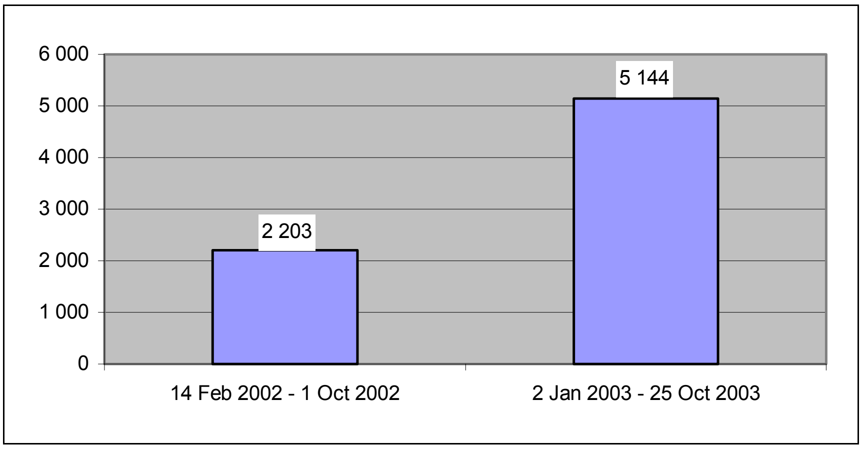
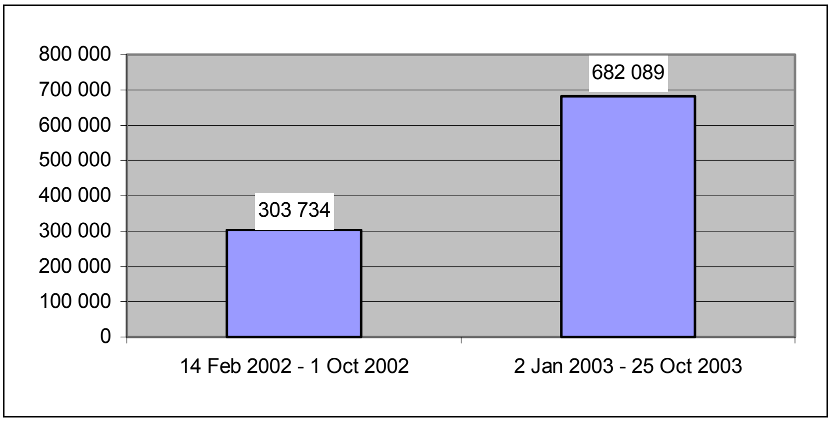


Figure 6.3: Distinct WebCT files requested



Although these statistics are useful in that they illustrate that the use of WebCT is increasing, they do not give an indication of how students use WebCT, whether the use of WebCT adds value to teaching and learning activities in general and whether students are satisfied with the infrastructure and tool. To get a more complete picture of the use of WebCT beyond mere server statistics, the following questions need to be answered:

- Are the students satisfied with the training and support available? What type of training and support do they prefer?
- Are the students satisfied with WebCT as LMS? What do they perceive to be the advantages of using it?
- What do the students perceive to be the main barriers/challenges when using WebCT/ technology infrastructure in general?
- Are the students satisfied with the infrastructure, support and training infrastructure? What type of support do they prefer? Are they satisfied with the computer access?
- Are students aware of the possible benefits of the integration of ICTs? Do they experience these benefits in their modules? Do they feel the ICTs are integrated into their modules/programmes?

Before these questions are addressed, a brief outline is given of the methodology, as well as of the demographics and computer/WebCT literacy of the group surveyed.

6.2 METHODOLOGY

6.2.1 The survey instrument

The students' survey questionnaire consisted of 16 questions[72] relating to the following issues:

- How long students have been using computers and WebCT,
- How students perceive their computer and WebCT skills,
- The students' training and support preferences,
- The students' general satisfaction with WebCT as tool, i.e. what they perceive to be the major advantages and disadvantages of the tool,
- The students' perceived barriers and challenges with regard to the use of WebCT and ICTs in general, with a special emphasis on student access to computers on campus in computer-user areas, and
- What students perceive to be the possible benefits of the integration of ICTs and their perceptions of how integrated the WebCT component is within their modules/ programmes.

6.2.2 Development of a sampling frame

The WebCT user statistics as on 17 August 2003 (Table 6.1 below) were used to draw the sample. WebCT 2003 and Tygerberg 2003 are the two WebCT production servers used for teaching and learning activities, whereas WebCT Dev is the development server used for training and development purposes. No students have access to WebCT Dev.

<u>Table 6.1: WebCT user statistics on 17 August 2003</u>

<table>
<tr><th>Server</th><th>Number of students</th><th>Duplicates</th><th>Sample</th></tr>
<tr><td>WebCT 2003</td><td>14 324</td><td rowspan="2">781</td><td rowspan="2">15 803</td></tr>
<tr><td>Tygerberg 2003</td><td>2 260</td></tr>
<tr><td>WebCT Dev</td><td>0</td><td></td><td></td></tr>
</table>

[72] Attached as Addendum C.

A total of 781 of the students had courses on both WebCT 2003 and Tygerberg 2003. I therefore subtracted 781 from the total number of students on the two servers to obtain the sample of 15 803 students.

6.2.3 Development and implementation of a Web-based survey system

I followed a Web-based survey approach, in which the respondents could complete the questionnaire online with the responses captured to a database. Personalised e-mails with a covering letter and a hyperlink to the survey were sent to all students with modules on WebCT. Only these students could gain access to and complete the questionnaire by entering their student number. I used these student numbers to relate the respondents' responses to the demographic data of the respondents extracted from the student systems database of the University.

6.2.4 Questionnaire submission rates

A total of 2 691 completed questionnaires were received. Table 6.2 summarises the reponse rate.

Table 6.2: Questionnaires submitted

E-Mail	E-mail problems	Sample	Response	Percentage
15 803	382	15433	2691	17.5%

Of the 15 803 sent out, 382 e-mails were not delivered as a result of full e-mail inboxes. The sample therefore consisted of 15 433, with a response rate of 17.5%.

6.3 REPRESENTIVITY OF THE SAMPLE

I will now consider seven figures (Figures 6.4 to 6.10) to show how representative the sample is. These figures show the comparison between the demographic data of the WebCT student population (15 803)[73] and the sample (2691).

[73] The total student population for 2002 is 21 434.

Figure 6.4: Age distribution

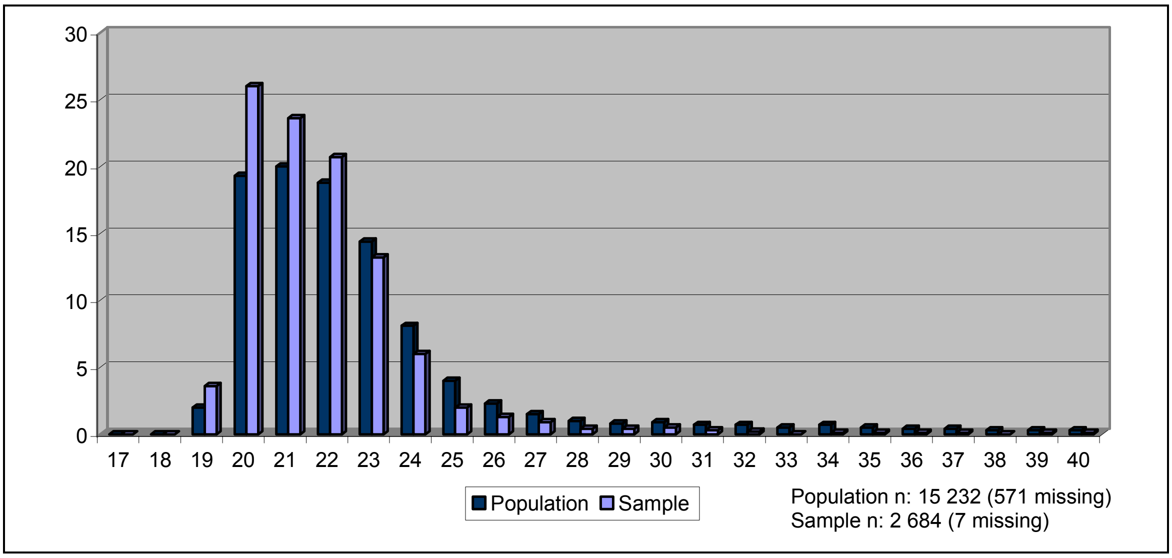


Figure 6.5: Race distribution

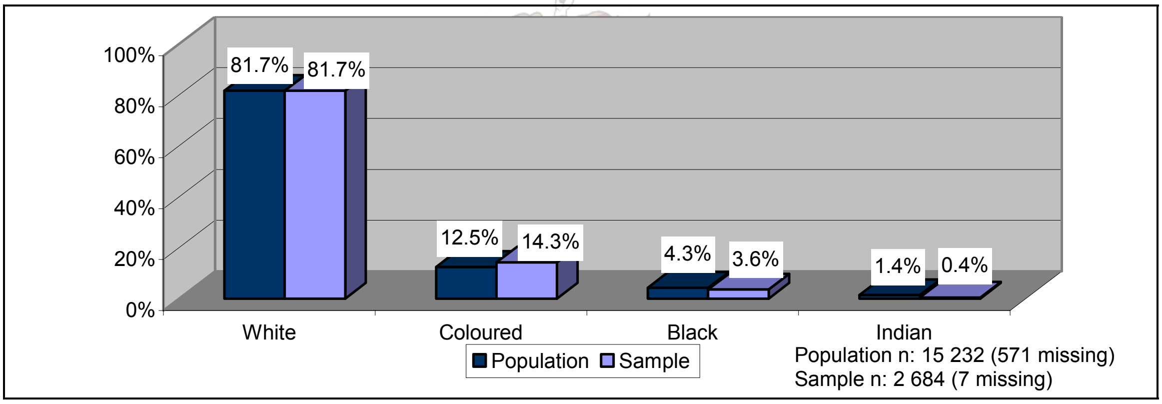


Figure 6.6: Language distribution

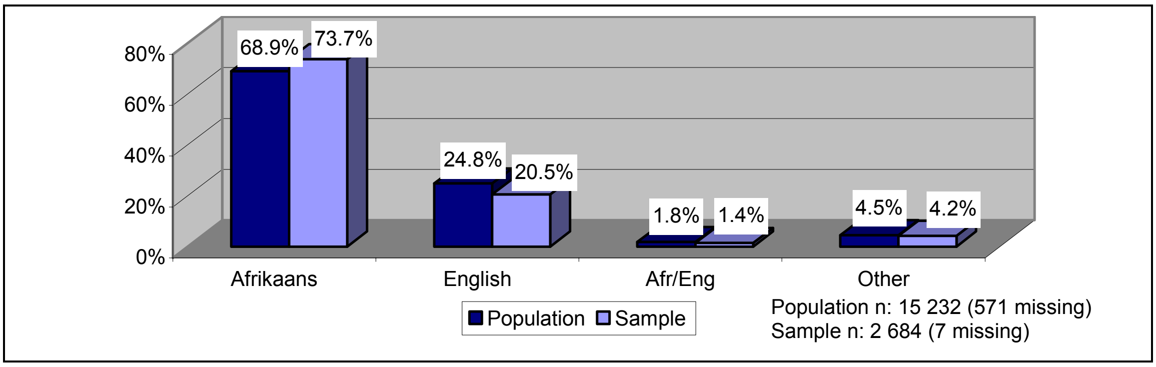


Figure 6.7: Sex distribution

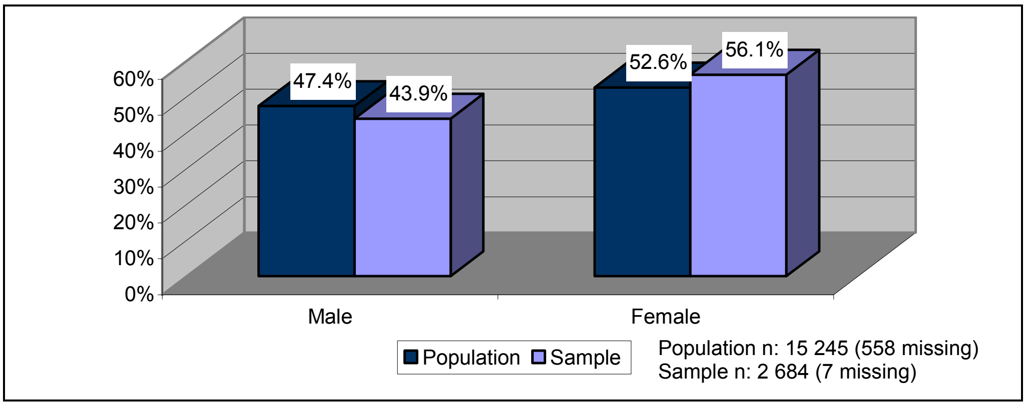


Figure 6.8: Faculty

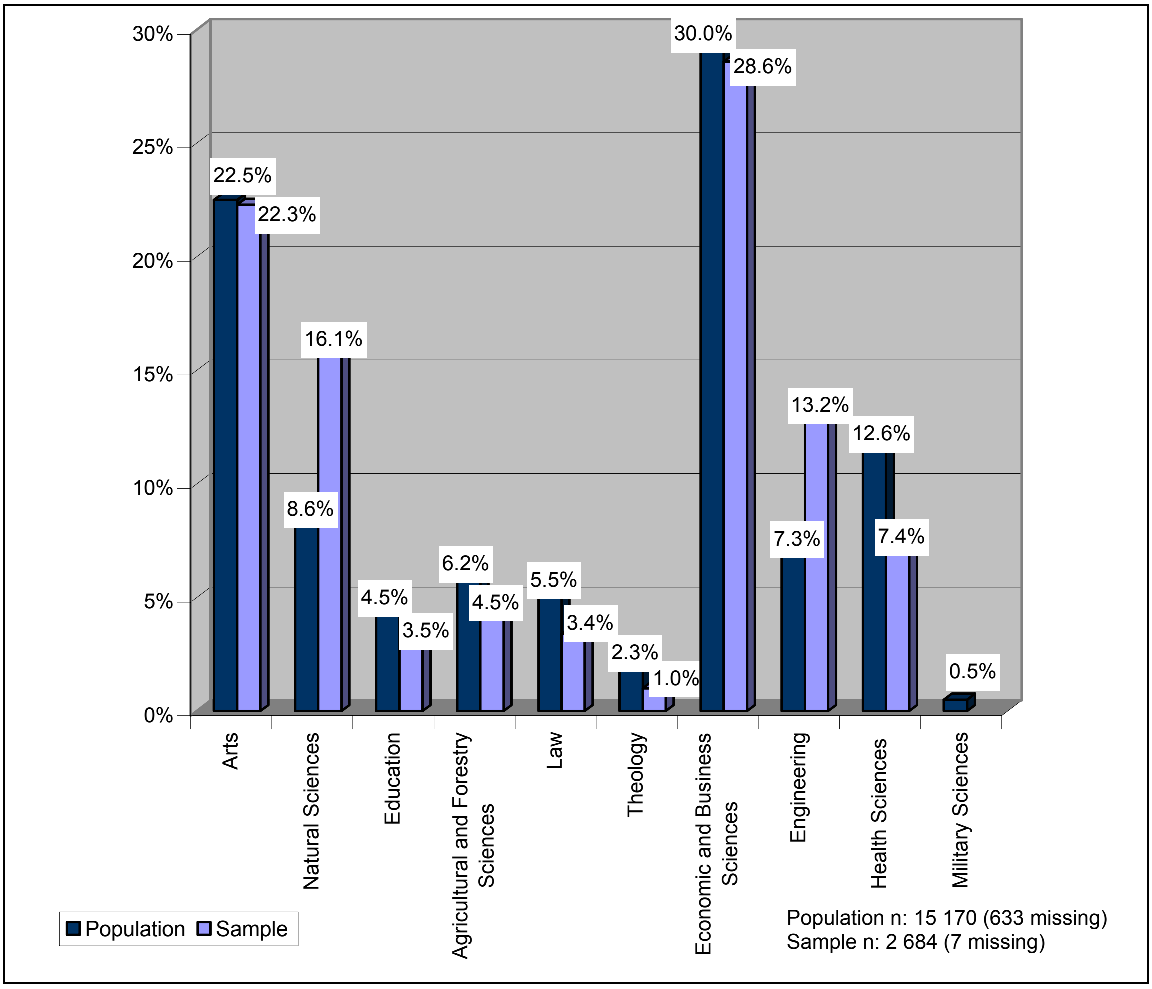


Figure 6.9: Undergraduate/Postgraduate

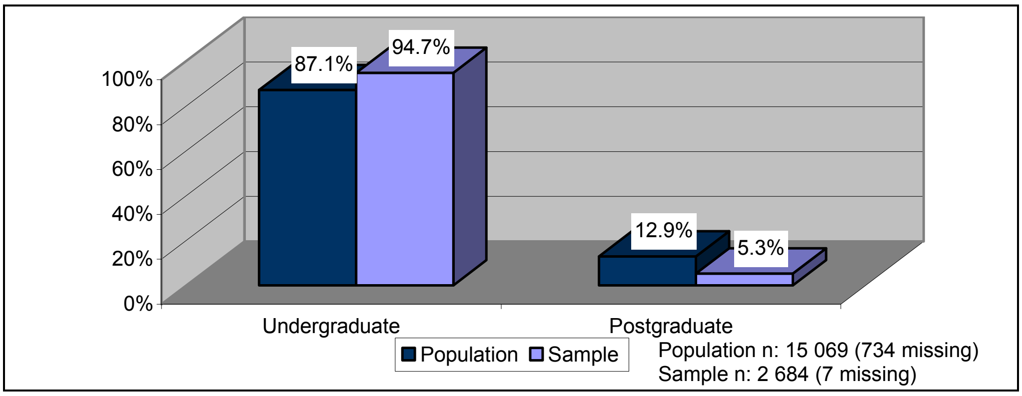
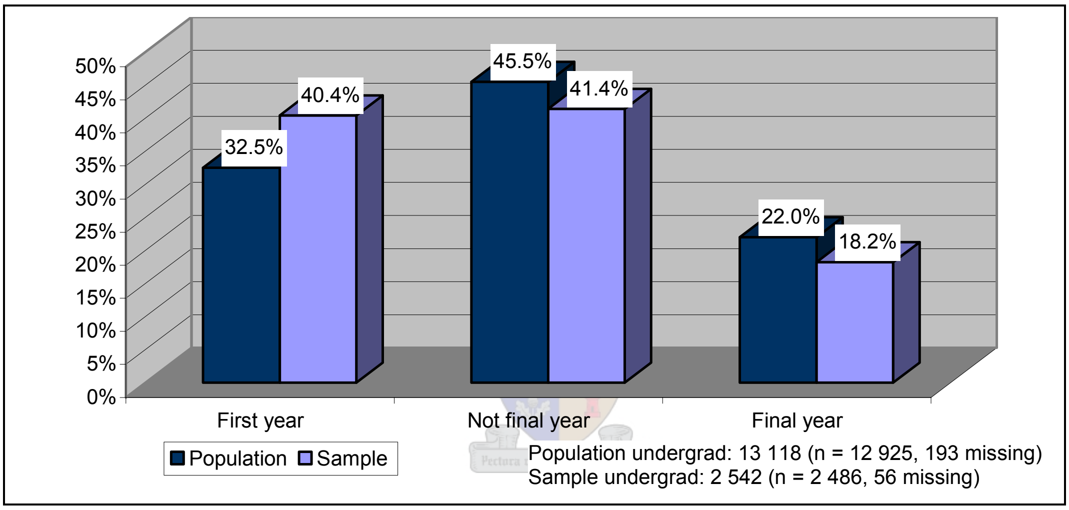


Figure 6.10: Year of study (only undergraduate)



It is clear from these figures that the demographic profile of the sample group is highly similar to that of the population. This close correlation between the profiles of the two groups is taken as an indicator of the representativeness of the sample. The sample differs from the population only in terms of age and faculties, with:

- Slightly higher representations of 20 to 22 year olds and a slightly lower representation of 24 year olds
- Higher representations in the Natural Sciences and Engineering Faculties and a slightly lower representation in the Health Sciences

These differences are to be expected if one takes into account that the Natural Sciences and Engineering students are more likely to use computers in their studies and therefore more likely to read the e-mail, follow the hyperlink and complete the survey. Nevertheless, these differences are sufficiently small that, together with the large number of respondents (2 691), we can accept the survey responses as a very good indication of the views of all the WebCT student users at the University of Stellenbosch.

In summary then, Figures 6.4 to 6.10 show that the respondents are mostly:

- 20 to 24 year old,
- White,
- Afrikaans speaking,
- Female,
- From the Economic and Business Sciences Faculty, and
- Undergraduate and not in their first or final year of study.

6.4 COMPUTER AND WEBCT LITERACY

The students were asked how long they had been using computers and WebCT specifically, as well as how they rate their computer and WebCT skills, to ascertain their computer and WebCT literacy. In order to correlate these responses with other variables, such as faculty, sex and age, I constructed two separate indices, one for computer literacy and one for WebCT literacy. The distributions of the responses, the construction of the indices as well as the cross-tabulations between these indices and three demographic variables (faculty, sex and age) are discussed below.

6.4.1 Computer literacy

The majority of the respondents had been using computers for five to 10 years (Table 6.3). This is quite remarkable if one takes into account that the majority of the respondents are between 20 and 24 years of age.

Table 6.3: Length of computer use

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 1 year	120	4.5	4.5	4.5
1-2 years	214	8.0	8.0	12.5
3-4 years	489	18.2	18.3	30.7
5-6 years	670	24.9	25.0	55.8
7-10 years	753	28.0	28.1	83.9
More than 10 years	432	16.1	16.1	100.0
Total	2678	99.5	100.0	
System	13	.5		
	2691	100.0		

Students were also asked to rate their computer skills (Table 6.4). Although the majority of students had been using computers for between five and 10 years, only 7% rated themselves in the expert category. The majority of the respondents rated themselves in the intermediate category (63%).

Table 6.4: Rating of computer skills

	Frequency	Percent	Valid Percent	Cumulative Percent
1_Beginner	59	2.2	2.2	2.2
2_Beginner	114	4.2	4.3	6.5
3_Beginner	257	9.6	9.6	16.1
4_Intermediate	895	33.3	33.4	49.5
5_Intermediate	790	29.4	29.5	79.0
6_Intermediate	378	14.0	14.1	93.2
Expert	183	6.8	6.8	100.0
Total	2676	99.4	100.0	
System	15	.6		
	2691	100.0		

To ascertain whether there is a difference between the different racial groups with regards to length of computer use and rating of computer skills, an one-way Anova procedure was used to compare the means (Table 6.5 below). African black, Indian and Coloured students were grouped together as a subgroup "black students", because of their small numbers.

