eLearning adoption in Eastern and Southern African higher education institutions

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Keywords

eLearning
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Abstract

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This research was undertaken to propose a model for eLearning adoption in Higher Education in Africa and to identify and empirically test measures to assess the model. The model identified eLearning, individual and organisational factors affecting eLearning adoption in higher education. eLearning factors were deemed to be aligned with the individual and organisational factors and therefore, the measurement of individual and organisational factors of eLearning adoption is essential in determining the current state, and future development that could enhance eLearning adoption in higher education. This study is a first attempt in Africa to define and present a conceptualization of an eLearning adoption framework. The framework is a combination of frameworks and models from various disciplines, including social psychology, information systems, anthropology, sociology, education, communication, marketing, management, geography, economics and cognitive psychology. These frameworks for eLearning adoption in Higher Education are synergised and contextualised in the study.

An exploratory instrument design method was used to discover the main variables and form the foundation for the systematic and rigorous generation of propositions to be tested as well as to generate the questionnaire items used in the study. The exploratory approach entailed 6 steps, namely, (i) identification of relevant studies and supporting literature that were considered for review; (ii) development of a template to obtain the themes, and the variables of measure in the studies reviewed; (iii) identification of the common themes and agreements in the findings of the studies with regard to their effects on eLearning adoption, and to formulate propositions on eLearning adoption based on the themes; (iv) generation or discovery of questions to measure the propositions,

culminating in the questionnaire used in the study; (v) refining the questions and the whole questionnaire; and (vi) validating the questionnaire through selected experts and a pilot study.

A number of propositions were formulated on the eLearning adoption phenomenon and covered three wide areas. First, there are propositions concerning individual characteristics of eLearning adoption that are identified as (a) perception of ease of use, (b) perception of relative advantage, (c) perception of compatibility, (d) availability of experimentation experience, (e) demonstrability of eLearning results, (f) measure of self-efficacy in using eLearning, (g) perception of complexity of eLearning, (h) personal innovativeness, (i) innovativeness needs or personal motivation, (j) communication behaviour, and (k) prior experience. Secondly, there are propositions that are based on organisational characteristics, namely: (a) top management support of eLearning, (b) organisational level of centralization in decision making, (c) level of formalisation, (d) organisational reaction to change, (e) communication behaviour, and (f) organisational absorptive capacity. Finally, there are propositions originating from social and environmental factors.

Data was collected using the revised questionnaire in a random sample of academic staff members in the Eastern and Southern African region, of which 67 responses were usable. Analysis of the data was done in two stages. Stage one was to test the proposition set, and secondly to do an exploratory factor analysis to establish the underlying variables, or factors, that explain the pattern of correlations within a set of variables of eLearning adoption. The testing of the proposition involved the use of cross-tabulation validated with a Mann-Whitney U test. Most of the propositions concerning individual characteristics were strongly supported, while the propositions based on organisational characteristics were not. The result of factor analysis shows that on the individual characteristics side, the factors having a large impact on the adoption of eLearning are related to: (i) perceived usefulness, (ii) self efficacy, (iii) demonstrability, (iv) perceived ease of use, (v) perceived complexity, (vi) perceived compatibility, (vii) intrinsic motivation, (viii) collaboration and communication, (ix) extrinsic motivation, (x)

subjective norm and (xi) personal innovativeness. On the organisational characteristics side, the factors having a great impact on the adoption of eLearning are: (i) absorptive capacity (ii) management support of eLearning, (iii) communication behaviour, (iv) centralisation of decision making, (v) the level of formalisation, and (vi) the organisational change culture. Each of these factors was extensively discussed and recommendations were made for interventions that could lead to high adoption of eLearning in higher education in Eastern and Southern Africa.

This research contributed to the body of knowledge by providing an increased understanding of the factors that influence eLearning adoption in higher education in Eastern and Southern Africa, and arguably, made an even more important contribution by recommending the interventions required to improve eLearning adoption in higher education institutions. This would enable managers, decision- and policy makers, and eLearning advocates to define and execute eLearning adoption strategies.

January 2011

Declaration

I declare that ***eLearning adoption in Eastern and Southern African higher education institutions*** is my own original work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

James Kariuki Njenga January 2011

Signed: . . . . . .

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Obviously, none of the people and organizations mentioned bears the responsibility for the quality of the thesis, except me.

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Abbreviations and Acronyms

AAP	Africa Action Plan
AVU	Africa Virtual University
CASE	Computer-Aided Software Engineering
CBAM	Concern-Based Adoption Model
CfA	Commission for Africa
CHE	Council on Higher Education
CIA	Central Intelligence Agency
DESA	Department of Economic and Social Affairs
DOI	Diffusion of Innovation - also IDT
EA	eLearning adoption
EFI	Economic Freedom Index
ERI	E-Readiness Index
ESA	Eastern and Southern Africa
EDSS	Expert Decision Support Systems
GATS	General Agreements on Trade in Services
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Index
HE	Higher Education
HEI	Higher Education Institution
HIPC	Heavily Indebted Poor Countries
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HPI	Human Poverty Index
IBE	International Bureau of Education
IC	Innovation Configurations
ICCC	Innovation Configuration Component Checklist
ICM	Innovation Configuration Matrix
ICTs	Information and Communication Technologies
IDT	Innovation Diffusion Theory - also DOI
ILO	International Labour Organisation
IMF	International Monetary Fund
IT	Information Technology
Kbps	Kilobits per second, the speed of a signal transmission equivalent to 1000 bits per second.

LOU	Levels of Use
MDGs	Millennium Development Goals
MOET	Ministry of Education and Technology
NCHE	National Council of Higher Education
NRI	Networked Readiness Index
NUL	National University of Lesotho
OECD	The Organisation for Economic Co-operation and Development
OER	Open Education Resources/Repositories
PBC	Perceived Behavioural Control
PEOU	Perceived Ease of Use
PPP	Purchasing Power Parity
PRSP	Poverty Reduction Strategy Paper
PU	Perceived Usefulness
RONMOE	Republic of Namibia - Ministry of Education
SCT	Social Cognitive Theory
SN	Subjective Norm
SoC	Stages of Concern
SoCQ	Stages of Concern Questionnaire
SSA	Sub-Saharan Africa
TAM	Technology Acceptance Model
TCU	Tanzania Commission for Universities
TEC	Tertiary Education Council
TFHES	Task Force on Higher Education and Society
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UBLS	University of Botswana, Lesotho and Swaziland
UDSM	University of Dar es Salam
UEA	University of East Africa
UIS	UNESCO Institute for Statistics
UN	United Nations
UNAM	University of Namibia
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organisations
UNISA	University of South Africa
UNR	*Universite Nationale du Rwanda*/National University of Rwanda
UTUAT	Unified Theory of Acceptance and Use of Technology
WB	The World Bank

WBDI	World Bank Data Indicators
WDHE	World Declaration on Higher Education
WEF	World Economic Forum
WHO	World Health Organisation

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Chapter One: Introduction

1.1 Prologue

Everett Rogers, one of the greatest minds behind adoption of innovation research indicates that "getting a new idea adopted, even when it has obvious advantages, is difficult." (Rogers, 2003:1). Rogers, like many other adoption researchers and proponents, details the varied issues that are related to adoption research. It is exactly these issues that this research will grapple with.

Due to the relative recency of the use and of electronic technology for teaching and learning, this thesis reports on research that investigated eLearning adoption (EA) in Higher Education Institutions (HEIs) in Eastern and Southern Africa (ESA). The principle objective of the research was to come up with a framework that enumerates the necessary conditions, factors and issues that could affect eLearning adoption. The framework was envisioned to include the negative conditions and influences on eLearning adoption, how they can be identified, curtailed or reduced. Using the framework, it is hoped that higher education institutions and individuals within these institutions will have a reference point for most of the necessary conditions for eLearning adoption and continued use of eLearning in Higher Education Institutions in Eastern and Southern Africa.

This chapter outlines the main structure of the thesis starting with the research background, followed by the problem statement of the research. An overview of the research objectives is then given in section 1.4. Section 1.5 gives a summary of the research approach used, which is followed by the definition of the main terms used in the research. The final section of this chapter gives an outline of the whole thesis, and how it is built up to achieve the research objectives.

1.2 Research background

This research takes place in the Higher Education Institutions (HEIs) setting of the early 21st century Africa. The characteristics of these HEIs were identified and summarised by the World Declaration on Higher Education (WDHE) as that of a HEI: a) being equally accessible to all on

the basis of merit; b) preserving its core mission of educating the people and provide opportunities for higher learning and lifelong learning; c) acting in accordance to ethics and scientific and intellectual rigour; d) reinforcing their relations with the world of work and society to be relevant; e) be linked in a seamless educational system starting from childhood; f) using diverse educational models and methods; g) advance knowledge through research and ensure research quality; h) providing for essential staff development; i) being student centered; j) ensuring women's participation; *k) embracing the potential of Information Technology (IT)*; l) being considered as public service; m) networking internationally; and n) working in close partnerships with all stakeholders (UNESCO, 1998).

It is further suggested that characteristics of early 21st century organisations revolve around knowledge, information and continuous innovation. For instance, in the recent years, terms like information age, information economy, knowledge economy, digital economy, new economy, and the network economy became commonplace (Sharma, 2005). Most proponents of these terms seem to agree that, by definition, the core to them is a set of global attributes characterized by high productivity and efficiency - especially because of the use of information and communication technologies (ICTs) (Sidhu, 2007; Melville & Wallace, 2007) . In this global economy the means of making profit is dictated by the speed of innovation or new ways of organising work and production (Sharma, 2005). By implication, therefore, for higher education institutions of the 21st century to be relevant, they should be global, highly productive, adopt ICTs and be innovative in approaches to their core business. All four factors are intertwined and it would be almost impossible to achieve one without the rest. For example, it is highly unlikely for a HEI to be global, or achieve a global stature if there is no adoption and use of innovations within its systems and structures. Likewise, the speed of innovation required for high productivity cannot be realised without the use of ICTs in a world where urgency and speed are basic requirements and where business is happening at the speed of thought (Gates & Hemingway, 1999). Consequently, this argument puts ICTs as among the core pillars of 21st century higher education institutions.

This is a fact that was well identified and articulated by the WDHE. In its report, the WDHE states that, higher education is presented with promising opportunities relating to technologies.

However, utilising these opportunities to improve the information processes within higher education institutions is a challenge (UNESCO, 1998). Article 12 of the declaration enumerates the potential and challenges of technology that are posed to higher education. It also states that:

> "…higher education should lead in drawing on the advantages and potential of new information and communication technologies, ensuring quality and maintaining high standards for education practices and outcomes in a spirit of openness, equity and international co-operation. [This can be done through the adoption of a number of approaches among them]…creating new learning environments, ranging from distance education facilities to complete virtual higher education institutions and systems, capable of bridging distances and developing high-quality systems of education… [and] … taking the new possibilities created by the use of ICTs into account". (UNESCO, 1998, p. 8)

The new approaches envisioned are popularly referred to as eLearning - the use of technology, mainly ICTs, in teaching and learning. The use of ICTs in teaching and learning ranges among other things in complexity, sophistication, application, capacity, flexibility, and form. eLearning evolved in response to the growing need of higher education institutions and other organisations to a) improve their capabilities (e.g. their geographical reach), b) improve their processes (e.g. student support) and c) efficiently manage their data and learning content as well as cope with the challenges, and benefits from 21st century opportunities. It is imperative, therefore, that Higher Education Institutions adopt new technologies for teaching, learning, research and research dissemination. Further, there is potential of users in the higher education institutions discovering new and innovative ways of exploiting the technologies even beyond their teaching and learning scenarios (Agarwal, 2000).

Following the 21st Century higher education institutions and ICTs premises of improved capabilities, processes efficiency, as well as mounting pressure from various other quarters – funders, government, public, internal – Higher Education Institutions (HEIs) in Eastern and Southern Africa have expended a significant part of their meagre resources on ICTs. However, the spending or acquisition of the ICTs does not evidently translate into their use, or adoption by the intended users (Berkun, 2007; Fichman, 2004).

1.3 Problem statement

There are many research reports indicating that the impact of ICTs and eLearning will be huge in higher education institutions, but little is known about the factors for its adoption in the higher

education sector in Africa (Ahmed & Nwagu, 2006; Council on Higher Education, 2006; Steiner, Tirivayi, Jensen, & Gakio, 2004; LaRocque & Michael, 2003). Studies on the adoption of innovation explain the factors that influence the adoption of innovation and they have shown that these factors vary depending on the innovation, the potential adopters and their unique contexts (Painter-Morland, Fontrodona, Hoffman, & Rowe, 2003; Rogers, 2003).

The touted impact of eLearning has lead technology companies and other advocates to the propagation of a *technopositivist* ideology. This ideology has seen technology for teaching and learning being marketed or presented with a lot of promise, benefits and opportunities to stakeholders in higher education. In most cases this ideology has denied the educators and the educational researchers the much needed opportunities to the motives, power, rewards, and sanctions of the technologies and how best they can be used, as well as an understanding of the factors that would influence successful adoption of these technologies (Robertson, 2003; Guri-Rosenblit, 2005; Watson, 2001).

Consequently, higher education institutions in Eastern and Southern Africa are investing a huge chunk of their meagre resources in these teaching and learning technologies without an understanding of the factors that could influence their optimum adoption and hence a justification of the investment (Kariwo, 2007; Williams, 2007; Economist, September 10, 2005; Guri-Rosenblit, 2005; Teferra & Altbach, 2004). While there seems to be ample research on the use and adoption of eLearning in the developed countries, very little seems to have been documented in Eastern and Southern Africa. For instance, though there are a number of research projects on the adoption of ICTs, the particular area of eLearning adoption in higher education institutions in Africa is lacking. In South Africa, the Council of Higher Education report states that of the 135 PhD and Masters records they found in the Nexus Database on the area of technology and teaching, "[o]nly a small percentage of this focus on Higher Education." (Council on Higher Education, 2006). This is not special to South Africa, as an "African Tertiary Institution Connectivity Survey" of 2003 found out that a meagre 8% (n=56 responses) of surveyed higher education institutions in Africa stated that they planned to install eLearning initiatives in the future. The same study, however, indicated that 51% (n=83 responses) had some form of eLearning activities taking place, while only 45% had an ICT/eLearning policy (Steiner,

Tirivayi, Jensen, & Gakio, 2004). Clearly, these are not the characteristics that should be portrayed by a 21st century HEI in a competitive global world. It is, however, worth noting that some institutions have an ICT policy that does not mention eLearning while others have an eLearning policy in other departments not directly related to ICTs (Steiner, Tirivayi, Jensen, & Gakio, 2004).

Further, research shows that the access to higher education is limited to less than 5% in Africa as compared to the global average of 16% (Prakash, 2003 quoted in Gunga & Ricketts, 2007). For the countries considered in this study, the World Bank Data Indicators (WBDI) state the access as 4.96 (World Bank, 2004). Technology, specifically eLearning, has the potential of increasing the access to higher education (Yieke, 2005), although its use in Africa for the last few years has been limited due to some challenges such as cost of connectivity, problems of access to technology, fear of the technology, resistance to change (Gunga & Ricketts, 2007; Council on Higher Education, 2006; Steiner, Tirivayi, Jensen, & Gakio, 2004).

Scholarly articles in the area of eLearning also paint a gloomy picture. For example, a review of the "Bibliography on Higher Education in Sub-Saharan Africa" by Saint (2004) for the World Bank, covering the period 1990-2004, has some shocking revelations. Of the 916 listed titles, including 91 PhD and Masters theses, none specifically mentions eLearning in the title; only 13 have ICTs (computer technology, ICT) in the title; and only two are related to ICTs in teaching and learning.

With this picture in mind, it was essential that a study be done on the adoption of eLearning in higher education institutions in Eastern and Southern Africa to both improve on the research, and also on the understanding of the various factors that are at play in the adoption process of eLearning.

The main research question can thus be formulated as: ***Which factors influence the adoption of eLearning in Higher Education in Eastern and Southern Africa?*** To answer this primary research question, secondary research questions were formulated as:

To begin with, six research questions were crafted:

i. *What is the current state of eLearning adoption?*
ii. *What are the impediments and challenges to its adoption?*
iii. *How should the higher education institutions in Eastern and Southern Africa align themselves to deal with the challenges of eLearning in order to reap its benefits?*
iv. *What are the ingredients/conditions for a successful adoption of eLearning? And*
v. *How can these ingredients/conditions be adopted for the different operating contexts of the higher education institutions in Africa?*
vi. *What would be to optimal conditions for eLearning adoption in higher education institutions in Eastern and Southern Africa?*

On further review of the literature, it emerged that non-adoption and discontinued use of eLearning should be investigated in tandem with adoption because "non adoption is not the mirror image of adoption" (Gatignon & Robertson, 1989 quoted in Frambacha & Schillewaert, 2002:171). Consequently, the following research question was added to the list above.

vii. *Why do some higher education institutions, or units within these institutions, or individual people, not adopt eLearning?*

Also from the literature, it emerged that it is difficult to study the adoption of eLearning without: a) studying what people's perceptions are about eLearning; b) Looking for valuable lessons from other fields and disciplines; and c) questioning why, despite what seems like an extensive publicising of eLearning, its diffusion is still slow.

This led to some additions to and the reformulation of the research questions:

i. *What is the current state of eLearning adoption in higher education institutions in Eastern and Southern Africa?*
ii. *What are the impediments and challenges to its adoption in these higher education institutions? What combinations of factors tend to make eLearning 'adoptable'?*
iii. *How should the higher education institutions in these countries align themselves to deal with the challenges of eLearning in order to realise its benefits?*
iv. *How can the conditions and perceptions towards eLearning adoption be identified? How can they be influenced to make eLearning adoptable? How can the negative influences towards the adoption of eLearning be identified and prevented? How can these conditions and perceptions be adapted for the different contexts in which the higher education institutions in Eastern and Southern Africa operate?*
v. *What are the valuable lessons from other related fields about individual capacity and inclination towards eLearning adoption?*
vi. *Why is eLearning, despite its publicised potential benefits, diffusing slowly in Higher Education Institutions in Eastern and Southern Africa?*

vii. *What are the reasons for non-adoption, rejection and discontinued use of eLearning in East and Southern African higher education institutions? How can these reasons, if any, be dealt with to lead to adoption or continued use?*

1.4 The research objectives

The aim of this research was to investigate the eLearning adoption challenges in higher education institutions in Eastern and Southern Africa and to develop a framework, *inter alia* containing an enumeration of the necessary conditions, factors and issues that might affect eLearning adoption, as well as indications how negative conditions and perceptions could be identified and prevented to ensure adoption and continued use of eLearning.

To achieve the above-mentioned aim of the study, the following objectives were formulated:

- *To identify and analyse the adoption and adoption levels of eLearning in Higher Education Institutions in Eastern and Southern Africa.*
- *To identify and enumerate the critical success factors, in terms of perceptions and conditions that are associated with the successful eLearning adoption, and its continued use.*
- *To identify and enumerate the negative perceptions and conditions which hinder the adoption of eLearning in these institutions that might lead to its non-adoption, rejection or discontinued use.*
- *To formulate an eLearning adoption framework that on the one hand would encapsulate the success factors that could be replicated and enshrined in higher education institutions for successful eLearning adoption, as well as on the other hand indicate how the negative influences could be dealt with (e.g. turned into opportunities for success or learning opportunities).*

1.5 Scope and limitations

The initial title of this research was "Adopting, Implementing and Sustaining eLearning Programmes in African Higher Education Institutions". This title, had four main topics or issues to be studied, *viz a viz* adoption, implementation, sustainability and eLearning programmes. It's coverage in terms of geographical scope was on higher education institutions in the whole of Africa – the 52 sovereign countries and states. Both the scope of issues and the geographical scope were considered to be too wide for any meaningful study to be done within the limited time and resources. There was need therefore to limit the scope to what could be managed within the constraints.

First to be limited was the geographical scope. The scope was limited to Eastern and Southern Africa, but with emphasis on the two countries Kenya in East Africa, and South Africa in the Southern Africa.

The scope was further reduced by limiting the research to "**eLearning adoption** in Eastern and Southern African Higher Education Institutions" effectively cutting down the study issues to two: adoption and eLearning. A review of the literature indicated that "adoption" rather than "adopt(ing)" is more appropriate for describing this kind or research. "Adoption" was seen as a process of gaining acceptance and approval of eLearning while "adopt(ing)" was seen as a once-off action of choosing eLearning.

The findings of the research have some limitations, first, the predictive validity of self-reported behavioural measures like the ones used in this study are not always high which may always lead to overestimations of correlations of the various factors due to common-method variance and also social desirability bias (Sedera & Gable, 2004; Collopy, 1996; Presser & Stinson, 1998).

Secondly, there cannot be a claim that the proposed factors and items for the eLearning adoption are exhaustive and complete since there are factors that were either not fully explored or not explored at all. Although the literature was extensive and thorough, future research could benefit research in the adoption of eLearning in higher education by conducting interviews with the academics to get additional dimensions or factors of eLearning adoption.

Thirdly, there could have been bias occasioned by the choice of an online questionnaire as a data collection tool. The assumption that most academics are using the Internet - hence the choice of an online questionnaire - might have included a bias in that those who are currently using eLearning could be the only ones with access to the Internet. This in effect could have cut out respondents who might not have had access to the Internet, but whose inputs could have been valuable.

Fourth, cross-sectional sampling was used in the data collection and therefore the results are not generalisable beyond the time the survey was carried out. There is need for strong recognition of the fact that individual perception regarding something may vary over time.

1.6 Research Methodology

This research sought to understand the adoption and non-adoption of eLearning in HEIs' settings as they naturally exist, and engage in their business in order to provide as much detail as possible. To get a better understanding of the issues, and answer the research questions raised, a host of pragmatic and eclectic research approaches (commonly known as mixed-methods research) were used (Miller & Fredericks, 2006:567). Mixed methods research has been defined as both philosophical assumptions and inquiry methods that guide the collection and analysis of data using both qualitative and quantitative approaches in one or more studies to provide a better understanding of the research problem that otherwise would not be well addressed by a single approach (Creswell & Plano Clark, 2007). The use of both approaches ensured that the traditional quantitative research methods that are dominant in Information Systems research and qualitative research approaches complimented each other. A mixed method was favoured for this research because of its multi-disciplinary and complexity nature, touching on the information systems, educational policies and principles, political studies, and marketing, among others. These multidisciplinary nature and complexity lead to the choice of methods that complement each other for the best answers to the research questions (Gilbert, 2006; Johnson & Onwuegbuzie, 2004).

For this research, Creswell and Plano Clark's (2007) exploratory mixed method design was used. The choice was motivated by the unavailability of instruments and a unified framework or model for studying eLearning adoption in higher education institutions. Indeed, Creswell and Plano Clark (2007) posit that exploratory mixed methods are approaches suited for exploring a phenomenon like eLearning adoption, and are particularly useful in situations where researchers need to develop and test research instruments and further generalize the results to different groups. Accordingly, the exploratory nature of the study will begin with a qualitative content analysis of existing literature, and the status of eLearning adoption to build propositions. To test the propositions, a quantitative instrument was developed and tested, that farther generated the framework for successful eLearning adoption.

Qualitative content analysis is "a research method that uses a set of procedures to make valid inferences from text" (Weber, 1990:9) using themes that can be combined into set of themes as

the most useful unit of analysis. The procedures for Content Analysis are systematic, rule-guided (Mayring, 2000). The aim of Content Analysis is to classify "textual material, reducing it to more relevant, manageable bits of data" (Weber, 1990:5). The strength of Content Analysis in this study is on its application to "substantive problems at the intersection of culture, social structure, and social interactions" that can be used to "generate variables in experimental designs (Aries (1973), as quoted in Weber, 1999:11). Content Analysis is a developed means of conducting primary research with a means of synthesizing study reports through systematic categorizations in the themes identified (Dixon-Woods, Agarwal, Jones, Young, & Sutton, 2005).

Directed content analysis was the most appropriate to use in this research because a study on the adoption of eLearning in higher education institutions could benefit from "existing theory or prior research about" adoption of innovation. However, the applicability of the theory in the adoption if eLearning in higher education institution is uncertain or "would benefit from further description," (Hsieh & Shannon, 2005:1281). The goal of this research was "to validate or extend conceptually a theoretical framework or theory" (Hsieh & Shannon, 2005, p. 1281) on eLearning adoption in higher education institutions in Eastern and Southern Africa. Based on the fact that the study was designed to explore the transferability or generalisability of previously developed conceptualisations of adoption of innovation studies to a new context (higher education institutions), the directed content analysis method (Hsieh & Shannon, 2005) was considered to be the most appropriate.

The Content Analysis procedure used, involved a) Identification of relevant studies and supporting literature that were considered for review; b) Development of template to obtain the themes, and the variables of measure in the studies reviewed; c) Identification of the common themes and agreements on the findings of the studies in relation to their effects on eLearning adoption to come up with propositions that formed the core of the eLearning adoption framework; d) Generation or finding of questions to measure the propositions that formed the questionnaire used in the study; e) Refining the questions and the whole questionnaire; and f) Validating the questionnaire with selected experts.

To measure and validate the framework a quantitative approach in the form of a survey was used. Surveying was chosen as the method of data collection because the study needed to capture factual and behavioural data over a very large and dispersed population within time and budgetary constraints that would lead to "logical, deterministic, general, parsimonious and specific" deductions about eLearning adoption in HEIs in Eastern and Southern Africa (Baker, 2002:187). Specifically, an online survey was chosen because of its low cost, speed of data collection convenience, improved anonymity and regional reach of the research sample. (Grandcolas, Rettie, & Marusenko, 2003; Couper, Traugott, & Lamias, 2001; Epstein, Klinkenberg, Wiley, & McKinley, 2001). Reliability was assessed by calculating the Cronbach's alpha coefficients (Green & Salkind, 2005). The questionnaire was first piloted using 29 people and the Cronbach's alpha was used to measure its reliability. Questionnaire design guidelines were used (Dornyei, 2003) to ensure that the items tested what they were intended to measure, hence ensuring content validity (Straub, 1989).

The target population for the study in these HEIs was the eLearning support members and academics using, or intending to use eLearning. Random samples drawn from staff lists were used to identify individual research subjects. Of importance to the selection and determination of the sample size is the accuracy and quality of the research findings which might be greatly influenced (negatively) by inappropriate, inadequate or excessive sampling (Bartlett, Kotrlik, & Higgins, 2001).

The data collected during the quantitative phase was analysed using software packages SPSS and Microsoft Excel. Both descriptive and inferential statistical analyses were done. Descriptive statistics were used to give data summaries, tables, and graphs for describing the measured sample. The frequency tables, mean, mode and median were done to form a foundation for doing further statistical analysis on the variables. Inferential statistical analyses were done in the form of factor analysis to determine homogeneity of the measured items and to allow for generalisations and predictions that further enabled for the testing of the propositions. SPSS was used to do most of the analysis and statistical tests including the cross-tabulation, the Mann-Whitney U test, and reliability testing. Microsoft Excel was mainly used for formatting and

editing results. It was also used to confirm the results of the runs results from SPSS and also to generate graphical visuals.

Finally, findings from the inferential statistics were used to identify the key components of the framework that was structured in Chapter Four. These key components provide an understanding and a *generalisable* theory based on the conditions of eLearning adoption in HEIs. During the model development and refinement evidence of framework integration, predictions, relations, representation and description of the variables associated with eLearning adoption were taken into consideration.