Table 6.5: Cross-tabulation between length of computer use, rating of computer skills and race

Comparison		N	Mean	Std Dev	Statistics
Length of computer use	White	2181	4.30	1.227	F = 211.981
	Black	487	3.36	1.385	p = .000
	TOTAL	2678	4.13	1.348	
Rating of computer skills	White	2180	4.64	1.252	F = 72.735
	Black	496	4.10	1.342	p = .000
	TOTAL	2676	4.54	1.286	

Although it is clear from Table 6.5 that there are significant differences between the two racial groups with regard to both length of computer use and rating of computer skills, it is interesting to note that that the biggest difference between the means exist with regard to length of computer use. This clearly indicates that black students, most of them from historically disadvantaged backgrounds, enter University with a significant disadvantage based on their lack of access to computers in the pre-university phase.

6.4.2 Computer literacy index

I combined the length of computer use and the students' rating of their own computer skills to create a computer literacy index. This process involved three steps.

First of all, I reduced the six categories of length of computer use (Table 6.3) to five and the seven categories of rating of computer skills (Table 6.4) to five. The new variables created in this way with distributions are summarised in Table 6.6 below.

Table 6.6: Recoded variables used to create the computer literacy index

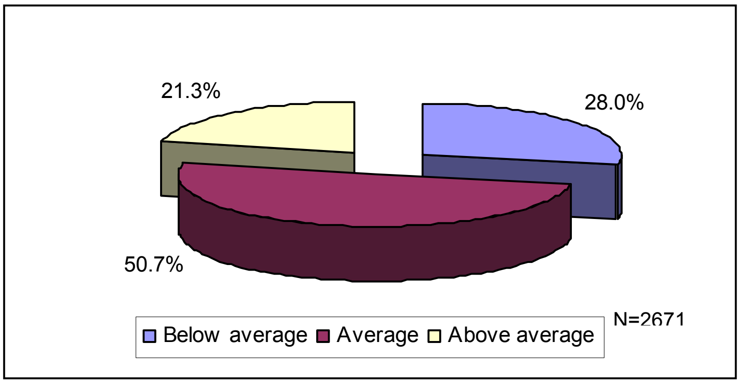
Variable	Frequency	Valid Percent	Value assigned
Length of computer use (N = 2 678)			
2 years or less	334	12.5	0
3-4 years	489	18.3	1
5-6 years	670	25.0	2
7-10 years	753	28.1	3
More than 10 years	432	16.1	4
Rating of computer skills (N = 2 676)			
Beginner	430	16.1	0
Lower intermediate	895	33.4	1
Middle intermediate	790	29.5	2
Upper intermediate	378	14.1	3
Expert	183	6.8	4

Secondly, I assigned a value to each variable category (lowest category = 0, See Table 6.6) and summed these values across variables to yield a single score for each respondent. The scores ranged from 0 – 8 and their distribution is shown in Table 6.7.

Table 6.7: Distribution of computer literacy scores

Score	Frequency	Valid Percent	Cumulative Percent
0	178	6.7	6.7
1	227	8.5	15.2
2	344	12.9	28.0
3	420	15.7	43.8
4	483	18.1	61.8
5	451	16.9	78.7
6	302	11.3	90.0
7	169	6.3	96.4
8	97	3.6	100.0
Total	2671	100.0	
System	20		

Figure 6.11: Computer literacy index



Lastly, to produce a convenient number of categories for cross-tabulations, I reduced the seven scores to three in the following way (Figure 6.11):

- Below average (0-2)

- Average (3-4)
- Above average (5-7)

Table 6.8: Frequency of usage of standard computer applications

	Daily		About once a week		A few times a month		Once a semester and less		Total
	Count	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**
E-mail	1793	67.2%	735	27.5%	126	4.7%	15	.5%	2669
Internet	935	35.3%	1028	38.8%	494	18.6%	192	7.3%	2649
WebCT	1045	39.3%	1103	41.5%	395	14.9%	116	4.4%	2659
Microsoft Office	632	24.9%	927	36.5%	557	21.9%	412	16.7%	2538

The majority of the respondents use all the standard computer applications at least once a week. E-mail remains the most popular application, with more than two thirds of the respondents indicating that they use it daily.

6.4.3 Cross-tabulating the computer literacy index with key demographic data

Table 6.9 shows the cross-tabulations between the computer literacy index and faculty, sex, race and year of study (undergraduate only).

Table 6.9: Cross-tabulation between demographic variables (faculties, sex, race and year of study) and computer literacy index

Comparison	Computer literacy index						Total	Statistics
	Below average		Average		Above average			
	N	%	N	%	N	%	N	
Faculties								
Arts & Humanities	179	30.2	315	53.1	99	16.7	593	Chi-square = 111.431 p = .000
Natural Sciences	126	29.6	209	49.1	91	21.4	426	
Education	28	29.8	49	52.1	17	18.1	94	
Agricultural and Forestry Sciences	55	45.1	54	44.3	13	10.7	122	
Law	31	34.4	50	55.6	9	10.0	90	
Theology	8	28.6	13	46.4	7	25.0	28	
Economic and Business Sciences	191	25.1	408	53.6	162	21.3	761	
Engineering	67	19.1	147	41.9	137	39.0	351	
Health Sciences	63	31.7	105	52.8	31	15.6	199	
TOTAL	748	**28.1**	1350	**50.7**	566	**21.2**	2 664	
Sex								
Male	259	22.2	530	45.3	380	32.5	1 169	Chi-square = 162.046 p = .000
Female	489	32.7	820	54.8	186	12.4	1 495	
TOTAL	748	**28.1**	1 350	**50.7**	566	**21.2**	2 664	

Comparison	Computer literacy index						Total	Statistics
	Below average		Average		Above average			
	N	%	N	%	N	%	N	
Race								
White	512	23.5	1138	52.3	526	24.2	2176	Chi-square = 149.165 p = .000
Coloured	179	47	167	43.8	35	9.2	381	
African black	54	56.8	37	38.9	4	4.2	95	
Indian	3	25	8	66.7	1	8.3	12	
TOTAL	748	**28.1**	1350	**50.7**	566	**21.2**	2664	
Year of study								
First year	369	37.1	481	48.4	144	14.5	994	Chi-square = 89.202 p = .000
Non-final year	286	28	509	49.8	228	22.3	1 023	
Final year	67	14.9	259	57.6	124	27.6	450	
TOTAL	722	**29.3**	1 249	**50.6**	496	**20.1**	2467	

It is important to emphasise that the computer literacy index is a self-reporting index that is partly based on the respondents' own opinion of their computer literacy. It is not based on some objective computer literacy measure or test. Nevertheless, the following salient points do emerge from the correlations with regard to faculties:

- About half of the students in the Agricultural and Forestry Sciences fall within the below average segment of the index, whereas only one fifth of the students in the Engineering Faculty fall in the below average category. Most of the Engineering students (39%) fall in the above average segment of the index. It is to be expected that the Engineering students would rate themselves higher than the other students.
- One would have expected that more of the Natural Science students would be in the above average category, but surprisingly their percentage is equal to that of the Economic and Business Science students and surpassed by the percentage of Theology students. Although the number of the Theology respondents is quite small, one should not summarily dismiss it. Lecturers in the Theology and Economic and Business Science faculties have considerably expanded their e-Learning activities and it could be that students feel more comfortable with technology because they are expected to use it on a regular basis as part of their learning activities.

With regard to sex:

- More male than female students fall in the above average category on the computer literacy index. One possible explanation for this significant difference between the female and male ratings could be the fact that the majority of the Engineering students, who rate themselves mostly in the above average category, are male.

With regard to race:

- The majority of the African black (57%) and coloured (47%) students fall in the below average category on the computer literacy index. The majority of the white students fall in the average category and a significant percentage (24%) of them in the above average category. This comes as no surprise because the results in Table 6.5 clearly show that the subgroup black students (African black, Coloured and Indian) have been using computers for a shorter length of time than white students. What does become clear from Table 6.9, however, is that there also exists a significant difference between the African black and Coloured students with more African black students falling in the below average category and more Coloured students falling in the above average category.

With regard to year of study:

- It is encouraging to note that the computer literacy of the students improves the longer they study at the University of Stellenbosch. One cannot, however, infer too much from this increase, as the computer literacy index is partly constructed using the number of years students have been using computers. There is a good chance that the older students have been using computers for a longer time purely as a function of their age.

6.4.4 WebCT literacy

Table 6.10: Length of WebCT use

	Frequency	Percent	Valid Percent	Cumulative Percent
Since 1999	47	1.7	1.8	1.8
Since 2000	274	10.2	10.3	12.0
Since 2001	654	24.3	24.5	36.6
Since 2002	646	24.0	24.2	60.8
Since 2003	1043	38.8	39.2	100.0
Total	2664	99.0	100.0	
System	27	1.0		

Most of the students have only been using WebCT since 2003. This is to be expected because most of the respondents are undergraduates, and not in their final year of study and the use of WebCT only really increased in 2001.

Students were also asked to rate their WebCT skills (Table 6.11). Although most of the respondents have only been using WebCT since 2003, it is interesting to note that more than half of them rate themselves as intermediate users. This can be seen as an indication that students find it is relatively easy to learn how to use WebCT and that they quickly progress from beginner to intermediate users of the application.

Table 6.11: WebCT skills

	Frequency	Percent	Valid Percent	Cumulative Percent
1_Beginner	46	1.7	1.7	1.7
2_Beginner	69	2.6	2.6	4.3
3_Beginner	220	8.2	8.3	12.6
4_Intermediate	700	26.0	26.3	38.9
5_Intermediate	741	27.5	27.9	66.8
6_Intermediate	582	21.6	21.9	88.7
Expert	301	11.2	11.3	100.0
Total	2659	98.8	100.0	
System	32	1.2		

Table 6.12: Cross-tabulation between length of WebCT use, rating of WebCT skills and race

Comparison		N	Mean	Std Dev	Statistics
Length of WebCT use	White	2170	3.84	1.094	F = 27.116
	Black	494	4.12	1.061	p = .000
	TOTAL	2664	3.89	1.093	
Rating of WebCT skills	White	2168	4.92	1.293	F = 17.256
	Black	491	4.65	1.446	p = .000
	TOTAL	2659	4.87	1.327	

Whether it is clear from Table 6.12 that there are significant differences between the two racial groups with regard to both length of WebCT use and rating of WebCT skills, it is interesting to note that the black students indicated that they have been using WebCT longer, but at the same time they rate their WebCT skills lower than the white students. This could be attributed to the fact that the black students also rate their general computer skills lower than the white students.

6.4.5 WebCT literacy index

In order to create a WebCT literacy index, the length of WebCT use was combined with the respondents' rating of their own WebCT skills. The procedure entailed three steps.

First of all, I reduced the five categories of length of WebCT use (Table 6.10) to four categories and the seven categories of rating of WebCT skills (Table 6.11) to five categories. This resulted in two new variables, with distributions as summarised in Table 6.13 below.

Table 6.13: Recoded variables used to create the WebCT literacy index

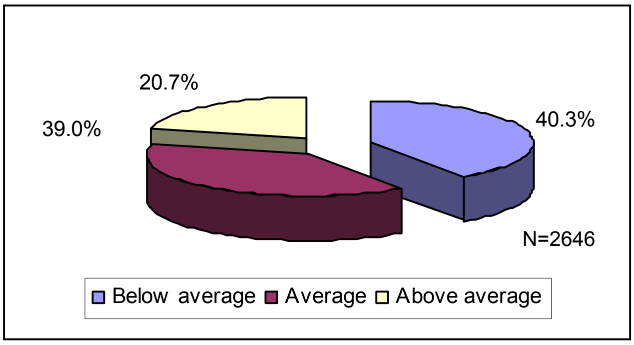
Variable	Frequency	Valid Percent	Value assigned
Length of WebCT use (N = 2 664)			
Since 2003	1043	39.2	0
Since 2002	646	24.2	1
Since 2001	654	24.5	2
Since 1999/2000	321	12.0	3
Rating of WebCT skills (N = 2 659)			
Beginner	335	12.6	0
Lower Intermediate	700	26.3	1
Middle Intermediate	741	27.9	2
Upper Intermediate	582	21.9	3
Expert	301	11.3	4

Secondly, I assigned a value to each variable category (lowest category = 0, See Table 6.11) and these values were summed across variables to yield a single score for each respondent. The scores ranged from 0 to 7 (See Table 6.14).

Table 6.14: Distribution of WebCT literacy scores

	Frequency	Valid Percent	Cumulative Percent
0	181	6.8	6.8
1	353	13.3	20.2
2	532	20.1	40.3
3	546	20.6	60.9
4	486	18.4	79.3
5	333	12.6	91.9
6	163	6.2	98.0
7	52	2.0	100.0
Total	2646	100.0	
System	45		

Figure 6.12: WebCT literacy index



Lastly, to produce a convenient number of categories for cross-tabulations, I reduced the seven scores in the following way (Figure 6.12):

- Below average (0-2)
- Average (3-4)
- Above average (5-7)

6.4.6 Cross-tabulating the WebCT literacy index with key demographic data

<u>Table 6.15: Cross-tabulation between demographic variables (faculties, sex and race) and WebCT literacy index</u>

Comparison	WebCT literacy index						Total	Statistics
	Below average		Average		Above average			
	N	%	N	%	N	%	N	
Faculties								
Arts & Humanities	237	40.4	201	34.3	148	25.3	586	Chi-square = 78.295 p = .000
Natural Sciences	170	42.5	161	38	83	19.6	424	
Education	44	47.8	33	35.9	15	16.3	92	
Agricultural and Forestry Sciences	54	44.6	51	42.1	16	13.2	121	
Law	29	33	38	43.2	21	23.9	88	
Theology	13	46.4	10	35.7	5	17.9	28	
	Below Average		**Average**		**Above Average**			
	N	**%**	**N**	**%**	**N**	**%**	**N**	
Faculties								
Economic and Business Sciences	258	34	345	45.5	155	20.4	758	
Engineering	128	36.9	130	37.5	89	25.6	347	
Health Sciences	118	60.5	62	31.8	15	7.7	195	
TOTAL	1061	**40.2**	1031	**39.1**	547	**20.7**	2 639	
Sex								
Male	403	34.8	480	41.4	276	23.8	1 159	Chi-square = 27.584 p = .000
Female	658	44.5	551	37.2	271	18.3	1 480	
TOTAL	1 061	**40.2**	1 031	**39.1**	547	**20.7**	2 639	
Race								
White	816	37.8	874	40.5	467	21.7	2 157	Chi-square = 34.346 p = .000
Coloured	184	48.9	127	33.8	65	17.3	376	
African black	51	54.3	28	36.7	15	16	94	
Indian	10	83.3	2	16.7	0	0	12	
TOTAL	1 061	**40.2**	1 031	**39.1**	547	**20.7**	2 639	

A significant number of the Health Science students fall in the below average category on the WebCT index. This can be attributed to the fact that the Health Sciences lecturers do not use WebCT to a large extent and the students themselves therefore do not use WebCT regularly. Although differences exist between the male and female students, with more male students scoring higher on the index and more females scoring in the below average category than males, these differences are not as pronounced as in the computer literacy index. The same applies to race. Although a significant number of African black students and coloured students fall in the below average category, the differences are not as pronounced as in the computer literacy index. The subgroup differences are not large in Table 6.15. This indicates that all students are more or less WebCT literate, with the only exception being the Health Science, African black and coloured students.

6.4.7 Number of WebCT courses

Approximately one third of the students had six and more courses on WebCT (Table 6.16). This is quite a substantial amount of "courses", but it has to be kept in mind that a "course" is not necessarily a "module". It could be a whole programme, a combination of modules, one module or even a part of a module.

Table 6.16: Number of WebCT courses

	Frequency	Percent	Valid Percent	Cumulative Percent
1	240	8.9	8.9	8.9
2	103	3.8	3.8	12.7
3	130	4.8	4.8	17.6
4	161	6.0	6.0	23.6
5	205	7.6	7.6	31.2
6	333	12.4	12.4	43.6
7	294	10.9	10.9	54.5
8	242	9.0	9.0	63.5
9	174	6.5	6.5	69.9
10	142	5.3	5.3	75.2
11	123	4.6	4.6	79.8
12	87	3.2	3.2	83.0
13	157	5.8	5.8	88.9
14	66	2.5	2.5	91.3
15	196	7.3	7.3	98.6
16	11	.4	.4	99.0
17	10	.4	.4	99.4
18	6	.2	.2	99.6
19	4	.1	.1	99.7
20	1	.0	.0	99.8
21	4	.1	.1	99.9
22	1	.0	.0	100.0
24	1	.0	.0	100.0
Total	2691	100.0	100.0	

To summarise:

With regard to computer literacy and WebCT literacy, the students rated themselves primarily as intermediate users. If one takes the period of computer/WebCT use and their own rating of their computer/WebCT skills together and correlates them with demographic variables, the following issues emerge:

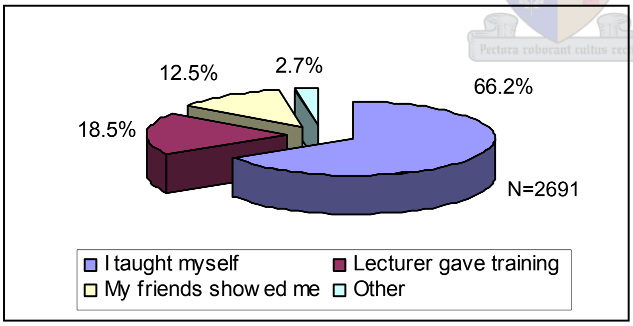
- The Engineering students rate themselves the highest on the computer literacy index, with the Agricultural and Forestry Sciences students mostly in the below average category.

- The computer literacy index scores for the male students are higher than those of the female students – possibly because of the predominance of (male) Engineering students who rate themselves in the above average category.
- The differences between the WebCT literacy scores for the different faculties, with the exception of the Health Sciences Faculty, where most of the students scored in the below average category, are not as evident as in the computer literacy index.
- The same applies to the differences in WebCT literacy scores between the male and female students, where the differences are not as prominent as in the computer literacy index.
- With regard to race, the African black and Coloured students rate themselves lower on the WebCT literacy index, but the differences are not as pronounced as in the case of the computer literacy index.
- The fact that the differences between the groups with regard to the WebCT literacy index are not that significant, indicates a general WebCT literacy level for all students

6.5 TRAINING AND SUPPORT

6.5.1 Getting started

Figure 6.13: How did you get started with WebCT?



There are no formal training and support programme for students in the use of WebCT. Uni-Ed recommends to lecturers that they give students a brief introduction to what type of activities they need to do on WebCT in the first few lectures at the start of the semester. The hypothesis that WebCT is fairly user-friendly is confirmed by the fact that two thirds of the students (Figure 6.13 above) claim that they taught themselves how to use WebCT.

The hypothesis that WebCT is easy enough for students to learn and that no formal programme is necessary is furthermore confirmed by students' comments in the open response question of the survey:

> *WebCT is regtig gebruikersvriendelik. Volgens my kan enige iemand sommer homself leer hoe dit werk - hoe moeilik is dit om op 'n link te click?! Dit is kardinaal tot my studies,*

en ek weet dat as ek bietjie deurmekaar is met wat in my kurses aangegaan kan ek net op WebCT kyk in die gemak van my koshuiskamer en dan weet ek wat aangaan.

Other ways of getting started include a combination of the methods listed in Figure 6.17, as well as various first-year programmes.

Table 6.17: Other ways of getting started with WebCT

	Frequency	Valid Percent
Combination of lecturer, friends and self	19	26.4
First-year information skills/literacy course	16	22.2
Combination of lecturer and friends	12	16.7
First year orientation/bridging programme	10	13.9
Combination of friends and self	8	11.1
Not learnt yet	3	4.2
Help personnel/desk/CUAs	2	2.8
Total	70	100.0
System	2621	

Although most students feel that they do not need any formal training programme and that help from the lecturer and friends is adequate, some students still feel that some WebCT orientation is necessary for less computer literate students – especially first year students.

WebCT is definitief die weg na die toekoms en die moontlikhede daarvan is werklik eindeloos. Die volle potensiaal daarvan word egter nog nie volledig verwesenlik nie. Verdere uitbreiding van hierdie sisteem (soos ek seker is aan die gebeur is) sal egter beter hulpverleningsfasiliteite en beter opleiding van studente verg. Studente se algemene rekenaarvaardighede geniet nog te min aandag. 'n Fantastiese instrument is nutteloos indien slegs 'n paar mense dit kan verstaan en gebruik.

Their suggestions for training and support include:

- An extension of the introduction at the beginning of the year for first year students

It might be useful to offer students one or two hour (voluntary) courses to upgrade our personal skills on WebCT. For first years arriving at the university at the beginning of the year all the info can be overwhelming. It would be useful to have another opportunity to learn more, now that I know the basics.

As a first year student WebCT was essential for me to use. As a computer literate student I had no problem with the usage but other students who have never yet used a PC did however find it rather troublesome. I would strongly suggest that you have more than the *one introduction class you give us at the begining of the year. Do take into consideration that not all the students get it the first time around and need more time to get used to it and understand it.*

- Using computer literacy classes to do WebCT training

Ek dink ook dat die Rekenaarvaardigheid klasse kan optree as 'n plek waar WebCT en sy funksies aan studente verduidelik kan word. Verder dink ek nie dit is nodig om 'n oormaat nuwe personeellede aan te stel vir WebCT nie. Waar mense probleme ondervind word hulle in die meeste gevalle gehelp deur mede-studente.

6.5.2 Support preference

At the beginning of the year, there are usually quite a number of student WebCT queries as the students register and access WebCT for the first time. To accommodate these students, a central WebCT helpdesk with telephonic, face-to-face and e-mail support was created at the beginning of 2003 as an experiment to see whether it would fulfil the support needs of the students. The e-Campus Projects Board decided to integrate this helpdesk function into every computer-user area from the beginning of 2004, because more students prefer support in computer-user areas to a central helpdesk. The e-mail support part of the helpdesk will still be available.

Table 6.18: Support preference

	Very important or Important		Not important or Not important at all		Total
	Count	**%**	**Count**	**%**	**Count**
E-mail support	2248	86.9%	338	13.1%	2586
A person in the computer-user area	2076	80.1%	516	19.9%	2592
Central WebCT helpdesk	1958	75.9%	622	24.1%	2580
Telephone support	846	34.2%	1625	65.8%	2471

To summarise:

- The WebCT training and support system is not a problem area, with most students feeling that the application is user-friendly enough to teach themselves
- The students did make useful suggestions about an extension of the first year introductory session at the beginning of the year to help first year students who are less computer literate

- Students prefer to have a person that can help them in the computer-user area where they are working with WebCT and, as a result, the central WebCT helpdesk will be decentralised to all computer-user areas in 2004.