1.7 Definition of terms

1.7.1 Adoption

Adoption has been defined by Rogers (2003) as "the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision." There is some discord among researchers about the working definition of adoption. Some (e.g. Klein & Knight, 2005; Kollmann, 2004) see it as the decision to use or reject an innovation thereby creating a distinction between adoption and implementation. Implementation within an organisation is seen as "the process of gaining targeted employees' appropriate and committed use of an innovation" making implementation the link between adoption (decision to use or reject) and the routine use (or continued use) (Klein & Sorra, 1996:1055). On the other hand, Klein and Sorra's definition of implementation falls under what Kollman (2004) defines as acceptance, which is the "act of usage" where the adopters integrates the innovation into their daily lives and use them less or more intensely. Others (e.g. Leseure, Bauer, Birdi, Neely, & Denyer, 2004), like Rogers (2003), view adoption as an all encompassing process that involves the initiation and adoption decision, set-up or adaptation, implementation, ramp-up (using the innovation) and integration (entrenchment and routinisation of its use into daily life). For this research, the working definition of adoption is adapted from Rogers (2003) and Leseure and others (2004) as the process through which a party responsible for decision making goes from the first knowledge about an innovation, to developing an opinion about the innovation that would determine the decision to use or reject it,

to investing resources in the innovation and finally integrating the innovation into the daily life of the party (entrenchment and routine usage).

1.7.2 Innovation

Innovation for this study is defined as an idea, tool, knowledge practice, object, process or procedure that is new to the potential adopters or its developers (whether or not it has been used by others), that is designed to benefit, or has economic value, or has the potential to add value to the adopting party (Morris, 2006; Klein & Knight, 2005; Anderson, De Dreu, & Nijstad, 2004; Templeton & Byrd, 2003; Hedges & Pulakoss, 2002).

1.7.3 eLearning

eLearning, short for electronic learning, and sometimes referred to as online learning, is the use of electronic devices (usually ICTs) to impart, enable or deliver instructional contents or experience (Parchoma, 2006; LaRocque & Michael, 2003) that can be automated (Robson, 2002).

1.7.4 eLearning as an innovation

In order to bring eLearning adoption research into perspective, it has to be seen through the definition of innovation. ELearning therefore, needs to be perceived as new and beneficial by the potential adopters. A learning culture, both by the individuals and the organizations is needed for the success of eLearning innovation to happen (Lin & Lee, 2005; Schulz-Zander, 2004). Schulz-Zander (2004) sees this learning culture as involving pedagogical practices, teacher training and promotion of dialogues, support and integration of ICT into all subjects, creation of "cross-curricula thematic approaches", development of new forms of assessment, and extending collaboration with partners outside the classroom and the school. Additionally, the learning culture should be extended to the strategic perception of eLearning within the organisation that ensures that the above changes are catered for in terms of availing the necessary knowledge, expertise and training (Lin & Lee, 2005).

Consequently, some paradigmatic shifts called for in eLearning bring about challenges not only in quality, but also in delivery, accountability and skills required (for a discussion on this see Pond, 2002). These new paradigms challenge the facilitators to involve and engage students

frequently to avert loneliness, low self-esteem, isolation, and low motivation to learn, of which the consequences are low achievements or eventual dropout (Rovai, 2002). This new engagement and involvement of students, both during the teaching and learning process and the development of the learning materials and contexts may translate to increased workloads for the facilitators (Connolly & Stansfield, 2007). These challenges of the paradigm shift often lead to user resistance and eventual failure of any eLearning initiative even where the benefits are apparent. In fact, most of the change theorists and researchers have indicated that people would always resist anything that would challenge the status quo, or one that is perceived to bring about increased roles and responsibilities (Lippert & Davis, 2006; Saunders, Charlier, & Bonamy, 2005; Piderit, 2000; Gallivan, 2001).

1.7.5 eLearning as a technology

Seen as a technology, eLearning is the set of electronic tools "used to create, store, exchange … [learning material or experiences] in their various forms (data, voice conversations, still images, motion pictures, multimedia presentations, and other forms, including those not yet conceived)" and allows for "new actions, new responses, new institutions, and new relations to each other" in the world of learning and knowledge transfer (Schultz, 2006:5). Parchoma (2006) uses the words "electronically-mediated learning" to define eLearning. In eLearning, technology should be used as a medium only. However, this does not always happen as people need to be trained on the technology first, then on how to use it to learn. More often than not, there are no clear cut distinctions in the area of eLearning, between training on technology and the use of technology as a medium for learning.

1.7.6 Innovating with eLearning

Innovating with eLearning is the use of ICTs in new ways to cater for a number of factors, including, and but not limited to, the distinct learners' learning styles, emergence of superior technological products, reinvention of the existing technologies, advancement of eLearning research and the context in which eLearning is being used. For example, the use of Web 2.0[1]

[1] O'Reilly (2006:online) defines web 2.0 as "the business revolution in the computer industry caused by the move to the internet as platform, and an attempt to understand the rules for success on that new platform. Chief among those rules is this: Build applications that harness network effects to get better the more people use them." Hogg, Meckel, Stanoevska-Slabeva, and Martignoni, (2006) see web 2.0 as "the philosophy of mutually maximizing collective intelligence and added values for each participant by formalized and dynamic information sharing and creation".

technologies for teaching and learning has been touted as the next phase of eLearning where among other things there is more control of learning being passed onto the learners, there is greater ease of collaboration and cooperation, and there is availability of technologies to support learning functions in social networks.

1.8 Thesis structure and chapters

Chapter two gives a broad contextualization of the countries being studied. It has four main sections, one detailing situations in the countries of study in respect of their demographics, economy, and higher education. Another section summarises some information on higher education in Eastern and Southern Africa that is pertinent to this study. A third describes eLearning, its promises, potential and challenges in higher education institutions in Eastern and Southern Africa. Finally, the chapter concludes with pointers and suggestions, mainly from the literature of where interventions might be necessary for these countries.

In chapter three, some of the widely espoused theories and models of adoption research are reviewed, purposely detailing their suitability in eLearning adoption research in higher education. The theories and models discussed include Roger's Diffusion of Innovation (DOI), the Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), Social Cognitive Theory (SCT), System Dynamic Models, and the Concern-Based Adoption Model (CBAM).

Chapter four merges the core elements of the theories and models discussed in chapter two with the context of eLearning in Higher Education in Eastern and Southern Africa described in Chapter two. First, a negotiation of a compromise between the promises and benefits of eLearning on one side, and the challenges of eLearning on the other is made. This is done using the constructs of the dominant theories and models discussed in chapter 3. Secondly, a discussion on the salient individual characteristics that have a bearing on the eLearning adoption decision or behaviour is presented. Again, like in eLearning characteristics, most of the tenets are borrowed from the major theories. Thirdly, the organisational characteristics, largely from the Diffusion of

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Key to the definitions is the technologies that enhance and allow for collaboration, cooperation and communication.

Innovation Theory and Organisational Change literature are offered. The factors without the individual and the organisation that have a direct or indirect influence on adoption of eLearning are discussed next. Finally, the chapter concludes with some a refinement of the conceptual model where each of the four set of factors are independently reviewed and broken down to show the effect they might have on the adoption decision or behaviour. These discussions are taken further in Chapter Five, which designs the foundation of the research model on the eLearning adoption to be tested empirically. Chapter Four concludes with a merged framework, showing the relationship between the various aspects identified and eLearning adoption in higher education.

Chapter Five discusses the empirical research approach used for the study. The chapter starts with a description of the research terminologies used and discusses of the choice of the mixed methods approach used in the research. It also describes in detail the whole research process that was followed and motivates for each of the steps leading to Chapter Six.

Chapter six presents the results of the data analysis from the questionnaire that was designed to test the framework discussed in Chapters 3 and 4.

Finally, the thesis ends with chapter seven that contains the discussion of the results, a presentation of the final model for eLearning adoption, conclusions, and recommendations.

Chapter Two: Contextualising the study

2.1 Introduction

This thesis investigates a model for eLearning adoption in countries in Eastern and Southern Africa, which are part of Sub-Saharan Africa (SSA), a region of which one report after the other paints a gloomy picture. For example, a development committee set up by the World Bank (WB) to evaluate the progress of the Africa Action Plan (AAP) stated that countries in SSA (and in South East Asia) are not expected to meet the Millennium Development Goals (MDGs) (World Bank, 2007). In addition, indices developed and used to compare links between interrelated variables and outcomes among countries show that countries in SSA are trailing in almost all of the indices (Kane, Holmes, & O'Grady, 2007; World Bank, 2007b; UNDP, 2006; UNPAN, 2005). A number of these indices deal with the uptake and adoption of relevant technologies, for example ICTs, in the improvement of the quality of life.

Over the last few decades, ICTs have brought about interdependencies, connectedness, improved collaboration, and a changed approach to service delivery including education[2]. In addition, the use of these ICTs in education (and eLearning) means different things to different people depending on their context[3]. Given this scenario there is need therefore to look into some level of detail, regarding the various contexts, for example the important indicators in the respective countries. For the same reason it is necessary to explore the comprehension of eLearning in the different contexts of the study.

This chapter is divided into five sections. The first section gives a description of selected indices. These indices are used for comparison purposes only. The second section discusses the situations in the countries of study in respect of their demographics, economy, and higher education. Section 3 gives a summary of some information on higher education in Eastern and Southern

[2] These changes have been explained with terms like modernity, globalization, knowledge society/economy, information society/economy and technologies like Web 2.0 and Education 3.0, among others (Keats & Schmidt, 2007; O'Reilly, 2006).

[3] For example using a data projector and a computer in a lecture theatre for presenting lectures; using web-based learning management systems to deliver learning contents and experiences; using radio broadcasts to educate rural farmers on what and when to plant; using the television to help grade 12 students grasp some ideas about their topics (Njenga & Fourie, 2010).

Africa that is pertinent to this study. In section four, eLearning is described, as well as its promises, potential and challenges in HEIs in Eastern and Southern Africa. Finally, the chapter concludes with pointers and suggestions, mainly from the literature, of where interventions might be necessary for these countries.

2.2 Growth and growth indicators

The World Bank and other donor and development agencies use among others countries' economic status to measure their growth. One such economic indicator is the Gross National Income (GNI), which according to the WB is the net income of a country derived by subtracting payments made to other countries from the value of goods and services plus total income from remittances from other countries. The GNI per capita is the GNI of a country, converted to U.S. dollars using the World Bank Atlas[4] method, divided by the midyear population. GNI per capita purchasing power parity (PPP GNI) is GNI converted to international dollars using purchasing power parity (PPP), while PPP are conversion factors that take into consideration the relative differences in prices of commodities across countries (World Bank, 2007b).

The WB further uses GNI to classify countries[5]. Using this classification, it is evident from Table 2.1 below that only two countries considered in this study are in the upper middle-income group, namely Botswana and South Africa. Nine or 60% of the countries are in the low income group, while two are in the lower middle income group. Closely related to the WB classification is the United Nations' (UN) classification which is based on the Human Development Index (HDI). According to the UN's classification, most of these countries (67%), represent low development as their Human Development Index falls below 0.5 (UNDP, 2006).

[4] The purpose of the Atlas conversion factor is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes (see World Bank, 2007b).

[5] Economies are divided according to 2006 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, $905 or less; lower middle income, $906 - $3,595; upper middle income, $3,596 - $11,115; and high income, $11,116 or more (World Bank, 2007b).

Table 2.1: Economic, population and Human Development Indices for ESA countries

Country1	GNI Per Capita[2] ($US 2006)	GNI Per Capita[2] ($PPP 2006)	Population[3] (Millions 2006)
Angola**	1980	2360	12,263,596
Botswana*	5900	12240	1,815,508
Burundi***	100	710	8,390,505
Kenya* **	**580**	**1300**	**36,913,721**
Lesotho**	1030	4340	2,125,262
Malawi***	170	720	13,603,181
Mozambique***	340	1220	20,905,585
Namibia**	3230	8110	2,055,080
Rwanda***	250	1270	9,907,509
South Africa*	**5390**	**11710**	**43,997,828**
Swaziland**	2430	5170	1,133,066
Tanzania***	350	740	39,384,223
Uganda***	300	1490	30,262,610
Zambia***	630	1000	11,477,447
Zimbabwe***	340	1940	12,311,143

1The World Bank classifies countries based on their Gross National Income (GNI) into low income, middle income (subdivided into lower middle and upper middle), or high income. (* upper middle income, **Lower middle income, and *** Lower income (Source: World Bank, 2007b).
2 Source: World Bank (2007b).
3 Source: (CIA, 2007)

2.2.1 The Human Development Index

Developed by the United Nations Development Programme (UNDP), the *human development index* (HDI) "is a composite index that measures the average achievements in a country according to three basic dimensions of human development: a long and healthy life, as measured by life expectancy at birth; knowledge, as measured by the adult literacy rate and the combined gross enrolment ratio for primary, secondary and tertiary schools; and a decent standard of living, as measured by gross domestic product (GDP) per capita in purchasing power parity (PPP) US dollars." (UNDP, 2006:276). The HDI for the countries that formed part of this study is presented in Table 2.2.

2.2.2 Global Competitiveness Index

The World Economic Forum's (WEF) Global Competitiveness Index (GCI) is a new, more comprehensive tool to assess competitiveness of nations that is made up of over 90 variables, of which two thirds come from the Executive Opinion Survey, and one third comes from publicly available sources (WEF, 2007). The variables are organised into nine pillars, with each pillar representing an area considered as an important determinant of competitiveness (Institutions, infrastructure, macroeconomic, health and primary education, higher education and training, market efficiency, technological readiness, business sophistication, and innovation). The impact of each pillar on competitiveness varies across countries as a function of their stages of economic development. In order to take this reality into account in the calculation of the GCI, pillars are given different weights (See www.weforum.org; Kane, Holmes, & O'Grady, 2007). The GCI for the countries that formed part of this study is presented in Table 2.2.

2.2.3 Networked Readiness Index

The WEF's Networked Readiness Index (NRI) measures the propensity for countries to exploit the opportunities offered by information and communications technology. It is published annually. The NRI seeks to better comprehend the impact of ICT on the competitiveness of nations. The NRI is a composite of three components: the environment for ICT offered by a given country or community, the readiness of the community's key stakeholders (individuals, businesses, and governments) to use ICT, and finally the usage of ICT amongst these stakeholders. See Table 2.2 below for the NRI of the participating countries.

2.2.4 E-Readiness Index

The E-Readiness Index (ERI) from the United Nation's Department of Economic and Social Affairs (DESA) displayed in Table 2.2 below "is a composite index comprising the Web measure index, the Telecommunication Infrastructure index and the Human Capital index" (UNPAN, 2005). It measures a country's capacity and willingness to use ICTs in developing government agenda and policies towards the people.

2.2.5 Human Poverty Index

The Human Poverty Index (HPI) presented in Table 2.2 below is related to the HDI but it classifies countries into two groups, namely Organization for Economic Cooperation and

Development (OECD) member countries (HPI-2) and developing countries (HPI-1). The HPI-1 measures poverty in developing countries. It focuses on deprivations in three dimensions: longevity, as measured by the probability at birth of not surviving to age 40; knowledge, as measured by the adult illiteracy rate; and overall economic provisioning, public and private, as measured by the percentage of people not using improved water sources and the percentage of children under five who are underweight. (See UNDP's Human Development Report, 2001:14)

2.2.6 Economic Freedom Index

The Economic Freedom Index (EFI) scores nations on 10 broad factors of economic freedom using statistics from organisations like the World Bank, the IMF and the Economist Intelligence Unit: Business Freedom; Trade Freedom; Monetary Freedom; Freedom from Government; Fiscal Freedom; Property Rights; Investment Freedom; Financial Freedom; Freedom from Corruption; Labour Freedom. (See The Heritage Foundation, 2010)

Table 2.2 shows some of the indices for the 15 countries used in this study.

Table 2.2: Fifteen countries development indices

Country	Rank HDI N=177	HDI	Rank GCI N=125	GCI	Rank NRI N=122	NRI	Rank HPI-1	HPI-1	EFI Rank	EFI	ERI Rank N=180	ERI
Angola	161	0.439	125	2.50	120	2.42	79	40.9	149	43.5	158	0.184
Botswana	131	0.570	81	3.79	67	3.56	93	48.3	38	68.4	90	0.400
Burundi	169	0.3840	124	2.59	121	2.40	78	40.7	146	46.8	166	0.164
Kenya	152	0.4910	94	3.57	95	3.07	60	35.5	82	59.4	122	0.330
Lesotho	149	0.4940	112	3.22	116	2.61	89	47.5	118	54.1	114	0.337
Malawi	166	0.4000	117	3.07	111	2.79	83	43	106	55.5	137	0.279
Mozambique	168	0.3900	121	2.94	115	2.64	94	48.9	101	56.6	146	0.245
Namibia	125	0.6260	84	3.74	85	3.28	57	32.5	55	63.8	111	0.341
Rwanda	158	0.4500	-	-	-	-	67	37.3	136	52.1	143	0.253
South Africa	121	0.6530	45	4.36	47	4	53	30.9	52	64.1	58	0.508
Swaziland	146	0.5000	-	-		-	97	52.5	64	61.6	108	0.359
Tanzania	162	0.4300	104	3.39	91	3.13	64	36.3	103	56.4	127	0.302
Uganda	145	0.5020	113	3.19	100	2.97	62	36	59	63.4	125	0.308
Zambia	165	0.4070	115	3.16	112	2.75	87	45.6	92	57.9	180	0.234
Zimbabwe	151	0.4910	119	3.01	117	2.6	88	46	154	35.8	120	0.332

Source: (Kane, Holmes, & O'Grady, 2007; UNDP, 2006; UNDP, 2001)

A HDI below 0.5 represents low development and 67% (N=15) of the countries in this study are in this group. Compared with countries at the top of the global list where the top 29 have an HDI of more than 0.9, these countries have most of the odds against them in terms of human development. This is also evident in the GCI, which also measures how well nations use their available resources for the betterment of its citizens. The most competitive country in this list is South Africa, which ranks 45 of the 125 countries while Swaziland and Rwanda do not even make the list.

Perhaps the most important attribute for eLearning use in the countries is the NRI and the ERI, where again, of the 122 countries listed, over 50% of the countries in the list take the last 22 places. However, these two indices cannot be considered independently of the rest. For instance, the HPI that looks into knowledge, survival after birth and economic provisioning is highly linked to both the NRI and ERI as there is no way a population that is not knowledgeable; that is more concerned about survival against many odds; and whose economy cannot support most of the basic needs, will be thinking of investing in telecommunication infrastructure, and thereby exploit the benefits of ICTs. This in retrospect also adversely affects the global competitiveness (GCI) of these countries. Compared to other regions of the world, there region scores poorly on the EFI, the best placed being Botswana at position 43 with an EFI of 68.4. Angola is lagging behind (position=149, EFI=43.5) on the EFI possibly because it is still on a pathway to recovery from many years of civil war.

2.3 Contextualising higher education in Eastern and Southern Africa

2.3.1 Introduction

As discussed earlier, most of the countries (67%) in this research according to the United Nations Development Programme (UNDP) represent low development as their Human Development Index (see section 2.2 and Table 2.2) fall below 0.5 (UNDP, 2006). In addition, according to the International Labour Organisation (ILO), the Eastern and Southern Africa region has the highest unemployment rate in the world at 10.3% and compares unfavourably with the world average of 6.3% (ILO, 2007). With this kind of picture, it is imperative and urgent that action be taken to spur economic and social development and improve the current situation. For example, some

efforts need to be directed to science, research and technology so that innovative means of addressing and solving the issues in this region can be identified. Higher Education (HE), in particular, can play an important and leadership role in dealing with these issues (UNESCO, 1998).

The value and importance of Higher Education (HE) cannot be underestimated. In Africa for example, recent studies have shown that HE is beneficial and is playing a crucial role in technology advancement, poverty alleviation, labour productivity, the fight against the spread of HIV/AIDS and other diseases, as well as contributing positively to social welfare and governance (Ndoye, 2005). Studies elsewhere have shown that HE is not only beneficial to an individual, but also to the wider society as the presence of an educated populace provides leadership that is humane, leads to high labour productivity that is favourable to economic growth and also, on average HE graduates earn more than those who did not attend HE institutions (Gyimah-Brempong, Paddison, & Mitiku, 2006; Economist, September 10, 2005). It would therefore be logical to assume that with these benefits enrolment in HE in Africa should be high so that the Africans can be in the forefront of the fight against the social odds facing them: poverty, diseases, civil strife, and ignorance and illiteracy. However, this is in not the case as research shows that the access to higher education is limited to less than 5% in Africa as compared to the global average of 16% (Gunga & Ricketts, 2006; Bloom, Canning, & Chan, 2006). The World Bank Data Indicators (WDI) put the access to HE in Africa[6] at less than 5% (WDI, 2007). Paradoxically, Africa with its low enrolment rates suffers a very high unemployment rate of its graduates that seems to incline that the number of graduates are more than the markets demand (Ndoye, 2005).

This apparent paradox begs to ask a number of questions: a) is the economic situation in Africa so bad that it cannot absorb its graduates. b) Is there something intrinsically flawed in the education systems in Africa that it has to rely on foreign (read developed countries) expertise. (Ndoye, 2005). Questions of quality and cost of higher education always arise in relation to the two above questions. For example, Bloom, Canning and Chan (2006) have quoted the

[6] This is based on the author's reworking of the data rendered by the World Bank (World Bank, 2007), as well as Bloom, Canning and Chan (2006), who incidentally used data from UNESCO (UIS, 2008).

Government of Mozambique in its Poverty Reduction Strategy Paper (PRSP) as saying that the cost and the quality of its HE course limited trained public administrators to 3% of its higher education. This is not unique only to Mozambique as the Commission for Africa (CfA) identified the quality and relevance of courses being offered as one of the barriers to employment and economic growth of countries (Commission for Africa, 2005). HE in Eastern and Southern Africa, like indeed in the world over, is tasked with provision of "mass education systems" with reduced funding, which has seen technology viewed as providing a solution (Osborne & Oberski, 2004, p. 417) to cater for the need for education and increase on their enrolment rates.

This section on HE in Sub-Saharan Africa (SSA) is divided into five major parts. First, a brief history and background of HE and HE movement in SSA, dating back from the time of the colonialists, is discussed. The second part links with the history and background by providing an insightful piece on the ownership of the Higher Education Institutions (HEI) in SSA in preparation for part three and four which deal with the players in higher education and economics and politics of/in higher education respectively. As technology and innovation has been put in the front line to achieving the Millennium Development Goals (MDGs), part five is dedicated for technology and its use in HEIs.

2.3.2 Historical background

Higher Education in most of the developing countries is reeling from the aftermath of colonisation (whose focus was getting a very small number of intellectuals connected to the colonial governments into HE) and anti-colonisation (where HE was reserved for a few of the elite and state dominated who took power after independence). A great number of public higher education institutions in Eastern and Southern Africa were inherited from their colonial masters, and to some degree seem to extend the legacy of the colonialists of elitism with the aim of producing a small group of administrators, and are often still adhering to the colonial (or European) model of education (Economist, 2005; Teferra & Altbach, 2004). For example, at independence in the early 1960s, Kenya, Tanzania and Uganda shared just a single university. Zimbabwe had only one university until 9 years after independence (Kariwo, 2007).

In addition, the colonial system had the language of the colonisers as the language of instruction, together with limitations in academic freedom and curriculum (Teferra & Altbach, 2004). In line

with differences in colonisation, there is also a variation in higher education among countries based on the respective colonial power. For instance Subotzky and Afeti (2005:5) note that there "are significant variations between Anglophone and Francophone countries in the form of differentiation, enrolment patterns and, importantly, in "institutional reputation" with Francophone countries putting more emphasis on polytechnics than universities as is the case with Anglophone countries.

In addition to colonisation, there has also been pressure from developed countries and donor agencies on African states to value Primary and Secondary Education more than HE. This undue pressure has ensured that most African governments put fewer resources into higher education (Bloom, Canning, & Chan, 2006). This could be argued as one of the reasons that higher education in Africa is unable to produce human capacity that could fulfill its development needs.

However, there is a move towards the establishment of private universities, and other middle level providers of tertiary education (e.g. polytechnics) in Africa. This has highly been attributed to the need to accommodate more students (as there is an oversupply from secondary education), to meet the demand and challenges of the labour market, to improve on the cost effectiveness and to increase diversity and equity (fighting elitism and ensuring education for all) (Subotzky & Afeti, 2005; Economist, 2005).

2.3.3 Players in higher education

The realisation of the importance of higher education and its emergence as a profitable venture and industry has lead to a number of interventions: from the sprouting of a number of private universities to availability of cross-border providers of education (Varghese, 2005). In Eastern and Southern Africa, the higher education segment is one of the fastest growing, something Varghese (2005:10) attributes to economic attractiveness, profitability and political and social acceptability. The main players in the higher education in the region are therefore the government, the private sector and cross-border higher education institutions.

2.3.3.1 Government

The role of the government in higher education in Eastern and Southern Africa can be seen from too angles – supervisorial and funding. From the supervisorial angle, governments give policy

directions on higher education institutions, mainly through independent boards or authorities. In South Africa for example, the Council on Higher Education (CHE) has the responsibility of supervising, on behalf of the government, all higher education institutions in South Africa. There are similar bodies in a number of countries in the study, for example Botswana has the Tertiary Education Council (TEC), Kenya has the Commission on Higher Education (CHE) responsible for (in general terms) registration, accreditation and quality assurance, coordination and regulation of admission to universities, among other functions. Tanzania has the Tanzania Commission for Universities (TCU). Rwanda has the National Council of Higher Education (NCHE). However, it is at the funding level where the impact on the provision of higher education is probably more important.

In the countries of the study, there are state-sponsored universities. However, in some countries like South Africa, there is a blurring line on private and public funding of higher education. In addition, some state universities operate a dual-model enrolment – one for public sponsored students and the other for privately sponsored students. This scenario has been attributed to the dwindling governmental funding support for higher education in Africa, the competitive pursuit of institutional prestige and market share, and the increase in demand for higher education (Kariwo, 2007; Williams, 2007).

2.3.3.2 Private sector

With the exception of a few countries, liberalisation of higher education, either through demand pressures or market pressures, have seen a growing number of private providers of higher education. There are also growing partnerships between the private sector and public universities on research that has an impact on the course offerings and their quality in the public universities. The private sector therefore participates in higher education in a number of ways. There are a number of reasons for the establishment of these private higher education institutions, among them “a genuine desire to participate in the provision of education” in response to demands from government and society; “political prestige and economic reasons”; and “to cater for the needs of a specific segment of the society” (Kuhanga, 2006:177).

2.3.3.3 Cross-border providers of higher education

The increase in demand for higher education in Africa has seen several cross-borders providers of education. These are mainly foreign institutions offering primarily business, management, information and technology courses. While the foreign institutions might have the potential to add value to the educational scene, critics have sounded a warning with regard to their quality assurance, student protection and intellectual property rights, maintenance of the cultural values of the population and the responsiveness of their offerings to national needs (Working Group on the Tertiary Education Policy for Botswana, 2005). Further, the ratification by the World Trade Organisation (WTO) of the General Agreements on Trade in Services (GATS) has liberalised cross-border education as a service that can be traded (Sidhu, 2007; Magagula, 2005; van der Wende, 2003; Larsen, Martin, & Morris, 2002).

In Africa, the major driving forces towards cross-border (and transnational) higher education are, among others (Kaberia, Mutinda, & Kobia, 2007:133; Magagula, 2005:37-38):

- Increased demand by nationals to access higher education especially given that the governments and existing private providers of higher education aren't in a position to satisfy the ever-increasing demand;
- Need for provision of greater access to specific knowledge or skill-based education and training especially where locals would like internationally recognised qualifications;
- Need to create cultural and political alliances which are especially being propagated by the internationalization and modernization; and
- Need to generate extra income for the exporting institution or country.

2.3.3.4 Economy, politics and higher education

As mentioned earlier (section 2.3.1), there is correlation between higher education qualifications, economic growth and socio-political systems. In addition, the effectiveness and efficiency of HE is related to among other things their leadership, governance and management, their funding and financing, staffing and human capacity and to some lesser extent the language of instruction (Kariwo, 2007; Williams, 2007; Kuhanga, 2006; Teferra & Altbach, 2004).