6.6 ATTITUDE TOWARDS WEBCT

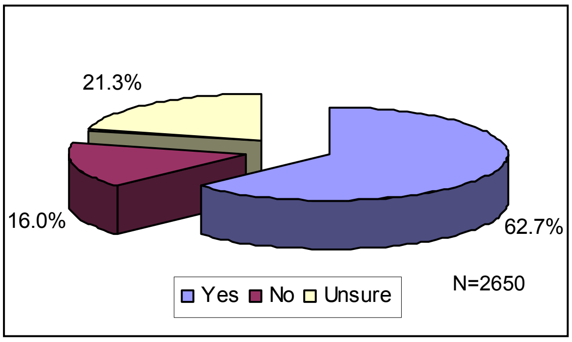
To assess the students' general levels of satisfaction with WebCT as tool and with the IT infrastructure, they were asked:

- Whether they would like more of their modules on WebCT,
- What they perceive to be the major advantages of WebCT, and
- What they perceive to be the major barriers and challenges in the use of WebCT and ICTs in general on campus.

I cross-tabulated their responses with regard to the advantages and barriers with the specific faculty computer-user areas in which they are registered to determine whether differences exist between the respondents from the different computer-user areas. Lastly, I used factor analyses to identify the underlying components in both the advantages and the barriers to correlate these with sex and faculty.

6.6.1 More modules on WebCT

Figure 6.14: Would you like more modules on WebCT?



Almost two thirds of the students would like more of their modules on WebCT (Figure 6.14). A very small number of the students (16%) did not want more of their modules on WebCT. When asked to motivate why they did not want more modules on WebCT, three out of five of these students indicated that all their modules were already on WebCT (Table 6.19). Overall, this points to a definite level of satisfaction amongst students with WebCT as a tool used in teaching and learning activities.

Table 6.19: Reasons for answering no to "more modules on WebCT"

	Frequency	Valid Percent
All modules are already on WebCT	247	58.3
Adequate – relevant modules are there	30	7.1
Printing is too expensive	29	6.8
Get/prefer handouts personal contact adequate	21	5.0
Use very little/use does not make a difference	20	4.7
Normal websites are better/faster	15	3.5
Lecturers do not use it well/can use it better	14	3.3
Difficult ot download documents/too slow/not user-friendly enough	13	3.1
Too much trouble/Don't like to study on computer, in CUA	10	2.4
Insufficient access to computers	9	2.1
Modules on WebCT that I have stopped	8	1.9
Technical difficulties with WebCT, especially quizzes	3	.7
Not computer literate/not self-disciplined	3	.7
Network is down	2	.5
Total	424	100.0

6.6.2 Major advantages of WebCT

Table 6.20: Major advantages of WebCT

	Strongly agree and Agree		Neutral		Disagree and disagree strongly		Total
	Count	%	Count	%	Count	%	Count
Access to content (Word, ppt, pdf, Excel, etc.)	2181	83.5	366	14.0	66	2.5	2613
My grades tool to view my grades	2016	78.8	395	15.4	149	5.8	2560
Administrative announcements (e.g on class and tutorial meeting times)	1957	75.6	409	15.8	223	8.6	2589
Access to old exams, test papers and memorandums	1824	71.6	423	16.6	299	11.7	2546
Feedback from lecturers and fellow students	1677	64.4	660	25.3	268	10.3	2605
Access to simulations/interactive content	1603	63.5	750	29.7	173	6.8	2526
Increased contact/interactivity with lecturers (BB, Chat, etc.)	1612	61.7	693	26.5	306	11.7	2611
Access to more advanced additional content	1580	61.2	752	29.1	248	9.6	2580
Opportunity to measure my progress by taking WebCT quizzes	1385	57.3	717	29.7	313	13.0	2415
Increased contact with fellow students (BB, Chat, etc.)	1116	43.4	944	36.7	509	19.8	2569

It is to be expected that access to content is the one advantage that most of the students strongly agree and agree with if one takes into account that WebCT is mostly used for content delivery (see results of lecturers' survey, Chapter 5). As I argued in Chapter 5, although this is not the best way to use WebCT in teaching and learning activities, it should not be summarily dismissed as not having any value in the teaching and learning process. Students find the 24/7 access to content, communication opportunities (with lecturers and amongst students) and assessment opportunities to be very helpful:

> *Very few of my lecturers have used WebCT, which is a pity as I have found it very helpful when WebCT has been a component of a module. It is useful to provide copies of notes on WebCT and for lecturer's to communicate with their students via WebCT. It is a neutral means of communication (more open than e-mail because other students can answer questions too, if they are able) and it means that students don't have to worry over much about scribbling notes down in lectures. It is also helpful when lecturors use WebCT for practise tests, questions and hints for projects. This means that students do not have to chase after already harassed lecturers for these study aids. On the whole, WebCT is useful and user-friendly. I just wish lecturers were more confident and used it more.*

The students find it especially helpful because they know that if the notes are on WebCT, all of them will be there in the right order. This is often not the case when the notes are placed on reserve in the library, where pages sometimes get lost.

> *My modules are on WebCT, but we have to get the notes either in the copy shop or in the library. Often the notes there are not in the right order or some are missing. All the notes of all my modules should be on WebCT!! It is much easier and you know that you have your notes in the right order and all pages of the notes are there.*

> *WebCT is great although I think that it can be improved, because I think that it would help a lot if lecturers were to put up the class notes as it is in lectures on WebCT so that you don`t have to be go to the library and copy center to get notes, as those places can get very crowded and pages of the notes can disappear. By placing the class notes on WebCT, all of the notes are available to everyone, either to read, write down or print!*

Printing these notes does, however, sometimes present problems, which will be discussed later under possible barriers and challenges.

Students find it to be an advantage to have the notes available before class to prepare for class and it also helps them in the sense that they can listen instead of only write in class.

Having notes available beforehand is a great advantage as regards preparing for a module. By being able to receive all the notes at once for a module makes it easier to settle down and focus on paying attention in class (because the slides do not need to written down), and studying, as opposed to running around looking for notes and hassling lecturers for powerpoints.

I find that Webct is extremely useful in that I can read over my days lectures without having to print them out at the copy shop.The comments of fellow students are useful as their questions answer many of mine.

Students especially find the availability of memomorandums and tests very helpful and there are frequent requests for more of these elements on WebCT:

Ek voel net sekere fakulteite doen baie moeite op web-ct om hulle notas, toetse en memo's en punte daar te sit en dit makliker te maak vir studente!!! Terwyl ander fakulteite of vakke nie eers op WebCT is nie?? ek voel jou hele kursus moet op WebCT wees en daar moet geen uitsonderings wees nie!!! Verder is ek 'n groot WebCT ondersteuner!!! Julle doen uitstekende werk!!!

The main advantage for me is that it is easy for lectures to place memo's etc on WebCT and we therefore have access to them at any time of day.

Students also find it more useful if lecturers post information on WebCT rather than on departmental notice boards. Notice boards on campus have been the traditional means to post information, announcements, marks and even solutions to tutorials and practicals. This often means that students have to sit in front of the notice boards to write down the solutions to tutorials and practicals. In this regard, one of the "student" respondents who is also a lecturer doing one module on WebCT remarked as follows:

In elk geval, nadat ek WebCT nou ook as student gebruik het, is ek oortuig dat hierdie tipe fasiliteit eintlik onmisbaar is. Die ou dae van goed op die kennisgewingbord plak, waar studente nie by kan uitkom as die gebou gesluit is nie, waar die kennisgewingbord toegesluit moet word om te verhoed dat die goed gesteel word, en waar studente voor die kennisgewingbord moet staan om die goed af te skryf, is vir altyd verby.

Students prefer to have access to all their information in one structured space within WebCT, instead of on different websites all with different URLs.

Die grootste voordeel van WebCT is dat mens maklik en vinnig by informasie oor jou modules uit kom. Jy hoef nie verskillende Web addresse in te tik of hordes links te volg voor jy vind wat jy soek nie. Op hierdie stadium is dinge nog baie gefragmenteerd - sommige modules is op WebCT, sommige op hul eie Web blaaie en ander sommer op beide. Ek sou verkies dat alles liewers op een plek is.

Die hoeveelheid van my dosente wat WebCT gebruik, 'n ander tipe module tuisblad het, en "couldn't be bothered" is omtrent eweredig versprei. Dit volg vanselfsprekend dat ek sou verkies dosente gebruik WebCT eerder as om niks te bied nie; en alhoewel WebCT dalk diegene wat 'n ander tipe tuisblad onderhou, kan limiteer (alhoewel ek nie so dink nie), is dit steeds uitputtend om die tuisblaaie op soveel verskillende plekke te moet opsoek. WebCT sentraliseer die inligting tot my beskikking.

Students find the structure and single access point provided by WebCT to be a great advantage, especially for their course notes:

Sal net wil sien dat meer dosente van Web CT gebruik sal maak. Sommige dosente maak wel gebruik van Powerpoint presentations in die klas om die klasse mee aan te bied maar plaas dit dan nooit op WebCT nie. Ander plaas dit weer net in die Bib op reserwe en die notas is dan altyd deurmekaar. Ek sal graag wil sien dat alle vakke op Web CT geakkomodeer word. Dit spaar ons as studente baie tyd, dit help met organisering aangesien alle inligting wat jy moet weet omtrent jou module bymekaar is.

Although students find it useful to have their notes in one place, they do ask for specific standards with regard to the naming and layout of documents to enable them to get to the documents more easily.

Soms is die spesifieke vak se opset moeklik om te verstaan bv. waar die dosent die spesifieke notas gestoor het. Deur dalk van `n standaard benaming of uitleg gebruik te maak kan die probleem opgelos word. Dosente sê bv. hul sal die transpirant op WebCT sit maar om dit dan te kry is soms moeilik.

Standaarde in WebCT, sommige dosente oordoen dit terwyl ander skaars iets doen. Standaard formaat vir algemene inligting (soos bv. 'n Web bladsy) in plaas van 'n Word dokument wat eers afgelaai moet word en nie maklik lees nie. Algemene inligting is: dosent se kontak besonderhede, toets lokale en datums, ens.

Interestingly enough, the module framework that is part of the minimum presence requirement contains all the standard information that this student is requesting.

Students who have to do continuous assessment on WebCT also find it very useful. One of the students compares his experiences in the first semester, which entailed lots of online testing, with the different scenario in the second semester:

> *I'm a first year studying BSc Human Life Science and during the first semester all our modules were on WebCT and it took up almost all our time doing various tests for physics and chemistry with the result that we didn't have any time for other subjects. Although the physics tests helped, it often wasn't beneficial as lots of copying took place. This term, however, we have no Physics tests and it's difficult to know if you are understanding the work or not as there is a lack of examples with answers provided. The same applies to Chemistry 154, as I personally benefit by practicing examples and then doing a test at the end to see if I understood the work.*

Therefore, although this student initially felt overwhelmed by the tests and did not see the value of doing them, the real value of regular feedback on his performance became obvious when there were no more online tests.

Other students agree with this perspective and request more online assessment and feedback to encourage them to work on a more continuous basis:

> *WebCT kan meer gebruik word om studente aan te moedig om deurlopend te werk deur bv meer toetsies daarop te skryf.*

> *None for WebCT, but for the individual modules, more online tests wouldn't be bad. I only had 2 for the year in Bestuursrek 3 (I didn't do well in them, but that's not point, :)), a different test every now and then would be nice. Other than that, my first experience with WebCT was enjoyable!*

> *Meer toetse met antwoorde en uitslae aan einde. Al die modules op WebCT te sit en dit meer geïntegreerd te maak. Moontlik vandag se werk te toets en dan kan studente deurlopend op WebCT werk.*

Another student refutes the lecturers' perception that WebCT is responsible for a decline in class attendance when she emphasises the real value of WebCT for her:

Vir omtrent enige vak is klasbywoning en selfstudie meer essensieel vir akademiese sukses as WebCT, maar ek dink WebCT is 'n geweldig handige onderwysinstrument / hulpmiddel / kommunikasiemedium / kennisgewingbord / ensovoorts. Die dienste wat ek tans op WebCT kry is voldoende vir my behoeftes, ek hoop net dat dosente meer daarvan sal gebruik maak om bv. interessante links of addisionele leeswerk of inligting in verband met die module beskikbaar te maak.

This particular student feels that it would be very useful if additional reading material and information about the module could be made available. She is obviously aware of the different functions/advantages of WebCT, whereas another student remarks that he was not even aware of all the functions of WebCT. He only came to know about these functions, such as the bulletin board and chat functions, by filling in the questionnaire.

Hier het definitief funksies uitgekom wat ek nie geweet het WebCT het nie, soos bulletin board en chat met dosente ens. Ons moes dit nog net gebruik om 'n gedeelte van werk wat voorgeskryf is te kom print en dit self leer!!!

6.6.3 Factor analysis: Major advantages of WebCT

To identify the underlying dimensions or components, I performed a factor analysis on the ten value statements about the possible advantages. I used a principal component analysis with a varimax rotation. The latent root criterion (eigen values greater than 1) was specified as stopping criterion, resulting in two factors being extracted, which explained about 54% of the variance in the statement responses. Unfortunately the value statement "Opportunity to measure my progress by taking WebCT quizzes" did not load well on either of the two factors and I excluded this statement in the second factor analysis. The results of the second factor analysis are shown in Table 6.21.

Table 6.21: Results of the second factor analysis of the possible advantages

Statement	**2 Factors**	
	F1	**F2**
Increased contact/interactivity with lecturers (BB, chat, etc.)	.850	.148
Feedback from lecturers and fellow students	.834	.216
Increased contact with fellow students (BB, chat, etc.)	.821	.124
Administrative announcements (e.g on class and tutorial meeting times)	.643	.329
Access to old exams, test papers and memorandums	-1.441E-02	.783
Access to more advanced additional content	.235	.701
Access to simulations/interactive content	.284	.607
My grades tool to view my grades	.371	.543
Access to content (Word, ppt, pdf, xls, etc.)	.126	.533
Total variance explained	**56%**	

After inspecting the patterns of loading and the statement content, I assigned the following labels to the factors:

- Factor 1: Increased communication and feedback (lecturer and students)
- Factor 2: Increased access to content (static, interactive, examinations, etc.)

I used the regression method to caluclate factor scores for each of the respondents. These factor scores were further used in a series of comparison procedures (t-test and one-way ANOVAs), with sex, faculty and year of study (undergraduate only) as independent variables. The results are summarised in Table 6.22.

Table 6.22: Cross-tabulation between "Possible advantages" factor scores and sex and faculty

Comparison		N	Mean	Std Dev	Statistics
Sex					
Communication & feedback	Male	1084	35.29	20.112	t = 4.640
	Female	1391	31.54	19.805	p = .000
Access to content	Male	1020	26.63	15.254	t = -.564
	Female	1313	26.98	15.081	p = .573
Faculty					
Communication & feedback	Arts	554	27.57	18.860	F = 13.380
	Natural Sciences	395	33.48	21.152	p = .000
	Education	87	31.18	19.026	Eta squared = .042
	Agricultural & Forestry Sciences	118	33.63	19.456	
	Law	84	29.91	19.979	
	Theology	27	34.26	27.755	
	Economic & Business Sciences	712	33.33	19.566	
	Engineering	320	40.92	19.594	
	Health Sciences	178	37.50	18.109	
Access to content	Arts	519	27.02	15.898	F = 3.397
	Natural Sciences	369	27.13	15.704	p = .001
	Education	85	31.35	14.359	Eta squared = .012
	Agricultural & Forestry Sciences	105	26.62	15.151	
	Law	75	27.47	13.238	
	Theology	24	27.71	16.217	
	Economic & Business Sciences	675	24.84	14.495	
	Engineering	307	27.38	15.473	
	Health Sciences	174	29.86	13.732	

The following salient points emerge from Table 6.22:

- Females find communication and feedback to be bigger advantages of the use of WebCT, with more of them agreeing or strongly agreeing with this possible advantage. This is indicated by the statistically significant lower mean score for females

- With regard to faculties, the mean scores on communication and feedback for the Engineering Faculty are significantly higher than those of all the other faculties except Theology and Health Sciences. One could infer from this that these students do not consider communication and feedback to be as big an advantage as the other faculties do. It is clear that that the Arts Faculty, with the lowest mean score, rates communication and feedback the highest.
- With regard to access to content, the only statistically significant differences exist between the Faculty of Economic and Business Sciences and the Education and Health Science Faculties. With a significantly higher mean score, Economic and Business Science students rate access to content higher than Education and Health Science students. This could be explained by the fact that the Economic and Business Science lecturers have made quite a fair amount of content available on WebCT, whereas Education and Health Sciences are just starting out.

6.6.4 Barriers and challenges

Table 6.23: Barriers and challenges

	Strongly agree and Agree		Neutral		Disagree and disagree strongly		Total
	Count	%	Count	%	Count	%	Count
Paying extra for printing credits	1932	74.6%	370	14.3%	288	11.1%	2590
Printing problems in CUAs	1391	53.7%	612	23.6%	585	22.6%	2588
Access to computers in CUAs	1005	39.2%	711	27.7%	849	33.1%	2565
Network is too slow	893	34.2%	721	27.6%	998	38.2%	2612
Not enough support if I have a problem with WebCT	623	25.1%	839	33.8%	1019	41.1%	2481
WebCT is too slow	409	15.8%	791	30.5%	1393	53.7%	2593
Not enough training to use WebCT	303	12.0%	542	21.4%	1688	66.6%	2533
Cannot log on to WebCT	211	8.9%	528	22.4%	1619	68.7%	2358
WebCT is too difficult to use	67	2.6%	293	11.5%	2188	85.9%	2548

The biggest barrier to the use of WebCT and ICTs in general remains printing problems. This includes the following four aspects:

- Problems with downloading large documents and printing them in computer-user areas,
- The fact that the printing and photocopying systems are two separate systems and not integrated,
- Students cannot load their printing credits automatically, and

- Students feel it is unfair that they pay for notes as part of their student fees, and that they then have to pay again by printing their notes.

I will discuss these four aspects, as well as access to computers and network problems, in more detail below. Although not enough support does not seem to present a barrier to students, with only one out of four students agreeing or strongly agreeing with it, it does seem to be a problem in some of the computer-user areas if one considers the student remarks captured in the open response.

Printing

Students first of all complain about the time it takes to download and print large files. These are mostly PowerPoint files – sometimes with very dark backgrounds.

> *WebCT is 'n goeie manier om op hoogte van sake te bly, maar daar is baie onkunde by dosente wat leêrs te groot maak om te druk of glad nie genoegsaam gebruik nie*

> *There is often a problem with the duration of time it takes to download and print notes of certain modules.*

To determine whether these printing issues present more of a barrier in some computer-user areas, I did a correlation between the computer-user areas and the printing problems in computer-user areas (Table 6.24)

Table 6.24: Cross-tabulation between computer-user areas and printing problems in computer-user areas

Comparison	Printing problems						Total	Statistics
	Strongly agree and Agree		Neutral		Disagree and Strongly disagree			
	N	%	N	%	N	%	N	
CUAs								
Humarga	412	53.0	202	26.0	164	21.1	778	Chi-square = 13.735 p = .089
Narga	285	53.4	127	23.8	122	22.8	534	
Fharga	424	57.6	156	21.2	156	21.2	736	
Firga	177	51.6	77	22.4	89	25.9	343	
Gerga	90	47.4	46	24.2	54	28.4	190	
TOTAL	**1 388**	**53.8**	**608**	**23.6**	**585**	**22.7**	**2 581**	

It is quite surprising that no siginificant differences exist between the computer-user areas if one takes the printer:student ratio in these areas into account (Table 6.25).

Table 6.25: Student:printer ratio in computer-user areas

	GERGA	FHARGA	FIRGA	HUMARGA	NARGA	TOTAL
Registered CUA users	2700	4160	1300	6000	2650	16810
Printers	2	10	3	6	8	29
Printer:student ratio	1350:1	416:1	433:1	1000:1	331:1	580:1

Students who access documents from home computers have even more problems than the students in the computer-user areas. They therefore ask for smaller documents that will download faster on their home computers.

> *I think if more of the lecturers used applications that are faster to download it would be really helpful to those students who don't live in Stellenbosch and make use of personal computers. I have found that downloading notes that are made in Powerpoint is very time consuming!!*

> *Lecturers should be trained on how to use webct and especially about how big files should be for students to be able to access these files on WebCT from home computers!!!!*

With the exception of in the Engineering Faculty, the photocopying and printing systems are not one system, which also causes problems for students. Whereas the photocopy credits are part of their student account, they have to pay cash for printing credits:

> *The main problem I have with getting notes etc from WebCT is that it means I have to have extra printing credits. And I have to pay for those credits out of my own money, since they can't be debited from my student account.*

There are frequent requests for the two systems to be integrated so that the printing credits can be made part of the student's account.

> *Ons moet nie printkrediete hoef te koop nie. Ons printkrediete moet deel wees van ons afrolkrediete. Indien dit nie moontlik is nie, moet ons ons printkrediete op ons studenterekening kan koop reg deur die jaar!*

> *Only the printing credits thing. It really is a hassle to have to buy printing credits all the time. It would be fabulous if Admin could put printing credits on our student account in the same way as photocopying credits are done.*

Another result of the fact that the two systems are not integrated is that printing credits are more expensive than photocopy credits:

> *WebCT is 'n welkome toevoeging tot die universiteit se arsenaal - dit werk oor die algemeen goed. Die netwerk is egter nie sonder probleme nie. Wat my telkemale geirriteer het is dat die onus al hoe meer op die student rus om die koste te dra van 'printing', wat heelwat duurder is as afrolkrediete. Myns insiens is dit een van die faktore wat na gekyk kan word. Dalk minder afrolkrediete en meer 'print'-krediete? Verder is WebCT heel effektief.*

Furthermore, students have to walk to the Administration building to buy the printing credits from the cashier. They cannot load them automatically on their accounts. This presents problems, especially after hours and over weekends, when Administration is closed.

> *Printing credits are a real problem as admin is not open on weekends or at night and then is when lots of people need to print. Why cant it be part of pronet?*

Students suggest that it would be very helpful if they could pay online for printing credits instead of having to walk to the Administration building:

> *What we print in CUAs should be charged to our student accounts and not the way it is currently being done. It's very inpractical and a nuisance to have to go and buy credits at Admin A. You are already logged on under your student number, so the network should be able to just charge the printing to your account.*

> *Printkrediete is die grootste probleem en almal kla daaroor. Skakel admin uit. Studente moet dit elektronies kan laai, sodat jy op naweke en in die aande nie uit krediete raak nie.*

Lastly, with regard to printing problems, students feel that it is unfair that they are expected to print their class notes when they are already paying “notes fees”.

> *Nog 'n kwessie wat baie studente kwel is dat ons reeds betaal vir klasnotas - en nogal 'n groot bedrag - ons het nie die finansies om elke dosent se stel notes gou te gaan druk voor klas nie, en ek het nog nie my eie rekenaar in die klas gesien nie :)) Is daar nie moontlikheid om 'n middeweg te bereik deur vir ons x-aantal rand vanaf ons nota-geld tot beskikking te bring van die uitdruk van notas nie, want aan die einde van die dag is dit tog waarvoor daardie geld moet gaan.*

One student feels that it will be cheaper to copy the notes instead of expecting students to print them.

> *WebCT veroorsaak dat studente honderde rande se print krediete moet koop om notas of slide shows wat slegs op WebCt beskikbaar is te druk. Dit is definitief goedkoper om hierdie notas te kopieer soos daar in die verlede gedoen is. Dit vergemaklik defnitief dosente se lewens wat nie lus is vir die moeite van notas kopieer en dit in die klas versprei nie, maar kos studente meer aan notagelde.*

Access to computers in CUAs

Students mostly access computers in computer-user areas (Table 6.26). Other access points include computer access where they work and at friends and family (Table 6.27).

Table 6.26: Access to computers

	Always and Mostly		**Sometimes and Never**		**Total**
	Count	%	Count	%	Count
Computer-user area	2103	81.4	479	18.6	2582
Residence	644	40.8	936	59.2	1580
Home	534	31.1	1182	68.9	1716
Internet café	24	2.0	1155	98.0	1179

Table 6.27: Other access

	Frequency	**Percent**	**Valid Percent**
Work/Office/Matie/SRC	46	1.7	34.8
Friends	35	1.3	26.5
Library	22	.8	16.7
Faculty/Dept CUA	9	.3	6.8
Family home/work	8	.3	6.1
Department	8	.3	6.1
Vodashop	1	.0	.8
WAP (cellphone)	1	.0	.8
Airport	1	.0	.8
Not using	1	.0	.8
Total	132	4.9	100.0
System	2559	95.1	
	2691	100.0	

Although access to computers in the computer-user areas does not seem to be a major barrier, with only two out of five of the students strongly agreeing and agreeing that access to computers in the computer areas is a problem (Table 6.23: Barriers and Challenges), these problems are experienced in mainly two computer-user areas (Table 6.28: Computer-user areas * Access to computers cross-tabulation).

Table 6.28: Cross-tabulation between computer user areas and "Access to computers in computer-user areas"

Comparison	Access to computers						Total	Statistics
	Strongly agree and agree		**Neutral**		**Disagree and strongly disagree**			
	N	**%**	**N**	**%**	**N**	**%**	**N**	
CUAs								
Humarga	403	51.9	185	23.8	189	24.3	777	Chi-square = 104.063 p = .000
Narga	220	41.4	150	28.2	161	30.3	531	
Fharga	205	28.4	222	30.8	294	40.8	721	
Firga	107	31.3	101	29.5	134	39.2	342	
Gerga	67	35.6	51	27.1	70	37.2	188	
TOTAL	**1 002**	**39.2**	**709**	**27.7**	**848**	**33.1**	**2 559**	

It is clear from Table 6.28 (as was also clear from the lecturers' cross-tabulation about student complaints discussed in Chapter 5) that Humarga is the computer-user area about which students have most complaints regarding access. More than half of the students who access computers in Humarga strongly agree and agree that computer access presents a barrier to their use of WebCT and ICTs in general.

This is confirmed by student comments such as:

> *'n Verdere probleem is dat hier in Humarga dikwels te min rekenaars is vir die talle gebruikers, en dat daar dan nie 'n kans is dat die student wel WebCT kan gebruik nie.*

It is further to be expected that computer access would be a problem in Humarga if one considers the student:computer ratio in Humarga (Table 6.29).

Table 6.29: Computer:student ratio

	GERGA	FHARGA	FIRGA	HUMARGA	NARGA	TOTAL
All computers	225	400	180	403	285	**1493**
Computers in open area	120	313	107	281	151	**972**
Registered CUA users	2700	4160	1300	6000	2650	**16810**
Student:computer ratio (all computers)	13	10	7	15	9	**11**
Student:computer ratio (open areas)	23	13	12	21	18	**17**

As was argued in Chapter 5, it is especially during peak times, between 10:00 and 15:00 (Figure 6.15), that the 21:1 student:computer ratio cannot be adequate.

Figure 6.15: WebCT hourly access

Each unit (■) represents 5,000 requests for pages or part thereof.

hour:	reqs:	pages:
0:	672268:	19709:
1:	282108:	14355:
2:	144447:	12655:
3:	70916:	11400:
4:	56276:	11081:
5:	56531:	11216:
6:	141021:	12961:
7:	1344015:	31150:
8:	5431153:	93401:
9:	10349422:	154562:
10:	12723403:	169252:
11:	12380238:	173892:
12:	9097141:	137522:
13:	8984843:	138218:
14:	9182124:	142499:
15:	8775325:	137853:
16:	6323492:	110552:
17:	3749782:	67154:
18:	2878408:	56180:
19:	3625980:	66031:
20:	3539894:	64933:
21:	3060586:	58279:
22:	2118387:	42865:
23:	1354494:	30603:

Network crashes/support problems and CUAs

Although only a small number of students, 34% and 25% respectively complain about network and support problems, it is again the students from Humarga (Table 6.30) who mostly strongly agree and agree that these two issues present barriers to the use of ICTs and WebCT in particular.

Table 6.30: Network and support problems in computer-user areas

Comparison	Network problems						Total	Statistics
	Strongly agree and agree		Neutral		Disagree and strongly disagree			
	N	%	N	%	N	%	N	
CUAs								
Humarga	295	37.5	212	27.0	279	35.5	786	Chi-square = 104.063 p = .000
Narga	184	34.1	154	28.6	201	37.3	539	
Fharga	240	32.3	210	28.3	293	39.4	743	
Firga	109	31.6	84	24.3	152	44.1	345	
Gerga	64	33.3	58	30.2	70	36.5	192	
TOTAL	**892**	**34.2**	**718**	**27.6**	**995**	**38.2**	**2 605**	
	Support problems						Total	Statistics
CUAs								
Humarga	207	27.7	215	28.7	326	43.6	748	Chi-square = 15.471 p = .051
Narga	119	23.3	183	35.9	208	40.8	510	
Fharga	178	25.2	255	36.1	274	38.8	707	
Firga	67	21.1	118	37.1	133	41.8	318	
Gerga	51	26.7	63	33.0	77	40.3	191	
TOTAL	**622**	**25.1**	**834**	**33.7**	**1 018**	**41.1**	**2 474**	

Although only a third of the students complain about network problems (Table 6.23), and even a smaller percentage, 25%, strongly agree and agree that support presents a problem, it is noteworthy that it is again the students from Humarga (Table 6.30) who mostly strongly agree and agree with both network and support problems. This is further confirmed by comments such as:

> *As a humarga user, I know I speak for the hundreds of students who get annoyed at the fact that the network crashes weekly - we are then unable to do anything with regards to WebCT or MS Word etc. Otherwise, WebCT is a blessing.*

Other general comments, mostly from Humarga students, include:

> *No problems with WebCT, just with the network and the unfriendly staff in the user areas.*

> *Die mense wat veronderstel is om hulp aan te bied in die rekenaarlokale is flippen ongeskik! Mense is te bang om hulle inelkgeval iets te vra! Maar die toegang tot die programme vergemaklik die hele leer proses. Dankie!*

> *Beter opgeleide en vriendeliker assistente in die gebruiksarea. Ek is te bang om vir hulp te vra!! Alle studente is nie onbeskof en ongemanierd nie.*

The supposed help desk personnel are extremely rude and while it is understood that it can be irritating to answer mundane questions about computers from people who don't know very much about them, it should be understood that that is their job.They can be very intimidating for people for whom computer and internet interactivity is new. An effort at civility, especially when the network is down, would go a long way to improving the working atmosphere of the CUAs.

There were quite a number of similar comments that should be investigated in each computer-user area.

6.6.5 Factor analysis: Barriers

I performed a factor analysis on the nine value statements about the possible barriers to identify the underlying dimensions or components. I used a principal component analysis with a varimax rotation. The latent root criterion (eigen values greater than 1) was specified as stopping criterion, resulting in three factors being extracted and explaining about 64% of the variance in the statement responses.

Table 6.31: Factor analysis: Possible barriers

Statement	3 Factors		
	F1	**F2**	**F3**
Not enough training to use WebCT	.843	4.287E-02	3.122E-02
WebCT is too difficult to use	.833	4.702E-02	6.419E-02
Cannot log on to WebCT	.652	9.193E-02	.212
Not enough support if I have a problem with WebCT	.579	.137	.344
Printing problems in CUAs	4.721E-02	.825	.144
Paying extra for printing credits	1.828E-02	.724	5.486E-02
Access to computers in CUAs	.164	.703	.112
Network is too slow	8.785E-02	.189	.873
WebCT is too slow	.285	9.254E-02	.850

After examining the patterns of loading and the statement content, I assigned the following labels to the three factors:

- Factor 1: Training and support
- Factor 2: Printing and access to computers in CUAs
- Factor 3: Technical and infrastructure problems

Table 6.32: Cross-tabulation between "Possible barriers" factor scores and sex and faculty

Comparison		N	Mean	Std Dev	Statistics
Sex					
Training and support	Male	966	71.16	18.941	t = .744
	Female	1237	70.55	19.180	p = .457
Printing and access to computers in CUAs	Male	1091	37.75	22.123	t = 2.472
	Female	1402	35.57	21.731	p = .013
Technical and infrastructure problems	Male	1132	56.56	26.351	t = -1.278
	Female	1441	58.87	25.332	p = .201
Faculty					
Training and support	Arts	489	71.09	18.610	F = 2.053
	Natural Sciences	346	69.94	18.860	p = .037
	Education	79	74.53	18.064	Eta squared = .007
	Agricultural & Forestry Sciences	105	71.73	17.658	
	Law	74	66.72	21.505	
	Theology	22	66.48	19.050	
	Economic & Business Sciences	634	71.07	19.287	
	Engineering	280	72.83	18.930	
	Health Sciences	174	67.74	19.932	
Printing and access to computers in CUAs	Arts	558	32.62	21.332	F = 6.424
	Natural Sciences	408	35.23	21.981	p = .000
	Education	91	33.79	21.095	Eta squared = .020
	Agricultural & Forestry Sciences	113	36.63	20.414	
	Law	84	33.63	22.122	
	Theology	24	35.42	19.074	
	Economic & Business Sciences	707	37.56	21.213	
	Engineering	323	42.29	23.997	
	Health Sciences	185	39.95	21.460	
Technical and infrastructure problems	Arts	568	56.49	25.021	F = .693
	Natural Sciences	416	57.72	26.063	p = .698
	Education	89	59.72	24.680	Eta squared = .002
	Agricultural & Forestry Sciences	117	55.56	24.259	
	Law	89	58.01	27.194	
	Theology	26	50.48	24.362	
	Economic & Business Sciences	735	57.48	26.305	
	Engineering	343	58.89	26.095	
	Health Sciences	190	55.89	25.962	

The only statistically significant differences exist between faculties, with the Engineering Faculty's mean the highest, indicating satisfaction with printing and access to computers in the computer-user areas, and the Faculty of Arts being the lowest, indicating dissatisfaction with printing and access to computers in the computer-user areas. These results further corroborate the results in Table 6.28, which show that it is mainly the students from Humarga (where the Arts students have access to computers) who feel that computers in the computer-user areas are not adequate. The differences between the Faculty of Arts and Economic and Business Sciences and Health Sciences respectively are also statistically significant (ad hoc Bonferroni test results). The means of the Law and Education faculties, where the students also access the computers in Humarga, are also significantly lower than that of Engineering, indicating that the Law and Education students are less satisfied than the Engineering students with the printing and computer access within Humarga. Lastly, it is interesting to note that that there is also a significant difference between Natural Sciences and Engineering, with the mean for the Natural Sciences Faculty being lower than that of Engineering, indicating that they are less satisfied than Engineering students with their printing and computer access.

All of these results taken together underline that students in Humarga (mainly Arts students) and, to a lesser extent, in Narga, are the ones complaining about printing and computer access in the computer-user areas.

<u>To summarise:</u>

- Overall, the students are quite satisfied with WebCT as tool, with two thirds of the students indicating that they would like more of their modules on WebCT. More than half (58%) of the 6% of students who indicated that they would not like any more modules on WebCT stated as motivation that all their modules were already on WebCT.
- It is to be expected that the students rate content-related activities highest with regard to advantages because, as was discussed in Chapter 5, lecturers use WebCT mainly for content distribution.
- However, there are exceptions however exist and students mention their appreciation for self-assessment opportunities and extend requests for more online tests and feedback.
- The main barriers to the use of WebCT and ICTs in general are printing in the computer-user areas and the fact that the photocopy and printing systems are not integrated. Because of this lack of integration, students have to pay cash for printing at a cashier in Administration A, who is not available after hours or during weekends.
- It appears as if printing, support and access to computers present specific barriers to Humarga students. The factor analysis of the barriers confirmed this, with the Arts students having the lowest mean score with regard to printing and computer access in computer areas, indicating that they strongly agree and agree that this is a barrier in Humarga.

6.7 POSSIBLE BENEFITS FOR STUDENTS

Table 6.33: Possible benefits of the use of WebCT (Seven principles[74])

	Strongly agree and Agree		Neutral		Disagree and Strongly disagree		Total
	Count	%	Count	%	Count	%	Count
Enables interactivity between students and teaching materials	2200	82.4%	367	13.7%	103	3.9%	2670
Enables the lecturer to give more prompt feedback	2056	77.1%	422	15.8%	190	7.1%	2668
Helps me to organise my learning activities better	1817	68.1%	677	25.4%	175	6.6%	2669
Increases contact between the lecturer and students	1795	67.2%	569	21.3%	307	11.5%	2671
Helps me to manage my time more effectively	1274	47.9%	995	37.4%	391	14.7%	2660
Acommodates various learning styles and preferences of students	1242	46.6%	1121	42.0%	303	11.4%	2666
Increases contact and cooperation between students	1112	41.7%	1029	38.6%	523	19.6%	2664

Students mostly strongly agree or agree with the possible benefits of the use of WebCT. The students again rate the availability of content (teaching materials) the highest. One of the students remarks:

> *I think the WebCT is cool because a person can study the notes and answer some tutorials to see if he/she understands the work, and even ask questions from lecturers through e-mail.*

Students find feedback from WebCT very helpful, with more than three quarters of the students rating it as very important.

> *Ek dink WEBCT is 'n wonderlike instelling, veral omdat ons nou kan kommunikeer met ons dosente. Die terugvoering was nog altyd vinning en van baie hulp. Ek kry al my ekstra inligting op WEBCT en kyk veral na huiswerk- en tutoplossings. DANKIE*

Students have varying experiences with regard to the feedback they get from lecturers and the amount of electronic communication between them. One of the students notes how beneficial the use of the bulletin board was for him and his fellow students:

> *Die modules waar dit wel gebruik word, is dit baie goed. Die kontak tussen dosent en student word baie verbeter. Ons het ook heelwat opdragte ontvang deurdat dit op*

[74] The seven principles of good practice in undergraduate teaching (Chickering & Gamson 1987) are discussed in detail in Chapter 3.

WebCT geplaas is. Ek het dit geniet hierdie jaar, veral in die module waar die bulletin bord gebruik is. Ek en my mede-studente het dit gebruik om interessante nuus op te 'post'.

Another student concurs with the possible benefits of using the bulletin board, but laments the fact that lecturers do not take an active part in the discussion on the bulletin board.[75]

Dit sal help as dosente meer gebruik maak van WebCT. Dis 'n baie maklike manier om ons in kennis te stel van 'n verskeidenheid van dinge, maar tog doen hulle dit nie. Of hulle kyk nooit na die boodskappe op die bullentin board, selfs die wat aan hulle gerig is, nie en geen terug voer word dus verkry nie. Die idee is dus fantasties en meeste studente maak alreeds gebruik daarvan, maar die dosente lyk nie of hulle veel belangstelling toon nie. Dit sal regtig soveel makliker wees as almal gebruik maak van WebCT en as al my vakke beskikbaar is daarop. Dit vat nie lank om 'n boodskap te 'post' nie (seker minder as 'n minuut) en dis 'n maklike manier om almal in kennis te stel.

Although the students feel that the use of WebCT could have the possible benefits listed in Table 6.31, some do feel that the computer can never replace the face-to-face contact they have with their lecturers:

Ek persoonlik dink WebCT is 'n wonderlike nuwe manier om aanvullende materiaal aan te leer of om jou vordering te toets. Tog kan iets soos WebCT nie die huidige formaat van onderrig vervang nie - 'n rekenaar kan nie soos 'n dosent beoordeel of hy sy klas iewers verloor het nie..... Ek is jammer as ek negatief oorkom - ek waardeer die werk wat ingesit is en ook die deeglikheid en hoë standaard van WebCT - baie dankie.

Some of the students correctly note that the real value of the use of WebCT depends on how the lecturer chooses to use it.

If the lecturers use WebCT properly and check their messages, then it is very effective. The helpfulness of this facility depends on the information the lecturers make available.

Werk net so goed as wat die dosent se vaardighede is, m.a.w. inhoud moet op datum wees en korrek geplaas word.

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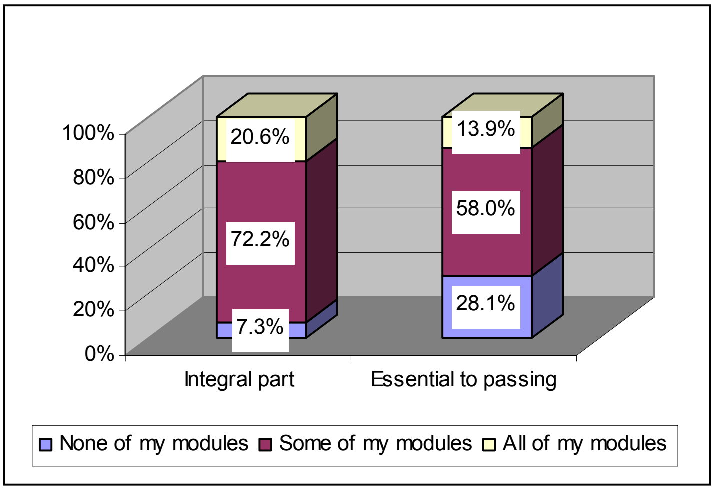
[75] The lack of communication is discussed further in Chapter 5.

Figure 6.16: Perceived integration of WebCT into modules



The students also feel that the lecturers should only use WebCT where it is applicable. When asked how they perceive the integration of WebCT into their modules, only one fifth of the students indicated that it is an integral part of all of their modules, and a smaller percentage (14%) indicated that it is essential for passing (Figure 6.16). What is encouraging is that 72% of the students indicated that WebCT is integrated into some of their modules and 58% that it is essential for passing. Students realise when WebCT is not an integral part of the teaching and learning activities. One of the students remarks in this regard:

> *Dosente moenie net WebCT gebruik omdat dit daar is nie. So het ons baie modules op WebCT wat ons nie gebruik nie. Gebruik dit net as dit werklik nodig is.*

Students also suggest that if lecturers receive more training they will be able to use WebCT more effectively – especially with regard to the regular updating of the modules on WebCT.

> *Sou dit graag verkies dat sommige personeel opleiding kry met die gebruik van WebCT, sommige van my modules is in Webct maar het nog nie verander vanaf die begin van die jaar af nie, myns insiens, waarskynlik dat sommige personeel nie weet hoe om dit te gebruik nie.*

Lastly, there is also the request from some students, as was the case with the lecturers, to integrate all the IT systems on campus:

> *Perhaps the interface of webCT should be updated. It can be made more user-friendly and modern (javascript instead of frames etc). Perhaps total integration of network drive space/webmail/WebCT?*

To summarise:

- Students are generally quite aware of the possible benefits of the use of WebCT, especially with regard to the availability of content, feedback from their lecturers and, to a lesser extent, communication via the bulletin board.
- Whereas the students are aware of the possible benefits of WebCT, they feel that the use of WebCT can never replace face-to-face teaching and learning activities.
- The students furthermore believe that the lecturers are not using WebCT to its fullest potential and that WebCT is only integrated fully into some of their modules. They see more training in how to use WebCT effectively as a possible solution to this problem.

6.8 CONCLUSION

The WebCT Web-based questionnaire for students was administered without any technical problems, with a response rate of 18% (2691 respondents). A comparison of the demographic data of the population and the sample groups reveals that the sample group is highly similar to the population. This close correlation between the profiles of the two groups is taken as an indicator of the representativeness of the sample.

The following trends emerge from a thorough analysis of the data, which included reporting on the quantitative and qualitative data, bivariate analysis and multivariate analysis:

- Students rate themselves mainly as intermediate users, both with regard to computer literacy and WebCT literacy. The Engineering students rate themselves the highest on the computer literacy index, with the Agricultural and Forestry Science students mostly in the below average category. African black and coloured students rate themselves lower on the computer literacy index. The same applies to the WebCT literacy index, but the differences are less pronounced, pointing to a general level of WebCT literacy among all students.
- Because most students consider themselves to be quite WebCT literate, WebCT training and support are not problem areas, with most of the students feeling that the application is user-friendly enough for them to teach themselves. Useful suggestions were made to extend the first year introductory programme. Students prefer a person in the computer-user area to help them instead of a central WebCT helpdesk. From 2004, the central WebCT helpdesk will be decentralised in all the computer-user areas.

- The students are generally quite satisfied with WebCT as a tool, with two thirds of them indicating that they would like more of their modules on WebCT. It is to be expected that the students rate content-related activities highest with regard to the advantages because, as was discussed in Chapter 5, lecturers use WebCT primarily for content distribution. The students indicated, however, that they would like more self-assessment oppportunities and feedback on WebCT.
- The main barriers to the use of WebCT and ICTs in general are printing in the computer-user areas and the fact that the photocopy and printing systems are not integrated. It appears that printing, support and access to computers present particular barriers for Humarga students. The factor analysis of the barriers confirmed this, with the Arts students having the lowest mean score with regard to printing and computer access in the computer areas, indicating that they strongly agree and agree that this is a barrier in Humarga. This result also correlates with the lecturers' results (Chapter 5).
- Although students are generally quite aware of the possible benefits of the use of WebCT, especially with regard to the availability of content, feedback from their lecturers and, to a lesser extent, communication via the bulletin board, they feel that:
    - The use of WebCT can never replace face-to-face teaching and learning activities, and
    - Lecturers should receive more training to integrate WebCT to its fullest potential into modules.

Overall, the students are therefore quite satisfied with the use of WebCT in their modules.

CHAPTER 7: INTEGRATIVE ASSESSMENT

7.1 INTRODUCTION

The University of Stellenbosch has been and still is making a huge investment in the integration of ICTs into the University business processes and, more specifically, into its teaching and learning activities. There has been an exponential increase in the use of WebCT in teaching and learning activities and anecdotal evidence exists of the success of various e-Learning initiatives. However, in the light of competing strategic priorities and questions about whether e-Learning is just part of the hype of the 1990s (Chapter 2), whether the integration of ICTs into teaching and learning activities has benefits (Chapter 3) and whether these benefits are evident at the University of Stellenbosch, it is necessary, at this juncture, to undertake a retrospective evaluation of the three phases (pre-strategy, strategy formulation and strategy implementation) outlined in Chapter 4.

There are two further motivating factors for this evaluation:

- To improve the e-Learning project/e-Learning initiatives posing questions such as:
  - What are the programme's[76] strength and weaknesses?
  - What is the coverage of the programme (students and lecturers)? Is the programme delivery standardised (students and lecturers)?
  - Has the programme been properly implemented? Has the programme been implemented as designed?
  - What are the required sources for implementation? Per faculty?
  - What constraints are there on proper implementation?
  - Are the programme recipients responding positively to the intervention? If not, why not?
- To generate knowledge
  - To improve our understanding of how programmes work and how people change their attitudes and behaviours because of successful interventions.