2.3.3.5 Leadership, governance and management

One of the recommendations made by the Working Group on Higher Education (2004) was the need to improve governance in HE in Africa. This is a view that was supported by Amaral and Magalhães (2003), in their article *The Triple Crisis of the University and its Reinvention.* The crises are hegemony, legitimacy and institutional. Amaral and Magalhães (2003) are of the view that with the global trend toward *managerialism* in higher education, a shift has taken place from HEIs as traditional "social institutions" to HEIs as mere "social organisations", with managerial values replacing conventional modes of academic governance. According to them, the hegemony crisis arose when the HEIs lost their exclusive roles in society, while the hierarchy and democracy questions the legitimacy of the traditional elitist university models. An institutional crisis on the other hand arise because the "increased autonomy given to universities in the mode of state supervision is contradictory with an increasing submission to efficiency and productivity criteria managerial in nature and origin." (Amaral & Magalhães, 2003:240). In addition, HEIs in Africa are in crisis because of an economic and debt predicament that has led to resource reduction, adjustment and deterioration of services, facilities and quality; multinational donors preference of funding basic education at the expense of higher education; and increasing enrolments without consideration of the students' qualification – that have also led to either an increased in the workload of the existing faculty or the recruitment of unqualified staff (Ng'ethe, Asssié-Lumumba, Subotzky, & Sutherland-Addy, 2004).

The view of universities in Africa as social organisations, like in the rest of the world, arose from the need of *massification* of higher education; the breaking of the barriers to access of education that were colonialist or cultural in nature; the need of HE to be responsive to the ever changing social, technological and economic needs of Africans; the impact of *modernity*, *globalisation* and cross-border education*;* and in some instances the expectation to participate in social and national leaderships (Van Wyk & Higgs, 2007; George, 2006; Olssen & Peters, 2005; Ruth, 2006; Cross & Adam, 2007; Kennedy, 2003). Two types of reforms in higher education with regard to governance have been reported: a representation and inclusivity in decision-making; and an enhancement of institutional efficiency through the provision of management support systems (Ng'ethe, Asssié-Lumumba, Subotzky, & Sutherland-Addy, 2004).

The new form of governance calls for a leadership that recognises the need for change, and that will act as pioneer in and influencer of the change. This can be achieved through leadership that understand the culture of the higher education institutions and deal with resistance or dissonance to the changes that may arise. In the case of the introduction and use of ICTs in Higher Education, Mason (2006) recommends leadership that does not delegate decisions on ICTs, but one where the senior management needs to understand the ICTs and seeks to integrate them into the strategic vision of higher education institutions. Mason (2006) further states that this vision should be developed, supported and communicated to the whole university community. Policies and support structures should be created around the vision. Cross and Adam (2007) observe that in all the successful ICT studies they have done, strong leadership is a *common denominator*.

2.3.3.6 Funding and Financing

Many governments are under immense fiscal pressures that have led to dwindling funding for higher education (Teferra & Altbach, 2004). Incidentally, even with the limited public funding in education, African governments spend more of their available income on education than most of the Western countries. Chart 2.1, compares available data from six countries in the study with Switzerland, the United Kingdom and the United States of America. While the United States spent on average 23.4% of its GDP per student, it was estimated that Lesotho spent 1145.7% (UIS, 2008).

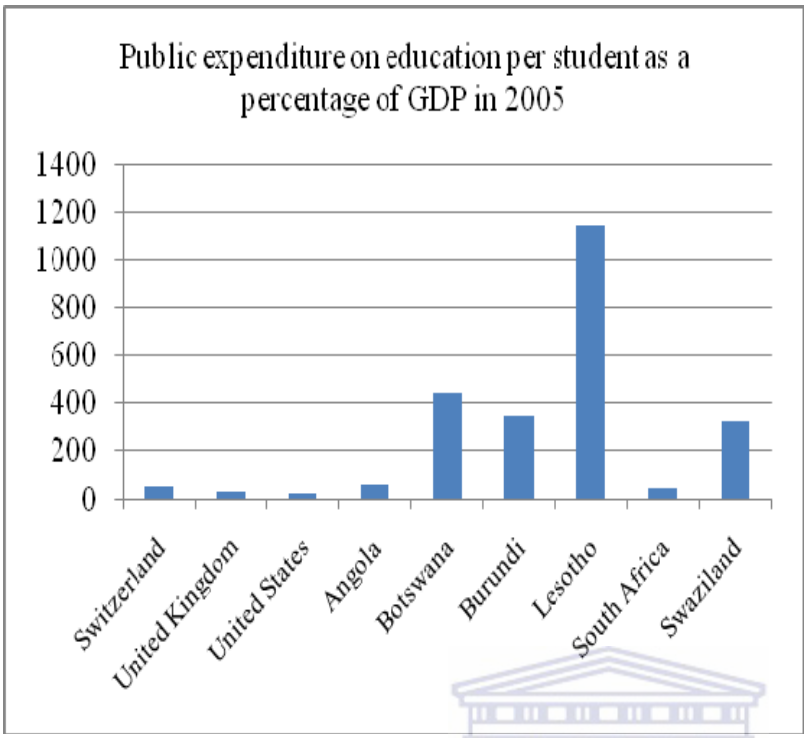


Chart 2.1: Comparison of public expenditure on education per student as a percentage of GDP (Source: UIS, 2008 – data of 2005)

Other studies show similar trends in other countries, for example, "in Rwanda, 15% of the total education budget is spent on the 0.2% of students who attend universities." (Economist, September 10, 2005). Ironically, "despite these relatively high investments in education, education human capital in Africa remains low." (Gyimah-Brempong, Paddison, & Mitiku, 2006:510).

The insufficiency of government funding to HEIs have led to a number of financial diversification measures, aimed at raising more funds. Apart from charging nominal fees to previously government funded students, some universities have enrolled full-fee paying students and initiated other entrepreneurial approaches to university funding (Kariwo, 2007; Williams, 2007).

2.3.3.7 Staffing and human capacity

HEIs in the region, as indeed in the rest of Africa are grappling with insufficient qualified teachers and researchers, especially in science and technology (TFHES, 2000). This situation has been attributed to among other things, the brain drain, the movement of qualified lecturers to the corporate sector, the lack of capacity to train enough lecturers and researchers, poor human resource management, and the loss to HIV/AIDS (Ndulu, 2004; Working Group on Higher Education, 2004; Teixeira & Amaral, 2001). HEIs and other policy makers should undeniably be aware of the long term effects of this situation as it would mean that there is no sufficient development of future human capacity that is direly needed in Africa. Sufficiency here can be seen both in terms of quantity and quality.

To deal with this challenge, the Working Group on Higher Education (2004:7) called for "innovative approaches to the development of human resources (training, retooling (upgrading) within higher education institutions and retaining their services (i.e., combating "brain drain")." It also called for policies that would allow proper graduate recruitment programs for the HEIs themselves, professional development programs and good management of AIDS prevention programs in addition to other staff retention programs like pension, health care insurance and housing assistance. On the innovative approaches to retention and development of staff in HE, Ng'ethe and others (2004) reported a number of initiatives by some universities mainly in South Africa. These initiatives mainly aim at equipping the teaching staff with relevant skills, while at the same time incentivising existing staff and encouraging new entrants to higher education teaching and research.

Higher Education institutions are also faced with a very high turnover of ICT skills required to support academics in their use of eLearning (Cross & Adam, 2007; Ondari-Okemwa, 2002). The combination of skills and competencies required for eLearning delivery makes it even harder for HEIs institutions to get competent personnel for eLearning's productive use. Therefore, the policy to increase the pool of ICT skills in higher education in developing countries should be core (Cross & Adam, 2007).

2.3.3.8 Languages and instruction

Although most of the higher education institutions have adopted, or recognise other languages, the languages of instruction in most of the countries still remain the ones inherited from the colonial masters (Teferra & Altbach, 2004; Brock-Utne, 2003, 1999). For instance, in the former Lusophone countries of Angola and Mozambique, the languages of instruction largely remain Portuguese, with English as a second language. Similarly, in the Francophone countries of Rwanda and Burundi, French and English are the languages of instruction. The situation is slightly different of the former Anglophone colonies (Brock-Utne, 1999). For instance, until recently Tanzania used Swahili as the language of instruction, though it too has now adopted English. In South Africa, for a long time Afrikaans remained the language of instruction, although English is now favoured, while some other local languages are also receiving attention (Brock-Utne, 2003).

2.4 eLearning in higher education in Eastern and Southern Africa

The use and implementation of technology in organisations often leads to changes within the organisations. In the last few decades, Information and Communication Technologies (ICTs) have brought about some revolutions in the social, political, economic, educational and work environments (Gyamfi, 2005). ICTs are often seen as a panacea to most problems, with the information revolution "that presents a seeming cornucopia of opportunities" (Wilson III & Wong, 2003:155). Many countries need to be assisted in managing this information revolution in order to avoid being marginalised or exploited (Commission for Africa, 2005; UNDP, 1997). The ICT developments and particularly the Internet has created an information revolution wave that seems to have accelerated in the last few years due to the great changes in people's view of information, how it is stored, dispersed, managed, and used. More importantly, ICTs have brought about interdependencies, connectedness, improved collaboration, and a changed approach to service delivery (Friedman, 2007; Melville & Wallace, 2007).

The information revolution and globalisation[7] have transformed the educational landscape. This educational transformation can be seen from a number of perspectives among them: education

[7] Van Der Bly (2005) in her article *Globalization: A Triumph of Ambiguity* argues there are many and diverse conceptualisations of globalisation. For this argument, the developmental economic definition of globalisation is adopted, which deals with the liberalisation, openness and internationalisation of trade, investment and finance.

being a service that can be traded (see for example Sidhu, 2007) mainly through the conversion of teaching material to electronic formats that can be packaged and sold in an educational market; due to the pace of change in the globalizing work environments, it has become imperative that employees constantly acquire new skills to remain employable or improve on their competitive advantage; the need for cooperation and collaboration among educational providers and experts from different regions and countries in the provision of educational experiences suitable for the new work force; the need, enrolment rates, and the demand for higher education has been rising over the last few years; educational offerings that are flexible and easily customizable to fit the needs of a specific audience; and the creation of communities of practice or knowledge repositories that are easily accessible (Melville & Wallace, 2007).

Melville and Wallace (2007:543) see the economic development of individuals pegged to the speed at which they develop "appropriate knowledge, skills and personal qualities in order to take full advantage of emerging technologies." This has led to the proliferation of a number of eLearning offerings world wide – both in higher education and in the corporate word (Allan & Lewis, 2006). In this section, the benefits and reasons given for using eLearning as a means in Higher Education and individual development, and the barriers to its use with specific focus on Africa are discussed. Later, a discussion aimed at answering the topical question "Is eLearning *coming in the future* for higher education in Africa or it's a *here and now* engagement that should already be in place?" is presented.

2.4.1 The benefits of eLearning to higher education

2.4.1.1 Creating a workforce that is knowledge-economy ready

Currently in the world, there is much focus on the knowledge economy, which broadly stated is the requirement of specialised information-handling skills and knowledge expertise with the ability to add value to the information and the skills and hence the economy (Williams, 2007; Melville & Wallace, 2007). Williams (2007) states that ICTs have brought about the means and media in the knowledge economy that complicates it, and at the same time provide powerful tools for knowledge conceptualisation that can lead to knowledge creation, and adding value to

This is in line with issues of modernisation, and socio-economic developments that come about or are promised through the adoption of technologies.

the existing knowledge. With the need for the knowledge workers in many organisations, the onus is now on the institutions of higher learning to produce knowledge-economy ready graduates. Viewed in this light, then, eLearning can assist students to acquire skills and familiarity with the tools of the knowledge economy as they learn. However, questions have arisen on the readiness of Africa (and, consequently, Eastern and Southern Africa) for the knowledge economy. It seems, however, that much still needs to be done for Africa to be ready, although there is slow progress towards it (Britz, Lor, Coetzee, & Bester, 2006).

2.4.1.2 Creation of continental and international networks

eLearning, if effectively used, can lead to the creation of continental and international networks that can also deliver education and knowledge beyond the regional and national borders (Huysman & Wulf, 2006; Painter-Morland, Fontrodona, Hoffman, & Rowe, 2003). Huysman and Wulf (2006:40) indicate that this is particularly important for businesses because of the changes in organisational boundaries and identities coupled with the growth of "virtual organizations, teleworkers and geographically dispersed teams [, that] increase[s] the difficulty of monitoring and controlling knowledge." In businesses, this facilitates a diversity of perspectives and experiences that could alert learners of the contextual dynamics of their specific environments in relation to the rest of the world (Painter-Morland, *et al.*, 2003).

The creation of these networks has implications for both the individuals and the organisations. It is the individuals' responsibilities to ensure that their skills and knowledge remain relevant and updated so that they can add value to the network, or at least remain competitive in the labour market. To the organisation, the networks form the frontiers for more opportunities for not only sharing knowledge but also reaching new markets beyond their borders. The inference from this for a Higher Education provider is not only to be part of the network, but also to be a leader in defining what is required for the network by carefully studying and forecasting the needs of the emerging networks (Huysman & Wulf, 2006; Painter-Morland, *et al.*, 2003).

2.4.1.3 Flexibility

eLearning provides flexibility in terms of content and delivery, pace, place and time of learning (Donnelly & Benson, 2008; Uys, Nleya, & Molelu, 2003). The availability of content in electronic format makes its transformation to multiple formats easy and quick. In addition,

updating the content is easier than, for example, updating printed content. In addition, the updated content can be availed to the intended audience electronically without undue delays (Donnelly & Benson, 2008). The content can also be translated by electronic translators (though they are currently prone to errors) and be availed in more than one language (Donnelly & Benson, 2008). The ease of updating, and by extension customisation and personalisation is touted to improve learning speeds and understanding of the subject matter because the students can suit the material to their own needs (Cantoni, Cellario, & Porta, 2004; Zhang & Nunamaker, 2003). The ease of customization leads to a self-paced approach to learning.

For Higher Education, it is imperative to look at the relationship between the students and the providers of HE and also the students' relationship with their environments and technologies. The understanding of these relationships will make sure HE providers achieve flexibility as an objective and at the same time "identify the factors that serve to increase/reduce flexibility and to say something about the consequences of flexibility"(Rye, 2008:online).

2.4.1.4 Provision of easy learning and learning process management

Where there is the use of assistive and enabling technology like the learning management systems and electronic portfolios, it is not only easy for the university's administration to manage the students and their learning, but also for the students to track their personal development (Black, *et al.*, 2007). In Learning and Course Management Systems (LCMS), most of the administration of the content, assignments and discussions are controlled and managed by the course lecturer, while in the case of ePortfolios the students control and manage their work "across multiple courses throughout an academic career" (Greenberg, 2004:31).

The seamless integration of HE students' learning portfolios and their workplace skills development and training portfolios would be particularly interesting. This would make sure that the employers can view a student's development and attainments in their academic careers as well as within their workplace. This emphasizes the need for collaboration between the corporate sector and the providers of HE in the design and the delivery of the courses.

2.4.1.5 Creation of repositories of intellectual and human capital

Another widely cited advantage of eLearning is the creation of repositories of intellectual and human capital, commonly referred to as communities of practice (Madoc-Jones & Parrott, 2005; Uys, Nleya, & Molelu, 2003). These communities of practice, together with the advantage of transcending geographical boundaries, can lead to the formation of a critical mass of students and facilitators who offer educative and supportive content and services to each other (Madoc-Jones & Parrott, 2005). There are a number of repositories of content that are openly and freely[8] available under the Open Education Resources/Repositories[9] (OER) to the general public mainly for non-commercial use (d'Antoni, 2005). The key motivations of these OERs is in the believe that "knowledge is meant to be shared, and that the sharing does not diminish its value to its creator"; the need for this knowledge to therefore be shared "to confront world challenges of ignorance, poverty, and environmental degradation"; encouraging a "gift culture"; and also as a means of "redressing the economic inequalities" (Anderson, 2008:4-5). The main challenges of these OERs lies in the ability of the audience to access them and to localise them to their contexts, as well as getting content that is interoperable with their computer software. A number of interoperability standards[10] for OERs have been drafted to cater for compatibility of the OERs and the users' software. On access and localisation, the onus is on the educational system to train the audience on the localisation and adaptation of the OERs.

2.4.1.6 Increased motivation, retention and success rates among students

Although there is no conclusive evidence, eLearning has been shown to increase student's motivation, retention of subject matter and their success rate. For example, a study on blended learning where simulations were used in teaching computer networking, students who used simulation software performed marginally better than those who did not use simulation software (Cameron, 2003). In another study on improving undergraduate performance in biology, it was found that students who engaged in a hybrid learning project attained approximately 10% more

[8] There is a debate on the meaning and application of the words "open" and "free" as used in open Source Software and the Open Education communities. While the debate is largely philosophical, free (French: *Libre)* in this case is derived from the word freedom and does not necessarily refer to the price or payment aspects. The four basic freedoms are applied here – freedom to copy, modify, use and redistribute. Open on the other hand means availing something or content with reasonable limitations (often seen contrasted with "closed" or "clandestinely held") or with limited "freedoms". Therefore not all Open content is free.

[9] For a list of repositories and members of the OpenCourseWare Consortium (see OpenCourseWare Consortium, nd)

[10] See for example the IMS Global Consortium's (IMS, nd) standard and the educommon's (COSL, nd) OpenCourseWare Management System for supporting OpenCourseWare initiatives.

marks than students who attended only the traditional lectures (Riffell & Sibley, 2005). However, research indicated that the students that benefit the most from eLearning, and complete their courses with high grades are the academically stronger students (higher academic performance at school and university; higher verbal reasoning capability, better discernment, and verbal IQ; higher intelligence and conscientiousness), who also score high in self-efficacy, goal commitment and learning efficiency (Clegg, Bradley, & Smith, 2006; Taylor & Bedford, 2004; Stanz & Fourie, 2002). Therefore, it could be true that the students in Riffell and Sibley (2005) and Cameron (2003) who chose to use eLearning could have performed better than their counterparts even if they used the face-to-face methods of delivery only. Consequently, eLearning may be seen as having the ability to improve performance or being suitable only amongst academically stronger students.

2.4.1.7 Increase interactivity, support and communication

The core feature of the use of ICTs in education is their interactivity and communication tools. eLearning can increase interactivity, support and communication between teachers, learners and the learning content. Interactivity in this context is seen as both an activity and a property or an attribute inherent to the technology (Richards, 2006). As an activity, Richards (2006:533) define interactivity as the "exchange and generation of content in context… where the personal context of the user informs the content … and/or where the contextual framework supplied requires the user to supply some or all content and/or where the contextual framework itself is supplied by the user". As a property or an attribute of the technology, Richards (2006) sees interactivity as more focused to the design and technique of use of the technology with little focus on the content of interaction. In the case of eLearning, these two views present the students interaction with the learning materials and technologies on one side, and the social activity of exchanging and generating ideas on the other (Nunes & McPherson, 2007). The increased interactivity and communication in eLearning can facilitate student-centred learning, which is in agreement with the constructivist view of education where students actively create meaning and new knowledge based on their engagements during the learning process (Madoc-Jones & Parrott, 2005; Cameron, 2003). On the interactivity-as-property, the burden is on the course creators and software developers to provide interactive designs and content. The role of the facilitators on the other hand is to create an atmosphere that encourages exchange of ideas and generation of new

ones during the learning process. Using tools provided in eLearning, both synchronous and asynchronous[11] communication can be realised. The use of eLearning tools usually improved participation of students groups who would otherwise fear doing so in a face-to-face setup (Thune & Welle-Strand, 2005; Zhang & Nunamaker, 2003).

2.4.1.8 Addressing the demand of higher education

Technology also has the potential of addressing the increase in demand for higher education by among other things allowing cross-border providers of education to offer distance-learning courses, and allowing for academic partnerships to be strengthened through the use of ICTs, as well as by encouraging lifelong learning (Harpur, 2006; Osborne & Oberski, 2004; Uys, Nleya, & Molelu, 2003; Fielden, 2001). Indeed, Harpur (2006:145) sees eLearning as a revolutionary technology that is "uniquely situated to modern mass access to higher education." To this end "colleges and universities are exploring new remote sites such as libraries, prisons, and community based organizations, but the main goal seems to be expanding entry into students' homes, campus branches, and non-affiliated campuses" (Van Dusen, 1998:60). Fielden (2001) advocates for the formation of the partnership to ease on the management challenges brought about by the technologies, and at the same time making the most of what these technologies present.

2.4.1.9 Summary of eLearning benefits

In summary, the case for eLearning use in higher education in Africa would be to improve efficiency and effectiveness, extending their reach, maximising their impact and reach, and responding to the demand for higher education. Effectiveness and efficiency can be realised in terms of costs and speed of delivery. For lowering costs, it is presumed that there would be low investments in travel, physical infrastructure, resource management and development of learning materials (Aczel, Peake, & Hardy, 2008). The use of the current Internet and web-based technologies allows for quick delivery of these materials, and also provides 24/7 access to expertise beyond geographical boundaries. With eLearning, higher education can offer a wide

[11] Synchronous communication takes place in real time and all the participants must be online at the same time. Examples of technologies for synchronous communication include chats, whiteboards, broadcast television, and audio and video conferencing. Asynchronous communication on the other hand does not require the participants to be in the same time and space as it does not happen in real time. Examples of technologies are email, discussion boards, and content posted for the students to read (Zhang & Nunamaker, 2003).

range of courses without barriers that are evidenced in the *brick and mortar* type of courses – distance, time, inflexibility and adaptability. The ease of adaptation and customization ensures that the learning content is well suited to an individual's learning style and preferences, hence increasing its impact and reach. In the cases where the demand for higher education outweighs the physical buildings on campuses, eLearning could be used to cater for the additional number of students and courses.

2.4.2 The Challenges of eLearning in Africa

There are enormous challenges that are faced in Africa with regard to technology for teaching and learning. This section provides a brief description of (arguably) the main challenges such as bandwidth, policies and regulations, access, power and related infrastructure, university management buy-in, new teaching and learning paradigms, human capacity, limited or lack of financial resources, and socio-cultural paradoxes and issues.

2.4.2.1 Bandwidth

The availability, quality, quantity and cost of bandwidth in Africa are still prohibitive and beyond reach of many HEIs and individuals. According to a recent study, "an average university in Africa has no more bandwidth than the amount found in a residential connection in Europe or the United States". However, bandwidth in Africa is always strained; costs on average 50 times more than a typical US university pays per Kbps[12]/month; and is of a low quality without firm commitments of policy from the internet providers of guaranteed uptimes (Hawkins, 2007, pp. 92-93). In addition, the lack of skills and policies at the institutions with regard to bandwidth management does not ensure that the bandwidth is effectively used (see also Steiner, Tirivayi, Jensen, & Gakio, 2004).

2.4.2.2 Policies and regulations

It has also been indicated that most countries in Africa have conservative and restrictive policies[13] that, most of the time serve as a hindrance to the use of eLearning or to the adoption of technologies that promote eLearning (Yieke, 2005). Although it could be argued that a number of countries in Eastern and Southern Africa have favourable ICT policies in place, there still

[12] Kbps = kilobits per second, the speed of a signal transmission equivalent to 1000 bits per second.
[13] Policies here include, but are not limited to monetary, fiscal, financial, industrial and trade policies.

seems to be a lag between both the diffusion and development of ICT-based processes and policies governing their operations in Eastern and Southern Africa. Indeed, there is a "mismatch between the techno-economic and the socio-institutional system, which makes the catching up process more difficult for large parts of the developing world" (Castellacci, 2006, p. 841). Policy directions also need to be taken to take advantage of ICTs both for educational purposes and other socio-economic activities. These policy directions, Castellacci (2006) argues, should cover institutions, national and international regimes. At the institutional level, a lack of policies leads to unnecessary duplication of efforts and an uncoordinated duplication of investments, consequently making the creation of institutional support strategies and mechanisms untenable. The lack of a conducive legal framework for the support of technology and technology projects for use in education and research can be seen as a challenge and a hindrance to the use of eLearning. It has been reported that countries that have undergone regulatory reforms have had positive short-term impacts, especially in stimulating investments, and lowering the costs of ICT products and services (Henten, Falch, & Anyimadu, 2004). Major policy implications for the region with regard to ICT development, for example, changes in telecommunications and economic policies, and the incorporation of ICT, such as PCs, into educational and other institutional systems, have been advocated (Oyelaran-Oyeyinka & Lal, 2005).

Cross and Adam (2007:89) calls for both proactive and reactive policies towards ICTs in HE. The proactive policies *shape events* in ICTs in higher education, and there is no evidence that many HEIs have them. Reactive policies on the other hand *respond to events*, are more prevalent in most HEIs and entail "a phenomenon which reflects largely the lack of a clearly defined e-learning sub-sectoral policy for higher education at both national and institutional levels." Cross and Adam (2007) add that the main shortcoming of having more reactive policies than proactive ones is that most eLearning implementations remain or end at the "pilot phase". Clegg, Hudson and Steel (2003) sees the behaviour toward use of ICT in education as either uncritical acceptance, 'mediation' pressures and pedagogy, or critical pedagogy. Like the Cross and Adam's (2007) reactive policies, uncritical acceptance blindly offers *solutions* when the core and critical questions have not been adequately addressed. The down side of uncritical acceptance is that "the new orthodoxy is not questioned and a techno-centrist discourse takes place." (Clegg, Hudson, & Steel, 2003:48). Mediation pressures is where acceptance allows for critical space,

while at the same time 'mediating managerialistic discourse' while the critical pedagogy is more critical and reflective. Castellacci (2006:842) sees this mediation as addressing the mismatch between the techno-economic paradigm and the socio-institutional systems paradigm. The *techno-economic paradigm* sees ICTs as having "economic effects on growth, wealth and welfare in the near future, and may lead to radical changes in firms' production structure and organizations, in the patterns of consumption, and in institutional settings." (Castellacci 2006:842) The *socio-institutional systems paradigm* on the other hand looks at the social and institutional challenges to the use, and diffusion of the technologies arising from requirements of skills, competencies and capabilities that the technologies require (Castellacci, 2006).

The need for higher education institutions in Africa to address policy issues by creating Cross and Adam's (2007) *proactive* and *reactive* policies, while managing Clegg and colleagues' (2003) *uncritical acceptance, 'mediation' pressure and pedagogy* and *the critical pedagogy* and Castellacci's (2006) *techno-economic* and *socio-systems paradigms,* is a challenge. The challenge comes largely due the fact that most HEIs are either reliant on government funding or in some projects, donor funding, who need to see some policies in place as a condition for funding, as well as the need for management to raise more funds through course offerings while at the same time reducing or lowering costs (Cross & Adam, 2007). This coupled with the pressures for the private sector *collaborators* have lead commentators, especially the development partners to allude to the need for inclusivity and wider participation in the policies in Higher Education, and by implication on ICTs and eLearning (Lazarus, *et al.*, 2008; Cross & Adam, 2007; King, 2007; LaRocque & Michael, 2003). While, there are some movements toward institutional eLearning policy formulation, much more still needs to be done.

2.4.2.3 Access

Access to communication technologies and information is one other major concern in Africa. With access, there are a number of facets: access to the technology; access to resources to invest in the technology; access to training and expertise; and access to market information among others. With these facets in mind, potential access to or availability of technologies alone does not directly translate (or always lead) to their ownership or use (James & Versteeg, 2007) due to a lack of or inadequate access to the other core components. Most of the African countries are

lagging on *access to technology* classifications that are being used widely (United Nations, 2005). What constitutes *access to technology* is debatable, but it has been seen as technology being within the reach of its intended users and with reasonable limitations. Some countries put the limitations in terms of time, population or distance (Henten, Falch, & Anyimadu, 2004:2) as is the case with the telephone:

> Universal access can be defined as a telephone available within every 20 km (as done in Burkina Faso), within a travelling distance of 30 min (as proposed in South Africa) or, as it is done in Ghana, as a telephone in every locality of more than 500 people (Henten, Falch, & Anyimadu, 2004:2).