The summary of the three phases (Chapter 4) and the results of the surveys (Chapters 5 and 6) already give an indication of what has been accomplished, but in order to get a more complete

[76] "Programme" in this instance refers to the e-Learning project.

picture, this chapter will integrate the results of the survey, the e-Learning project documentation, the faculty evaluation reports and the project manager's observation to:

- monitor the activities and outputs and
- measure the impact (outcomes) of the three phases.

I will then be in a position to answer the questions that motivate this evaluation.

After answering these questions, I will then evaluate the institutional characteristics and technological environment, specifically the use of WebCT as LMS at the University of Stellenbosch. I will conclude with an overall assessment of the progress made at the US.

7.2 MONITORING ACTIVITIES AND OUTPUTS AND MEASURING OUTCOMES

Table D1 in Annexure D contains the intermediate goals, objectives, activities, outputs and outcomes of the three phases outlined in Chapter 4. An extra column, "Data", was added to include an indication of the motivating documentation for the outcomes. Although this is not an impact evaluation because the project is still in process, the outcomes are also evaluated (albeit to a lesser extent), as some of the outcomes have already been achieved or are in the process of being achieved. Furthermore, if one takes the co-evolution of technology and society as the point of departure, these outcomes should not be seen as the ultimate goal or outcome, but merely as cross-sections, at time t, of ongoing processes of technological and social change (Rip 2002).

The blue colour used in Table D1 (Annexure D) indicates that the activities were completed, the output is present and the outcomes realised. The orange colour indicates that the specific activities are still ongoing and that the outputs and outcomes are still in process. The following important issues, mostly with reference to the orange elements, can be identified in this table:

- Although the infrastructure (Intermediate goal 1) and faculty development initiatives (Intermediate goal 4) established in the pre-strategy phase form the backbone of the consecutive stages, they should not be seen as only applicable in the first stage. The development of IT infrastructure and the refinement of faculty development initiatives (training and support programmes) are continued throughout the three phases.
- Because both infrastructural and faculty development initiatives are ongoing processes, their outcomes are mostly listed in orange to indicate that one cannot fully measure their impact at this stage. We did find, however, that there is a general level of satisfaction with the IT infrastructure (Outcome 1.1) and the faculty development initiatives, although, as we have seen in Chapters 5 and 6, these satisfaction levels

vary amongst faculties, especially with regard to student computer access, these satisfaction levels.

- With regard to faculty development initiatives (Intermediate goal 4), the results from the lecturer survey, the faculty reports and observation by the project manager of the e-Learning project show that great progress has been made, as most of the lecturers feel that they are able to do the development and updating of their online modules themselves (Outcomes 4.1, 4.4, 4.5). Some of the students disagree, however, as they feel that the lecturers could do more to update content and communicate with them more regularly. The survey results also reveal that the lecturers are in general quite aware of the possible benefits of the integration of ICTs, although some still question the use of ICTs and how to effectively integrate them into teaching and learning activities (Outcomes 4.2, 4.3, 4.4). The survey results and the exponential increase in the use of WebCT reveal that lecturers are taking increasingly greater responsibility for the design and development of e-Learning initiatives (Outcome 4.6). Lecturers also have ample opportunity to share good practice (Outcome 4.7), both at the annual WebCT mini-conferences and within their departments and faculties. This sharing of good practice was singled out by lecturers as one of the most important factors to get started and increase their use of ICTs in teaching and learning activities. Although there are examples of lecturers reflecting more on teaching and learning activities in general (Outcome 4.8) and consequently redesigning modules and programmes, there is unfortunately not much evidence at this stage of the redesign of academic modules and programmes as a result of the use of ICTs (Outcome 4.9). ICTs are mostly used for the distribution of content, with a few exceptions of innovative applications. In this regard, it has to be kept in mind that the e-Learning project is still ongoing and that it is definitely premature to measure its full impact at this stage. It is therefore also impossible to really assess the long-term outcome that the integration of ICTs becomes part of "business as usual" (Outcome 4.10). As was also argued in Chapter 3, in the discussion of the current status of the integration of ICTs world wide, patience is required to see the real impact of the integration of ICTs into teaching and learning activities.
- Although a process of wide consultation was followed during the strategy formulation phase, I have indicated the outcomes that all the stakeholders and the University of Stellenbosch in general have a shared e-Campus vision in orange (Outcome 2.2). Again, the e-Campus initiative is a six-year project (2002 – 2007) and, although the vision was formulated in the strategy formulation phase, it will only become a "shared" vision over the next few years as more and more staff members buy into the idea of an e-Campus and make the ideals of the e-Campus part of their business as

usual. According to change management expert, John Kotter, change only becomes permanent when it becomes “the way we do things around here, when it seeps into the bloodstream of the corporate body” (Kotter 1995).

- All the faculties except one reached or exceeded their minimum presence targets for 2003 (Outcome 3.2). Although these module frameworks and some form of electronic communication are therefore online, the survey results show that students find that lecturers do not update their content frequently enough and that they do not always use the electronic communication to its fullest potential (Outcomes 3.2.1, 3.2.2). The question also remains whether all the outcomes were revised in the process (Outcome 3.2.1).
- Work also remains to be done with regard to the communication of the e-Learning project’s goals and the establishment of ownership of the e-Learning initiatives within faculties (Outcomes 3.3 and 3.4). The e-Learning coordinator system, established in 2002, is working better in its second year of implementation (2003), but the challenge remains to motivate lecturers to take ownership of their e-Learning activities, to go beyond mere compliance with the “minimum presence” requirement, to reflect on teaching and learning in general and to redesign modules and programmes to ultimately realise the potential benefits of the integration of ICTs into teaching and learning activities. The issue of peer evaluation, which promotes reflection on teaching and learning activities in general (Outcome 3.5), also needs attention. The challenge remains to motivate lecturers to move beyond mere compliance with evaluating minimum presence “targets” to become “self-reflective practioners”, as described in Chapter 3.
- The potential long-term impact of the e-Learning project will be quite difficult to measure if one goes beyond the mere mechanistic counting of how many modules have an online presence, to the question of whether the integration of ICTs adds value to the specific module or programme. This impact cannot be measured separately, but, as I have indicated next to Outcome 4.10, this evaluation process should be tightly integrated into the normal academic programme evaluation process. If the evaluation of ICTs is seen as a separate process, the integration thereof will always be perceived as a “separate process” and it will never become part of “business as usual”.

7.3 RETROSPECTIVE ASSESSMENT

After considering the outcomes of the four intermediate goals, I will now attempt to answer some of the macro questions that inform the motivation for the retrospective assessment. The main motivation for the retrospective assessment of the e-Learning initiatives is two-fold:

- To improve the e-Learning project/e-Learning initiatives, and
- To generate knowledge, i.e. to improve our knowledge of how programmes work and how people change their attitudes and behaviours because of successful interventions

7.3.1 To improve the e-Learning project/e-Learning initiatives

7.3.1.1 What are the programme's strengths and weaknesses?

The strengths of the programme can be summarised as follows:

- The fact that the e-Learning project, as part of the e-Campus initiative, enjoys top management support is certainly one of the programme's main strengths. If the perception exists that the University considers e-Learning to be a priority, it is much easier to convince lecturers to experiment with it. The status of teaching and learning in relation to research will also be raised through the strategic priority given to teaching and learning in general as part of the Strategy for Teaching and Learning.
- The strategic approach to the integration of ICTs into teaching and learning activities, instead of relying only on voluntary participation, is a further strength. Clear targets with regard to a minimum presence for all modules were set, which helps to create a baseline presence of ICTs in all modules.
- The monetary incentives for e-Learning initiatives provide tangible recognition and reward for teaching and learning initiatives that can also serve to improve the status of teaching and learning in general.
- The commitment of the IT division to provide a stable IT infrastructure and support system is another strength of the programme. The users' general satisfaction with the infrastructure and support system attests to the success of this division. The value of the IT infrastructure and support system is definitely one of the strengths of the programme as a whole.
- The same applies to the WebCT infrastructure, training and support system. The strong growth in the use of WebCT and the general satisfaction of the users with the system demonstrate that the value of this system should not be underestimated.

- The general awareness of the value added as a result of the use of ICTs in teaching and learning activities (by both lecturers and students) is another strength of the programme and demonstrates that the programme is doing well.
- The students, as primary beneficiaries of the programme, are furthermore generally satisfied with the programme, and have made requests for the reach and scope of the e-Learning initiatives to be expanded as well as for training for lecturers to use WebCT more effectively.

<u>Weaknesses:</u>

- Although the strategic approach is a strength of the e-Learning project, some lecturers do experience it as a “top-down” initiative with a minimum presence requirement. Some lecturers indicated in the survey that they would prefer to have a choice whether to create the minimum presence or not.
- More continuous communication is also needed to get more buy-in from lecturers and to convey what is meant by the concept “e-Learning”, as well as by the e-Campus initiative. In some cases, e-Learning is seen as only “minimum presence” and, although efforts are made to dispel this myth, there is still confusion. Communication about the fact that the e-Learning project is driven by teaching and learning considerations also needs more attention.
- Another potential weakness is the infrastructure for students in some faculties, where lecturers resist e-Learning initiatives because their students tell them that they cannot get access to computers in the computer-user areas.
- It is too early to assess whether the e-Learning project really makes a difference to teaching and learning practice leading to reflection and the redesign of modules. Early indications are, however, that WebCT is largely used for content distribution and that the electronic communication opportunities are not used to their full potential. There are however also very strong indications that lecturers are increasingly moving towards encouraging active learning and increasing contact with students via WebCT.
- Whereas it was and still is a good idea to establish ownership of the e-Learning initiatives within faculties, it could potentially weaken the effect of the intervention, because the project manager then only coordinates the process and does not do any hands-on management. On the other hand, although this can be seen as a weakness, the alternative, central management of the project, is not an option. The only way that the e-Learning project will be sustained after its completion in 2004 is if the lecturers take ownership of the initiative and integrate ICTs into teaching and learning activities as “business-as-usual”.

7.3.1.2 What is the coverage of the programme (students and lecturers)? Is the programme delivery standardised (students and lecturers)?

All the faculties have access to the infrastructure, support and training services provided by IT. With regard to the monetary incentives, the Faculty of Military Science did not receive any money, although the lecturers are very involved in e-Learning activities. The distribution of the money was decided by Senate according to the number of FTE (full time equivalent) students and the number of academic staff members.

Whereas the money was distributed centrally, the amount awarded to each lecturer was decided within each faculty. Different processes were followed, with some faculties using the Uni-Ed project form, one faculty deciding that each lecturer should receive a fixed amount of money and yet another deciding that they would use the money to appoint a person to do the work at faculty level.

Taking these very different processes into account, it cannot be said that the programme delivery is standardised. What is standardised is the central coordination, infrastructure and support services, but it depends on each dean and his e-Learning coordinators how the money is divided between the faculty members.

Because care is taken not to be prescriptive in what the faculties do with their money as long as the minimum presence targets are reached, some departments and faculties made very good progress, whereas other just complied with the requirements. Various students made requests in the open response of their survey for a more standardised approach to be followed with regard to the integration of ICTs, and specifically of WebCT. However it is important to emphasise that one has to be extremely careful in prescribing a specific format or approach. The bottom line remains: ICTs should only be integrated where appropriate and where they add value. Attention should however be paid to standards surrounding document formats and file sizes to avoid the printing problems experienced by students as a result of incorrect file types and sizes.

7.3.1.3 Has the programme been properly implemented? Has the programme been implemented as designed?

The e-Learning initiatives in the pre-strategy and strategy formulation phases were bottom-up, voluntary initiatives as a result of the “teach ‘em to fish” approach followed by the University of Stellenbosch. No e-Learning production facility was created, but training and support were provided for lecturers to take responsibility for the development and maintenance of e-Learning activities themselves. This has not changed since 1998 and, in this sense, one could state that the programme was properly implemented as designed in the first two phases.

With regard to the implementation of the e-Learning project (phase three), it was implemented as designed in year one. Monetary incentives were given to lecturers to either be paid out as remuneration or to be used to pay an assistant.[77]

In year two (2003), the implementation changed as a result of the feedback received from the faculties at the end of 2002. The money could be used for hardware and software if the minimum presence had been achieved and the department/faculty took responsibility for the maintenance and updating of the hardware and software bought. The general management of the project in the faculties also changed, with two instead of one e-Learning coordinator per faculty.

7.3.1.4 What are the required resources for implementation? Per faculty?

The required resources for implementation include infrastructure, training and support, money and e-Learning coordinators. As already mentioned, the central infrastructure, training and support systems were established in the pre-strategy phase and their development extends into the strategy formulation and implementation phases. These resources, especially infrastructure and computer access for students on campus, are of the utmost importance for the implementation to be successful. Each faculty or a few faculties together fund the computer-user areas for students, each with its own software applicable to the specific faculty. The required monetary resources to maintain these faculty-specific computer-user areas vary from faculty to faculty. With regard to infrastructure and, more specifically, access to specialised Web and multimedia software, lecturers frequently request that the software be made available on a central server with limited access so that each individual lecturer does not need to buy his/her own applications. Lecturers furthermore often request more one-on-one assistance within their specific faculty or department.[78]

Further resources that are required for the implementation include the human resources needed for central coordination (project sponsor, project manager, steering committee, management committee), as well as human resources within each faculty (e-Learning coordinators). These e-Learning coordinators play a vital role in the implementation at faculty level.

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[77] There were only two exceptions, in which a scanner and computer were bought after approval was obtained.

[78] The idea of a central server and a central support centre for lecturers will be discussed under recommendations in the conclusion.

7.3.1.5 What constraints are there on proper implementation?

Table 7.1 gives a summary of the main faculty and/or institutional concerns/barriers to the successful integration of ICTs into teaching and learning activities, as well as the possible institutional responses as discussed in Chapter 3, Section 3.6.2.

Table 7.1: Summary of faculty and institutional concerns/barriers and suggested appropriate institutional responses to address the issues[79]

Lecturer/Institutional concern	Institutional response
1.Lack of commitment to change by faculty members as a result of: • the time investment to learn how to integrate ICTs effectively into teaching and learning activities, • the time it takes to develop, maintain and participate in online learning activities, • a lack of incentives and rewards for teaching and learning in general, • a lack of reflection on teaching and learning itself, and • a lack of understanding of the potential benefits of ICTs for teaching and learning activities.	1. Develop policy(ies) on: • lecturer workload, • professional practice and rewards for teaching, • possible release time for the development of online learning environments, • instructional development grants and stipends, and • recognition in terms of tenure, salary and promotion decisions. Do research on: • How students learn, • What roles ICTs can play in supporting the learning environment and • The use of ICTs in the specific institutional environment (e.g. adoption, barriers to adoption of ICTs, support needed, success stories). Canvas public commitment and support from top management for the use of ICTs in teaching and learning. Encourage collaboration and sharing between faculty members: • Organise demonstrations and events where lecturers can share good practice, and • Regular communication amongst all stakeholders (support staff, lecturers, students, management). Encourage and facilitate a lecturer ethos which values experimentation and toleration of mistakes.
2. Inadequate training and support (technical and pedagogical)	2. Develop a well-designed, scalable, individualised faculty development/ consulting plan – both technical and pedagogical. Recruit faculty members to help with demonstrations, training and support.
3. Lecturer ownership of digital material	3. Develop a flexible policy on intellectual property rights and ownership of online material.
4. Inadequate infrastructure and the so-called digital divide	4. Build and support a flexible reliable technological infrastructure with adequate access to hardware and software for lecturers and students. Plan for ubiquitous student access to all the learning resources. Develop faculty training programmes (technical and pedagogical). Provide for computer and information literacy training for students.
5. Costs	5. Develop an understanding of the required operational tasks. Consider IT to be a strategic resource and fund it accordingly. Make substantial resource commitments. Develop a willingness to take risks. Investigate partnerships for the development of online material.

Source: (Panel on the Future of Teaching and Learning 2000), (Benfield and Francis 2003), (Hagner 2000), (Morrison 1999b), (Hawkins 1999), (Bonk 2001), (Oblinger and Verville 1999)

[79] Discussed in detail in Chapter 3, Section 3.6.2.

The issues highlighted in red are the main barriers that emerged from the results of the lecturer and student surveys (Chapters 5 and 6) at the University of Stellenbosch. All the facets of issue 1, lack of commitment, are present at the University of Stellenbosch. Time to do the online development and maintenance as well as regular online communication remain the most important constraints. This, coupled with the fact that the lecturers have the perception that teaching and learning are not valued and rewarded as much as research, will cause them to focus on research rather than e-Learning activities when they have to prioritise activities within the limited time available to them. With regard to incentives and rewards in the University of Stellenbosch context, it became clear that, although monetary incentives are useful, lecturers find demonstrated student benefits as a result of the integration of ICTs a greater motivator.

Lecturers and students were on the whole quite satisfied with the training and support (issue 2). It does not appear that issue 3, lecturer ownership of digital material, is a barrier at the moment. This does not mean that no attention should be paid to this issue, and adequate policies should be put in place.

The survey results (lecturers and students) show clearly that, although the University of Stellenbosch has an excellent infrastructure for students and faculty members, there still remains some dissatisfaction with the computer access for students within some computer-user areas. Further research is also needed on whether e-Learning initiatives promote diversity or not.

Lastly, the costs of the e-Campus initiative at a time when the University of Stellenbosch and all other South African higher education institutions are under enormous financial pressure will remain a potential barrier. The benefits and potential pay-off of the integration of ICTs into all the activities need to be emphasised to justify the costs of the initiative.

7.3.1.6 Are the programme recipients responding positively to the intervention? If not, why not?

Overall, the survey results show that the students and lecturers are quite satisfied with the intervention, although questions remain within some faculties about whether the money spent on the intervention will have the desired impact. These questions relate to the fact that some lecturers still doubt that the integration of ICTs has the potential to add value to teaching and learning activities. Other lecturers do not necessarily doubt the potential value of e-Learning activities for some subjects/disciplines/teaching styles, but they do feel that e-Learning should not be a requirement, but rather the choice of each individual lecturer.

What should be emphasised is that, although there are lecturers who question the monetary incentives, they are mostly within the Natural Sciences and Engineering Faculties, while the lecturers from the Human and Social Sciences welcome the monetary incentives. There is a definite trend that the different faculties respond in very different ways to the intervention.

The students' positive attitude to the intervention is underscored by their requests for more activities on WebCT, more frequent updating of content, more regular communication and additional training for lecturers to use ICTs appropriately.

7.3.2 To generate knowledge

This retrospective assessment also helps us to improve our understanding of how programmes work and how people change their attitudes and behaviours because of successful interventions. What became clear from the results of the survey was that, although monetary incentives are important to get lecturers started and to afford assistants to help them with the online development and maintenance, it is not the most important incentive. The most important incentive for lecturers to get started was a workshop or a demonstration. Benefits for themselves and for their students were the prime reasons for lecturers to increase their e-Learning activities. It is therefore the value added within the teaching and learning environment that leads to a change in attitude and behaviour, and not necessarily or only an external incentive such as monetary awards.

Although monetary incentives help as institutional incentives, in that they reward teaching and learning practice, caution should be taken to not only reward the "e" part of the teaching and learning process. There are merits in promoting innovation by providing special incentives, but the ultimate goal is to value and reward teaching and learning in general and not just one aspect of the teaching and learning process.

Peer accounts and demonstrations of successful e-Learning projects also play a vital role in convincing lecturers to try out e-Learning activities. A lecturer is much more likely to experiment with the integration of ICTs if he/she sees an example of how a colleague is using ICTs and what the benefits and challenges are. However, care has to be taken when selecting these "champion" lecturers to give demonstrations. If they are only early adopters of technology who have created very sophisticated e-Learning applications, other lecturers who are not as technology literate might find their example too daunting to follow.

What is often overlooked when considering why the e-Learning project is successful is the stable infrastructure and very good training and support system. It is often overlooked because it forms the backbone of the initiative and is often not made explicit in the intervention. Nevertheless it remains one of the most important aspects of the intervention. If the lecturers feel that that there is always someone they can trust to help them and that adequate training is available, they will be more willing to try something new.

7.4 ASSESSMENT OF THE INSTITUTIONAL CHARACTERISTICS OF THE UNIVERSITY OF STELLENBOSCH

Having done an evaluation of the activities, outputs and outcomes and having answered some of the macro questions that inform the retrospective assessment, I am now in a position to do a preliminary assessment of whether the 12 conditions[80] (Oblinger, Barone, and Hawkins 2001) that are indicative of the institutional characteristics that are essential for effective action in a higher education setting are present at the University of Stellenbosch.

With regard to the enabling institutional environment: What would it take for IT to no longer be an experimental tool made available with minimal support to a few employees and students, but rather a "strategic asset" that can be used by the entire faculty, staff and student body to increase the productivity of mission-critical academic programmes? (Graves 1999).

I consider these 12 conditions to be ongoing processes at the University and this assessment is therefore only an indication of whether these processes are present and should not be seen as a final assessment of their effectiveness.

Table 7.2: Assessment of twelve conditions at the University of Stellenbosch

Condition	Description	Assessment of presence			Evidence/Comment
		To a large extent	To some extent	Not at all	
Choices	Identifying a strategic direction and selecting a path to get there based on a clear sense of institutional mission.	✓			e-Campus initiative e-Learning project Strategy for Teaching and Learning
Commitment	Allocating resources to enable the institution to adjust its course and to follow the path selected.	✓			Special funds for e-Campus initiative Infrastructure, support and training investment
Courage	Energetic and focused leadership from the very highest level of administration.	✓			Manager: Innovation is the project manager of the e-Campus initiative.
Communication	Building a climate of trust by including the entire campus community in the transformation process through a carefully conceived and well-executed strategy for dissemination of information about extant and emerging services, plans, decisions, etc.		✓		Although present, more can be done in this regard as became clear from the results of the lecturer survey.
Cooperation	Collaborating across functions and throughout levels and		✓		e-Campus initiative, although more can be

[80] Discussed in Chapter 3.