However, these time, population and distance-based definitions do not cater for the access to training and expertise, financial resources (even to pay for the use of the technology) as well as access to market information. With access therefore, there should be a move to the integration of these technologies with communities and institutions – financial, physical, digital, human and social resources (Warschauer, 2002). Probably, a move back to creating strategies, policies and regulations that ensure that there is a well rounded accessibility of all digital resources *without limitations*.

In Africa, the access to computers is very limited as compared to parts of the developed countries. For example, as of 2004, the WDI reports that there were only two computers per 1000 people in Malawi. The situation is no better in countries in Sub-Saharan Africa (SSA) that are highly regarded and more developed than Malawi. For example, in South Africa in the same year, access to computers was limited to 82 computers per 1000 people. Africa's Internet penetration is ranked lowest in the world, with only 5.3% of the population having access compared to the world average of 21.9%, as is illustrated in Chart 2.2 below (Internet World Stats, 2008).

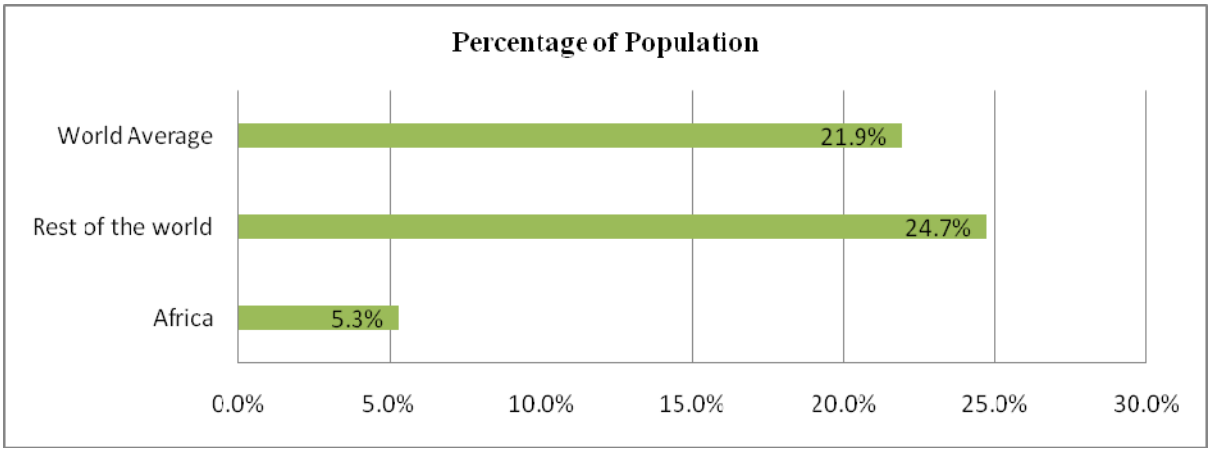


Chart 2.2: Internet access as a percentage of the world population
Source: Internet World Stats (2008)

2.4.2.4 Power and related infrastructure

Linked to the communication infrastructure are the related issues of unreliability, unavailability and cost of power. Power remains one of the most expensive costs manufacturing firms have to bear in Africa, accounting for over 50% of the production costs in some countries (Eifert, Gelb, & Ramachandran, 2008). Other than the prohibitive cost of electricity, Africa has the lowest *electrification rate* in the world, at 24% (compared to the world average of 73%) with many rural areas still uncovered by the main grids since 10% of the population covered is in urban and industrial centres (Wolde-Rufael, 2006). Although most universities in Africa are located in major urban centres, these challenges of power still face them. Unreliable power supply does not only lead to huge capital investments in alternative sources of power like generators and power protection systems, but it also leads to quick wearing out, and failure of most electronics used for eLearning. This has a direct impact on the maintenance and repair costs as well as insurance costs.

2.4.2.5 University management buy-in

Implementation of any organisation-wide innovations or processes requires the support of top management within the organisation. Where there is lack of management and explicit approval of eLearning within higher education, together with the allocation of resources, time and commitment would make the implementation and success of eLearning very difficult

(Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Sharma & Rai, 2003; Gallivan, 2001).

2.4.2.6 New teaching and learning paradigms

The paradigmatic shifts called for in eLearning bring about challenges not only in quality, but also in delivery, accountability and skills required (for a discussion on this see Pond, 2002a). The new paradigm challenges the facilitators to involve and engage students frequently to avert loneliness, low self-esteem, isolation, and low motivation to learn, of which the consequences are low achievements or eventual dropout (Rovai, 2002). The engagement and involvement, both during the teaching and learning process, and the development of the learning materials and contexts translates to increased workloads for the facilitators (Connolly & Stansfield, 2007). This dual challenge of paradigm shift, and increased workload in the face of eLearning use in HE could lead to user resistance, and eventual failure of any eLearning initiative. In fact, most of the change theorists and researchers have indicated that people would always resist anything that would challenge the *status quo*, or one that is perceived to bring about increased roles and responsibilities (Lippert & Davis, 2006; Saunders, Charlier, & Bonamy, 2005; Gallivan, 2001; Piderit, 2000). These two challenges yoked with the high costs of infrastructural investments that are required for eLearning often results in a reluctance of organisations to embrace eLearning because of the adverse cost implications without a guarantee of success (Lippert & Davis, 2006; Saunders, Charlier, & Bonamy, 2005; Gallivan, 2001; Piderit, 2000).

2.4.2.7 Human capacity

Perhaps what compounds the paradigm shift challenges is the perceived and real shortage of skills especially in eLearning and ICT in general in Africa. This has not only led to a lack of researchers or very poor research capacity, but also acts as a hindrance to the use of ICTs in higher education institutions. Complicating the challenge of skills shortage further is the fact that it has become increasingly difficult to keep the qualified personnel in Africa because of the brain drain and international war for talent (Ndulu, Chakraborti, Lijane, Ramachandran, & Wolgin, 2007; Teferra & Altbach, 2004). Teferra and Altbach (2004) cite poor working and living conditions, real and perceived persecutions, and social, political and economic problems as the most common reasons behind the departure of qualified personnel.

The flight of skilled labour from Africa leads to a drag in investment, income and growth; adversely affects the rate of inventions, innovations and adoption of innovations; and results in a shortage of skilled labour to complement the semi-skilled and unskilled labour in the socio-economic development of African countries (Ndulu, 2004; Teferra & Altbach, 2004; Ndulu, *et al.*, 2007). Ndulu (2004:69) states that "skills lost through brain drain are not easily replaced given the limited capacity of higher education and training capacity in developing countries and the paucity of the means for acquiring these elements elsewhere."

Africa should therefore, to arrest this situation, increase enrolment to higher education especially in sciences, address the issue of brain drain, improve on staff retention programs, launch extensive and continuous staff training programs, and make the best use of the available human capital (Ndulu, *et al.*, 2007; Ndulu, 2004; Adam, 2003). The challenge of human capacity has an adverse effect on the adoption of an innovation such as eLearning (Ndulu, 2004).

Apart from the brain drain, HEIs are faced with very high turnover of ICT skills required to support academics in their use of eLearning (Cross & Adam, 2007; Ondari-Okemwa, 2002). The combination of skills and competencies required for eLearning delivery makes it even harder for HEIs institutions to get competent personnel for its productive use. As a policy in higher education for developing countries, increasing the pool of ICT skills should be core (Cross & Adam, 2007).

2.4.2.8 Limited or lack of financial resources

Teferra and Altbach (2004) indicate that most higher education institutions in Africa are facing financial crises, arising from, amongst other things, expansionist and massification pressures, poor economic status in host countries, lack of external funding, students defaulting or experiencing an inability to pay, and misallocation and poor prioritization of available funds. This imply that a) higher education is limited to those who can afford to pay the higher fees, leaving the majority without affordable access to education; b) HEIs limit enrolment to be in tandem with the funds availed to them by the government or sponsors; c) HEIs are limited to low cost, low quality education programs that in the long run do not address the urgent and pertinent needs of the society in terms of socio-economic developments; and d) HEIs get involved in

uncoordinated infrastructural development that end up being too costly (TFHES, 2000). These issues have an adverse effect on the investment in eLearning technologies. Proper coordination and formation of flexible funding models encouraging public participation in HE and coherent and rational national approaches should be used to optimise the financing and funding for Higher Education (TFHES, 2000).

2.4.2.9 Socio-cultural paradoxes and issues

Cultural barriers have been cited as preventing the use of new technology (Lichtenthaler & Ernst, 2008). Techno-positivists and techno-centric advocators of technologies have done so with plenty of promises and gusto that falls short of demonising the culture of those who are hesitant to adopt these technologies. Cultural barriers in the adoption of technology, like eLearning, arise from the perceived threat of eroding the African culture with the Western media and culture; creation of new forms of identities that are incompatible with the African cultural identities; the inapplicability of foreign ideologies and intellectual knowledge to the African context and realities; the death of African languages and indigenous knowledge; and the inapplicability of foreign pedagogies in teaching and learning contrary to time-tested African pedagogies (Alzouma, 2005; Heath 2004; Zhao, Massey, & Murphy, 2003; Wejnert, 2002; Ess & Sudweeks, 1998; Gray, 1982). The issues of Westernization, authenticity of foreign tools and processes in relation to the African context and cultural identity are briefly discussed below.

Cultural identity is strongly related to economic vulnerability, especially when used as a status symbol in emergent cultures, which puts developing countries more reliant on the West for economic reprieve at particular high risk of its loss (Tomlinson, 2003). In HEIs, these vulnerabilities and status symbolism can be seen in the production and consumption of knowledge using technology that would consequently define the competitiveness of the institutions which consequently leads to the creation of an identity of its own. While eLearning, and indeed other technologies can be a factor of defining competitiveness, competitiveness in HEIs is complex and technology or eLearning alone cannot be used as the gauge (Njenga & Fourie, 2008; Tomlinson, 2003).

2.5 Summary and conclusion

As pertinent literature shows, the use of eLearning for HE in Africa seems to be a mirage given the challenges discussed, despite its benefits and potential. There are still real unresolved issues to its use in Eastern and Southern Africa. Until these issues are resolved, eLearning will always be an unexplored idea rather than being a current engagement whose advantages and benefits need to be taken. To address these issues some of the strategies that could be employed are briefly discussed. The list is not exhaustive and hopefully, as these issues are resolved, there will be a here and now approach to eLearning for HEs in Eastern and Southern Africa.

Formation of networks: HEIs and other organisations should collaborate to form the networks that create opportunities for not only sharing knowledge but also reaching new markets beyond their borders and at the same time creating a culture of collaboration and cooperation. HEIs should be leaders in defining what is required for the network by carefully studying and forecasting the needs of the emerging networks.

Fostering relationships between HEIs, students and their environments: The understanding of these relationships will ensure that HE providers achieve flexibility as an objective and at the same time "identify the factors that serve to increase/reduce flexibility and to say something about the consequences of flexibility" (Rye, 2008:online).

Dealing with human resources: Perhaps Africa should address the lack of enough human resources by increasing enrolment to higher education especially in sciences, attend to brain drain, improve on staff retention programs, launching extensive and continuous staff training programs, and make the best use of the available human capital (Ndulu, *et al.*, 2007; Ndulu, 2004; Adam, 2003).

Proper coordination and formation of flexible funding models: This would encourage both private and public participation in HE. Coherent and rational national approaches should be used to optimise the financing and funding of Higher Education (TFHES, 2000).

Establishment of a conducive policy and regulatory framework: Agile methods for defining and shaping the policy and regulatory frameworks, and the implementation of such frameworks should be devised. This policy and regulatory framework would address Cross and Adam's (2007) *proactive* and *reactive* policies, while managing Clegg and colleagues' (2003) *uncritical acceptance, 'mediation' pressure and pedagogy* and *the critical pedagogy* and Castellacci's (2006) *techno-economic* and *socio-systems paradigms*.

It is worth mentioning that despite the weighty odds HEIs in Africa find themselves with respect to eLearning, HEIs in Africa have expended part of their meagre resources on ICTs. However, the spending or acquisition of the ICTs does not necessarily translate into their use, or adoption by the intended users. Hypothetically, although as stated earlier there are a number of benefits and promises to using eLearning, they might not be apparent to the adopting units and lecturers in the HEIs. Until there is some awareness, the adoption process cannot start. Therefore, an understanding and development of a working model of eLearning adoption in HEIs in Africa is essential. This would ensure that the resources invested are widely adopted and accepted by the lecturers.

Chapter three that follows will explore some of the models and theories of adoption of innovation and will discuss their suitability for eLearning adoption.

Chapter Three: Adoption models

3.1 Introduction

Although HEIs in Africa have expended part of their meagre resources on ICTs and other innovations, the success of these innovations primarily depends on their adoption. Acquisition of eLearning technologies alone, although necessary, is not sufficient as its full benefits can only be realized from its full utilization following what Fichman (2004) calls the "dominant paradigm in information technology innovation" research. Dominant paradigms are the systems of thought that are standard and held by a society at a given time. In terms of innovation research (also called the pro-innovation bias), the dominant paradigm postulates that the more individuals and organisations possess the right independent variables, the more the innovation will be adopted (Fichman, 2004b), meaning that innovation in and of itself is valuable (Moore, 2001). In Fichman's terms, the pro-innovation bias is an explanation of innovation in economic-rationalistic models where a certain quantity of 'The Right Stuff' translates to more innovation (Fichman 2004b:315).

Moore (2001) postulates that innovations are valuable only if they, among other things, help in achieving competitive advantage which, in economic-rationalistic models is seen in economic terms (e.g. better pricing options). In recognising the dangers of the dominant paradigm, this study holds that like other Information Systems (as a discipline) initiatives, eLearning evolved in response to the growing need of organisations and individuals to a) improve their capabilities (e.g. their geographical reach, productivity), b) improve their processes (e.g. student support, promote just-in-time training) and c) efficiently manage their data and learning content. ELearning, if well used, is a viable, usable concept that can go beyond the marketing terms that eLearning technology solutions developers (mis)use. ELearning has the potential to improve HEIs learning and teaching capabilities, processes and still manage data relevant to teaching and learning. Indeed, eLearning, like all other innovations, cannot improve organisational performance if it is not used. It is worth noting, however, that in some instances adoption of innovation might lead to more undesirable effects than non-adoption (Berkun, 2007).

ELearning adoption can only be regarded as successful when eLearning is used appropriately by most, if not all, its intended users. As such, one of the significant hindrances to eLearning adoption could be its uninformed acceptance by the intended users or potential adopters. Over

the years, researchers have had a strong interest in understanding why people accept or reject innovations and how users respond to new technologies. Research has been done in the area of technology adoption, where researchers have used a variety of words to describe their studies: diffusion, acceptance, appropriation, domestication, implementation, use, assimilation, continuance, and internalisation, among others (Lippert & Davis, 2006; Klein & Knight, 2005; Rogers, 2003; Pedersen & Ling, 2002); as well as organisational and individual innovativeness and creativity (Mauzy & Harriman, 2003; Woodman, Sawyer, & Griffin, 1993).

Rogers (2003:5) defined *diffusion* as "the process by which an innovation is communicated through certain channels over time and among the members of a social system" that leads to alterations in the structure and functions of the social system. Rogers conceptualised diffusion of innovation as a multistage process involving i) *knowledge*, ii) *persuasion*, iii) *decision*, iv) *implementation* and v) *confirmation*. The adoption of the innovation falls in the decision stage. What seems to be an elaboration on Rogers' definition is Katz, Levin and Hamilton (1963:240) who see diffusion as a sociological process involving "(1) acceptance, (2) over time, (3) of some specific item-an idea or practice, (4) by individuals, groups or other adopting units, (5) linked to specific channels of communication, (6) to a social structure, and (7) to a given system of values, or culture".

Acceptance has been defined as "the point at which individuals begin to embrace new behaviors as they shift from a cognition state of readiness for change to a behavioural state of action" (Lippert & Davis, 2006:440).

Appropriation is the buying and acceptance of an innovation (Van de Wijngaert, 2005) or in general terms, the ability to assert ownership of an innovation (Nissen, 2006), and how the users use the innovation, or reinvent or reuse the innovation to fit purposes other than the ones it was adopted for (Wirth, von Pape, & Karnowski, 2008). This is closely related to *domestication,* which has been defined as "the mutual adaptation" of innovation (Nissen, 2006:254), while *implementation* has been defined as the process associated with positive cognitive, affective and behavioural responses associated with the introduction, use and perceived usefulness of an innovation (Lippert & Davis, 2006). These responses involve the successful execution of the plans that were set up during the introduction stage (Leseure,

Bauer, Birdi, Neely, & Denyer, 2004) owing to the skills and the commitments of the individuals involved (Klein & Knight, 2005).

In adoption and diffusion research, *use* or the *act of usage* is the representation of the acceptance of an individual to permanently integrate an innovation into everyday life and to continue utilising the innovation frequently (Lippert & Davis, 2006) while *assimilation* of an innovation has been defined as the cumulative acquisition and cumulative successful deployment of the acquired innovation that's evident by the penetration of the innovation within organisation and its routine use (Swanson, 2004; Fichman, 2004b). *Continuance* can be seen as the continued use of an innovation after acceptance or initial use. On the same note, *internalization* is the "effective and continued use of" an innovation over time (Lippert & Davis, 2006:434).

It is clear from the definitions above that there is some level of overlapping, or synonymy in the choice of words largely attributed to the dominant discipline of the adoption of innovation. For instance, diffusion has its origins in marketing and economics while a number of studies on Information Technology and Information systems use adoption. Likewise, domestication research has a dominant sociological bent toward establishing the effects of innovation on the society (Pedersen & Ling, 2002). While there might be differences in the scope and objectives of the studies, limited by the definitions of the words they use, this research uses a multiplicity of theories, models and frameworks to explain or predict users' adoption of new innovations. Most of the differences only arise with regard to the variables and the scope of analysis of the variables, as well as the specific focus on the adoption 'stage' or 'stages' in the adoption process.

3.2 Theories and models of adoption

A theory has been defined as a "plausible or scientifically acceptable set of general principles offered to explain phenomena" that have been observed over time and cannot be discredited by existing knowledge (Merriam-Webster Collegiate Dictionary, 2000). A theory forms a "comprehensive, coherent, and internally consistent system of ideas about a set of phenomena" (Knowles, 1978:5) and is a hypothesis assumed for the sake of argument or investigation, or an unproven assumption (Mergel, 1998). In the same note, a model has been defined as an abstract mental picture or a mind map or representation that helps individuals to

understand something they cannot see or experience directly and is often characterised by a set of abstraction criteria that determine what should be included in the model (Merriam-Webster Collegiate Dictionary, 2000; Pires, Van Sinderen, De Farais, & Almeida, 2004). The use of theories and models to explain complex phenomena like the adoption of eLearning is noble. However, caution should be taken in the use of models, since their definition and theories are just assumptions which have not been approved or disapproved scientifically over a period of time, and there is no guarantee that they will hold in different contexts and at different times. Similarly, a model is as good as its creator (Wolstenholme, 1999) and therefore there is need for them to be scrutinised before being applied in different contexts. In this chapter, some of the widely referred to theories and models of adoption research are reviewed, purposely detailing their suitability in eLearning adoption research in higher education.

3.2.1 Diffusion of Innovation theory (DOI)

Rogers' Diffusion of Innovation (DOI) theory or Innovation Diffusion theory (IDT) or Rogers' Theory was constructed through meta-analysis of innovations in different contexts, but was mainly used in the agricultural sector to study the diffusion of technology and other farming practices (Rogers, 2003). It is widely centred on the characteristics of the innovation and the adopters (Agarwal, 2000). In this theory, the innovation adoption is a process of uncertainty reduction through a communication process where information regarding an innovation is passed from one member of the society to the other.

DOI theory recognises that a number of factors interact to influence the diffusion of an innovation. The main factors influencing the diffusion process are (Rogers, 2003):

1). the innovation itself,
2). how information about the innovation is communicated,
3). time, and
4). The nature of the social system into which the innovation is being introduced.

3.2.1.1 The innovation

The rate at which an innovation is adopted is partially determined by the perceived attributes of an innovation to the potential adopter, called innovation characteristics. Rogers (2003) proposes five attributes of an innovation, namely its relative advantage, complexity, compatibility, trialability and observability.

Relative advantage

Relative advantage is the clear and unambiguous benefits of reliability, effectiveness or cost-effectiveness that can be derived from an innovation and that are determined by the potential adopter and not the makers of the innovation (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 2003; Berkun, 2007). Relative advantage is the degree to which an innovation is perceived to be better than the idea it supersedes (Rogers, 2003) or the available alternatives. The relative advantage can be seen from a number of angles: economic (e.g. cost-effectiveness and profitability), social (e.g. fashion, class and prestige), ease of use, convenience, satisfaction, and reliability (Rogers, 2003; Meyer, Johnson, & Ethington, 1997). Using this premise, if an innovation has no or little relative advantage to the potential adopter, it is unlikely to be considered for adoption.

Interestingly, even where the relative advantage of innovations are apparent, their adoption take a lengthy period of negotiations among the potential adopters since the adopters are not simply passive 'adopters' or passive receptors of the innovation (Fitzgerald, Ferlie, Wood, & Hawkins, 2002). These negotiations can have either a positive or a negative influence on the adoption decision.

For eLearning to be adopted, its relative advantage should be visible to the potential adopters (not innovators). For this study, the relative advantage of eLearning is perceived or ought to be perceived by the professors and lecturers in a number of ways such as economic (the cost in terms of time of learning material preparation), learning new technologies, new pedagogies, and the increased cost of media production compared to cost savings in time and space delivery (flexibility and location), and improved quality of teaching. For the professors and lecturers to adopt eLearning, based on its relative advantage, its perceived costs should be lower than its benefits.

Compatibility

Compatibility is the degree to which an innovation is perceived as being consistent with existing values, past experience (norms), habits, values and lifestyle and discerned needs of adopters. Innovations with high compatibility are readily adopted. The compatibility of an innovation is measured against its relative advantage. If the cost of incompatibility is higher than the relative advantage, most people would not adopt it (Rogers, 2003; Berkun, 2007).

The compatibility of eLearning in higher education can be measured from the effort required to transform the traditional modes of teaching into electronic modes, as well as the systems and structures that need to be transformed. In chapter two, there is a discussion of the challenges that eLearning in higher education may face. These challenges add into the incompatibility of eLearning with the existing teaching and methods. For example, in terms of structures, higher education structures are not always compatible. The changing norms and the challenges brought about by the eLearning innovations, for example transformation of a professor from a teacher to a facilitator, are not easily accepted.

Complexity

Complexity is the opposite of simplicity. Simple things are easier to explain, use and understand. Innovations that are perceived to be simple to use are more easily adopted. Complexity arises due to the intricate intertwinement and interrelationships between entities within a context of multiple chains of dependencies and varied outcomes (Moffat, 2003). Through training, experience and demonstrations perceived complexity can be reduced where people understand these intertwinements and interrelationships. Additionally, an innovation that is perceived to be complex can be broken down into manageable parts that can be adopted incrementally. If the barriers to innovation adoption are few within the organisation, it is highly likely that the assimilation of a complex innovation would be easy (Rogers, 2003).

The complexity of eLearning can also be measured based on the amount of learning required to use it. First, professors need to learn the "online pedagogy" and the technology. The new learning requires a mastery of not only the technology tools, but also the jargon that comes with them, and the paradigm shift as discussed in chapter two. In addition, eLearning adds with it some complexity in the different expertise required – each of these requirements are intertwined and intricately related. However, if the learning can be broken down into manageable chunks that can be learnt incrementally, it can reduce the perceived conceptual gap in its complexity.

Trialability

Innovations that potential users can experiment on are adopted and assimilated more easily. The easier an innovation is to try, the higher the likelihood of its adoption (Rogers, 2003; Berkun, 2007).

In Higher Education in Africa there is the question of access to eLearning for the professors to try it. A number of opportunities can be created where "pilot" or "tryout" courses can be run. The pilots and tryouts should, however, be done carefully to avoid the situation Cross and Adams (2007) describes, namely that higher education institutions often are reactive in their response to situations. The aims of the pilots and tryouts should therefore be seen as a step towards more proactive responses that would shape the direction the HEIs should take in implementing and facilitating eLearning adoption.

Observability

Observability refers to the observable benefits or positive results of an innovation. If the potential benefits of an innovation are visible to the intended adopters, the innovation will be adopted more easily (Rogers, 2003; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004). There should therefore be initiatives to make the benefits of innovations visible to increase the likelihood of their adoption. However, most technological products have limited observability (Berkun, 2007).

ELearning benefits, like many other information systems and educational initiatives, have limited visibility as compared to say fashions fads or trendy mobile phones that people use socially (Berkun, 2007). To complicate matters further, it is difficult or impossible at times to quantify and differentiate learning that has arisen from the use of technology. There is, however, some literature that suggests eLearning can be a very effective way of teaching and learning depending on the various combinations of pedagogical and collaborative tools used (Arbaugh & Hwang, 2006; Zhang & Nunamaker, 2003; see also, for example, Dysthe, 2002 for eLearning effects in social work education).

3.2.1.2 Information communication and communication channels

The movement and spread of information regarding an innovation within the social system also affects the rate at which it is adopted (Rogers, 2003). The factors that mediate communication processes during transmission and absorption between members within the society form variables of the adoption research (Wejnert, 2002). Communication and its effect on the adoption process has been studied by focusing on elements like the role of interpersonal communication (Wirth, von Pape, & Karnowski, 2008; Singh, 2006; Lee, Lee, & Schumann, 2002), communication within professional networks (Shrum & Campion,

2000), social density and bandwagon effect (Fichman, 2004b), and the role and type of media (Ratten & Ratten, 2007).

In eLearning, for example, interpersonal communications, including nonverbal observations, could be considered to be the most influential because of its complexity and high risk (Midgley & Dowling, 1993; Mahajan, Muller, & Bass, 1990; Lee, Lee, & Schumann, 2002). Interpersonal communication thrive where there is deeply rooted confidence and a sense of camaraderie. Adoption results could be more favourable where opinion leadership is being shown or where opinion formers are leading the way. Opinion leaders are recognised as innovative and knowledgeable, and other people within the social set up tend to follow in their footsteps. Opinion leaders often form the championship or change agency required for innovation adoption (Rogers, 2003; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004). The opinion leaders create an environment of respect for, and interest in others, and an ability to recognize others that might encourage the adoption of an innovation (Lin, 2003; Pollard, 2003; Fitzgerald, Ferlie, Wood, & Hawkins, 2002). The presence of an eLearning champion within a unit or the higher education institution is likely to have a significant influence on the adoption of eLearning.

3.2.1.3 Time

Three aspects of time are eminent in the DOI theory namely, the *innovation-decision process time, the relative time with which an innovation is adopted by an individual or group and the innovation's rate of adoption.* Rogers (2003) defines the *innovation-decision process* as a cognitive process through which an individual goes through from the time an individual is made aware of an innovation to the time the individual makes a decision and a firm commitment to adopt (or reject) the innovation. Rogers breaks the adoption process down into five stages. The five stages are:

1. *Awareness* – when an individual is informed or made aware of the innovation.
2. *Interest* – when the individual is stimulated or provoked to get to know more about the innovation.
3. *Evaluation* – When an individual makes an attempt to determine the essential qualities of an innovation.
4. *Trial* – when an individual tries the innovation, albeit in a small way.
5. *Adoption* – when the individual makes a decision and continue using the innovation

Rogers (2003) uses *the relative time with which an innovation is adopted by an individual or group* to identify different categories of adopters as shown in Figure 3.1. In the DOI theory, there are five categories of adopters: innovators, early adopters, early majority, later majority, and laggards.

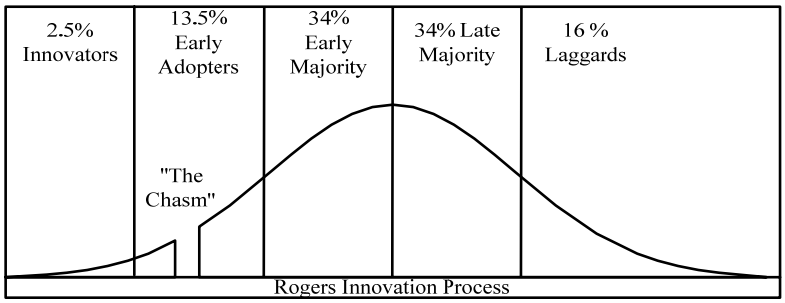


Figure 3.1: The technology adoption life cycle[14]
(Source: Moore, 2001)

The innovators are venturesome, daring, and have risky tendencies. They have control of substantial financial resources and have the abilities to understand and apply complex technical knowledge, and cope with a high degree of uncertainty about an innovation. Early adopters are integrated in the local social system with the greatest degree of opinion leadership in most systems. They also serve as role models for other members or society, which makes them earn respect from peers. The early majority have frequent interactions with peers, but do not hold any positions of opinion leadership. They also take a lot of time deliberating on new ideas. The late majority act on pressures from peers, are sceptical, cautious, and adopt innovation as an economic necessity. Finally, laggards are considered to have no opinion leadership and their point of reference is always the past. This makes them very suspicious of any innovation, with lengthy adoption of innovation deliberations.

Finally, Rogers describes the role of time in the *innovation's rate of adoption* as the relative speed with which an innovation is adopted by members of a social system - that is the number of individuals who adopt a new idea in a specified period of time. The five attributes of an innovation, the nature of the communication, the nature of the social system and the extent of change agents' efforts, all affect the rate of adoption of an innovation (Rogers, 2003:221).

14 The original version of the technology adoption life cycle is highly attributed to Rogers, though it was developed at the Iowa State College in 1957. A modified version includes a gap in the bell curve, between early adopters and the early majority by Moore (1991) in his book "Crossing the Chasm". This essentially splits the adoption process into three distinct phases, an early market and a mainstream market, separated by a period of time called the valley of death.

In the time-of-adoption thesis, the key concerns are the adopters' characteristics (Wejnert, 2002) and their perceptions towards the innovation. That is, if adoption is the effect of a person's interaction with the environment, the social factors would be modulated by the characteristics of the adopter or personal innovativeness. Personal innovativeness, however, cannot be considered in isolation of the need for innovativeness and the dynamic social processes that take place during the adoption processes (Wejnert, 2002; Midgley & Dowling, 1978). The social dynamics offers sanctions or rewards that could have a significant influence on the outcome of the adoption process (Teichler, 2006).

3.2.1.4 The social system

The social system is the environment (individual, organisational and environmental) within which an innovation is diffused (Rogers, 2003). A number of factors have been studied on how individual roles (Sharma & Rai, 2003) and organisational social characteristics influence the innovation adoption process (Siritongthaworn, Krairit, Dimmitt, & Paul, 2006; Miller, Lu, & Thammetar, 2004; Martin, Massy, & Clarke, 2003; Frambacha & Schillewaert, 2002). A number of social and societal variables have been used to explain innovation adoption, for example, Wejnert's (2002) classification of innovators identified six variables, four of which are directly related with the society, while the other two are indirectly related. These variables are:

> a) Societal entity of the innovators, b) familiarity with the innovation, c) status characteristics d) socioeconomic characteristics, e) relative position in social networks, and f) personal characteristics that are associated with cultural variables that modify personality characteristics of actors at a population level (Wejnert, 2002:302).

The environmental settings have been identified to fall into at least four categories: geographical, societal, political, globalization and uniformity (Wejnert, 2002). Geographical settings include the proximity to the source of innovation and the infrastructure since some of the innovations can only be adopted when certain infrastructure is in place. Societal culture is concerned with the norms and the belief structures that need to be confronted for the innovation to be adopted. Under politics, adoption mitigating factors are measured against the regulatory frameworks and norms that control actors' behaviours. The globalization and uniformity categories deal with the notion that the world is one cultural community whose innovations and use of these innovations should be synchronized.

The social systems in which individuals and organisations exist have an impact on the adoption of eLearning as they, among others make and enforce policies and regulations (Lin, 2003), define the political stability (Wejnert, 2002), and dictates the cultural and community values (Steenkamp, Hofstede, & Wedel, 1999). In addition, the social systems and processes determine when a critical mass is reached. A critical mass is realised when "a sufficient number of users has been reached to create a 'self-sustaining' rate of adoption" (Garrison, 2001:223). Critical mass is closely related to the bandwagon effect (sometimes called herding effect), which is a situation where an innovation like eLearning is adopted by organisations because of the 'me too' phenomenon without any serious considerations of the innovation (Swanson & Ramiller, 2004).

3.2.1.5 Examples of studies using DOI

Sharma and Rai (2003) used the Innovation Diffusion Theory to study a failed adoption of computer-aided software engineering (CASE) using two variables: a) the positional power of the information systems leader, and b) the tenure of office of the information systems leader. They discovered that the "positional power is inversely related to CASE adoption" and the "shorter tenure of the ISD leader is associated with higher adoption of CASE." (Sharma & Rai, 2003:399)

Lu, Liu and Liao (2005) did an adoption study of a project management course being offered using a website where students were using Microsoft Project 2003. They found out that the perceptions on the relative advantage of the website and the compatibility of the use of eLearning website had a direct influence on the students' intention to use the website. However, there was no significant relationship between the ease of use, trialability, result demonstrability, visibility and image (Lu, Liu, & Liao, 2005).

Frambach and Schillewaert (2002) present a multi-level organisational innovation adoption framework. The framework aims at incorporating the role of individual decision (one level) with that of the organisational decisions (the other level).

3.2.1.6 Criticism and Critics of the DOI

Despite its popularity, DOI has received some critique:

1. The DOI has been criticised as being too literal, making it very difficult to distinguish between its premises and its conclusions (Bass, 1969).

2. The pro-innovation bias (Moore, 2001) or the dominant adoption paradigm (Fichman, 2004b) where adoption of innovation is presented as the right choice. One of the shortcomings of pro-innovation bias is the assumption that adopting the innovation is the right choice especially when it's not clearly stated in research (Moore, 2001; Fichman, 2004b).
3. The longitudinal nature of the research and the "recall effect". In these kinds of studies, especially when they involve self-reported data, a question of validity arises because of the length of the recall period or the recency of the event in question. Obtaining information of events that happened in the past depends on the research subject's recall which is prone to errors. In the case of innovation adoption, unless the respondents made notes of each of the steps in the adoption, or the innovation is a life changing one that is engraved in the memory, the suitability of DOI theory to some kind of innovation research is questioned (Biemer & Lyberg, 2003; Bechhofer & Lindsay, 2000) .
4. The stages presented in a linear way from awareness, interest, evaluation, trial, through to adoption may be construed to depict causality while indeed not all adoption of innovations processes require all five distinct phases. Indeed, just like the other generic and linear models of diffusion, it has been criticised of lacking empirical validity especially in "delineating the complex, context-sensitive nature of the phenomenon itself, in much greater depth" (Fitzgerald, Ferlie, Wood, & Hawkins, 2002:1429).
5. DOI does not take into consideration the re-invention, customization and/or adaptation of the innovation either for the specific use it was made for, or for a different purpose.
6. DOI does not take care of innovations that are adopted in cycles or stages or causal adoptions (Mustonen-Ollola & Lyytinen, 2003). That is, DOI does not take into account the intricate particularities of complex innovations for instance situations where the adoption of a product leads to the adoption of another product, procedure or method of doing things. In a business setting, when an organisation adopts a new technology successfully, the focus of the adoption within the organisation changes from the adoption of the technology to the adoption of the new methods or procedures that arise from the use of such technology. For example, the adoption of eLearning might lead to the adoption of new forms of assessment, and also quality assurance of the learning materials. However, the study of eLearning adoption using DOI would

least consider the adoption of the new assessments forms or the forms of quality assurance.

3.2.2 Behavioural models and theories

The Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) explain and predict user behaviour in relation to performance of a task or behaviour at hand. These models look at the intrapersonal, interpersonal and community effects on a person's behaviour.

3.2.2.1 The Theory of Reasoned Action

According to the TRA, a person's performance of a specific behaviour is determined by the person's behavioural intention to perform the behaviour, and behavioural intention is jointly determined by the person's attitude and subjective norm concerning the behaviour in question (Lippert & Davis, 2006) as shown in Figure 3.2.

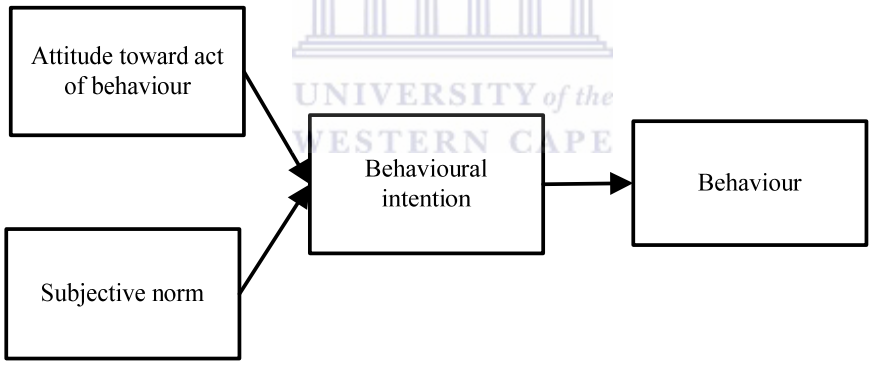


Figure 3.2: Theory of Reasoned Action
(Source: Fishbein & Ajzen, 1975)

The TRA uses a two-step process to identify and measure relevant beliefs about an innovation. The first step involves identifying the beliefs around the behaviour towards the innovation, followed by an assessment and weighted multiplicative scaling of the beliefs (Agarwal, 2000).

TRA can be represented mathematically as

$$B \approx BI = w_1 AB + w_2 SN$$

Equation 3.1: The Theory of Reasoned Action

Where:

≈ *stands for approximately equal to, B* is behaviour; *BI* is behavioural intention; *AB* is attitude toward behaviour; *SN* is subjective norm, and w_1 and w_2 are weights representing the importance of each term.

Ajzen (1991) identified the limitations of this model as including a significant risk of confounding between attitudes and norms since attitudes can often be reframed as norms and *vice versa*. Furthermore, the theory is based on the assumption that when someone forms an intention to act, they will be free to act without limitation irrespective of the person's freedom to act in accordance to the intentions.

3.2.2.2 The Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) is a derivative of the TRA that addresses the TRA's limitation "in dealing with behaviours over which people have incomplete volitional control" (Ajzen, 1991:181). TPB defines the relationships between attitudes towards a reasoned behaviour (A), the subjective norm (SN) and the perceived behavioural control (PBC) of performing the behaviour (B) in question (Workman, 2005; Morris & Vinkatesh, 2000; Ajzen, The Theory of Planned Behavior, 1991). According to Ajzen (n.d)

> Human behaviour is guided by three kinds of considerations: beliefs about the likely outcomes of the behaviour and the evaluations of these outcomes (behavioural beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behaviour and the perceived power of these factors (control beliefs).

These three variables are used as determinants of an intention or behaviour. Attitudes are the dispositional factors, favourable or unfavourable, arising from a person's evaluation or appraisal of performing behaviour. Subjective norm is the individual's assessment of social influences (pressures) about performing behaviour, while the perceived behavioural control is the personal evaluation of his ability to successfully perform the behaviour of interest (Workman, 2005; Morris & Vinkatesh, 2000; Ajzen, 1991).

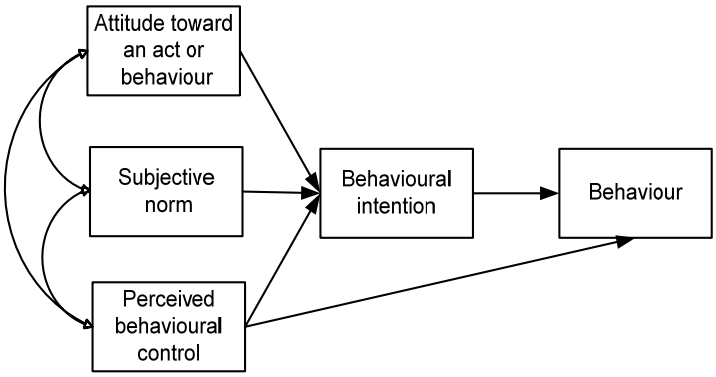


Figure 3.3: Theory of planned behaviour
(Source: Azjen, 1991)

As indicated in Figure 3.3, the main difference between TRA and TPB is the behaviour that is beyond someone's control. Ajzen (1991) modified the TRA to include the perceived behavioural control (the degree to which an individual feels that the decision to perform or not perform is within his/her control), which is determined by two distinct factors: Control Beliefs and Perceived Power). They both, however, assume that a person's perception of new behaviour is based on an internal cost-benefit analysis (perceived usefulness).

Attitude toward behaviour

While a reasoned behaviour in this context is a specific action that a party has set to perform, attitude toward behaviour (A) "refers to the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question" (Ajzen, 1991:188). TPB asserts that the individuals simultaneously and automatically acquire an attitude towards behaviour through the evaluation of the desirability of the consequences of the behaviour (e_i) and the strength of each salient belief (b_i) about the object of the attitude. That is, a person's attitude (A) is directly proportional to the summative index ($\Sigma b_i e_i$) as shown in equation 3.2 below:

$$\mathbf{A} \alpha \mathbf{\Sigma b_i e_i}$$

Equation 3.2: Attitude as a factor of desirability of consequences and salient beliefs

Where: α stands for proportionality, e_i for desirability of consequences and b_i the strength of salient belief.

For example, an individual may believe that using eLearning will result in losing control in the classroom (b_i) and may consider this as an undesirable outcome (e_i) and hence have an unfavourable evaluation of using eLearning.

Subjective norm

Subjective norm (SN) "refers to the perceived social pressure to perform or not to perform the behaviour" (Ajzen, 1991:188). Social pressures are defined in terms of normative beliefs - a combination of an individual's beliefs concerning other people's views of the behaviour of interest (n_i) and the individual's willingness or motivation to comply (m_i) with those views. The subjective norm (SN) is directly proportional to the sum of the products of n and m across the number of the salient normative beliefs identified. That is:

$$\mathbf{SN} \propto \Sigma \boldsymbol{n_i m_i}$$

Equation 3.3: SN is a combination of individual's behaviour and motivation to comply

Where: α stands for proportionality, n_i individual's beliefs concerning others' view of a behaviour and m_i the individual's willingness to comply.

In other words, an individual may believe that peers hold that using eLearning is important ($\boldsymbol{n_i}$), and that complying with the wishes of peers is very important ($\boldsymbol{m_i}$) leading to a very strong subjective norm towards the use of eLearning.

Perceived behavioural control

Perceived behavioural control (PBC) "refers to the people's perception of the ease or difficulty of performing the behaviour of interest" (Ajzen, 1991:183). The effects of control on intentions and actions are the strength of TPB over TRA. Perceived behavioural control (Ajzen, 1991; Taylor & Todd, 1995) refers to perceptions of internal and external behavioural constraints where the internal behavioural constraints include the personal skills and knowledge (or individual's self confidence) required to perform the behaviour of interest. The individual's confidence in PBC is similar to self-efficacy in the Social Cognitive Theory that will be discussed at a later stage (Ajzen, 1991; Bandura, 1989). The external behavioural constraints include the resources and opportunities (or facilitation conditions) at the disposal of individuals for engaging in this specific behaviour. PBC is formed by the sum of the control beliefs (c_i) weighted by the perceived facilitation (p_i) of the control belief in either

inhibiting or facilitating the behaviour (Taylor & Todd, 1995:150) as shown in equation 3.4 below:

$$\mathbf{PBC} \alpha \Sigma p_i c_i$$

Equation 3.4: Perceived behavioural control is made up of external behavioural constraints

Where: α stands for proportionality, p_i for perceived facilitation and c_i the sum of the control beliefs.

If individuals feel that they possess the necessary skills to use eLearning (c_i) and that the skills (p_i) they possess are important in using eLearning, then their perceived control of their behaviour towards adoption eLearning would be greater.
From the foregoing then:

$$\mathbf{B = BI_{i1}+PBC_{i2}} \quad \text{.....a}$$

$$\mathbf{BI=A_{i3}+SN_{i4}+PBC_{i5}} \quad \text{.....b}$$

Equation 3.5a and b: TPB is made up of attitude, SN and PBC

In TPB, behaviour is a weighted function of the intentions towards performing behaviour in question (BI) and the perceived behavioural control of the behaviour (PBC); and intention is also a function of the attitude (A), subjective norm (SN) and the perceived behavioural control (PBC), that is "the stronger the intention to engage in a behaviour, the more likely should be its performance ... and behavioural intention can find expression in behaviour only if the behaviour in question is under volitional control" (Ajzen, 1991:181).

In the successful adoption of eLearning (behaviour of interest) scenario using TPB, there has to be the necessary opportunities and resources available to the individual (perceived behavioural control), and further, the individual should have the intentions (behavioural intentions) of adopting eLearning. These intentions are made after the individual's appraisal or evaluation of eLearning opportunities and resources available and the social pressures or expectations.

Morris and Vinkatesh (2000) used TPB to study the chronological age factor of the behaviour towards and intention of using technology. They determined that age is a factor in the adoption of technology, and that the younger the workers are, the more likely they are to adopt technology. Traditionally, universities do not have young professors, partly because of the years required to masters the subject, and partly because of the intrinsic nature of their establishments (Tadmor, 2006). Understandably, this could lead to the slow adoption of eLearning at universities.

In a study on the use, disuse and misuse of expert decision support systems (EDSS), Workman (2005) established that attitudes have a high relation on the misuse of technology. He found a correlation between the length of time a person has been using EDSS and a positive attitude towards it, as well as the perceived control of EDSS. Workman (2005:227) concluded that "subjective norms were found....to lead to increased furtive behaviour." Applied to eLearning adoption, if people have experience in using the eLearning technologies available, then their perceived control of these technologies would be high which would lead to a high likelihood of adopting eLearning.

3.2.2.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) is a derivative of the TRA whose goal "is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations" (Davis *et al.,* 1989:985). TAM is tailored towards modelling user acceptance of IT within organisations (Vishwanath & Goldhaber, 2003) with the aim of creating causal linkages between an individual user's attitudes and perceptions toward the technology and the actual adoption of the technology. TAM in its essence suggests that perceptions of usefulness and ease-of-use can be used to predict behaviour. TAM has an added base of tracking the impact of external factors on internal beliefs, attitudes and intentions. In terms of TAM, behavioural intent determines computer usage. Behavioural intent again is determined by the person's attitude towards using the computer, and its perceived usefulness. Further, attitudes towards using a system are jointly determined by two beliefs: perceived usefulness, and perceived ease of use (Vishwanath & Goldhaber, 2003; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989).

Perceived usefulness

Perceived usefulness (PU) is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989:320). PU is a subjective measure of the effectiveness, efficiency and the relative importance of the system to one's job. That is, for a system to be perceived as useful, the user should believe that it positively affects the user's performance. (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989).

Perceived ease of use

Perceived Ease of Use (PEOU) is "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989:320). Like complexity in the Diffusion of Innovation theory, and perceived behavioural control in the theory of planned behaviour, PEU is a construct that is closely tied to a user's assessment of the effort involved in performing the behaviour of interest (e.g. using eLearning). Users by nature would like to minimise their efforts and therefore PEU has a direct relationship with perceived usefulness (PU). That is, the easier a behaviour is to perform, the less effort needed to perform it, and the more effort can be allocated to performing other behaviours which in turn have an effect on the enhancement of job performance by the behaviour of interest (Venkatesh, 2002; Davis, 1989).

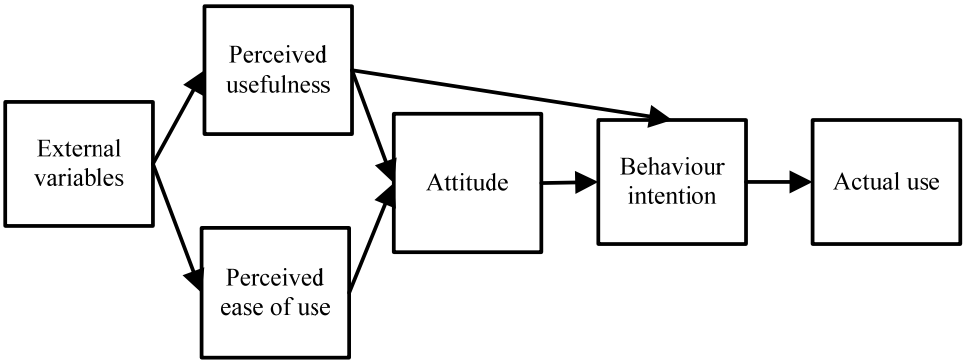


Figure 3.4: Original Technology Acceptance Model
(Source: Al-Gahtani & King, 1999:278)

PU and PEU are related to attitude toward technology and subsequently intention to use and actual use. In what has been termed as TAM2, Venkatesh and Davis (2000) have extended perceived usefulness to variables like experience, subjective norm, image, job relevance, output quality, and result *demonstrability*.

Siritongthaworn, Krairit, Dimmitt, and Paul (2006) did in-depth interviews with university administrators, instructors and students in a study on eLearning implementation in Thailand. Using Technology Acceptance Model (TAM) variables (Davis, 1989), they observed that the main factors that are responsible for eLearning implementation are a) Characteristics of the organisation b) Instructors' perceptions of eLearning and 3) Accessibility to the Internet. The organisation characteristics included eLearning policies and the organisation of the eLearning unit. Instructor perceptions were on benefits, and ease of use.

3.2.2.4 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) model is an integration of the various technology acceptance and use models that has four "core determinants of intention and usage and up to four moderators of key relationships" (Venkatesh, Morris, Hall, & Davis, 2003:425). The four key components of UTAUT are: a) performance expectancy, which measures the degree to which an individual perceives that using the system could help improve his/her performance; b) effort expectancy that measures the degree to which an individual perceives the technology to be easy to use; c) social influence, which measures the degree to which an individual perceives that the persons who s/he cares about feel that she should use the technology; and d) facilitating conditions that measure the degree to which an individual perceives organisational assistance to facilitate his/her use of the technology. The moderators of the key relationships are gender, age, voluntariness, and experience (Venkatesh, Morris, Hall, & Davis, 2003).

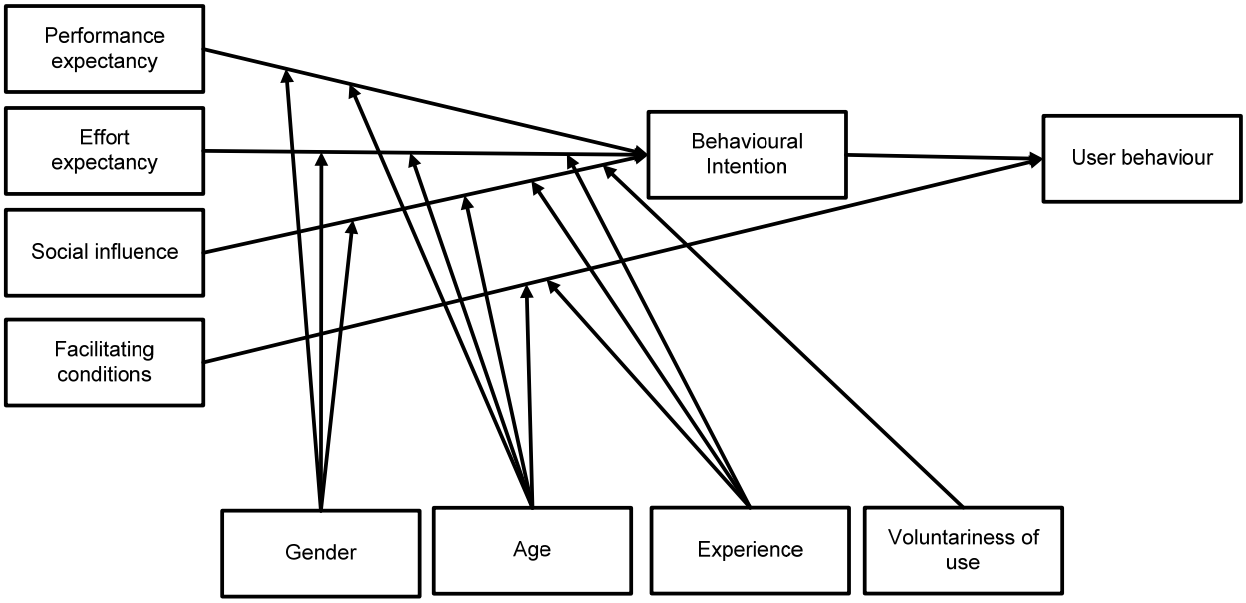


Figure 3.5: The Unified Theory of Acceptance and Use of Technology
(Source: Venkatesh, Morris, Hall, & Davis, 2003:447)

3.2.2.5 Criticism of the behavioural models and theories

Bagozzi (2007:245) in his article *The legacy of the technology acceptance model and a proposal for a paradigm shift* identifies the major shortcomings of TAM (just like TRA and TPB) as:

a) The *two critical* gaps in the framework which arise in the linkages between variables and the concepts that underlie the basic behavioural models. These linkages are the *intention→behaviour* linkage and the *individual reaction→intentions* linkage. The *intention→behaviour* linkage is uncritical because it treats "behaviour as a terminal goal and fail to consider that many actions are taken not so much as ends in and of themselves but rather as means to more fundamental ends or goals" (Bagozzi, 2007:245). Since the need to use a technology to attain a certain objective is neglected, there is no focus on the end-state of the use of the technology which might be factors to its use/adoption/acceptance/rejection. Secondly, the gap between the intention and the action might be too large in terms of time, with many intervening steps and unanticipated obstacles. The models do not address the adjustments required between the process (or path from intention to action). Thirdly, the role of decision makers in the process where they seek to advance the adoption of the required action

without necessarily focusing on the behaviour or required behaviour. Therefore, more could possibly be achieved if these models recognise that intention formation is succeeded by planning and dealing with challenges and obstacles in the steps towards the desired action.

The failure of the *individual reaction→intentions* linkage to recognise the myriad of factors that decision makers put into considerations before they form an intention to act. One such thing is the "compelling motivations for acting on putative reasons for acting" (Bagozzi, 2007:246). While people might perceive something to be useful (PU) they might not have the motivation to act accordingly. In addition, there might be multiple reasons for acting or not acting that together might form a decision to act (see also Sheeran & Silverman, 2003).

b) The absence of a sound theory and method for identifying the determinants of PU and PEU, as well as other bases for decision making. This absence is evidenced in a) the treatment of belief-evaluation pairs in equal importance where there is obscurity in the differential contributions to salient beliefs that might be there; b) failure of a) above to allow for or specify underlying salient beliefs that may exist in human memory; c) failure to account for or represent relationships among the salient beliefs; and d) failure to cater for additive and multiplicative effects with multiple regressions (Bagozzi, 2007).
c) The neglect of group, social, and cultural aspects of decision making. Devolving the individual from the organisation, group, social, and cultural is another criticism. On the social scene, Bagozzi (2007) identifies four key issues that are likely to affect an individual's decision to use a technology *inter alia* social normative influence, social identity, mutual negotiations in the acceptance of technology within a social grouping, and the individual differences within cultures. Wejnert's elaboration of the socio-cultural attributes in the adoption of innovation captures this clearly. These attributes include a) societal entity of the innovators, b) status characteristics c) relative position in social networks, and d) personal characteristics that are associated with cultural variables that modify personality characteristics of actors at a population level (Wejnert, 2002:302). The models' assumption that individuals have total discretion to accept and use a technology especially in situations where the technology has an impact, or is sanctioned or being promoted in their social setups (e.g. group or

organisation) in disregard to the group's or organisational set up is too limiting. While it may be claimed that the social influence of the models capture some of the measures that might be dictated by the organisational aspects, their constructs for the social influence: subjective norm, social factors, and image do not capture organisational variables of adoption, for example availability of expertise within the organisation, its size and structure, level of support for adopters available in an organisation (see section 4.4 and Damanpour and Schneider, 2006 for a discussion on the organisational factors). The study of eLearning adoption in higher education cannot devolve an individual from the organisation for a number of reasons (e.g. the investments and resources required, policy and regulations). Therefore, while these models can be used to study the use and acceptance of a named technology used in eLearning, it would be very difficult for them to capture all the essential factors for a proper and full eLearning initiative in higher education institutions (see also Arvola, *et al.*, 2008; Wejnert, 2002).

d) The reliance on *naïve* and over-simplified notions of affect or emotions. The variables that can influence the use of a technology based on for example, "intrinsic motivation, affect toward use (joy versus sadness emotions), affect (liking for a particular behaviour), and anxiety toward performing a behaviour have been proposed as direct predictors of effort and/or performance expectancies and, therefore, are claimed to be indirect determinants of intentions" (Bagozzi, 2007:248) (see section 3.2.3 on Social Cognitive Theory for more details). This reliance overemphasises rational and cognitive influences on behaviour at the expense of adequately capturing the affective component of many behaviours (Ajzen, 1991).

e) The over dependence on a purely deterministic framework without consideration of self-regulation processes. These models are overly deterministic, where it is hypothesized when an independent variable increases (or decreases), the dependent variable is expected to increase (or decrease) by a value that can be empirically obtained. With this approach, "discovery of nonsignificant empirical relationships, where theoretical connections are hypothesized, represents a failure to sustain the hypotheses." (Bagozzi, 2007:249). Therefore it is important, under some conditions, to include some self-regulating inputs that recognizes that "a decision maker is capable at times of choosing to act in a way that is neither impulsive, compulsive, habitual, coerced, nor bribed, but rather results as an intentional response" (Bagozzi, 2007:250).