Condition	Description	Assessment of presence			Evidence/Comment
		To a large extent	To some extent	Not at all	
	constituencies to achieve a consistent and integrated set of support services for teaching and learning.				done to achieve more collaboration
Community	Complementing the community of support nurtured through cross-functional collaboration with an equally cohesive community of faculty across disciplines.		✓		e-Campus initiative, but more can be done in this regard
Curriculum	Reconceptualising the curriculum to reflect its distributed, interdisciplinary and outcomes-oriented nature.		✓		Strategy for Teaching and Learning e-Learning project More can be done in this regard
Consistency	Reflecting institutional commitment to transformation through consistent action and recognising the importance of standards within both the technology industry and the institution.		✓		US quality assurance framework
Capacity	Developing the teaching and learning capacity of the institution (e.g. curriculum and faculty) to serve student achievement and outcomes.		✓		Strategy for Teaching and Learning Faculty development plan More can be done to raise the status of and reward teaching and learning activities in general.
Culture/ Context	Understanding the culture, values and sensitivities of a given campus climate.		✓		Because of top management commitment, an effort is made to adapt the e-Campus initiative to the campus climate.
Complexity/ Confusion	Overcoming the confusion associated with coping with transformation by adapting to the inherent complexity of the decision-making process by adopting more agile and responsive governance processes.		✓		An ongoing process that is very difficult to manage within a higher education setting.
Creativity	Developing strategies and tactics that harmonise with the campus culture and context and recognising that this is a creative, not just a political process.		✓		e-Campus initiative e-Learning project More work needs to be done to change the perception that the e-Learning project is political (“minimum presence” requirement) to its being a creative (innovative e-Learning applications) process.

As can be seen from Table 7.2, all of these conditions are present at the University of Stellenbosch. The ones that need special attention are: Communication, Cooperation, Community, Curriculum, Capacity, Culture/Context, Complexity/Confusion and Creativity. Especially with regards to communication and creativity, special care should be taken that the e-Campus initiative remains a process in which lecturers and staff feel they can contribute actively. Otherwise the e-Campus initiative will run the danger of only being considered as a top-down process with no buy-in from its stakeholders. The risk of this approach is that, without buy-in, the changes will only be temporary while the initiative is implemented, with no guarantees for sustainable long-term effects on the business processes of the University as a whole.

7.5 EVALUATION OF THE TECHNOLOGICAL ENVIRONMENT, SPECIFICALLY THE ROLE OF WEBCT AS LMS

We have seen an exponential increase in the use of WebCT as LMS at the University of Stellenbosch. The WebCT system is stable and the results of the lecturer and student surveys reveal general satisfaction with the technological infrastructure and the faculty development programme.

If one considers the four waves in the development of learning management systems identified by Judith V. Boettcher (2003) in the USA context (Table 7.3), one finds evidence of the first three waves. Although there is a keen awareness of wave four, the design of standards and related content and learning object developments, free peer-reviewed online content (e.g. the content on Merlot.org) is not yet used at the University of Stellenbosch. There are two possible reasons for this:

- All the lecturers are not aware of the existence of this free online content
- Some lecturers find that this (mostly) American content is not applicable in the South African context and prefer to develop their own content.

Table 7.3: Four waves in learning management system development

Four Waves	Assessment in University of Stellenbosch context
1. Technology used to organise the elements of a course and to communicate with students.	e-Learning project "minimum presence" requirement (module framework and electronic communication).
2. Rise of the "hybrid course" in which the best of Web interactions are integrated - Using technology to make business as usual more efficient.	Some evidence in redesign of modules and academic programmes.
3. Creation of new systems that support efficiency in administration and delivery at the infrastructure and enterprise level supporting an online campus.	e-Campus initiative aimed at integrating all IT systems (specifically the portal project).
4. Design of standards (IMS/SCORM design standards), open source developments (OKI) and related content and learning object initiatives (MERLOT, OCW and Reusable Learning Objects project at the University of Cambridge).	Keen awareness of the IMS/SCORM design standards and related content and learning object initiatives (not yet used to their fullest potential).

7.6 OVERALL ASSESSMENT OF THE PROGRESS MADE AT THE UNIVERSITY OF STELLENBOSCH

The following three questions need to be answered to assess the overall progress made at the University of Stellenbosch with regard to e-Learning initiatives:

- Where is the University of Stellenbosch at this stage with regard to the integration of ICTs into teaching and learning?
- Has a paradigm shift occurred in the teaching and learning process to take full advantage of the supposed transformational possibilities of the integration of ICTs at the US?
- What type of model is used in the integration of ICTs into teaching and learning activities?

To answer these questions, e-Learning experts (Morrison and Oblinger 2002), (Collis and Van der Wende 2002) identify three phases in the successful integration of ICTs into teaching and learning[81]. These three phases were discussed in more detail in Chapter 3. Table 7.4 provides an assessment of the three phases at the US.

Table 7.4: Three phases and assessment of the University of Stellenbosch situation

Phases	Assessment
1. The establishment of institution-wide technological infrastructure and the bottom-up institution-wide adoption of ICTs in teaching and learning activities (mostly experimentation, often without real reflection on the impact of ICTs on student learning).	Pre-strategy phase with the establishment of an IT division, Uni-Ed and the exponential growth in the use of WebCT.
2. The pedagogical use of the infrastructure and the effective integration of ICTs into teaching and learning activities to improve learning (reflection on the whole teaching and learning process with an emphasis on student learning).	Ongoing process - Some evidence of redesign of modules and academic programmes[82].
3. The strategic use of ICT with a view to different target groups of higher education. The goal in this stage is to integrate the different elements of the technological enterprise into a "seamless educational enterprise".	Ongoing process – e-Campus initiative.

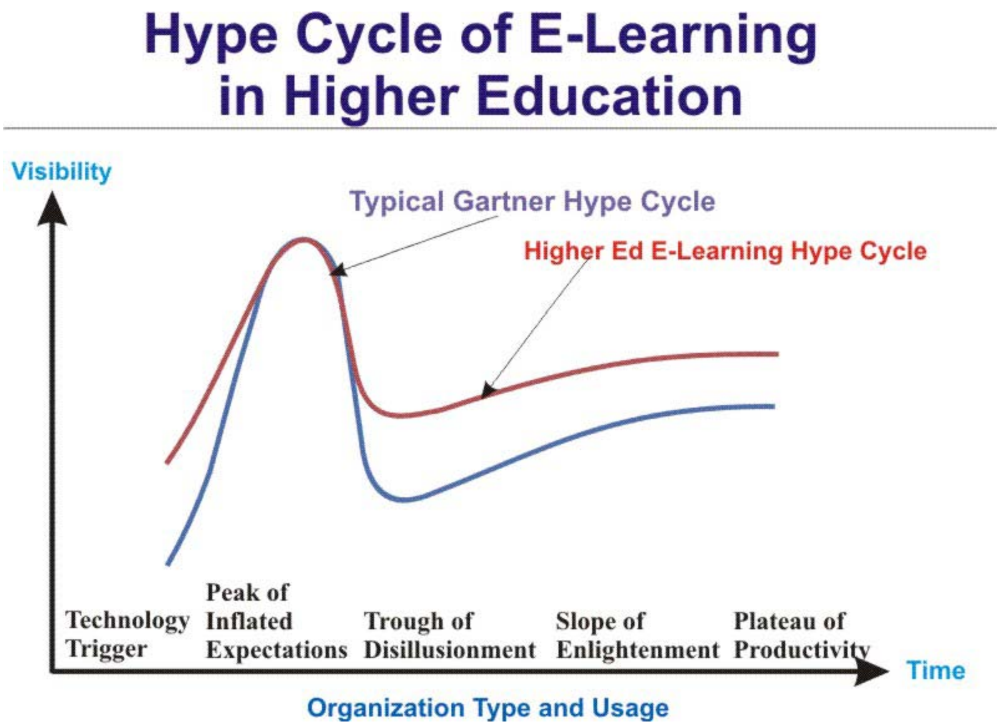
Table 7.4 clearly shows that all three phases are present at the University of Stellenbosch. Phases two and three are part of an ongoing process that includes the e-Learning project as well as the e-Campus initiative. These results correspond to a large extent with the results of a survey done by Betty Collis and Marijk van der Wende of Twente University. They found that, in most cases, institutions are now moving from the first phase of mostly bottom-up experimentation to a phase in which institution-wide use of ICT is being encouraged. In many cases, the first stage of institution-wide ICT implementation, i.e. the establishment of institution-wide technological infrastructure, is now in place. However, the second stage, i.e. rich pedagogical use of this

[81] Discussed in Chapter 3.
[82] Results of the lecturer survey, Chapter 5.

infrastructure, is generally still in development. The report finds that, overall, the third stage has not yet been considered explicitly (Collis and Van der Wende 2002). In the case of the University of Stellenbosch, the third stage is being considered explicitly.

The Gartner Group, a higher education research group, provides a useful graph of the so-called Hype Cycle of e-Learning in higher education (Figure 7.1 below) that can be used to further clarify the three phases assessed in Table 7.4.

Figure 7.1: Hype Cycle of e-Learning in higher education



In the case of the University of Stellenbosch, the technology trigger was the introduction of WebCT and e-Learning initiatives in general. The exponential growth in the use of WebCT at the University of Stellenbosch created a peak of inflated expectations and, in some cases, resulted in a trough of disillusionment – especially for students who feel that the lecturers are not using the communication possibilities of WebCT to their fullest potential. It is further clear that the University of Stellenbosch is now moving to the slope of enlightenment and the plateau of productivity (Phases 2 and 3), on the basis of the evidence of some redesign of academic programmes and modules.

With regard to the second question, I would argue that the paradigm shift in the teaching and learning process to take full advantage of the supposed transformational possibilities of the integration of ICTs has not yet occurred. WebCT is still largely used for the transfer of content, with little evidence of the redesign of modules and academic programmes.

Lastly, it became clear from the case study that the University of Stellenbosch uses a hybrid model in the integration of ICTs, i.e. a mixture of appropriate online and face-to-face teaching and learning activities. The focus is furthermore on the instrumentalist use of technology[83] (Dan Scurry, as cited in Andersen 1999), i.e. the integration of ICTs into teaching and learning activities is:

- Not focused on technology, but rather on the analysis of the needs, opinions and characteristics of the actors within the adoption site, and
- Not focused on the product, but rather on the context and integration of the technology in context.

7.7 CONCLUSION

It is clear from this retrospective assessment that the e-Learning project is not just part of the hype of the 1990s (Chapter 2), but that is becoming an integral part of the teaching and learning activities at the University of Stellenbosch. Although there are indications of benefits for students and lecturers, it is at this stage to early to do a full impact evaluation, especially of the last phase (strategy implementation phase) of the intervention. John Kotter, change management guru, reminds us that “the most general lesson to be learned from the more successful cases is that the change process goes through a series of phases that, in total, usually require a considerable length of time. Skipping steps creates only the illusion of speed and never produces a satisfying result” (Kotter 1995).

The retrospective assessment has yielded some important results that will be used to improve the e-Learning project. It has also provided an important indication of why lecturers will engage in e-Learning activities. It was found that the strategic thrust of the project in the strategy formulation and implementation phases is both a strength and a weakness of the programme. On the one hand, it provides for monetary incentives and also attaches strategic importance to all e-Learning activities, but on the other hand the initiative and its targets are perceived negatively by some lecturers as a top-down process. The challenge remains to obtain buy-in for the project from all lecturers and to establish ownership of the initiative within faculties. This is the only way to ensure the sustainability of the initiative.

Although lecturers and students are generally quite positive about the e-Learning initiatives, an effort should be made to provide more communication about the benefits of e-Learning activities

[83] Discussed in more detail in Chapter 3, Section 3.2.3, Table 3.1.

for both lecturers and students. In this regard, lecturers who share their experiences of the integration of ICTs can play an invaluable role. This, together with a stable infrastructure and a good support and training system, were found to be the prime motivators for lecturers to start and increase their usage of ICTs in teaching and learning activities. Monetary incentives do have value in some faculties and should not be discounted altogether.

Some of these results can definitely be generalised and applied to other tertiary education institutions in South Africa. Specific recommendations for the University of Stellenbosch and more general recommendations for other tertiary education institutions will be made in the concluding chapter.

CHAPTER 8: CONCLUSION

8.1 REFLECTION ON MAIN RESEARCH QUESTION

I should never be able to fulfill what is, I understand, the first duty of a lecturer - to hand you after an hour's discourse a nugget of pure truth to wrap up between the pages of your notebooks and keep on the mantelpiece for ever.

-Virginia Woolf (A Room of One's Own)

Although the integrative assessment of e-Learning activities at the University of the Stellenbosch (Chapter 7) shows that the University has been quite successful in its three-phase approach to the integration of ICTs into teaching and learning activities, it does not necessarily imply that this approach will work at other higher education institutions. Instead of therefore trying to provide prescriptive answers to the main research question of this study: *How does a South African higher education institution, taking cognisance of worldwide trends, effectively integrate ICTs into its business processes and, more specifically, into its teaching and learning activities to promote deep learning experiences for students?* I rather conclude with recommendations at three levels, as well as provide some suggestions for further research on the topic. The three levels are:

- <u>Level 1:</u> Recommendations for higher education institutions to deal with changes in the higher education context at an institutional level as a result of the three forces discussed in Chapter 2, i.e. knowledge as principal driver of growth in a networked society, the information and communication technology (ICT) revolution, and the business of higher education – new competitors in the market place, keeping the South African context in mind.
- <u>Level 2:</u> Recommendations for higher education institutional management structures for integrating ICTs at an institutional level into all business process as a possible strategy to deal with the changes discussed in Chapter 2.
- <u>Level 3:</u> Recommendations for faculty development and information technology divisions for integrating ICTs into specifically teaching and learning activities, paying attention to the enabling institutional and technological environment, as well as to good teaching and learning practice. In the case of level three, I also make specific recommendations that apply to the e-Learning project at the University of Stellenbosch specifically.

8.2 LEVEL 1 RECOMMENDATIONS: DEALING WITH CHANGES IN HIGHER EDUCATION CONTEXT

Three main forces, namely knowledge as principal driver of growth in a networked society, the information and communication technology (ICT) revolution and the “marketplace” of higher education, are the main causes of change in the global higher education context. At the same time, the South African higher education system has undergone changes after 1994. The significant recommendations at this global institutional level, are based on the discussion of these drivers and their impact on the “traditional” university in Chapter 2:

- Higher education institutions should not get swept up in the hype and make changes just because all the other higher education institutions are changing or to make a quick profit. This is especially true for the use of ICTs for full online delivery of academic programmes for distance education students. As we saw in the second chapter, the institutions/companies that were only focused on profit and content delivery did not survive once the dot-com bubble burst. Higher education institutions should use the core processes of the institution as the primary motivating factor for change and choose appropriate technologies as tools to improve these processes.
- As also became clear in Chapter 2, it is, on the other hand, not enough for higher education institutions to only take notice of the global trends - they have to do something about them as well. An institution has to plan to become part of the “borderless” knowledge-based network society. Higher education institutions as monopolies, drawing only on their own resources, can no longer be successful in the knowledge-based network society. To be successful in the knowledge-based network society a higher education institution has to:
    - become part of the global network,
    - form partnerships and interact within the network to be a “learning organisation” (Arie de Guess, (as cited in Capra 2003, p.92)),
    - equip itself to deal with change and new forms of knowledge production, and
    - be able to produce graduates who are “knowledge workers” and lifelong learners.
- Higher education institutions should no longer only rely on the “brand name” of the specific institution, but should also pay attention to quality assurance of academic programmes and educational outcomes. These issues emerged as some of the critical success factors in the discussion of the new providers and their impact on the university (Chapter 2, Section 2.2.3.2). Furthermore, higher education institutions should focus on

building a good reputation and end-to-end customer service by adopting a more entrepreneurial stance, but without sacrificing the core academic values of the institution.

- Higher education institutions in South Africa should pay attention to the global trends, but should remain aware of the unique African and South African challenges that necessitate country-specific responses to issues such as equity of access, effectiveness, efficiency, accountability and access to ICTs in higher education institutions.These unique African and South African challenges emerged in the discussion of the impact of the three global drivers discussed on the higher education sector in South Africa (Chapter 2, Section 2.4).

8.3 LEVEL 2 RECOMMENDATIONS: INTEGRATING ICTS INTO ALL BUSINESS PROCESSES

Some critics, such as Sir John Daniel, claim that the integration of ICTs into all the business processes of a higher education institution is a possible way of dealing with the changes in the higher education context (Daniel 1998). To achieve the anticipated benefits of the integration of ICTs, the lessons learned at the University of Stellenbosch re-affirm the research findings (see specifically Chapter 4, Section 4.8) that it is not only enough to focus on loosely best practices but rather on “best systems”. To facilitate this systems approach to the integration of ICTs, higher education top management should pay special attention to the following issues:

- Top management should ensure that the business processes of the higher education institution and not the technology per se are the main driving forces behind the integration of ICTs. The integration of ICTs should therefore form part of the overall institutional policy framework and planning process on the basis of the institution’s strategic priorities.
- To start the process of the integration of ICTs into all business process, top management or the educational faculty development unit, as was the case at the University of Stellenbosch, should start a campus-wide conversation about the integration of ICTs into the higher education institution as well as establish a team to formulate and seek approval for a strategy/plan for the integration of ICTs. The discussion of the process followed at the University of Stellenbosch (Chapter 4) and the integrative assessment thereof (Chapter 7) re-affirm the consensus in the research (Chapter 4) that in order to promote cost efficiencies, to avoid duplication of services and to obtain buy-in from all stakeholders, this process should pay special attention to:
    - Consulting as widely as possible and allowing for divergent views,
    - Establishing an institutional vision,

- Embedding the strategy in the institutional fabric, and
- If at all possible, securing special funding for the individual projects of the initiative as well as for monetary incentives, but being careful that the integration of ICTs is not seen as an optional add-on.

- It further emerged in the discussion and assessment of the case study of the University of Stellenbosch, that to ensure the effective implementation of the formulated strategy/plan, top management should establish an appropriate management and communication system. Based on the lessons learned in the Stellenbosch context discussed in Chapter 4, the system should have:
  - A strong “institutional champion” at top management level to drive the initiative top-down,
  - Executive leadership and support communicated on a regular basis,
  - The right leadership team,
  - A uniform, flexible project management methodology for the management of the implementation, and
  - A communication plan to ensure continuous communication and consultation with all stakeholders.

8.4 LEVEL 3 RECOMMENDATIONS: INTEGRATING ICTS INTO TEACHING AND LEARNING ACTIVITIES

To ensure that the potential benefits of the integration of ICTs specifically in teaching and learning activities are realised, I make a few recommendations pertaining to the institutional environment, faculty development initiatives to support the integration of ICTs into teaching and learning activities, and an enabling technological environment. These recommendations are based on the literature review of the possible benefits (Chapter 3), the discussion of the case study of the University of Stellenbosch (Chapter 4), the results of the surveys (Chapters 5 and 6) and the integrative assessment (Chapter 7). I conclude with some context-specific recommendations for the e-Learning project and e-Learning initiatives at the US.

8.4.1 Institutional planning level

At an institutional planning level, the following recommendations are made:

- The higher education institution should adopt a bottom-up and top-down plan/strategic approach, with specific targets for the integration of ICTs into teaching and learning activities. The bottom-up approach, relying on voluntary participation and experimentation, is very important as shown in the case study of the University of Stellenbosch. However, the case study also shows that a more structured, strategic approach has its advantages, as long as it remains a flexible strategy that is not prescriptive and allows for individual creativity. Many of the short-term challenges associated with moving from a bottom-up to a more top-down approach as discussed in Chapter 4, Section 4.6, are also long-term advantages. The most important is the fact that lecturers are “forced” to take notice of e-Learning as an alternative method to structure teaching and learning activities. Whereas it could lead to some resentment and negative perceptions, it can also lead to some lecturers realizing the advantages of this approach for their specific discipline and students.
- With regard to access to e-Learning activities, higher education institutions should be aware that, in developing countries such as South Africa, the provision of physical resources (hardware, software and Internet connectivity), although critical for the successful adoption of technology, will not solve the so-called “digital divide”. Resnick (2001) argues that whereas the “access gap” (to hardware and software) will narrow, the “fluency gap” (regarding computer and information literacy) could remain. Higher education institutions should therefore pay attention to both the physical infrastructure and the social practices – the types of literacies required to be “digitally fluent”. [84] The “digital fluency” of both lecturers and students can be addressed in workshops and as an integrated part of the curriculum.
- Although monetary incentives for e-Learning initiatives help as institutional incentives in that they reward teaching and learning practice, caution should be taken not only to reward the “e” part of the teaching and learning process. There are merits in promoting innovation by providing special incentives, but the ultimate goal is to value and reward teaching and learning in general and not just one aspect of the teaching and learning process. Only about 40% of the lecturers at the University of Stellenbosch thought that special financial incentives should be given to lecturers to integrate ICTs (See Chapter 5, Figure 5.34) Lecturers rated intrinsic academic factors to get started and increase their

[84] Resnick defines digital fluency as not only knowing “how to use digital technology, but also knowing how to construct things of significance with digital technology” (Resnick 2001).

usage of ICTs much higher than monetary incentives (See Chapter 5, Table 5.34 and Table 5.38). This study furthermore shows that in order to motivate lecturers to take part in e-Learning initiatives, it is more important for higher education institutions to:

- Demonstrate its support and commitment for good teaching and learning practices with the appropriate use of ICTs. Institutional values, where (mostly) research and not teaching and learning activities are valued and rewarded, need to change for the integration of ICTs to be successful. Laurillard argues for "a common understanding of the nature of learning at the university level, an acceptance that teachers must become reflective practitioners, and an intention by university management to create the conditions that foster and reward this rather different approach" (Laurillard 2001).
- Establish an educational faculty development unit that should, working closely together with the Information Technology division, build confidence in the whole e-Learning system and the people involved. This can be done through a flexible faculty development plan, excellent support and a reliable, stable infrastructure for both staff and students. This unit can provide central guidelines, training, support and facilitate demonstrations on how ICTs could add value in teaching and learning activities, but the ownership of e-Learning initiatives should be established within the individual faculties to ensure the sustainability of these initiatives. The merits of this "teach 'em to fish" approach is described in more detail in Chapter 4, Section 4.3.3.

8.4.2 Faculty development initiatives

In order for the educational faculty development unit to ensure that the potential benefits of the integration of ICTs discussed in Chapter 3 are realised, academic faculty development practitioners should:

- Emphasise the redesign of academic modules and programmes by means of a blend of the best aspects of contact and online methods focused on a learner-centred approach, instead of opposing classroom (contact) and online teaching and learning. The discussion on realising the possible benefits of ICTs in Chapter 3 clearly shows that lecturers should be encouraged to go beyond what is possible in a "traditional" classroom situation and emphasise what one can do with IT that one cannot do without it to support and enhance learner-centred practices. Lecturers should be encouraged not to get caught up in the (limiting) focus on using ICTs only for the transmission of content and information (See Chapter 3, Section 3.2.2 for a more detailed discussion on the potential problems with “unreflective” use of technology in teaching and learning).