A further criticism of these models is their failure to consider the characteristics of the innovation being studied (Venkatesh, 2006). This failure is likely to manifest itself in innovations that, like most innovations, do drastically change the work and life of the adopting individuals and organisations. Taking the example of eLearning (as discussed in Chapter 2), its adoption call for a paradigmatic shift that brings about new challenges. Failure for a model to cater for, and address these challenges by looking at the characteristics of the eLearning, and to a greater extent the changes it will bring about in the teaching and learning process might make it unusable. Emanating from the dominant paradigm in innovations research it could be argued that technology is the innovation under consideration. However, the use of technologies, like the ones used in eLearning, also brings about changes in *processes* and *services*. Consequently, there is a distinction between the adoption and adoption rate of technology products, and adoption and adoption rate of process and services as is postulated in the DOI theory (Rogers, 2003). That is, while people may readily adopt the technologies that can be used in teaching and learning, the actual adoption of the new teaching and learning paradigms that would go hand in hand with the use of these technologies might be slow or lacking.

3.2.3 Social Cognitive Theory (SCT)

Highly attributed to research work by Bandura (1977, 1989), Social Cognitive theory (SCT) focus mainly on the personal efficacy to expend and sustain a coping behaviour in the face of challenges and obstacles. Bandura (1977:191) states that mastery and experience reinforce personal efficacy, and that the expectations of personal efficacy are derived from information obtained through "performance accomplishments, vicarious experience, verbal persuasion, and physiological state". This can be seen as recognition of the prominence of cognitive processes in the acquisition and retention of new behaviour patterns. Since personal behavioural acquisition and retention is a form of learning, it can happen through modelling. Part of the modelling occurs through observation of others performing the action, and is further refined through *self-corrective adjustments* informed by feedback from performance until the expected personal outcome or satisfaction is achieved. The measure of the personal outcome is a consequent of the intervening influences of goal setting and self-evaluative reactions.

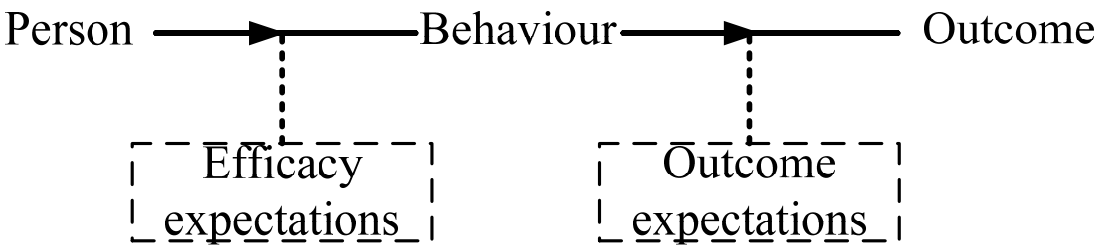


Figure 3.6: Difference between efficacy expectations and outcome expectations
(Source: Bandura, 1977:193)

Figure 3.6 above depicts the difference between efficacy expectations and outcome expectations: One's ability to perform a behaviour of interest leads to his or her setting of goals to achieve the expected performance. The personal judgment of ability to perform behaviour of interest to achieve a certain outcome within the limitations of obstacles defines an individual's self-efficacy which is the core of the SCT. Consequently, SCT posits that individual behaviour is an outcome of the individual's interaction with others in a social context. In this context, behaviours, individual differences, and contextual contingencies mutually influence and affect each other (Bandura, 2000). The strengths of SCT in innovation research rests in the ability to encourage people and creating opportunities for them to have requisite skills and knowledge to confidently use innovations (Bandura, 1989). That is, an individual watching others perform a task influences the individual's perception of his or her self-efficacy, or ability to perform the task (Lewis, Agarwal, & Sambamurthy, 2003).

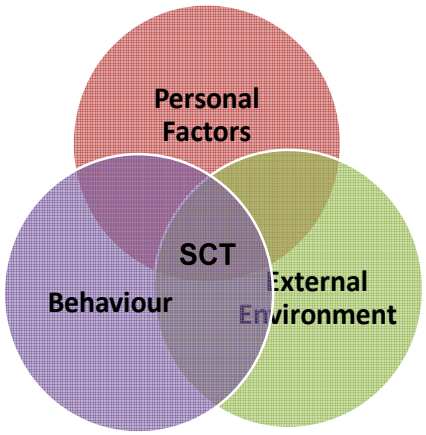


Figure 3.7: Social Cognitive Theory
(Illustration based on Bandura, 1989).

Figure 3.7 shows a diagrammatic conceptualisation of the SCT. The figure clearly depicts that SCT is a convergence of three types of simultaneous interactions, each having an effect on the other. Bandura (1989:1175) refers to the above as a *system of triadic reciprocal causation*. First, the interaction between the person and behaviour involves the influences of a person's thoughts and actions. The second interaction is between the person and the environment and it involves human beliefs and cognitive competencies that are developed and modified by social influences and structures within the environment. The third interaction, between the environment and behaviour, involves a person's behaviour determining the aspects of their environment and in turn their behaviour is modified by that environment (Bandura, 1977, 1989).

Perhaps the main contribution of the SCT in adoption of innovation research is on the self-efficacy of the adopting individual, and the role the social context play in influencing adoption of the innovation. In adoption of innovation terms, a person's behaviour towards an innovation is socially influenced, and is dependent on the person's perceived ability to use the innovation to achieve a preconceived outcome. An individual's self-efficacy beliefs can be seen as a "set of proximal determinants of human motivation, affect, and action" that "operate on action through motivational, cognitive, and affective intervening processes." (Bandura, 1989:1175). That is, the cognitive processes of an individual during the innovation adoption process determine the thought patterns, cognitive controls and anticipation which are jointly affected by the individual's motivation and information-processing operations. The motivational processes determine how an individual perceives and deals with obstacles during the adoption process. Affective processes on the other hand determine the emotional reactions (liking or disliking of a particular behaviour) of the individual in the face of obstacles that in turn affects their motivation (Bandura, 1989).

The motivational, cognitive and affective processes, when influenced by the social environment leads the individual to create and select an environment based on the self-efficacy on one side, and what the individual thinks the society thinks she or he can do on the other side (Bandura, 1989). This marks the complexity of the *system of triadic reciprocal causation*.

In summary, for adoption research, the core construct of this theory have been identified as outcome expectations, performance outcome expectations, personal self-efficacy, and affect or emotional reactions (Biemer & Lyberg, 2003; Lewis, Agarwal, & Sambamurthy, 2003; Venkatesh, *et al.*, 2003; Agarwal & Karahanna, 2000; Compeau & Higgins, 1995; Compeau, Higgins, & Huff, 1999; Bandura, 1977; 1989). In addition, some studies have used the role of society in the determination of adoption behaviour. For example, a study of the behaviour of Australian youths towards the use of WAP services for banking purposes using SCT determined that youths' behaviour is socially influenced especially by models (celebrities). The study suggested that banks could probably benefit if they used modelling (copying and imitating other people's behaviour) in their advertisements (Ratten & Ratten, 2007).

3.2.3.1 Potential shortcomings of the Social Cognitive Theory in adoption of eLearning research

The social cognitive theory's focus on an individual's self-efficacy with disregard to environmental contingencies, for example, access, availability and affordability, can be great limitations for its use in eLearning, especially in Africa. This is because, as described in detail in chapter two, issues of access, availability and even affordability of the technologies and skills required for eLearning in Africa are still unresolved, and dire.

The fact that the self-efficacy measurements' over-rely on self-reports can lead to *social desirability bias* which is the tendency of respondents to give responses that they perceive are favourable among their peers or in their social settings (Ruiz-Moreno, García-Morales, & Llorens-Montes, 2008; Presser & Stinson, 1998; Collopy, 1996).

The lack of full systematization and loose organisation of the Social Cognitive Theory can also be seen as a shortcoming. This is mainly in relation to inherent controversial issues. For example, at what stage and how would one measure Bandura's *triadic reciprocality.* Do individuals interpret the results of their performance and alter their environments and their self-beliefs? Do these alterations and information in turn inform and alter their subsequent performance?

3.2.4 System Dynamic Models/Mathematical Models

The origin of these methods is the need to use computing power to model the complex socio-economic situations where causal (influence) diagrams are reduced/converted/transformed to

mathematical equations that can be programmed in a computer (Wolstenholme, 1999). The models are mainly used in forecasting as an answer to numerous "what if" questions and are very famous in the management science (operations research) discipline.

The mathematical models' usefulness in adoption research, especially in large organisations and in different contexts is in question because data is not always available for the contexts at hand, leading to too many speculative variables or assumptions. The proponents of mathematical models make a critical distinction between diffusion and adoption. Their main concern is diffusion – the spread of an innovation – instead of adoption that deals with influences and characteristics of the innovations and the adopting units (Karshenas & Stoneman, 1992).

3.2.4.1 The Bass Model

Bass (1969:215) developed a consumer goods diffusion model, popularly referred to as the Bass Model, which is a "theory of timing of initial purchase of consumer goods…. and intended to apply to the growth of initial purchases of broad range of distinctive new generic classes of products". Bass develops the theory as it applies to the timing of the adoption after criticizing Rogers' Model as "largely literary" and not "always easy to separate the premises of the theory from the conclusions". The Bass Model has, however, a behavioural rationale that is consistent with the Rogers Model.

The Bass model can be expressed in the following mathematical equation:

$$x(t) /[1 - X(t)] = P + qX(t)$$

Equation 3.6: Bass Model

The Bass Model was presented by Wirsam and Muller (2006) in its simplistic form as:

$$x(t)=dX(t)/dt=p(m-X(t)) + q/mX(t)(m-X(t))$$

Equation 3.7: Simplified Bass Model

Where

d stands for the derivative sign, t is the adoption period; x(*t*) is number of adopters in time *t*; m is the adoption potential; X(*t*) is the number of previous adopters in time *t*; *p* influence on adoption; *q* influence on adoption that is independent of previous adoption

Hence variables *p* and *q* are the innovation and imitation coefficients respectively that are constant in the course of time according to this model. In the equation, **p(m-x(t))** represent adopters whose adoption decision is independent of the influence from others who have adopted an innovation while **q/mX(t)(m-X(t))** represent adopters who have been influenced by earlier adopters of an innovation (Mahajan, Muller, & Bass, 1990).

From the Bass Model it can be deduced that:

a) At any given context, there is a group of people, the innovators, who are ready and willing to explore the innovations even without being influenced by others who adopted the innovation before them. This is clear because at time t=0, the equation **x(t)=pm**.
b) The model does not take into mind the influence of similar innovations that would have occurred previously or simultaneously with the innovation in question.
c) Since the p and q coefficients are given as constants, it would be very difficult or impossible to capture all the variables that influence an adoption decision as just two constants.

The suitability of this approach to the adoption of eLearning in higher education institutions in Africa is negligible, partly because of the speculative nature of the model, lack of enough data and attributes that can be used for the forecasting and its leaning more towards the diffusion aspects than the adoption and use of eLearning.

3.2.5 Concerns-Based Adoption Model (CBAM)

Developed by Hall, Wallace and Dossett in 1973, CBAM is a macro level theory with the goal to study systemic changes in the educational settings by examining the social, political and interpersonal characteristics. It is based on the premise that change is understood when it is expressed in functional terms of what people experience during change (Mills & Ragan, 2000) and the interventions developed to that change. CBAM focuses on the individual, the innovation and the contexts. It is an empirically grounded theoretical model mainly dealing with the implementation of educational innovations of which key components include a)

assumptions about educational change, b) the concepts of Stages of Concern (SoC), c) Levels of Use (Lou), d) Innovation Configurations (IC), e) change facilitator styles, and f) interventions (Anderson, 1997; Giancola, 2001).

Unlike the other models and theories (DOI, TRA, TPB, TAM, UTAUT, and Bass) whose research is variable-oriented, CBAM's key consideration is an examination of the complex interrelation of factors that collectively affect an individual's adoption of innovation in their contexts given their concerns and level of use of the innovation. Consequently, *Innovations Configuration* arises as a result of these complex combinations of variables and ensuing interventions that can be derived from its elaborate diagnostic tools to produce a particular innovation-related outcome (see discussions by Fichman, 2004b and Ragin, 1999).

There are variations to the CBAM model that are tailored towards specific innovations. For example, the Innovation Configuration Matrix (ICM), which is particularly relevant to instructional design innovations within the educational context (Mills & Ragan, 2000).

Educational Change

One of the strengths of CBAM is probably its focus on the people involved in the change process and their individual concerns. The CBAM has its tenets about change summarised in the following five factors:

> (1) Change is a process, not an event; (2) change is accomplished by individuals; (3) change is a highly personal experience; (4) change involves developmental growth in feelings and skills; and (5) change can be facilitated by interventions directed toward the individuals, innovations, and contexts involved. (Anderson, 1997:333)

These five factors are used in the designing, testing, measuring and conceptualising change in individuals using three diagnostic approaches: Stages of Concern (SoC); Levels of Use (Lou); and Innovation Configurations (IC) described below.

Stages of Concern (SoC)

Stages of Concern include the teachers' perceptions, feelings, motivations and frustrations about the innovation. They represent the subjective realities and the ambivalence towards an innovation that the potential adopters have and portray in the various stages (Van den Berg & Ros, 1999; Anderson, 1997). The subjective realities and ambivalence can be influenced by a number of factors, among them the adopter's previous experiences, current contexts,

preferences and styles, legal and financial security and self confidence (Van den Berg & Ros, 1999). The stages of concern are shown in table 3.1 below.

Table 3.1: Teacher's Stages of Concern

Stage	Description
Stage 0: Awareness	Teacher has little knowledge about or interest in the change.
Stage 1: Informational	Teacher is interested in learning more about the innovation and the implications of its implementation.
Stage 2: Personal	Reflects strong anxieties about the teacher's ability to implement the change, the appropriateness of the change, and the personal costs of getting involved.
Stage 3: Management	Teacher begins to experiment with implementation; concerns intensify around the logistics and new behaviours associated with putting the change into practice.
Stage 4: Consequence	Concerns focus predominantly on the impact of the change on students in their classrooms and on the possibilities for modifying the innovation or their use of it to improve its effects.
Stage 5: Collaboration	Reflects teacher interest in working with other teachers in the school to jointly improve the benefits of change implementation for students.
Stage 6: Refocusing	Teacher is thinking about making major modifications in the use of the innovation, or perhaps replacing it with something else.

Adapted from: Anderson (1997) and Van den Berg and Ros (1999)

A comprehensive 35 question Stages of Concern Questionnaire (SoCQ) is used to measure teacher's concern about an innovation. The SoCQ deals with three fundamental concerns: self concerns that relate to soul searching and creating a personal meaning of the innovation (stages 0-3); task concerns that relate to the possible effect of the innovation on one's performance of a task (stage 4); and other or impact concerns that relate to the impacts of innovations on others within the adopters' environment (stages 4-6) (Van den Berg & Ros, 1999).

Levels of Use (LoU)

The LoU focuses on the individual's behaviour. Eight levels of use have been identified including: non-use, orientation, preparation, mechanical use, routine, refinement, integration and renewal. The LoU diagnostic approach is presented in Table 3.2 below.

Table 3.2: Levels of Use

Level of Use	Description
Level 0: Non-use	Little or no knowledge of the project, no involvement with the project, and is, doing nothing toward becoming involved
Level 1: Orientation	Acquires information about the project and explores what it will require
Level 2: Preparation	Prepares for first use of the project
Level 3: Mechanical use	Focuses on day-to-day use of the project with little time for reflection
Level 4A: Routine	Use of the project has stabilized
Level 4B: Refinement	Varies implementation to increase classroom impact
Level 5: Integration	Collaborates with colleagues to achieve a collective impact
Level 6: Renewal	Explores alternatives to or make major modifications to the project

Source: Giancola (2001:370) and Anderson (1997)

The diagnostic approach of LoU entails a Levels of Use Interview with a scoring procedure and a protocol for a brief "branching interview" that focuses on the important decisions and changes that the teachers make in their use of innovation.

Innovation Configurations (IC)

IC is used to identify the patterns of innovations that result due to the fact that teachers implement the innovations differently from each other in their classrooms, that is using the innovation in its operational form (Christou, Eliophotou-Menon, & Philippou, 2004; Anderson S. E., 1997; Newhouse, 2001). IC's strength is that it recognises that users may opt to adopt an innovation, but not as it is, or for the purpose that it was made for, but they might choose to re-invent, customize or adapt the innovation. For example, a teacher's success in using a technology might not be of how to use it as it was designed, but how it has been adapted and fitted to the teacher's context (Mills & Ragan, 2000; Anderson, 1997).

IC is measured using an Innovation Configuration Component Checklist (ICCC) that specifies key behavioural components of a change and the possible variations in the way teachers implement the innovation/change associated with each component. The ICCC consists of statements (components) that define the intended outcome of an innovation that should be observed when the innovation is fully and successfully implemented.

Interventions

Interventions are the blueprints for change that are derived from the CBAM's diagnostic tools. There are a number of relevant interventions: extrinsic incentives (Gandolfo, 1998); addressing faculty grief (Gandolfo, 1998); support for professional development in the form of travel funds (Baldwin, 1998); assistance with technological applications (Baldwin, 1998; Pollard, 2003); presence of an innovation champion (also referred to as opinion leaders) (Pollard, 2003).

3.2.5.1 Discussing CBAM

In CBAM, the success of the adoption of innovation (SA) in the school environment can be expressed in the following equation:

$$\mathbf{SA}=f(\mathbf{SoC},\mathbf{LoU},\mathbf{IC})$$

Equation 3.8: The Concerns-based model

From Equation 3.8 above, it follows that adoption of innovation (SA) is a function (*f*) of three variables measuring dimensions of implementation as it occurs at the individual level, namely stages of concern (SoC), levels of use (LoU) and innovation configurations (IC).

Like the DOI theory (Rogers, 2003), the CBAM in its SoC and LoU presents possible concerns and levels of use that seem to occur chronologically, although they are not necessarily chronological (Anderson, 1997). The level of teacher's adoption of innovation is dependent on a number of factors, among them the "teacher's norms, innovation characteristics, implementation assistance, time and experience with implementation, and administrative pressure and support" (Anderson, 1997).

CBAM boasts of its abilities to bridge the gap between the innovators' culture and the culture of actual practice by paying more attention to the way the stakeholders in the actual practice understand and use the innovation (Van den Berg & Ros, 1999).

3.3 The theory and model of eLearning adoption in HEIs in Africa

All models show the causal linkages between consciously intended antecedents and their effect on the adoption, or use decision. In common, they posit that beliefs and perception have significant influence on the user's intention to act or portray the behaviour in question.

Another major commonality among the models and theories is the social influence or impact on adoption behaviour. Table 3.3 provides a summary of the theories and models. This summary will guide the development of the eLearning adoption model discussed in chapter 4.

Table 3.3: Summary of adoption models and theories

	Rogers Model	TRA	TPB	TAM	UTAUT	Systems Dynamics	Social Cognitive Theory	CBAM
Dominant Environment/ Systems	Varied: Originally used in agricultural innovations. Number of uses in IT/IS	Varied – deals with personal intentions, attitude and the subjective norm	Varied: explaining the measures of attitude, subjective norm and perceived behavioural control;	Technologies that is relatively simple and easy to use e.g. Email, word processors. Limited use in complex systems or contexts.	User acceptance and use of computing technology	Marketing and econometrics Explaining and predicting the diffusion of a product.	Varied – deals with individual behaviour in relation to social context where the behaviour is shaped, and shapes the context	Teachers' use of technology
Adoption volition[15]	Assume users have the choice. Recognises the organisation the user is in	The user	The user	Assumes that users have a choice to the extent they can use or act according to the behaviour of interest.	The user	The social contingencies	Individual and social contingencies	Assumes user has choice. Users have concerns at different stages that need to be addressed
Causal Structures[16]	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Unidirectional	Bidirectional	Bidirectional	Unidirectional
Dominant Discipline	Multidisciplinary (Anthropology, Sociology, Education, Communication,	Social Psychology	Psychology	Information systems, information technology	Information systems, Information technology	Interdisciplinary (Psychology, economics)	Cognitive psychology	Interdisciplinary (Psychology, Education)

15 In adoption volition, we look at the assumption of the model or theory in relation to whether the use of the system or the action towards a behaviour is out of choice or mandatory. Brown *and others* (2002:284) define a voluntary environment "as one in which users perceive the technology adoption or use decision to be wilful choice". Consequently, a mandated environment is "where users perceive use to be organizationally compulsory". Most adoption research has been conducted where the user has a choice. However, in the use of eLearning, as explained on the chapter on eLearning and Higher Education, at times, due to factors e.g. organisational policies, the user does not always have the choice not to use it, irrespective of their attitudes towards it.

16 The causal relationship between the main variables. Unidirectional is where the adoption variables influence the adoption (e.g. the attitudes and the behaviours) while bidirectional is where there is reciprocity on the influence (e.g. adoption variables influence the attitude and behaviour, and the attitude and behaviour in turn influence the adoption variables).

	Marketing and Management, Geography, Economics)							
Summary of scope	Wide: users' decision to adopt or reject an innovation; communication driven; user aggregation and classification	Defines a person's intention to adopt an innovation in terms of subjective norm and attitude.	Defines a person's intention to adopt an innovation in terms of subjective norm, perceived behavioural control and attitude.	Defines a person's intention to adopt an innovation in terms of the innovation's perceived ease of use and perceived usefulness.	An integration of the various technology acceptance and use models that has four core determinants of intention and usage: performance expectancy, effort expectancy, social factors and facilitating conditions	Effects of communication and communication channel (media and interpersonal); and their effect on the adoption rate of a product	SCT posits that individual behaviour is an outcome of the individual's interaction with others in a social context. In this context, behaviours, individual differences, and contextual contingencies mutually influence and affect each other	Has three main diagnostic measures: stages of concerns, levels of use; and innovation configuration that a user goes through during the adoption process
Conceptualisation of adoption	Wide: Involves the characteristics of the innovation; communication channels; time and adopter classification; and the social system	The adopters personal evaluation regarding the performance of a behaviour in terms of the subjective norm and the attitude toward performing the behaviour	The adopters personal evaluation regarding the performance of a behaviour in terms of attitude, subjective norm and the attitude toward performing the behaviour	User's perceptions of an innovation in terms of its usefulness and ease of use.	User evaluation of a technology in terms of performance expectancy, effort expectancy, social factors and facilitating conditions moderated by the user's gender, age, experience and voluntariness to use the technology			User aggregation and classification depending on the stage of concern or level of use.
Orientation in terms either product of process	Products and processes	Products and processes	Products and process	Products: computer applications	Computing systems	Products	Products and process	Products and process
Main factors	Innovation Individual Environment Organisation	Individual Environment	Individual Environment	Individual Innovation	Individual	Individual Environment	Individual Environment	Individual Environment Innovation

Chapter Four: Theoretical and conceptual framework design

4.1 Introduction

A review of the literature on the adoption of innovations (Chapter 3), and the status of eLearning adoption in Higher education in Eastern and Southern Africa (Chapter 2) revealed that there are a number of factors affecting the adoption and adoption levels of innovations, and eLearning in particular. In the initial assessment, it was determined that although a number of higher education institutions have implemented some form of eLearning initiatives, its adoption is still lower than it would be expected given its promises and potential. In the remainder of the chapter, the core elements of this conceptual view of eLearning adoption are explained in detail.

The adoption of eLearning for this study, as discussed in chapter three, is assumed to be the right thing to do. It is therefore important to look at the salient eLearning characteristics, individual characteristics and organisational characteristics as well as the socio-economic environment that have a bearing on the eLearning adoption decision or behaviour that would foster eLearning adoption. Given the numerous number of variables identified in chapter three, this chapter seeks to formulate the most pertinent variables for the adoption of eLearning. The identification of these factors is a culmination of contradictions that the main research question of this thesis seeks to answer: ***What factors influence the adoption of eLearning in Higher Education in Eastern and Southern Africa?*** The contradictions have been brought about by the development in the field of information and communication technologies (ICTs) over the last few years. This development in ICT has led to changes in almost every sector of human life, including teaching and learning. Despite the seemingly high adoption rates of these ICTs, there is still relatively low diffusion of eLearning in HEIs in Eastern and Southern Africa.

Rogers' diffusion of innovation (DOI) theory looks at innovation adoption based on the characteristics of innovation and its attractiveness to potential adopters. Though it was later modified to include a confirmation phase, the earlier version of the DOI theory limited itself to the acquisition of the innovation as the final stage in the adoption process. The earlier version had the phases as *awareness*, *interest*, *evaluation*, *trial*, and *adoption* while the modified one has the phases as *knowledge*, *persuasion*, *decision*, *implementation*, and *confirmation* (Rogers, 2003). Although it might be argued that Rogers' confirmation stage

could involve the aspects of continued use of the innovation after acquisition, this argument does not follow from the processes. Perhaps that would explain why Rogers suggested that non-adoption and rejection of an innovation should also be included in the adoption of innovation studies (Rogers, 2003).

4.2 Factors affecting the adoption of eLearning

Consequently, the role of decision, and indeed the decision making process itself cannot be overemphasised in the light of eLearning. The adoption of eLearning in higher education for this research is deemed to be determined by two sets of decisions, namely: a) decisions made by the higher education institutions, and b) decisions made by individual members within these institutions. In this research the decisions individuals and organisations make are contextually mitigated by the conceptualization of eLearning, individual adopters' characteristics, the characteristics of the HEIs and the social, system and environmental situation they are in[17]. Each of these factors has different attributes that affect the adoption decision either positively or negatively as is depicted in Figure 4.1 below. Additionally, Figure 4.1 shows a series of possible outcomes of an adoption decision or behaviour.

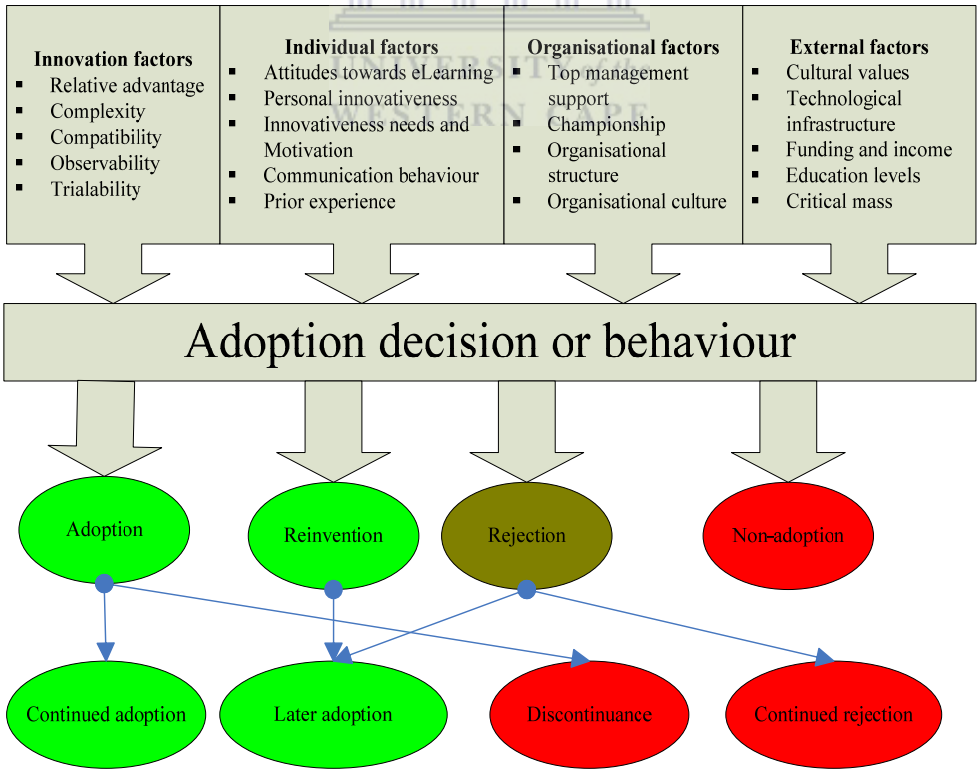


Figure.4.1: Conceptual view of the adoption of eLearning

[17] As discussed in section 2.3: Contextualising Higher education in Eastern and Southern Africa.

4.2.1 ELearning adoption factors

Although eLearning has great potential and promises, for a successful adoption of eLearning these promises and potential must be seen, and be of relevance to the *adoption decision making unit* – both at the organisational and individual levels. The perceived promises and potentials of eLearning include among others, the economic incentives that surpass the alternatives available of distance education[18] and traditional classrooms[19]. The perceived net benefit of eLearning has an important effect on the organisational adoption. Innovation factors are independent variables that act as "predictors of both individual and organizational adoption of innovations" (Jeyaraj, Rottman, & Lacity, 2006:1). Theories to study the diffusion and adoption of innovations have used different innovation characteristics. The Technology Acceptance Model uses the constructs of Perceived Ease of Use (PEOU), and the Perceived Usefulness (PU) (Davis, 1989). The Diffusion of Innovation Theory uses the relative advantage, complexity, compatibility, observability and trialability (Rogers, 2003). However, a closer look at the 5 innovation characteristics of Rogers shows that each of them could be classified either as PEOU or PU (see chapter 3 for a full review).

4.2.1.1 Relative advantage of eLearning

Relative advantage is the clear and unambiguous benefits of reliability, effectiveness or cost-effectiveness that can be derived from an innovation that are determined by the potential adopter and not the makers of the innovation (Berkun, 2007; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 2003). The relative advantage can be seen from a number of angles: economic (e.g. cost-effectiveness and profitability), social advantages (e.g. fashion, class and prestige), ease of use, convenience, satisfaction, and reliability (Rogers, 2003; Meyer, Johnson, & Ethington, 1997). Using this premise, it follows that if an innovation has no relative advantage to the potential adopter, it will not be considered.

Interestingly, even where the relative advantage of innovations are apparent, their adoption take a lengthy period of negotiations among the potential adopters since the adopters are not simply passive 'adopters' or passive receptors of any innovation (Fitzgerald, Ferlie, Wood, & Hawkins, 2002). These negotiations can have either a positive or a negative influence on the

[18] A situation where the learner and the educator are separated by time or space or both.
[19] Sometimes referred to as brick and mortar as a symbolism of the architecture of the face to face teaching venues. It is a form of teaching where the educator and the student share the same space at the same time.

adoption decision. For instance, Berkun (2007) presents a case where the best or the potentially beneficial innovation is not always adopted because of among other things, its relative advantage being only understood and seen by the innovators and not the adopting units. Indeed, eLearning specialists and champions get excited about the technical capabilities of the eLearning systems and all their benefits. Unfortunately, as long as these benefits are not seen by the users it always leads to the rejection and non-use of the eLearning systems (Njenga & Fourie, 2010).

For eLearning to be adopted, its relative advantage should be visible to the potential adopters (not innovators). For this study, the relative advantage of eLearning is perceived or ought to be perceived by the educators in a number of ways, amongst others economic, prestige, and quality improvement. The economic perception can be in relation to the cost in terms of time of learning material preparation, learning new technologies, new pedagogies, and the increased cost of media production compared to cost savings in time and space delivery (flexibility and location). The prestige perception arises where the use of eLearning is seen, among peers, as a status symbol and a portrayal of good image. The quality improvement perception arises where eLearning is perceived to be better or superior in its delivery of learning compared to other modes. For the professors to adopt eLearning, based on its relative advantage, the perceived cost of eLearning should be lower than its perceived benefits.

4.2.1.2 Complexity of eLearning

The complexity of eLearning can be measured with, among others, the amount of learning required to use it once the educators are aware of it. Educators need to learn a whole new "eLearning pedagogy", as well as the new technology or eLearning platform. A number of complexities have been identified that might hinder the adoption of eLearning:

1) The new way of learning requires a mastery of not only the technology tools and systems but also the jargon that comes with them.
2) ELearning adds some complexity through the number of different competencies, as well as the level of expertise required.
3) The level and kind of learner support processes, assessment and evaluation (Macpherson, Homan, & Wilkinson, 2005).

However, if the learning of a new innovation could be broken down into manageable chunks that could be learnt incrementally, it could reduce the perceived conceptual gap in its complexity.

4.2.1.3 Compatibility of eLearning

Compatibility is the degree to which an innovation is perceived as being consistent with existing values, past experience (norms), habits, values and lifestyle and perceived needs of adopters. Innovations with a high compatibility are more readily adopted. If the cost of incompatibility is higher than the relative advantage, most people are unlikely to adopt it (Berkun, 2007; Rogers, 2003). The compatibility of eLearning in higher education can be measured by the effort required to transform the traditional modes of teaching into electronic modes, as well as the systems and structures that need to be transformed. In terms of structures, higher education structures are not always compatible. The changing norms and the challenges brought about by the eLearning innovations, for example, the transformation of a professor from a teacher to a facilitator are not easily accepted (Pond, 2002a; 2002b). In addition, most higher education institutions are more accustomed to the brick and mortar approach of teaching and any efforts to change the *status quo* could be met by major resistance.

4.2.1.4 Observability of eLearning

Observability refers to the observable benefits or positive results of an innovation. If the benefits or potential benefits of an innovation are visible to the intended adopters, the innovation will be adopted more easily (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 2003). Initiatives should therefore be undertaken to make the benefits of innovations visible in order to increase the likelihood of their adoption. However, most technological products have limited observability (Berkun, 2007).

ELearning benefits, like many other information systems and educational initiatives, have limited visibility unlike say fashions fads or trendy mobile phones that people use socially (Berkun, 2007). This lack of observability might adversely affect the educators' adoption decisions. A number of interventions are needed to allow for some observability. For instance, the promoters of eLearning could use examples of eLearning initiatives taking place elsewhere to show the potential adopters some of the major results of eLearning.

4.2.1.5 Trialability of eLearning

Innovations that potential users can experiment on are adopted and assimilated more easily. The easier an innovation is to try, the higher the likelihood of its adoption (Rogers, 2003; Berkun, 2007). Indeed, most innovators use the ideas of 'free samples' or 'trial versions' as give-aways to intended adopters to experiment with. While this approach is feasible for tangible products, it is very difficult to capture it in service-oriented and specialised innovations like eLearning. In addition, the number of technologies required to produce a meaningful eLearning try-out might be too many and from too many different innovators, making it difficult to offer it to the educators as 'free samples' or 'trial versions'.

Furthermore, professors at higher education institutions in Africa do not always have access to eLearning technology to try it (see also Chapter 2). However, a number of opportunities can be opened where "pilot" or "tryout" courses can be run. Institutional drive in the provision of these opportunities is therefore very important (Agarwal & Karahanna, 2000).

4.2.2 Individual factors and characteristics

Adoption of eLearning at the individual level is dependent on the individual, the individual's use of eLearning and the individual's needs to use eLearning on the premise that individuals adopting eLearning are not passive recipients. The individual is involved in an engagement with eLearning before they make a decision to adopt it (see section 3.2). Innovation adoption theories and models have explored how an individual's attitude towards an innovation, personal innovativeness, innovativeness need or motivation to use an innovation, cognitive absorption, self-efficacy, communication behaviour, and their prior knowledge with similar innovations affect the adoption decision (section 3.2.3). In the following paragraphs these factors will be discussed in detail with the eventual aim of generating research propositions (abbreviated as **P**s) to empirically test the factors.

4.2.2.1 Attitudes toward an innovation

Deeply rooted in the behavioural models of adoption (see chapter three's Theory of Planned Behaviour and the Theory of Reasoned Action), attitude towards a behaviour is defined as "the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question" (Ajzen, 1991:188). TRA and TPB assert that an individual simultaneously and automatically acquire an attitude towards behaviour through the evaluation of the desirability of the consequences of the behaviour and the strength of each

salient belief about the object of the attitude (Fishbein & Ajzen, 1975; Ajzen, 1991). Other factors that can be studied together with behavioural models are the absorptive capacity and the self-efficacy. Absorptive capacity has been defined as an individual's receptivity and capability to value, assimilate, and apply new knowledge (Cohen & Levinthal, 1990) while self-efficacy is an individual's judgment of the his or her own capabilities for performing a specific task or attaining a particular outcome (Bandura, 1989).

For the successful adoption of eLearning (which is in this case the behaviour of interest) according to behavioural theories, there has to be the necessary opportunities and resources available to the individual, and further, the individual should have the (behavioural) intention of adopting eLearning. This intention is formed after the individual's appraisal or evaluation of eLearning opportunities and resources available and the social pressures or expectations (section 3.2.2).

P1: An individual's attitude towards the eLearning adoption will have a significant influence on its adoption. Where that attitude towards eLearning adoption decision is positive, there will be a positive influence and where the attitude is negative, there will be a negative influence.

Measuring an individual's attitude toward a behaviour may require questions that enquire about the extent to which the individual thinks or believes that portraying that behaviour is important. In this regard, there is a need to know if the individual perceives eLearning as something that is good, wise, likeable or pleasing for them by asking questions like:

Overall, using eLearning for teaching and learning is a
1. …. good idea.
2. …. foolish idea
3. …. Something I don't like.
4. …. Something I find very pleasing

Box 4.1: Questions for testing an individual's overall attitude towards eLearning
(Adapted from Morris & Venkatesh, 2000)

The questions in Box 4.1 alone cannot clearly depict or elicit an individual's attitude towards eLearning, as an individual's attitude could be mediated by, amongst other factors, the individual's perception of ease of use of eLearning, perceived relative advantage, compatibility with the *status quo*, availability of the eLearning tools for experimentation,

eLearning results demonstrability, personal self-efficacy, and perceived complexity of eLearning (Rogers, 2003; Vishwanath & Goldhaber, 2003; Agarwal & Karahanna, 2000; Bandura, 1989).

P1a. An individual's perception of the ease of use of eLearning will have a significant positive influence on its adoption.

1. I would find using eLearning for teaching and learning easy.
2. I would find eLearning for teaching and learning clear and understandable to me and to my students.
3. I would find it is easy to gain knowledge in the use of eLearning.
4. Overall, eLearning for teaching and learning would be easy for me.

Box 4.2: Measure of the individual's perception of ease of use of eLearning
(Adapted from: Davis, 1989)

P1b. An individual's perceptions of the relative advantage in using eLearning for teaching and learning will have a positive significant influence on the adoption decision.

1. Using the eLearning would enable me to accomplish teaching and learning more efficiently than using traditional classrooms.
2. Using eLearning would enhance my effectiveness in teaching and learning.
3. I would find eLearning useful.
4. Overall, eLearning is advantageous.

Box 4.3: Measure of the individual's perception of relative advantage of using eLearning
(Adapted from: Liao & Lu, 2008)

P1c. An individual's perception of the compatibility of eLearning with the traditional teaching and learning methods will have positive and significant effects on its adoption.

1. Using eLearning is not compatible with any course or kind of students I teach.
2. eLearning does not fit in with the way I like teaching.
3. It is more convenient to use other forms of teaching and learning (e.g. traditional classroom) than eLearning

Box 4.4: Measure of the individual's perception of the compatibility of eLearning
(Adapted from: Liao & Lu, 2008)

P1d. The extent to which eLearning tools and technologies are availed to an individual for experimentation will have a significant impact on the individual's decision to adopt eLearning.

1. There are resources available for me to test and experiment with eLearning for teaching and learning.
2. If I needed help on an issue with eLearning, I know who to contact.

Box 4.5: Measure of the availability of the experimentation experience
(Adapted from Agarwal & Karahanna, 2000)

P1e. The extent to which the results of using eLearning are demonstrable to the potential adopter, will positively influence the potential adopter's decision on eLearning.

1. I have seen lecturers use eLearning for their courses.
2. I have seen lecturers use eLearning for courses similar to what I teach.
3. I think being seen using eLearning is good for my image.
4. I have seen courses delivered on eLearning.

Box 4.6: Measure of the demonstrability of eLearning results
(Adapted from Vishwanath & Goldhaber, 2003)

P1f. High self-efficacy in the use of eLearning tools and technologies will have a positive influence on the adoption of eLearning.

1. I could use eLearning if there was no one around to tell me what to do.
2. I could use eLearning if I had only the internet to check for help on how to use it.
3. I could use eLearning if I had seen someone else using it before.
4. I could use eLearning if I could call someone for help if I got stuck.
5. I could use eLearning if someone else had helped me get started.
6. I could use eLearning if I had a lot of time to complete an eLearning course.
7. I could use eLearning if there is someone to show me how to do it first.

Box 4.7: Measure of the individual's self-efficacy in using eLearning
(Adapted from Agarwal & Karahanna, 2000)

P1g. The extent to which eLearning is perceived to be complex by its potential adopters will negatively influence the potential adopters' decision to adopt eLearning.

1. I believe that eLearning is a cumbersome mode of teaching to use.
2. Learning to use eLearning will not be easy for me.

3. Using eLearning will be a frustrating experience. 4. It will not be easy for me to use eLearning for teaching and learning. 5. Overall, I believe that eLearning is not easy to use.

Box 4.8: Measure of the individual's perception complexity of eLearning
(Adapted from Vishwanath & Goldhaber, 2003)

4.2.2.2 Personal innovativeness

Innovativeness refers to the degree to which adopting units are willing to use new concepts, ideas, products, or services (innovations) and their awareness of the potential of these innovations. In adoption research, innovativeness is defined according to the time of adoption (Rogers, 2003) with the assumption that it is a personality trait that can be measured (Midgley & Dowling, 1978) and that it is affected by the person's characteristics and the social system within which the person exists (Anderson, De Dreu, & Nijstad, 2004). Using this approach, the studies have segmented the target population as innovators, early adopters, early majority, late majority and laggards (Rogers, 2003).

Midgley and Dowling (1978:235) defined innate innovativeness as "the degree to which an individual makes innovation decisions independently of the communicated experience of others". Communicated experience refers to information transmitted between consumers and is generally based on actual experience with the new product (Midgley & Dowling, 1978). Midgley and Dowling (1993:612) further redefine innovativeness in 'contingency models' to include the dependency on the individual's interests in the innovation. Although the later definition allows for "operationalisation" of the innovativeness measures as a break from the former self-report bias, this study opts to use the earlier definition for the following reasons:

- eLearning innovation in higher education is special in that it has both the products and the process of innovation that need to be taken care of, and which are not specific to any other product or processes. In other words, the personality trait measure allows the appraisal of innovativeness that is not "product" dependent (Hurt, Joseph, & Cook, 1977);
- In congruence with the other constructs in the study, it enables the research to use a self-report tool, rather than deal with a potential adopter's historical data on new products that might not necessarily predict the personal traits that affects his/her decision to use eLearning; and finally

- Since the tools are custom made for eLearning adoption the researcher can be able to model or predict eLearning adoption independent of other products or processes that might not directly influence or show personal characteristics pertinent to the use of eLearning.

P2: Personal innovativeness will have a positive influence on the decision to adopt eLearning.

1. If I hear about a new information technology for teaching and learning, I would look for ways to experiment with it.
2. In general, I am hesitant to try out new information technologies for teaching and learning.
3. Among my peers, I am usually the first to try out new information technologies for teaching and learning.
4. I like to experiment with new information technologies for teaching and learning.
5. When it comes to deciding whether to use new teaching and learning methodologies, I don't rely on experienced colleagues.
6. I decide to use new teaching and learning technologies without relying on the opinions of colleagues who have been using them.
7. I do not rely on colleagues for information about new teaching and learning technologies prior to making up my mind about whether or not to use them in my class.
8. My peers often ask me for advice or information on using eLearning.
9. I am aware that I am usually one of the last persons in my department to accept new things.
10. I tend to feel that the old ways of teaching and learning is the best.
11. I am challenged by unanswered questions regarding eLearning [technology].

Box 4.9: Measure of personal innovativeness on the decision to adopt eLearning
(Source: Agarwal & Karahanna, 2000; Manning, Bearden, & Madden, 1995; Hurt, Joseph, & Cook, 1977)

4.2.2.3 Innovativeness needs or personal motivation

Personal motivation or Innovativeness needs have been known to influence peoples' decision making process (Lin, 2003). The need for a person to innovate, or adopt an innovation creates a personal motivation that defines the relevance of an innovation and hence a demand for its adoption (Getz, Siegfried, & Anderson, 1997). Motivation has been defined "as purposeful behaviour that is ultimately directed toward the fundamental goal of inclusive fitness" (Bernard, Mills, Swenson, & Walsh, 2005:129). A difference is made between intrinsic motivation and extrinsic motivation. While intrinsic motivation has been defined as "performing an activity for its own sake because of the satisfaction it provides" (Meyera & Evans, 2005:247), extrinsic motivation is instilled through an external reward system or by

use of incentives or performing behaviour with the expectation of achieving a goal (Venkatesh, 1999).

Some behavioural theorists have posited that when external and artificial rewards or incentives are used to reinforce intrinsically motivated behaviour, there will be a "reduction of self-motivated behaviour and an increased dependency upon the continuation of the external reward" (Meyera & Evans, 2005). That is, if there are people within the higher education institutions who are intrinsically motivated to use eLearning, organisational incentives towards its use can influence eLearning adoption decisions. However, care should be taken when using external rewards and sanctions as they might undermine intrinsic motivation and hence negatively influence adoption especially where there seems to be conflict between the needs of the organisation's management and those of the educators (Teichler, 2006). In addition, in the context of eLearning adoption in higher education, intrinsic motivation cannot be equated to (or be part of) the extrinsic rewards, but is a major prerequisite or antecedent of an extrinsic motivation or reward (Dermer, 1975).

P3a: The individual's personal satisfaction or gratification with regard to eLearning use will have a positive influence on the individual's eLearning adoption decision.

P3b: The individual's personal outcome expectations with regard to using eLearning will have a positive and significant influence on the individual's eLearning adoption decision.

Intrinsic needs and motivation

1. I would like to use eLearning even if it is challenging.
2. I would like to learn as much as I can about eLearning.
3. I would like to use eLearning even for subject areas where others think it would be inappropriate.
4. I would do extra work on eLearning as long as I am interested.
5. I would go out of my way to find out more about eLearning.
6. I would work really hard to make eLearning a success story for me.

Extrinsic motivation

1. I would use eLearning if there is some form of reward or incentive from the university.
2. I would use eLearning if it is mandatory for a course that I am teaching.
3. I would use eLearning only if am required to.
4. I would like the university to take me for a course on using eLearning before I start using it.
5. I would like to see the university purchase the necessary infrastructure for eLearning before I start using it.

Box 4.10: Measure of the individual's perceived innovativeness need
(Adapted from: Lepper, Corpus, & Iyengar, 2005)

4.2.2.4 Communication behaviour

The decision to adopt and the rate of adoption are influenced by the kind of information about the innovation, and how it is communicated within the social system (Rogers, 2003). The factors that mediate communication processes during transmission and absorption of information between members within the society form variables of the adoption research (Wejnert, 2002) and they have been categorised as either a source or a mode of communication (Rogers, 2003). Communication and its effect on the adoption process has been studied through elements like the role of interpersonal communication, communication within professional and social networks, social density, and the role and type of media (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Jones, Watson, Gardner, & Gallois, 2004; Lin, 2003; Rogers, 2003; Wejnert, 2002).

Interpersonal communications, including nonverbal observations are generally considered to be the most influential, especially in the adoption of complex innovations and where the perceived risk of the innovation is high (Lee, Lee, & Schumann, 2002; Midgley & Dowling, 1993; Mahajan, Muller, & Bass, 1990;). Rogers (2003) distinguishes between homophilous (see also Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004) groups and heterophilous groups in the use of interpersonal communication. While homophilous groups refer to individuals who are "similar in certain attributes, such as beliefs, education, social status, and the like" or individuals with similar interests, heterophilous refer to members of different sectors, who are more likely to be dissimilar, even in their interests. He contends that interpersonal communication is more effective in homophilous groups. Rogers (2003) argued that the diffusion of innovation requires some level of heterophily, that is dissimilar in attributes. In this study, the assumption takes the idea of the homophilous definition because the research subjects are academics in higher education whose mandate is almost similar – to teach and to do research. The heterophilous nature of the research comes in the differences in knowledge and interests in eLearning.

Interpersonal communication thrive where there is deeply rooted confidence and a sense of camaraderie. However, it is homophilous opinion leadership within interpersonal communication that makes the adoption decision more tenable within the homophilous group. In adoption research, opinion leaders are recognised as innovative and knowledgeable, and other people within the social group tend to follow their footsteps, forming the championship

or change agency required for innovation adoption (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 2003;). The opinion leadership creates an environment of respect for, and interest in others, and an ability to recognize others' feelings (Lin, 2003; Pollard, 2003; Fitzgerald, Ferlie, Wood, & Hawkins, 2002). Through this approach, trust follows more naturally, as do a sense of vision, purpose, genuine interest, and social symbolic meaning, and interest towards the adoption of the innovation at hand, which ideally would drive the public opinion towards the eLearning adoption (Lippert & Davis, 2006; Hausman, Johnston, & Oyedele, 2005).

P4a: Interpersonal communication about eLearning will lead to higher adoption rates of eLearning.

P4b: An individual's exposure to others engaging in eLearning within higher education will have a positive influence on the individual's adoption decision.

1. I would like to collaborate with colleagues using eLearning in my unit.
2. Colleagues using eLearning make an effort to collaborate with me.
3. I make an effort to collaborate with colleagues at my university using eLearning.
4. My colleague(s) and I regularly share ideas on eLearning.
5. My university's administrators encourage the use of eLearning through collaboration.

Box 4.11: Measure of communication behaviour of the target audience
(Adapted from: Mohr & Spekman, 1994)

4.2.2.5 Prior experience

Change theorists and researchers have posited that prior experience influence an individual's resistance to change (Lippert & Davis, 2006). This previous experience can be seen as a result of an individual's interaction with the change proponents, or the innovation (or similar innovations) being introduced (Lippert & Davis, 2006). Likewise, in the adoption of innovations, prior experience has been found to have a relative significant influence on the determinants of adoption of new innovations (Taylor & Todd, 1995; Fishbein & Ajzen, 1975).

Most lecturers in higher education in Africa have prior experience in teaching and learning modes, other than eLearning. These experiences are likely to affect their adoption of eLearning as it requires them to change the way they teach, as well as their roles in the

teaching and learning process. Similarly, a positive or negative experience of the use of technology in education will have an influence on the adoption of eLearning.

P5: An individual's prior experience with teaching and learning technologies will have a significant effect on the individual's eLearning adoption decision: where the prior experience was good or satisfactory the influence will be positive; where the prior experience was bad or unsatisfactory the influence on the adoption of eLearning will be negative.

1. I would use eLearning if the students that I teach are not on campus on a regular basis
2. I would use eLearning if it does not interfere or change the way I teach my students

Box 4.12: Measure of the individual's prior experience
(Adapted from Taylor & Todd, 1995)

4.2.3 Organisational factors

Adoption of corporate innovations by individuals happens within an organisational context (section 3.2.1) as is also the case with eLearning in the higher education environment. For eLearning adoption in higher education a number of resources need to be pulled together. Innovation adoption theories, particularly the DOI, have shown that there are a number of factors within the organisations that mitigate or hinder adoption of innovations. These factors include top management support, availability of champions and championship behaviours, organisational structure, and organisational culture (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Pollard, 2003; Gallivan, 2001).

4.2.3.1 Top management support

Marketing, Information Systems, and innovation research has consistently concluded that top management commitment have significant influence on the adoption of an innovation within an organisation (Leseure, Bauer, Birdi, Neely, & Denyer, 2004; Swanson & Ramiller, 2004; Sharma & Rai, 2003; Gallivan, 2001). Doubtlessly, top management within organisations act as linkages between individuals and the innovation, and it is also one of the best predictors of continued use of an innovation (Jeyaraj, Rottman, & Lacity, 2006) because a culture that supports repeated innovation and innovation adoption is created. Moreover, where an innovation aligns itself with the goals of management, and management is frequently involved and consulted, the innovation is more likely to be adopted (Greenhalgh, Robert,

Macfarlane, Bate, & Kyriakidou, 2004; Pollard, 2003; Gallivan, 2001). In fact, Pollard (2003) found that a lack of management support could be generalised to indicate the non-adoption of an organisational innovation. However, when there are strong and clearly communicated messages by management supporting the adoption of an innovation, the adoption rate is likely to be higher (Gallivan, 2001).

Congruent to findings of the numerous studies mentioned above, it is anticipated that the support of senior and middle management in higher education institutions will have a significant impact on the adoption of eLearning. It is higher education management that need to appropriate the necessary resources, and create a policy or a vision for eLearning, and at the same time drive the policy to realise the vision. A perceived lack of managerial support is likely to significantly hinder the adoption of eLearning by faculty members.

P6: Top management's favourable attitude towards eLearning will positively influence the adoption of eLearning.

1. The University is committed to a vision of using eLearning in teaching and learning.
2. The University is committed to supporting my efforts in using eLearning for teaching.
3. The University strongly encourages the use of eLearning in teaching and learning.
4. The University will recognize my efforts in using eLearning in teaching and learning.
5. The use of eLearning in teaching and learning is important to the University.
6. My department is committed to a vision of using eLearning in teaching and learning.
7. My department is committed to supporting my efforts in using eLearning in teaching and learning.
8. My department strongly encourages the use of eLearning in its courses.
9. My department will recognize my efforts in using eLearning in teaching and learning.
10. The use of eLearning in teaching and learning is important to my Department.

Box 4.13: Measure of the top management's commitment to eLearning
(Source: Lewis, Agarwal, & Sambamurthy, 2003)

4.2.3.2 Championship

A champion has been defined as a person within an organisation who "emerges informally" and is actively and enthusiastically involved in the process of adoption of innovations within the organisation (Howell & Higgins, 1990). Through the use of informal networks within the organisation, the champion steers the organisational adoption of innovation by overcoming the indifference and resistance that the innovations may provoke (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Howell & Boies, 2004; Rogers, 2003; Howell & Shea, 2001; Markham, 1998; Shane, 1995; Lawless & Price, 1992; Howell & Higgins, 1990).