- Use the integration of ICTs as a lever to promote faculty development and reflection on teaching and learning in general. Kathleen King (2002) argues that the introduction of technology as a possible new teaching and learning space has the potential to trigger a process of “critical reflection and self-examination”. In this regard, lecturers should be encouraged to rethink teaching and learning approaches and how technology can support them to promote deep learning experiences that are social, active, contextual, engaging and student-owned, keeping in mind that the specific technologies are only tools.
- Get buy-in from faculty members and students for e-Learning initiatives by:
    - Showing how the integration of ICTs can add value to teaching and learning activities. Lecturers rated this factor the highest with regard to the factors that motivated them to increase their usage of WebCT (See Chapter 5, Table 5.38).
    - Ensuring recognition and reward for innovative projects.
    - Promoting collaboration and sharing amongst peers. It became clear in the results of the lecturers’ survey that peer accounts and demonstrations of successful e-Learning projects play a vital role in convincing lecturers to try out and increase e-Learning activities (See Chapter 5, Table 5.34 and Table 5.38). A lecturer is much more likely to experiment with the integration of ICTs if he/she sees an example of how a colleague is using ICTs and of the benefits and challenges. However, care has to be taken when selecting these “champion” lecturers to give demonstrations. If they are only early adopters of technology who have created very sophisticated e-Learning applications, other lecturers who are not as technology literate might find their example too daunting to follow.
- Remain flexible, i.e. allow lecturers to choose to what extent they want to make use of e-Learning initiatives to suit their own personal teaching styles, academic disciplines and subjects. There was a strong sentiment in the open comments of the lecturers on the survey that they should have a choice whether they want to use ICTs or not and that they will use it only when it is appropriate (See discussion under “Should have choice to use incentives or not” under Table 5.4.2 in Chapter 5).
- Be aware of the possible barriers to the integration of ICTs into teaching and learning activities, e.g.
    - Time to do development of online material and communicate electronically with students,

- Students access to computers and printers (on campus),
- Computer access for students off campus,
- Teaching and learning practice is not valued, and
- Infrastructure (lecturers).

- Be aware of and accommodate diverse technology adopter types (lecturers and students). It is important to support the early adopters, but whereas the early adopters are willing to experiment with technology, the later adopters will need more support, training and incentives to get involved. (See Chapter 3, Section 3.6.1 for a more detailed discussion of the characteristics of the different adopter types.) To accommodate these different types, lecturers should be encouraged to follow an incremental approach in the development of online learning activities.

8.4.3 Enabling technological environment

In order to create an enabling technological environment for e-Learning initiatives, the IT division should:

- Invest in an enabling technological environment for teaching and learning, looking specifically at Web learning management systems (LMS) as user-friendly Web environments that could support teaching and learning.
- Standardise on one LMS and ensure that this system is integrated into the larger interconnected IT system to move into the third wave of integrated enterprise-wide learning management systems as identified in Chapter 3, Section 3.7.3.
- Take note of global standards and interoperability, which are crucial for the transformation of teaching and learning. As discussed in Chapter 3, Section 3.7.4, to move into the fourth wave of the development of learning management systems, interoperability, according to Barone, is necessary to make the new teaching and learning methods "affordable, supportable, portable and robust" (Barone 2003).
- Keep abreast of and evaluate open source learning management system developments, such as the MIT initiative. Open source learning management systems are also part of the fourth wave discussed in Chapter 3, Section 3.7.4 and could provide more complex tools and support than are currently available commercially.

8.4.4 Specific recommendations for the e-Learning initiatives at the University of Stellenbosch

With regard specifically to the e-Learning initiatives at the University of Stellenbosch, the academic faculty development unit and its members responsible for the e-Learning initiatives:

- Should be aware of and communicate the possible problems relating to the unreflective use of ICTs in teaching and learning at the University of Stellenbosch, e.g. a drop in class attendance. It became clear in especially the open comments of the lecturers in the survey, that some of the lecturers incorrectly link the use of WebCT to a drop in class attendance (See Chapter 5, Section 5.5.1).
- Should emphasise the redesign of complete academic modules/academic programmes to go beyond mere compliance with the minimum requirement of the e-Learning project. Although the results of the lecturers' survey showed that there is a general awareness of the potential value added by the integration of ICTs (See Chapter 5, Section 5.8.1), only about a third of the lecturers indicated that they have redesigned their modules and programmes (See Chapter 5, Figure 5.27).
- Encourage more electronic interaction between lecturers and students and more updating of online content. It became clear from the results of both the lecturers' and students' survey results that the Bulletin Board is not used to its full potential and that the students feel that the content is not updated enough (See Chapter 5, discussion of Tables 5.18 and 5.19 and the related student comments).
- Further establish the ownership of e-Learning initiatives within the faculties and obtain buy-in from individual lecturers for e-Learning initiatives. Although, as indicated in the integrated assessment (Chapter 7, Section 7.2), progress has been made to obtain buy-in, work still needs to be done with regard to the communication of the e-Learning project's goals and the establishment of ownership of the e-Learning initiatives (Annexure D, Outcomes 3.3 and 3.4). This can be done by:
    - Communicating the potential value of the integration of ICTs into teaching and learning activities at a residential university,
    - Communicating the fact that the integration of ICTs does not mean that e-Learning activities will replace face-to-face teaching and learning activities,
    - Emphasising that good teaching and learning practice should remain the driver for the e-Learning initiative, and not the technology or the monetary incentives,

- Consulting with deans and faculty e-Learning coordinators to formulate an e-Learning plan with e-Learning goals for each faculty with the incentives that are applicable to the specific faculty, and
- Doing pilot projects researching the possible benefits and costs of e-Learning activities at the University of Stellenbosch.

- Expand existing infrastructure for lecturers. Although the lecturers indicated that they were very satisfied with the current infrastructure (See Chapter 5, Table 5.30), some did indicate that they would like central access to expensive software and hardware. The recommendations are therefore to investigate the possibility of:
  - Establishing an instructional resource walk-in support centre where expensive hardware and software (graphics/sound/video/audio/animation) are available for lecturers to use, with the necessary support and training being available.
  - Hosting expensive software (graphics/sound/video/ audio/animation) on a central server from where lecturers can access it via a limited number of licenses.

On a more central level, a coordinating body consisting of representatives from IT, the computer user area managers and the faculty development unit should be formed to:

- Carefully consider whether the computer:student ratio in some computer-user areas is adequate to ensure that every student has access to a computer. Although the University of Stellenbosch has an excellent infrastructure for students and academics, the results of both the student and lecturer surveys showed that whereas the “fluency gap” is not an issue with most of the students and staff rating themselves as intermediate with regard to computer literacy (See Chapter 5, Section 5.4.2 and Chapter 6, Section 6.4.2) the access gap, especially with regard to some computer user areas (See Chapter 5, Figure 5.31and Table 5.31 and Chapter 6, Tables 6.26 and 6.27) as well as students who commute and therefore do not have access to computer user areas after hours, remain an issue (See Chapter 5, Section 5.9.1.3).
- Address the printing issues identified by students as the biggest barriers to using ICTs (and WebCT) (See Chapter 6, Table 6.2.1 and the accompanying discussion). These problems include:
  - Problems with downloading large documents and printing them in the computer-user areas,
  - The fact that the printing and photocopying systems are two separate systems and not integrated,

- Students cannot load their printing credits automatically in the computer-user areas, but have to go to the Administration building to pay cash for the credits, and
- Students feel it is unfair that they pay for notes as part of their student fees, but that they have to print the majority of their notes themselves.

8.5 RECOMMENDATIONS FOR FUTURE RESEARCH

In order for each higher education institution to ultimately answer the main research question, *How does a South African higher education institution, taking cognisance of worldwide trends, effectively integrate ICTs into its business processes and, more specifically, into its teaching and learning activities to promote deep learning experiences for students?* in their own specific context, Twigg (2001) argues for a kind of “institutional research”. This institutional research should focus on determining the value that ICTs can add to teaching and learning activities, the specific barriers and incentives that will work within the institution, the most effective paths for individual learners and a greater focus on the monitoring and measuring of costs. She argues for the use of a continuous assessment loop that focuses on two main things: “student learning outcomes and customer and student satisfaction with all experiences at the institution” (Twigg 2001). She further suggests continuous monitoring and feedback so that adjustments can be made to the learning designs of academic modules and programmes.

In the case of the University of Stellenbosch specifically, the following follow-up research should be done:

- A cost-benefit analysis of the e-Learning initiatives.
- Research on the relationship between diversity and the use of ICTs in teaching and learning activities, focusing specifically on two aspects:
  - The question whether the integration of ICTs into teaching and learning activities in a South African (and US) context is an exclusionary measure or whether it can actually promote diversity, and
  - How the use of ICTs can promote diversity in terms of teaching and learning styles.
- Case studies to research and identify the benefits of ICTs in each faculty, focusing on specific academic modules and programmes.
- Research on and testing of appropriate evaluation criteria and quality assurance mechanisms for e-Learning initiatives as part of the broader quality assurance processes

of the University of Stellenbosch to enable continuous evaluation of the e-Learning initiatives by the lecturers themselves. The results of these (self)-evaluation activities could lead to further reflection on teaching and learning in general and result in the redesign of modules and academic programmes.

Although successful in its endeavours to integrate ICTs into teaching and learning activities, the University of Stellenbosch does not hold the final answers to the main research question. Nevertheless this study does provide useful results and recommendations for the University of Stellenbosch, as well as for other higher education institutions, to move forward in a responsible way at a time where all South African higher education institutions feel the financial pressure and could question whether the investment in ICTs is really worth it. If this investment is made with the goal of promoting student learning in mind, and following a strategic approach that adheres to the institution's core academic values and priorities, it will certainly be worth it.

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ANNEXURES

ANNEXURE A: UNI-ED WORKSHOP PROGRAMME: 2003

Workshops and discussion opportunities 2003

Uni-Ed is an academic service unit of the University that is responsible for services to lecturers on the terrain of learning and teaching, focusing on the following:

To develop and facilitate the quality assurance processes on the terrain of learning and teaching • to serve as an anchor for the processes with regard to the design, approval, accreditation and registration of learning and teaching programmes • to initiate and to facilitate policy development on the terrain of learning and teaching • to promote innovation and good practice in learning, teaching and assessment • to provide information, advice and training on the terrain of e-Learning • to facilitate and support the instructional design of learning and teaching programmes (and -modules) • to administer the student feedback system • to train newly appointed academic staff for their task as lecturers at the University of Stellenbosch • to undertake needs based research in Higher Education

Lecturers are invited to contact Uni-Ed should they wish to make use of these services (contact ms S. Els se@sun.ac.za or visit Uni-Ed's Web page at http://www.sun.ac.za/uni-ed/uni-ed_e.html).

One way of delivering these services is the presentation of workshops and discussion opportunities. Thus all lecturers are invited to participate in the following sessions. No attendance fees will be charged. Lecturers from the Tygerberg campus (TB) are welcome to attend the sessions at the Stellenbosch campus (S) and *vice versa.* On request of departments Uni-Ed will hold needs-based workshops. For more details please visit the Uni-Ed website.

Please complete the attached enrolment form and return it before 28 February 2003.

Theme	Presenter(s)	Target group	#	Date	Place	Time
PREDAC	Nicoline Herman, Jan Botha, Francois Cilliers, Hanelie Adendorff, Antoinette van der Merwe	Newly appointed lecturers	1	20-23 January	The Beach House Conference- centre, Kleinmond	
			2	27-30 January		
			3	21-24 July		
Workshop for teaching assistants with lecturers	Margot Steyn and Idilette van Deventer	Law A department can request a workshop	4	22 January		As requested by department
WebCT Introduction Hands-on workshop: Design of a module homepage; Basic uploading and display of content. (Single Page); Communication (Discussion tool en Calendar tool); Assessment, module management and administration will be demonstrated. *Prerequisite:* Basic computer literacy	Antoinette van der Merwe		5	4 February	SB	09:00 – 11:00
			6	19 February	TB	14:00 – 16:00
			7	3 June	SB	10:00 – 12:00
			8	9 June	TB	10:00 – 12:00
WebCT Advanced Hands-on workshop: Advanced display of content (Content Module); Assessment (Assignment tool and Quiz tool); Module management and administration. *Prerequisite:* Basic knowledge of WebCT	Antoinette van der Merwe		9	5 February	SB	9:00 – 11:00
			10	20 February	TB	14:00 – 16:00
			11	5 June	SB	14:00 – 16:00
			12	10 June	TB	14:00 – 16:00

Theme	Presenter(s)	Target group	#	Date	Place	Time
WebCT (Departmental) Content is determined during a discussion with the departmental representative *Prerequisite:* Minimum 6 persons	Antoinette van der Merwe	A specific department can request a workshop	13	As requested by department	SB/ TB	As requested by department
Introduction to the creation of a Teaching Portfolio This workshop will describe a Teaching Portfolio and the purposes to which it can be put. Details of the multitude of sources from which material can be gathered will be presented together with the steps to create the portfolio. As a valid way of demonstrating good teaching it avoids the short-sightedness of looking only at student evaluations as a means of assessing teaching and learning.	Keith Barker (University of Connecticut)	All lecturers	14	7 February	SB	11:00 - 13:00
Assessment within the context of student centred learning and teaching How do you plan and execute reliable and feasible assessment?	Hanelie Adendorff, Nicoline Herman	All lecturers	15	6 March	TB	14:00 - 17:00
			17	27 March	SB	14:00 - 17:00
Assessment with WebCT What are the possibilities that WebCT has to offer? *Prerequisite*: Attended WebCT training / WebCT experience	Antoinette van der Merwe, Francois Cilliers, Hanelie Adendorff		18	21 February	TB	13:00 - 15:00
			19	6 June	SB	09:00 – 11:00
			20	11 June	TB	11:00 – 13:00
Advanced Web Search			21	18 March	SB	13:00 - 16:00

Theme	Presenter(s)	Target group	#	Date	Place	Time
How to find and evaluate information on the internet *Prerequisite:* Experience in Web searches			22	28 August	SB	13:00 - 16:00
Presentation Techniques Practical session with personal feedback and hints	Elsabé Daneel	All lecturers	23	25 March	SB	13:00 - 17:00
			24	26 March	SB	13:00 - 17:00
Outcomes for Post Graduate programmes The nature, formulation and use of outcomes in Post Grad programmes	Jan Botha		25	3 November	SB	14:00 - 17:00
			26	18 November	TB	14:00 - 17:00
Advanced PowerPoint During this practical workshop the focus is on the incorporation of images, sound, video, animation of text, images and graphics; hyperlinks between windows; hyperlinks to other programmes and documents from other programmes to PowerPoint, as well as exporting of PowerPoint slides to MS Word. *Prerequisite:* Basic knowledge of PowerPoint	Alida Louw		27	14 April	SB	14:00 - 17:00
			28	15 April	TB	14:00 - 17:00
			29	17 June	SB	14:00 - 17:00
			30	19 June	TB	14:00 - 17:00
			31	13 August	SB	14:00 - 17:00
Portfolios How do I compile a portfolio to give evidence of the quality of my teaching?	Nicoline Herman	All lecturers	32	15 May	TB	14:00 - 17:00
			33	20 May	SB	14:00 - 17:00
Teaching large classes How to manage large groups of students	Hanelie Adendorff, Francois Cilliers	All lecturers	34	8 May	TB	14:00 - 17:00
			35	18 June	SB	14:00 - 17:00
Study guides How to draw up study guides that give useful	Nicoline Herman, Francois Cilliers	All lecturers	36	12 June	SB	14:00 - 16:00

Theme	Presenter(s)	Target group	#	Date	Place	Time
guidance and support to students						
WebCT Mini Conference Lecturers demonstrate their *WebCT*-modules and share their experience with other lecturers	Antoinette van der Merwe	All lecturers but specifically current WebCT users	37	2 June	SB	09:00 – 13:00
PREDAC mini-conference A one day mini-conference at the end of the year during which participants are given the opportunity to share their learning and teaching experience of the past year	Nicoline Herman	PRONTAK and PREDAC participants	38	26 November	SB	08:30 - 13:00

ANNEXURE B: WEBCT QUESTIONNAIRE: LECTURERS

Survey: Lecturers

1) How **long** have you been using **computers** (e.g. Word, Excel, Internet searches)? (Choose one)

- o Less than 1 year
- o 1-2 years
- o 3-4 years
- o 5-6 years
- o 7-10 years
- o More than 10 years

2) How would you **rate** your **computer** skills? (Choose one)

Beginner			Intermediate			Expert
o 1	o 2	o 3	o 4	o 5	o 6	o 7

3) How **often** do you use the computer applications listed below?

	Daily	About once a week	A few times a month	Once a semester	Once a year	Never
a) E-mail	o	o	o	o	o	o
b) Internet	o	o	o	o	o	o
c) WebCT	o	o	o	o	o	o
d) Microsoft Office	o	o	o	o	o	o
Other (Specify): ……………………………..	o	o	o	o	o	o

4) **Since when** have you been using **WebCT**? (Choose one)

- o Since 1999
- o Since 2000
- o Since 2001
- o Since 2002
- o Since 2003

5) How would you rate your **WebCT skills**? (Choose one)

Beginner			Intermediate			Expert
○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

6) How **many WebCT workshops** have you attended (Choose one)

- ○ None
- ○ One
- ○ Two
- ○ More than two

7) If **none**, how did you get **started** with WebCT? (Check all that apply)

- ☐ I taught myself
- ☐ One of the Uni-Ed personnel helped me to get started
- ☐ One of my colleagues helped me to get started
- ☐ Other (Specify):

8) If you **did attend workshops**, what **types** of WebCT workshops did you attend? (Check all that apply)

- ☐ Basic
- ☐ Advanced
- ☐ Dreamweaver
- ☐ Other (Specify):

9) Do you feel you are able to do the WebCT **development** of your modules yourself? (Choose one)

- ○ Yes
- ○ No
- ○ Unsure

10) Do you feel you are able to do the **updating** of your WebCT modules yourself? (Choose one)

- ○ Yes
- ○ No
- ○ Unsure

11) Please rate the extent to which you believe that these factors **persuaded or prompted** you to use WebCT:

	Very important	Important	Not important	Not important at all	Not applicable
a) Recommendations from peers	○	○	○	○	○
b) You received money as part of the e-learning project	○	○	○	○	○
c) Departmental chair or dean requesting you to use it	○	○	○	○	○
d) You were faced with a specific teaching problem or challenge	○	○	○	○	○
e) Student requests	○	○	○	○	○
f) The examples of WebCT modules shown at a demonstration within your department	○	○	○	○	○
g) A WebCT training workshop	○	○	○	○	○
h) The demonstrations of peers at the annual WebCT mini-conference	○	○	○	○	○
Other (Specify): ………………………………………..	○	○	○	○	○

12) Which **WebCT tools** did you use when you **started** with WebCT? (Check all that apply)	13) Which **WebCT tools** do you **now** use? (Check all that apply)
☐ Homepage	☐ Homepage
☐ Single Page	☐ Single Page
☐ Content Module	☐ Content Module
☐ Quiz	☐ Quiz
☐ Selective Release	☐ Selective Release
☐ Bulletin Board (Discussion tool, threaded)	☐ Bulletin Board (Discussion tool, threaded)
☐ Calendar	☐ Calendar
☐ Assignment tool	☐ Assignment tool
☐ Chat	☐ Chat
☐ E-Mail	☐ E-Mail
☐ Syllabus	☐ Syllabus
☐ Other (Specify):	☐ Other (Specify):

14) **What** are you using WebCT for? (Check all that apply)

- ☐ Module homepage
- ☐ Static module content files (Word, Powerpoint, Excel, Pdf etc. files)
- ☐ Module framework
- ☐ Interactive content / Simulations
- ☐ Class tests
- ☐ Semester tests
- ☐ Tutorial / Practical tests
- ☐ Self-assessment tests that students can complete at their own convenience
- ☐ Exams
- ☐ Gradebook
- ☐ Electronic submission of assignments
- ☐ Communication (e.g. Bulletin Board, Chat rooms, e-mail)
- ☐ Other (Specify): ______

15) How **often** does a lecturer / an assistant / a secretary **update the module content** on WebCT? (Choose one)

- o More than once a week
- o About once a week
- o A few times a month
- o Once a semester
- o Once a year
- o Never
- o Other (Specify): ______

16) Who **mostly** updates the module content on WebCT? (Choose one)

- o A lecturer
- o An assistant
- o A secretary
- o Other (Specify): ______

17) How **often** does a lecturer / an assistant / a secretary **communicate electronically** (e-mail, bulletin board) with the students? (If never, skip to question 18) (Choose one)

- o Daily
- o About once a week
- o A few times a month
- o Once a semester
- o Once a year
- o Never
- o Other (Specify):

18) Rate the **frequency** of the following types of **electronic communication** according to the number of postings on the Bulletin Board within WebCT.

	Daily	About once a week	A few times a month	Once a semester	Once a year	Never
a) Questions about administrative issues (class meeting times, exam times, meeting places)	o	o	o	o	o	o
b) Questions about exam / test issues	o	o	o	o	o	o
c) Questions about content	o	o	o	o	o	o
d) Questions about assignments	o	o	o	o	o	o
e) Social interaction	o	o	o	o	o	o
f) Queries about technical difficulties with WebCT	o	o	o	o	o	o
g) Challenging problems posed by the lecturer which students have to answer / solve	o	o	o	o	o	o
h) Required student group discussions as part of assignments / tutorials	o	o	o	o	o	o
Other (Specify): …………………………….	o	o	o	o	o	o

19) Compared to when you started using WebCT, would you say your **current** usage of WebCT is: (Choose one)

- o More
- o The same
- o Less

20) If your usage is **more**, please rate the **following factors** according to their importance in contributing to your increased usage of WebCT.

	Very important	Important	Not important	Not important at all	Not applicable
a) Recommendations from peers	○	○	○	○	○
b) You received monetary incentives as part of the e-learning project	○	○	○	○	○
c) Your department chair / dean requested you to use it more	○	○	○	○	○
d) You see increased uses in your teaching	○	○	○	○	○
e) You see benefits for your students, e.g. increased student learning	○	○	○	○	○
f) A specific teaching problem or challenge	○	○	○	○	○
g) You react to student requests to use it more	○	○	○	○	○
h) You received more training	○	○	○	○	○
i) You received additional assistance	○	○	○	○	○
j) You feel more comfortable with the technology to use it in new ways	○	○	○	○	○
k) You saw more examples of how other lecturers are using WebCT	○	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○	○

21) With regard to **barriers / challenges** you perceive to the use of WebCT and ICTs (information and communication technologies) in general, how much do you **agree** with the following statements?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
a) It is too time consuming to develop online material	○	○	○	○	○	○
b) It is too time consuming to take part in online communication	○	○	○	○	○	○
c) Teaching practice in general is not valued and rewarded	○	○	○	○	○	○
d) The WebCT technical support is not adequate	○	○	○	○	○	○
e) The WebCT training is not adequate	○	○	○	○	○	○
f) The IT technical support (queries and repairs with regard to hardware and software) is not adequate	○	○	○	○	○	○
g) The technological infrastructure (e.g.	○	○	○	○	○	○

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
computers and network access) for lecturers is not adequate						
h) The network is too slow	○	○	○	○	○	○
i) Many of my students find WebCT too difficult to use	○	○	○	○	○	○
j) Many of my students are not computer literate	○	○	○	○	○	○
k) Many of my students do not have adequate access to computers in computer user areas	○	○	○	○	○	○
l) Many of my students report problems with printing in computer user areas	○	○	○	○	○	○
m) Many of my students who do not live on campus do not have access to computers after hours	○	○	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○	○	○

22) Do your students complain that they **cannot get access to a computer** in a computer user area? (Choose one)

- ○ Yes
- ○ No

23) If **yes**, how **often** do your students complain that they could not get access to a computer in a computer user area? (Choose one)

- ○ Sometimes
- ○ Most of the time
- ○ Always

24) Which **teaching and learning activities motivate** you to use WebCT in your teaching? Rate the extent to which these statements are **applicable** to your use of WebCT.

	Very applicable	Applicable	Not applicable	Not applicable at all
a) To increase contact with my students	○	○	○	○
b) To increase student-student contact and cooperation	○	○	○	○
c) To post lecture material online	○	○	○	○
d) To post additional material to challenge students to do more than is required	○	○	○	○
e) To encourage active learning – more interactivity between students and teaching materials	○	○	○	○
f) To provide more prompt feedback to students	○	○	○	○
g) To emphasize time on task – to allocate realistic amounts of time to tasks required of students	○	○	○	○
h) To accommodate various learning styles and preferences of students	○	○	○	○
i) To provide students with more self-assessment opportunities so that they can see how they are progressing through the module	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○

25) What do you think are the **major advantages** of using WebCT? Please rate the extent to which you **agree** with these statements with regard to your specific modules on WebCT.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
a) WebCT provides a framework to organize my module materials	○	○	○	○	○	○
b) WebCT provides module security (only students enrolled in the module can see the materials)	○	○	○	○	○	○
c) WebCT provides useful communication tools	○	○	○	○	○	○
d) WebCT provides useful tools for students	○	○	○	○	○	○
e) WebCT provides a convenient gradebook	○	○	○	○	○	○
f) WebCT provides a convenient online testing environment	○	○	○	○	○	○
g) The discussion area (Bulletin Board) in WebCT allows me to answer students' questions more efficiently	○	○	○	○	○	○
Other: (Specify): ……………………………..	○	○	○	○	○	○

26) What do you think are the **major disadvantages** of using WebCT? Please rate the extent to which you **agree** with these statements.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
a) WebCT is too inflexible	○	○	○	○	○	○
b) WebCT is not user friendly enough	○	○	○	○	○	○
c) WebCT is unsuited to the learning outcomes of my specific module	○	○	○	○	○	○
d) WebCT is too limited in its functionality	○	○	○	○	○	○
e) WebCT is too structured	○	○	○	○	○	○
f) WebCT gets in the way of good teaching and learning practice	○	○	○	○	○	○
g) Students do not like WebCT	○	○	○	○	○	○
h) WebCT is too time consuming to use	○	○	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○	○	○

27) Please rate the extent to which you believe that these **institutional factors / incentives** will motivate you to use WebCT.

	Very important	Important	Not important	Not important at all	Not applicable
a) More recognition for good teaching practice general	○	○	○	○	○
b) Possibility of promotion	○	○	○	○	○
c) Demonstrated student benefits – improved student learning	○	○	○	○	○
d) More training in the effective use of WebCT in teaching and learning (pedagogical)	○	○	○	○	○
e) More technical training	○	○	○	○	○
f) More support (technical and pedagogical)	○	○	○	○	○
g) Better IT infrastructure for students	○	○	○	○	○
h) Better IT infrastructure for lecturers	○	○	○	○	○
i) Additional remuneration to lecturers	○	○	○	○	○
j) Money for hardware and software	○	○	○	○	○
k) Money to pay an assistant to help with the development of online material	○	○	○	○	○
l) Release time from teaching to create online modules	○	○	○	○	○
m) Less administrative demands on my time	○	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○	○

28) What type of **training and support** do you prefer? Please rate the different types of training and support according to your **preference**.

	Very important	Important	Not important	Not important at all	Not applicable
a) Face-to-face	○	○	○	○	○
b) E-Mail	○	○	○	○	○
c) Telephone	○	○	○	○	○
d) Online	○	○	○	○	○
Other (Specify): …………………………….	○	○	○	○	○

29) a) Do you think **special financial incentives** should be given to lecturers to integrate ICTs (information and communication technologies) into teaching and learning activities? (Choose one)

○ Yes
○ No

b) Please **motivate** your answer.

30) a) Have you **redesigned your module / programme** as a result of your use of WebCT? (Choose one)

○ Yes, I have
○ No, everything is still the same

b) If you **have changed anything**, what did you change?

31) Do you think the use of WebCT has had an effect on the **amount of contact** you have with students? (Choose one)

- o Yes, the contact has increased
- o Yes, the contact has decreased
- o No, the contact has stayed the same

32) Do you think that your students are more **actively engaged** with your module material as a result of your posting it online?

- o Yes, the students are more actively engaged
- o No, the students are not more actively engaged
- o No, there is no difference in the students' engagement

33) Do you think WebCT has the potential to include **interactive activities** in your class / class materials?

- o Yes
- o No
- o Don't know

34) Do you think WebCT has the potential to provide a way for you to **accommodate more diverse learning styles / levels of preparation of your students** with regard to the following statements?

	Strong potential	Some potential	No potential at all
a) Module materials in a variety of formats (text, graphics, sound, video)	o	o	o
b) Students can work at their own pace	o	o	o
c) Students can review additional / remedial material if they feel it is necessary	o	o	o
d) Students have access to more advanced content	o	o	o
Other (Specify): …………………..	o	o	o

35) Please rate the **institutional interventions** with regard to their importance for you personally:

	Very important	Important	Not important	Not important at all
a) Diversity	○	○	○	○
b) Language	○	○	○	○
c) e-Campus	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○

36) Any **additional comments or recommendations** with regards to the integration of ICTs (information and communication technologies) in teaching and learning activities or WebCT in general?

ANNEXURE C: WEBCT QUESTIONNAIRE: STUDENTS

Survey: Students

1) How **long** have you been using **computers** (e.g. Word, Excel, Internet searches)? (Choose one)

- ○ Less than 1 year
- ○ 1-2 years
- ○ 3-4 years
- ○ 5-6 years
- ○ 7-10 years
- ○ More than 10 years

2) How would you rate your **computer skills**? (Choose one)

Beginner			Intermediate			Expert
○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

3) **Since when** have you been using **WebCT**? (Choose one)

- ○ Since 1999
- ○ Since 2000
- ○ Since 2001
- ○ Since 2002
- ○ Since 2003

4) How would you rate your **WebCT skills**? (Choose one)

Beginner			Intermediate			Expert
○ 1	○ 2	○ 3	○ 4	○ 5	○ 6	○ 7

5) How did you **learn** how to use **WebCT**? (Choose one)

- ○ My lecturer gave us training on the use of WebCT
- ○ My friends showed me how to use WebCT
- ○ I taught myself
- ○ Other (Specify):

6) Where do you **access computers / WebCT**?

	Always	Mostly	Sometimes	Never
a) CUA (computer-user area)	○	○	○	○
b) Residence	○	○	○	○
c) Home	○	○	○	○
d) Internet Café	○	○	○	○
Other (Specify): ………………………………..	○	○	○	○

7) If you have access to a computer user area, **which one** of the following do you use? (Choose one)

- ○ Humarga
- ○ Narga
- ○ Gerga
- ○ Fharga
- ○ Firga
- ○ Business School
- ○ Other (Specify):

8) How **often** do you use the computer applications listed below?

	Daily	About once a week	A few times a month	Once a semester	Once a year	Never
a) E-mail	○	○	○	○	○	○
b) Internet	○	○	○	○	○	○
c) WebCT	○	○	○	○	○	○
d) Microsoft Office	○	○	○	○	○	○
Other (Specify):…………………..	○	○	○	○	○	○

9) How **many** of your modules are on WebCT? (Choose one)

- ○ None
- ○ One
- ○ Two
- ○ Three
- ○ Four
- ○ Five
- ○ Six
- ○ More than six

10) a) Would you like **more** of your modules on WebCT? (Choose one)

- ○ Yes
- ○ No
- ○ Unsure

b) If **No**, why not?

11) Please rate the **extent** to which you **agree or disagree** with the following statements regarding WebCT.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
a) WebCT helps me to organize my learning activities better	○	○	○	○	○
b) WebCT increases contact between the lecturer and students	○	○	○	○	○
c) WebCT increases contact and cooperation between students	○	○	○	○	○
d) WebCT enables interactivity between students and teaching materials	○	○	○	○	○
e) WebCT enables the lecturer to give more prompt feedback	○	○	○	○	○
f) WebCT helps me to manage my time more effectively	○	○	○	○	○
g) WebCT accommodates various learning styles and preferences of students	○	○	○	○	○
Other (Specify): ………………………………..	○	○	○	○	○

12) With regard to the **WebCT components of your modules**, please indicate the extent to which WebCT is **integrated** into your modules.

	All my modules on WebCT	Some of my modules on WebCT	None of my modules on WebCT
a) The WebCT component is an integral part of the module	○	○	○
b) The WebCT component is essential to passing the module	○	○	○
Other (Specify): ………………………………..	○	○	○

13) What do you think are the **major advantages** of using WebCT? Please rate the extent to which you **agree** with these statements with regard to your specific modules on WebCT.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
a) Access to content (Word, Powerpoint, Pdf, Excel etc files)	○	○	○	○	○	○
b) Access to simulations / interactive content	○	○	○	○	○	○
c) Access to old exams, tests papers and memorandums	○	○	○	○	○	○
d) Access to more advanced additional content	○	○	○	○	○	○
e) Increased contact / interactivity with lecturers (Bulletin Board, Chat etc)	○	○	○	○	○	○
f) Increased contact with fellow students (Bulletin Board, Chat etc)	○	○	○	○	○	○
g) Feedback from lecturers and fellow students	○	○	○	○	○	○
h) Opportunity to measure my progress by taking WebCT quizzes	○	○	○	○	○	○
i) Administrative announcements (e.g. on class and tutorial meeting times)	○	○	○	○	○	○
j) My Grades tool to view my grades	○	○	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○	○	○

14) With regard to **barriers / challenges** you experience to the use of WebCT and computers in general, how much do you **agree** that the following statements represent possible barriers?

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Not applicable
a) Access to computers in computer user areas	○	○	○	○	○	○
b) Printing problems in computer user areas	○	○	○	○	○	○
c) Paying extra for printing credits	○	○	○	○	○	○
d) WebCT is too difficult to use	○	○	○	○	○	○
e) Not enough training to use WebCT	○	○	○	○	○	○
f) Cannot log on to WebCT	○	○	○	○	○	○
g) Not enough support if I have a problem with WebCT	○	○	○	○	○	○
h) WebCT is too slow	○	○	○	○	○	○
i) The network is too slow	○	○	○	○	○	○
Other (Specify): …………………………..	○	○	○	○	○	○

15) What type of **support** do you prefer? Please rate the different types of support according to your **preference**.

	Very important	Important	Not important	Not important at all	Not applicable
a) A person in the computer user area	○	○	○	○	○
b) Telephone support	○	○	○	○	○
c) E-mail support	○	○	○	○	○
d) A central WebCT helpdesk	○	○	○	○	○
Other (Specify): ……………………………..	○	○	○	○	○

16) Any other comments / suggestions?

ANNEXURE D: RETROSPECTIVE ASSESSMENT

Table D1: Monitoring activities and outputs & measuring outcomes

SQ = Student questionnaire, *LQ* = Lecturer questionnaire, Q = Question, C = Chapter, S = Section

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
1. To provide the **necessary stable IT infrastructure and support systems** to enable lecturers and students to use ICTs in teaching and learning activities	1.3. To maintain a central IT division 1.4. To provide adequate computer access for students 24/7	1. The IT division provides: 1.1. A stable central IT infrastructure (networks, library services, Internet, e-mail, admin systems etc.) for students and staff 1.2. Software support and training (staff) 1.3. Hardware support and maintenance (staff) 1.4. The technical support for student computer user areas where students can access computers (the management of these facilities resides in each faculty)	1. A central IT infrastructure exists that includes: 1.1. Networks, library services, Internet, e-mail and admin systems etc. 1.2. A central helpdesk that provides staff support (hardware and software) 1.3. A training programme for all staff 1.4. Central faculty student computer-user areas (Humarga, Narga, Fharga, Firga, Gerga) are open 24/7	1.1. All lecturers and students have stable access to the necessary stable 24/7 IT infrastructure, support and training programmes (Ac)	1.1 IT infrastructure, IT helpdesk, IT training programme 1.1.1. Student access and use of infrastructure and support: *SQ*: Q3 (C6, S6.4.2: Computer Literacy Index); Q5, Q15 (C6, S6.5: Training and Support); Q6, Q7, Q8, Q14 (C6, S 6.6.4: Barriers and challenges) *LQ*: Q21jklm, Q22, Q23 (C5: S5.9: Barriers and challenges); 27g (C5, S5.10.4: Institutional incentives) 1.1.2. Lecturer access and use of infrastructure and support: *LQ*: Q3 (C5, S5.4.2); Q21fgh (C5: S5.9: Barriers and challenges); Q27eh (C5, S5.10.4: Institutional incentives)
2. To establish a shared **campus-wide e-Learning culture** for the **sustainable**		2. The Vice-Rector (Teaching) organises a two-day design session for the e-Campus (Oct 1999)	2. The campus-wide conversation takes place		
integration of ICTs	2.1. To inform all	2.1. Lecturers give	2.1. Presentations of lecturers	2.1. All stakeholders	2.1 Rosenview minutes and

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
	stakeholders of the benefits of cooperation	demonstrations of what they are already doing with WebCT 2.1.1. The service organisation representatives give an overview of the infrastructure already in place	as to how they are using ICTs in teaching and learning 2.1.1. Presentations by service organisations on what type of infrastructure is available	are better informed about what other divisions are planning (Aw)	draft documentation
	2.2. To establish a shared vision between all stakeholders for an e-Learning project	2.2. The participants formulate a vision for an "e-Campus" and e-Learning at the design session	2.2. Draft Rosenview planning document	2.2. All stakeholders have a shared vision (At / B)	2.2 Shared vision: "The Univ of S'bosch strives to establish and further an academic environment of excellence where information and communication technology is effectively integrated."
	2.3. To obtain top management's commitment to the e-Learning project	2.3. e-Campus Forum strategy formulation activities 2.3.1. All stakeholders formulate a six-year strategy 2.3.2. The Vice-Rector (Teaching) presents the draft documentation to the General Management meeting 2.3.3. The Vice Rector circulates the documentation to the AAC and faculties for comment 2.3.4. All stakeholders discuss and incorporate the suggestions	2.3. Draft e-Campus quantum leap strategy document 2.3.1. Concept documentation 2.3.2. Approved draft documentation 2.3.3. Comments from AAC and faculties 2.3.4. Final e-Campus quantum leap documentation	2.3. Top management is strongly committed to the idea of an e-Campus (B)	2.3 Vice-Rector (Teaching) drives process in initial phase Manager: Innovation (part of top management) takes over management of process

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
		2.3.5. The Vice-Rector (Teaching) presents documentation to Senate	2.3.5. Approved final e-Campus document		
		2.3.6. The Vice-Rector (Teaching) submits the proposal to Council for funding	2.3.6. Council funding of R14 million for 2002-2007 (R1.5 million for e-Learning project)		
3. To provide an **enabling institutional environment** to **encourage** lecturers to engage in e-Learning activities	3.1. To provide special funding for e-Learning activities divided between the faculties	3. The e-Learning project manager with steering committee formulate and implement an e-Learning plan: 3.1. Divide the money awarded between the faculties according to general guidelines	3. Approved e-Learning plan 3.1. Money allocated to faculties	3.1. Faculties receive money for e-Learning initiatives (Ac)	3.1 e-Learning funding policy document (approved by Senate)
	3.2. To establish a minimum electronic presence (online module framework and electronic interaction) for all modules	3.2. The lecturers create the minimum electronic presence for all modules	3.2. Revised learning outcomes for all modules	3.2. A minimum online presence has been established	3.2 Faculty reports to Senate (August 2001, February 2002, May 2002) *SQ*: Q9 (C6, S6.6.1 More modules on WebCT) Q16 (open comments) *LQ*: Q14, Q17, Q18 (C5, S5.5: Pattern of WebCT usage)
	3.2.1. 2002 = 30% of all modules have a minimum presence		3.2.1. Revised module frameworks for all modules	3.2.1 Online module frameworks with revised outcomes are available	
	3.2.2. 2003 = additional 40% of all modules		3.2.2. An electronic communication facility within every module	3.2.2. Students and lecturers engage in electronic interaction as part of their	
	3.2.3. 2004 =				

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
	remaining 30%			teaching and learning activities (B)	
	3.3. To inform lecturers centrally about the e-Learning project	3.3. The project manager communicates regularly with the e-Learning coordinators	3.3. Regular e-mails to e-Learning coordinators	3.3. Lecturers are better informed about the goals of the e-Learning project (Aw)	3.3 Comments from lecturers in faculty reports to Senate (August 2001, February 2002, May 2002)
	3.4. To assist faculties to take ownership of / buy-in for the e-Learning initiatives within Faculties (students and staff)	3.4. The steering committee selects e-Learning coordinators within each faculty 3.4.1. The project manager encourages e-Learning coordinators to devise specific faculty guidelines for money allocation 3.4.2. The Task Group for Teaching & Learning defines the e-Learning project as two action plans (module framework and electronic communication) in the Strategy for Teaching and Learning 3.4.3. Faculty representatives formulate T&L strategies 3.4.4. The steering committee submits the Strategy to Senate for approval (Oct 2001)	3.4. 2 Faculty coordinators per faculty 3.4.1. Faculty-specific guidelines 3.4.2. Strategy for T&L (2002-2004) documentation 3.4.3. A strategy for T&L for each faculty 3.4.4. Approved STL	3.4. Faculties take ownership of / buy into the e-Learning project/ e-Learning initiatives (B)	3.4 Faculties devise their own Strategies for T&L Faculties devise faculty-specific guidelines for e-Learning The e-Learning coordinators manage the e-Learning project within faculties
	3.5. To promote	3.5. The project manager	3.5. A set of general e-Learning	3.5. Lecturers reflect	3.5. Peer-evaluation reports

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
	reflection about the use of ICTs in teaching and learning activities	develops a general e-Learning project process (including self-evaluation form)	guidelines	on how to integrate ICTs into teaching and learning activities (B)	that inform the faculty reports
		3.5.1. The project manager prompts e-Learning coordinators for faculty reports	3.5.1. Peer evaluation of e-Learning initiatives take place		
		3.5.2. The project manager collates faculty reports in one report	3.5.2. Reports to Committee for Teaching and Learning		
		3.5.3. The project manager submits the report to the Committee for T&L and Projects Board			
4. To **support** lecturers to integrate ICTs into their teaching and learning activities		4. Uni-Ed (a central faculty development unit):	4. Uni-Ed exists as faculty support unit		
	4.1. To select a suitable Web LMS for teaching and learning activities	4.1. Selects WebCT as LMS for lecturers and students	4.1. WebCT is the standard supported LMS at the US	4.1. Lecturers are more competent in using WebCT (S) (*Im*)	4.1 *LQ*: Q5 (C5, S5.4.4); Q6, Q7, Q8, Q9, Q10 (C5, S5.7: Training & Support pattern); Q12-13 (C5, S5.5.1: Use of WebCT Tools); Q19 (C5, S5.6.1: Major advantages of WebCT as tool); Q20hj (C5, S5.10.3: Factors that motivate lecturers to increase usage of WebCT); Q21e (C5, S5.9: Barriers and Challenges); Q27d (C5, S5.10.4: Institutional incentives as
	4.2. To provide training (technical and pedagogical)	4.2. Offers training workshops (technical & pedagogical) to lecturers	4.2 Faculty development plan with training workshops		
	4.3. To provide support (technical and pedagogical)	4.3. Provides support (technical & pedagogical) to lecturers	4.3. E-mail, telephone support		
	4.4. To give advice (technical and pedagogical)	4.4. Provides one-on-one consultations for lecturers	4.4. One-on-one consultations		

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
	4.5. To create awareness of the possible benefits of the integration of ICTs into teaching and learning activities	4.5. Gives demonstrations of how ICTs can be used in teaching and learning activities to lecturers 4.6. Produces publications for lecturers	4.5. Demonstrations 4.6. Publications, Web resources, manuals)	 4.2. Lecturers are more aware of the possible benefits of the integration of ICTs into teaching and learning activities (Aw) (*Im*) 4.3. Lecturers are more aware of the effective use of ICTs in teaching and learning activities (Aw) (*Im*) 4.4. Lecturers are able to do the development of online activities themselves (S) (*Int*) 4.5. Lecturers are able to do the updating of online activities themselves (or with the help of an assistant) (S) (*Int*)	motivators) 4.2. *LQ*: Q11d (C5, S5.10.1: Factors that prompt lecturers to use WebCT), Q20def (C5, S5.10.3: Factors that motivate lecturers to increase usage of WebCT); Q24, Q31, Q32, Q33, Q34 (C5, S5.8.1 Good teaching and learning practice as motivator) 4.3. *LQ*: Q14, Q15, Q16, Q17 (C5, S5.5: Pattern of WebCT usage); Q25 (C5, S 5.6.1: Major Advantages of WebCT) 4.4. *LQ*: Q5 (C5, S5.4.4); Q9 (C5, S7: Training & Support pattern); Q12-13 (C5, S5.5.1: Use of WebCT Tools); SQ: open comments 4.5. *LQ*: Q10, Q15 (C5, S5.5.2: Updating of content / material); 16, 17, 18 (C5, S5.5.3: Frequency and type/nature of communication)

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
				4.6. Lecturers take greater responsibility for the design and development of the "minimum presence" and innovative projects (B) (*Int*)	4.6. *LQ*: Q12-13 (C5, S5.5.1: Use of WebCT Tools); Q15 (C5, S5.5.2: Updating of content / material); Q16, Q17, Q18 (C5, S5.5.3: Frequency and type/nature of communication); Q19 (C5, S5.6.1: Major advantages of WebCT as tool)
				4.7. Lecturers regularly share good practice (B)	4.7. Annual WebCT mini-conference *LQ*: Q11ah (C5, S5.10.1: Factors that prompt lecturers to use WebCT); Q20ak (C5, S5.10.3: Factors that motivate lecturers to increase usage of WebCT)
				4.8. Lecturers reflect more often on teaching and learning activities in general (B) (*Int*)	4.8 *LQ*: Q11d (C5, S5.10.1: Factors that prompt lecturers to use WebCT); 20def (C5, S5.10.3: Factors that motivate lecturers to increase usage of WebCT); Q24, Q31, Q32, Q33, Q34 (C5, S5.8.1: Good teaching and learning practice as motivator); Q27c (C5, S5.10.4: Institutional incentives as motivators)

Intermediate Goals	Objectives	Activities	Outputs	Outcomes	Data
				4.9. Lecturers more often redesign their modules/programmes (B) (*Int*) 4.10. The integration of ICTs into teaching and learning activities becomes "business as usual"/part of a lecturer's normal activities (B) (*Lt*)	4.9. *LQ*: Q30ab (C5, S5.8.2: Redesign of module / programme) *SQ*: Q12 (C6, S6.7: Possible benefits for students) 4.10 Integrated programme evaluation process