Indeed, champions have been described as having personal commitment to the innovation that creates an environment to "willingly risk their position and reputation to ensure its success" (Howell & Boies, 2004:124). Shane (1995) identified four different roles of champions for organisational innovations as summarised by Greenhalgh and others (2004:585):

- the organisational maverick, who gives the innovators autonomy from the organisation's rules, procedures, and systems so they can establish creative solutions to existing problems;
- the transformational leader, who harnesses support from other members of the organisation;
- the organisational buffer, who creates a loose monitoring system to ensure that innovators properly use the organisation's resources while still allowing them to act creatively; and
- the network facilitator, who develops cross-functional coalitions within the organisation.

The presence of an eLearning champion within a unit or the higher education institution is likely to have a significant influence on the adoption of eLearning. Of particular interest is the relationship between the champion and the target adopters. In addition, if the champion's position is high up in the management of the unit or institution and the champion has strategic influence, it is likely to have a positive significant influence on eLearning adoption. Further, if the champion is a member of, or creates, a peer network or working team that advocates the use of eLearning, these networks and teams are likely to have a significant positive influence on the adoption of eLearning (See the section on *Organisational culture* below).

P7: The availability of eLearning champions in higher education institutions will have a significant positive influence on the adoption of eLearning.

Do you know a person in your university who
1. ….is currently advocating for eLearning use?
2. ….expresses strong convictions about eLearning?
3. ….shows optimism about the success of the innovation?
4. ….does not give up when others say eLearning cannot be done?

If yes to any of the above questions: Does that person
1. …refers problems on eLearning to those who can solve them?
2. …gets the right people involved in eLearning issues?
3. …gets key decision makers involved in eLearning issues?

Box 4.14: Measure of the availability of an eLearning champion in an organisation
(Source: Howell & Higgins, 1990)

4.2.3.3 Organisational structure

Organisational innovation adoption researchers are presented with a structural dilemma "that makes the combination of creative and innovative organization extremely difficult to obtain" (Sapolsky, 1967: 497). Certainly, "factors that increase the probability that organizational participants will devise and present innovation proposals are precisely those factors that decrease the probability that the organization will adopt the proposals" (Sapolsky, 1967:497). This dilemma creates a conflict between an organisation's direction towards adoption of innovation and its structure. To solve this conflict, Sapolsky (1967:509) suggested elaborate models to measure "the rates of innovation presentation and adoption". While these suggestions were made more than 30 years ago, the dilemma and the conflict still linger. Research on organisational structures and innovation are still dominating the research agenda without a clear answer to the dilemma.

Research on the influence of organisational structure on the adoption of innovation has focused on *size, centralisation, formalisation, complexity, matrix principles, communication and stratification, and management hierarchy*.

Organisational size

Although still inconclusive, organisational size has been shown to have some influence on the adoption of innovation (Lee & Xia, 2006). Researchers have theorised the organisational size phenomenon in relation to innovation adoption in a number of ways:

1) The organisations' ability to absorb risk. Due to the size of their budgets, larger organisations are more likely to adopt an innovation because the budget for the innovation could be hedged from other budget areas within the organisation to absorb the risk should the innovation fail (Sharma & Rai, 2003; Flanagin, 2000).
2) The size of the organisation in terms of employees or potential adopters. A larger number of employees creates a 'critical mass' which justifies the acquisition of certain innovations (Kimberly & Evanisko, 1981).
3) Some innovations are necessitated by the size of the organisations due to the increased sophistication of rationalising and coordinating organisational activities, for example administrative innovations (Kimberly & Evanisko, 1981).

A number of measures have been used on the size of the organisations ranging from the number of employees, the market share and the organisational budget. The size of HE

institutions, if defined by their population comprising of both students and staff, could qualify them as large organisations. Alternatively, the budgets of HEIs could be an indication of their size. Therefore, in HEIs all three theories on size are applicable, but for eLearning, unless there is coordination of the various systems being used, the size in higher education could not be used as a differentiating factor for this research.

P8: The size of the higher education institution will positively influence its decision to adopt eLearning

Secondary data will be used to determine the relationship between the size of a higher educational institution and the adoption of eLearning. Such data include published enrolment numbers and number of staff members.

Centralisation

Centralisation is the degree to which decision making is dominated by a single actor or unit (usually at the top) or distributed within the organisation (Adams, Bessant, & Phelps, 2006; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Ahuja, 2000). The over-concentration of decision making authority at the top stifles the development of innovative solutions, (Damanpour, 1991), while decentralisation serves to enhance the required behaviour (Howell & Higgins, 1990) and hence facilitate innovation by increasing organisational members' awareness, commitment, and involvement (Damanpour, 1991; Pierce & Delbecq, 1977).

There are concerns that centralisation in HEIs in Africa makes them unresponsive to changes in knowledge, labour market and economic development (Bloom, Canning, & Chan, 2006). Encouraging decentralisation in HEIs is therefore likely to have a more significant positive influence on the adoption of eLearning than in centralised HEIs. That is, where individuals or units within organisations are independent in the eLearning decision and the choice of technology, there will be a greater adoption of eLearning.

P9: Concentration of decision making in higher education will have a negative influence on the adoption of eLearning.

To what extent are the…
1. Technology, policy and strategy decision towards the use of eLearning is centralised at your university;
2. Capital budget decisions, selection and financing of long-term investments on eLearning technology, training, and development centralised;
3. Long-term strategies (growth diversification, etc.) and decisions related to changes in the use of eLearning, centralised at your University.

Box 4.15: Measure of centralisation of decision making
(Adapted from Miller, 1987)

Formalisation

Formalisation is "the degree of emphasis on following rules and procedures in role performance" (Adams, Bessant, & Phelps, 2006:33), which is evidenced by a "well-developed policies-and-procedures manual [that] ensures uniformity of service and adherence to a structured protocol" across the organisation (Meyer, Johnson, & Ethington, 1997). Flexibility and low emphasis on work rules facilitate innovation (Damanpour, 1991), as it permits openness, which encourages new ideas and behaviours (Pierce & Delbecq, 1977). On the other hand, rigidity in decision making may prohibit organisational decision makers from seeking new sources of information (Adams, Bessant, & Phelps, 2006; Pierce & Delbecq, 1977). Indeed, the formalisation of the champion role could lead to its disappearance (Howell & Higgins, 1990) (see *championship* above)

A measure of formalisation is the presence of formal policies and guidelines that are prescriptive to what ought to be done on eLearning in HEIs, and the degree of "freedom available to organizational members as they pursue their functions and responsibilities versus the extent of rules that precisely define their activities" (Damanpour, 1991:589; see also Miller, 1987 for a tool that measures the degree of formalisation).

P10: The degree of formalisation in a HEI will be negatively related to the decision to adopt eLearning.

1. Positions in my university are concretely defined 2. Positions in my university have written job descriptions 3. The authority structure in my university is clearly defined 4. The authority structure in my university is formalised in writing 5. The university emphasises written communication between colleagues 6. There are established channels of communication 7. The university has written rules and policies to be adhered to by all lecturers 8. The policy also stipulates the sanctions and penalties for violating the written rules and policies 9. There is a strict training program for new staff members at my university

Box 4.16: Measure of the degree of formalisation
(Adapted from: Hall, Johnson, & Haas, 1967)

Organisational complexity

Organisational complexity in adoption of innovation research has been depicted to comprise of functional differentiation and specialisation (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Damanpour, 1991). Functional differentiation is the extent to which an organisation is divided into a number of subunits. Specialisation on the other hand is where this differentiation leads to precise functions for each unit. Organisational complexity hence is the amount of differentiation that exists within different elements constituting the organisation, and how their functions integrate coherently in the organisation (Pierce & Delbecq, 1977; Moch & Morse, 1977). It refers to the complex linkages within and outside the organisation (Mellahi & Wilkinson, 2004).

P11: A higher degree of complexity within the university structures will have a positive influence on the adoption of eLearning

For this study, the complexity of higher education institutions is assumed to be the same because they operate on specialised departments offering specified disciplines and the focus of the research was on the teaching, learning and research. This is unlike other industries where there are specialised departments dealing with specific aspects.

Organisational stratification

Although not widely studied, organisational stratification has been theorised to have a significant negative effect on the adoption of innovation (Pierce & Delbecq, 1977). Pearce and Delbecq (1977:31) see organisational stratification as manifested by the "degree of status congruence and ease of intraorganisational mobility". That is, having a clear distinction of the

status, and levels within the organisation that causes a preoccupation with the 'class' issue. In higher education for example, there has been "accelerated and polarized" stratification along the lines of science *versus* humanities (Tadmor, 2006). While this is only an example, there are situations within organisations where there have been other forms of stratification. For example, Laubach (2005:1525) identified a consent deal that "underlies an informal stratification that divides the workplace into an 'informal periphery,' a 'conventional core' and an 'administrative clan'". The *administrative* clan consists of an elitist group of top managers who enjoys the best labour market relations. The *conventional core* on the stratified layer is lower than the administrative clan, and work under firm formal rules and procedures. The *informal periphery* consists of employees at the bottom of the structure who are treated as a contingent and work under firm managerial controls.

P12: The presence of stratification in higher education is likely to have a significant adverse effect on the adoption of eLearning.

Based on the Laubach (2005) classification. Since the focus of the study was on one level, the teaching, learning and research staff data will not be collected for this proposition.

4.2.3.4 Organisational culture

Organisational culture, also corporate culture (Gordon, 1991:397), has been defined as a set of "widely shared assumptions and values that give rise to typical behaviour patterns… that are transmitted to organizational entrants in formal (e.g., mission statements) and informal ways (e.g., modes of speech) …based upon internally oriented beliefs regarding how to manage, and externally oriented beliefs regarding how to compete". While organisational culture is a broad subject, there are aspects of it that influence the organisations' adoption of innovation as it forms part of the social system (Rogers, 2003). These aspects relate to how the organisational culture and among other things 1) supports experimentation and is resilient to change 2) has good communication tendencies and 3) has the absorptive capacity to hold on to the innovation.

Trialability is identified as one of the core attributes of an innovation considered before adoption (Rogers, 2003) as is the extent at which an innovation can be experimented on. The extent to which an organisational culture deals with the challenges of trialability, that is, *supports experimentation with an innovation*, and at the same time manages the challenges of

the innovation, influences its adoption. In higher education, if there is support for experimentation with eLearning technologies, there will be a significant positive influence on its adoption. An organisational culture where there is *resilience to change* is most likely to succeed in innovation adoption (Erumban & de Jong, 2006; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004).

P13: Higher education's resilience to change and support for experimentation will have a positive influence on the eLearning adoption decision.

In the event of changes in eLearning, my university is likely to…
1. ....understand the values of the changes within the current context
2. ....interpret it as unusual and unexpected
3. ....interpret it based on the failures of past changes
4. ....interpret it based on the successes of past changes
5. ....interpret it based on the context relevance and merits of the changes

Box 4.17: Measure of organisational resilience to change and support of experimentation
(Source: Armenakis & Bedain, 1999; Buchanan & Badham, 1999)

Communication is a vital ingredient of a change process within an organisation. In fact, the way the employees perceive an innovation's effect to their profession (Jones, Watson, Gardner, & Gallois, 2004) and how the organisation as a whole encourages constructive communication between the various stakeholders (champions, opinion leaders, change agents) has significant influence on the adoption of innovation (Rogers, 2003). Communication characteristics and behaviour within an organisation can be measured using the existence of a participative climate, presence of collaboration in solving problems, existence of information exchange initiatives and support for ideas.

P14a: The perception of quality information on eLearning will positively influence the adoption of eLearning

To what extent do you feel that the communications within your university with regard to eLearning is 1. ...timely 2. ...accurate 3. ...adequate 4. ...complete 5. ...credible

Box 4.18: Measure of quality of information on eLearning
(Adapted from: Mohr & Spekman, 1994)

P14b: A higher degree of constructive communication will positively influence the adoption of eLearning

1. The university management seeks our counsel and advice on the use of eLearning 2. We participate in goal setting for eLearning implementation in the University 3. The university encourages us to give suggestions on eLearning 4. All parties using eLearning keep each other informed of their needs and/or new developments 5. We do not volunteer much information regarding eLearning and its development within the university

Box 4.19: Measure of organisational communication behaviour
(Adapted from: Mohr & Spekman, 1994)

An organisation's absorptive capacity has been defined as its ability "to recognize the value of new, external information, assimilate it, and apply it to commercial" use (Cohen & Levinthal, 1990:128). Absorptive capacity can be measured by the number of innovations an organisation can successfully adopt and implement (Hurley & Hult, 1998). An organisation's absorptive capacity is important throughout the adoption process (Szulanski, 1996) and can be enhanced through training as it deals with the expertise and knowledge within the organisation (Cohen & Levinthal, 1990) and how easy it is for an organisation to acquire and reorganise new knowledge (Lane & Lubatkin, 1998). Absorptive capacity for eLearning has been theorised to be influenced by two sets of variables: the organisation's ability to assess prior knowledge on eLearning in the light of the existing organisational model and the nature of eLearning technologies available (Martin, Massy, & Clarke, 2003) *(see also Szulanski, 1996)*.

P15: A high absorptive capacity in higher education institutions will have a significant and positive influence on eLearning adoption.

1. My university has regular staff training on eLearning or use of learning and teaching technologies 2. My university regularly holds information sessions on the use of eLearning 3. My university always invites vendors of eLearning technologies to do demonstrations of their technologies to the teaching staff 4. My university encourages collaboration with the vendors of teaching and learning technology 5. My university encourages collaboration with other universities on teaching eLearning courses 6. My university offers support for lecturers to attend seminars and workshops on eLearning 7. My university is a key player on eLearning initiatives in my country

Box 4.20: Measure of organisational absorptive capacity
(Adapted from: Zahra & George, 2002; Szulanski, 1996)

4.2.4 Social, system and environmental factors

Factors outside organisations and individuals are likely to influence the adoption of eLearning (Rogers, 2003). Some of the factors that have been identified to have significant influence are community and cultural values; technological infrastructure and the presence of related innovations; funding and income; education; policy and regulations; critical mass and bandwagon effect; communication channels and organisational visibility.

4.2.4.1 Community and cultural values

Studies on national culture commonalities and between-national differences have dwelt on the relationship between power distance, individualism, uncertainty avoidance, and masculinity and adoption of innovations (Steenkamp, Hofstede, & Wedel, 1999). Studies investigating these constructs have found significant influence on the adoption process. For example, a study on customer innovativeness determined that small power distance, weak uncertainty avoidance and masculinity will demonstrate innovativeness (Singh, 2006). In addition, in a study of Enterprise Resource Planning (ERP) adoption in Europe, it was found that "higher levels of the uncertainty avoidance, masculinity and power distance dimensions in a country negatively influenced adoption, while higher levels of long-term orientation have a significant positively influence" (Van Everdingen & Waats, 2003:230).

P16: Higher education institutions in countries where there is small power distance, weak uncertainty avoidance and masculinity will have higher eLearning adoption.

Hofstede's (1996) data on the power distance, uncertainty avoidance and masculinity will be used to determine their effect on eLearning adoption in the countries of the study.

4.2.4.2 Technological infrastructure and related innovations

ELearning adoption entails also the acquisition of technological infrastructure. In addition, the presence of some infrastructure like telecommunications infrastructure influences eLearning adoption. Indeed, the capacity to adopt and use the Internet, which is closely related to eLearning, was found to be influenced by the presence of technological infrastructure, income and education of the population (Corrales & Westhoff, 2006). A number of infrastructural measures can be used to determine the level of technological infrastructure that can be used for eLearning, for example the e-Readiness index, the Network Readiness Index, and Internet usage statistics, among others.

P17: Higher education institutions in countries with well developed communication infrastructure are likely to have higher levels of eLearning adoption than countries where there are constraints in communication infrastructure.

Secondary data, specifically the Network Readiness Index and the e-Readiness Index will be used to compare the inter-country levels of eLearning adoption (from section 2.2).

4.2.4.3 Funding and income

Income at the personal, organisational and national levels have been shown to have an influence on the adoption of innovation (Vishwanath & Goldhaber, 2003; Morris & Venkatesh, 2000; Steenkamp, Hofstede, & Wedel, 1999). Vishwanth and Goldhaber (2003) found that individual income indirectly influenced cell phone adoption by making it difficult for an individual to own or experiment with a cell phone (triability) resulting in a lack of observability of the features of the cell phones. A study related to country adoption by Kiiski and Pohjola (2002) analysed the diffusion of the Internet in Organisation for Economic Co-operation and Development (OECD) countries. Using data from 1995–2000, they found that Gross Domestic Product (GDP) per capita and access cost were the main factors that influenced the diffusion of the Internet in this region. Lack of sufficient income and funding in higher education is hypothesised to have a negative influence on eLearning adoption as

African higher education faces great fiscal problems (Teferra & Altbach, 2004; LaRocque & Michael, 2003). Measures of country income are determined from the GDP and Gross National Income (GNI).

P18: Higher levels of GDP and GNI per capita in a country will have a positive effect on the adoption of eLearning by higher education institutions.

Secondary data from international agencies and country statistics offices will be used, for example the GNI and GDP figures for the various countries covered by this study.

4.2.4.4 Education

Like technological infrastructure and income, the level of education of the population is hypothesised to have a direct influence on the adoption of innovation (Corrales & Westhoff, 2006). Kiiski and Pohjola (2002) found that education has a significant influence on the adoption of internet technologies in developing countries. The literacy rates among the adult population of the countries where the HEIs are situated are likely to have a significant and positive influence on the adoption of eLearning.

P19: Higher education institutions in countries where there are high levels of adult literacy will have higher levels of eLearning adoption.

Secondary data from international agencies and country statistics offices will be used to determine the level of education of the population.

4.2.4.5 Critical mass and bandwagon effect

In adoption research, a critical mass is realised when "a sufficient number of users has been reached to create a 'self-sustaining' rate of adoption" (Garrison, 2001:223). When the self-sustenance in adoption is realised, it has some form of bandwagon effect, that is, "adoption begets more adoption, leading to a self-reinforcing pattern" (Fichman, 2004:145) because the perceived cost-benefit of the innovation has moved from negative to positive. For some innovative investments, there must be a critical mass of users to justify the investments. The bandwagon effect is the situation where an innovation like eLearning is adopted by organisations because of the 'me too' phenomenon without any serious considerations of the innovation (Swanson & Ramiller, 2004). Bandwagon effect is the chain reaction about by the continuous adoption of an innovation because others have adopted it (Rogers, 2003; Moore,

2001). On eLearning, a lecturer might adopt it as a reaction to peers having adopted it, without the lecturer's own evaluation of eLearning's benefit to him or her. Critical mass and bandwagon effect are likely to have a positive influence on the adoption of eLearning. HEIs might choose to adopt eLearning as the common fad and fashion, or because their reputation or visibility might be in the balance because other 'competing' institutions have adopted it (*see also* Comacchio & Scapolan, 2004)

P20a: The bandwagon phenomenon is likely to have a positive influence on eLearning adoption

What kind of experiences have you had with eLearning 1. I have seen colleagues using it 2. I heard about it from colleagues at another university

Box 4.21: Measure of bandwagon phenomenon
(Source: Author)

P20b: Reaching a critical mass of eLearning users is likely to have a positive influence on eLearning adoption

Responses from the same institutions on using eLearning will determine if there is a critical mass of eLearning users at the institutions.

4.3 Summary and initial theoretical framework

The purpose of this chapter was to merge the literature review covered in chapters two and three into a conceptual framework for understanding eLearning adoption in HEIs in Eastern and Southern Africa. In summary, there are four dimensions that have been identified, namely:

- eLearning characteristics;
- individual characteristics;
- organisational characteristics; and
- social, system and environmental characteristics.

However, as noted earlier, it is the *perceptions* of individuals and the *contexts* within which eLearning and the individual exist that determine the adoption of eLearning. In this section, a summary of three dimensions (individual; organizational; and social, system and

environmental) in relation to eLearning characteristics is presented, followed by an integrated conceptual framework.

4.3.1 Individual factors and characteristics

The fit between individual and eLearning factors determine whether the individual adopts eLearning or not as depicted in the diagram below.

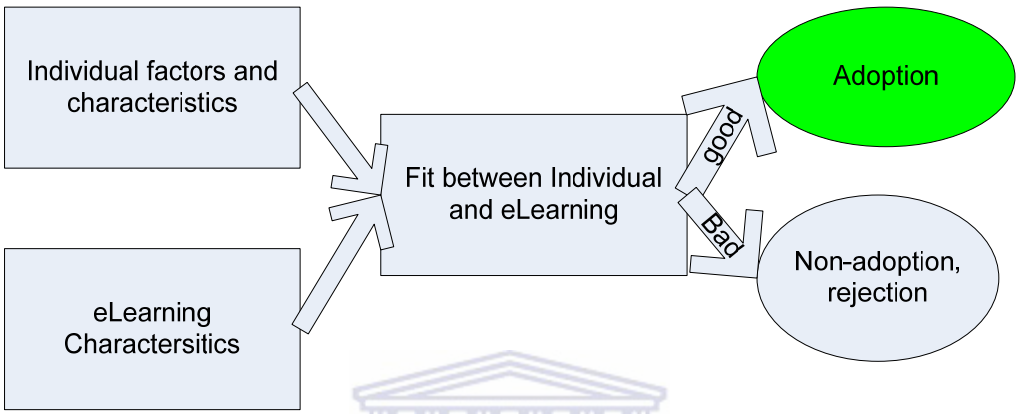


Figure 4.2: Individual factors versus eLearning factors and adoption decision

Although the interrelationships between the individual-eLearning factors fit are complex, there could be a simplification that could lead to some sort of matching between the individual factors on one side and the eLearning factors on the other. Table 4.1 gives a summary of the propositions on individual adoption of eLearning.

Table 4.1 Example of the prepositions on individual and eLearning characteristic

Individual	Individual-eLearning fit	eLearning
• Attitudes toward eLearning • Innovativeness • Innovativeness need and motivation • Communication behaviour • Prior experience	• Individual's knowledge about eLearning • Individual's preferences and lifestyle on using eLearning and related innovation • Individual's perceived need or necessity to use eLearning • Individual's abilities and constraints in using eLearning • eLearning functionalities of importance to an individual • Individual's satisfaction and gratification in using eLearning	• Applications • Functionalities • Interactivity • Availability • Response time • Relative advantage • Complexity • Compatibility • Trialability • Demonstrability

The better the fit of the individual's characteristics and factors are to eLearning characteristics, the higher is the likelihood of the individual to adopt eLearning. If we represent an individual as P, and eLearning as E this entails:

- P*i* →E*i* where P*i* is the individual's knowledge about eLearning, E*i* is the individual's experience in using eLearning or a similar innovation, and → denotes the fit. If the fit is strong, there will be a higher likelihood of eLearning adoption;
- P*ci*→E*ci* where P*ci* are the different personal characteristics, E*ci* are the characteristics of the different eLearning applications and processes, and → represents the fit. If say an individual's lifestyle and attitude have a good fit to the characteristics of eLearning (for instance functionality, complexity), then this has a positive influence on eLearning adoption; similarly E*ci*→P*ci,* that *is*, if there is a good fit between eLearning characteristics and individual characteristics; this will tend to positively influence the individual's adoption of eLearning.

4.3.2 Organisational factors and characteristics

Like the individual factors affecting eLearning adoption, organisational factors are complex. These factors are even more complex because they also *de*al with individuals within the organisation and their relationships. Table 4.2 gives a summary of the propositions related to organisational adoption of eLearning.

Table 4.2 Example of the prepositions on organisational and eLearning characteristics

Organisational	Organisation-eLearning fit	eLearning

• Top management support
• Championship
• Organisational structure
  ▪ Size
  ▪ Formalisation
  ▪ Centralisation
  ▪ Complexity
  ▪ Stratification
• Organisational culture
  ▪ Resilience to change
  ▪ Communication
  ▪ Absorptive capacity
	• Top management support of eLearning
	• Availability and support of champions and championship behaviour with regard to eLearning and other innovations
	• Organisational reception and assimilation of new ideas dealing with eLearning
	• Organisational approach to participative decision making concerning eLearning
	• eLearning functionalities of importance to the organisation
	• Organisational attitude towards change brought about by eLearning
	• Organisational communication behaviour regarding eLearning
	• eLearning compatibility with organisational core business
		• Applications
		• Functionalities
		• Interactivity
		• Availability
		• Response time
		• Relative advantage
		• Complexity
		• Compatibility
		• Trialability
		• Demonstrability

Similar to individual adoption, the better the fit between organisational characteristics and eLearning characteristics, and the higher is the likelihood of the organisation to adopt eLearning. If we represent an organisation as O, and eLearning as E this entails:

- O*i* →E*i* where O*i* is organisation's top management support of eLearning, E*i* is compatibility of eLearning with the organisation's core business, and → denotes the fit. If the fit is strong, there will be a higher likelihood of eLearning adoption within the organisation;
- O*ci*→E*ci* where O*ci* are the attributes of the organisational culture, E*ci* are the characteristics of the different eLearning applications and processes, and → represents the fit. If an organisation is resilient to change, and it encourages free flow of information within its ranks and files and these attributes fit on to the characteristics of eLearning (of demonstrability and trialability), then this has a positive influence on eLearning adoption; similarly E*ci*→O*ci,* that i*s,* if there is a fit between eLearning characteristics *a*nd the organisational characteristics, this will tend to positively influence the organisation's adoption of eLearning.

4.3.3 Social, system and environmental factors and characteristics

How the factors external to the individual and the organisation fit into the eLearning characteristics have an impact on the adoption of eLearning. Table 4.3 gives a summary of

the propositions related to factors external to both an individual and an organisation and their fit to eLearning characteristics.

Table 4.3 Social, system and environmental factors

Organisational	Organisation-eLearning fit	eLearning

• Community and cultural values
  ▪ power distance
  ▪ uncertainty avoidance
  ▪ masculinity
• Technological infrastructure and other innovation
• Income and funding
• Policy and regulation
• Education
• Critical mass and bandwagon effect
	• Community and cultural values support for experimentation with eLearning.
	• Cultural values in relation to dealing with uncertainty when presented with eLearning and other innovations
	• Availability of technological infrastructure to support eLearning
	• Availability of income and funding to implement and support eLearning
	• Policies and regulations favouring eLearning
	• Universities members' education and their ability to consume eLearning products
	• Availability of a critical mass to enable eLearning investments to break even
	• eLearning compatibility with cultural and community values
	• Demonstrability of eLearning products to the community to boost their image
		• Applications
		• Functionalities
		• Interactivity
		• Availability
		• Response time
		• Relative advantage
		• Complexity
		• Compatibility
		• Trialability
		• Demonstrability

Finding a clear fit between the external variables and eLearning characteristics would boost, albeit hypothetically, the adoption of eLearning by individuals members of the organisation and the individuals. If we represent external systems as S, and eLearning as E, this entails:

- S*i* →E*i* where S*i* is national policy decisions on eLearning, E*i* is compatibility of eLearning with the national educational strategy, and → denotes the fit. If the fit is strong, there will be a higher likelihood of eLearning adoption within the country;
- S*ci*→E*ci* where S*ci* are the attributes of the community and its cultural values within a country, E*ci* are the characteristics of the different eLearning applications and processes, and → represents the fit. If a culture has a small power distance, weak uncertainty avoidance and masculinity, this fits into eLearning's attributes of availability, trialability and demonstrability which might positively influence the eLearning adoption within the population; similarly
- E*ci*→S*ci*, that is, if there is a fit between eLearning characteristics and the external factors; this will tend to positively influence the larger population's adoption of eLearning.

4.3.4 Merged framework

So far, the four dimensions or themes of this eLearning adoption study have been presented (see table 9.1 in Appendix II for a complete list of variables). This chapter is concluded with a summary table (Table 4.4.) which gives an indication on how the various propositions are likely to affect eLearning adoption. The propositions on the left hand side of the table must be true for the impact depicted on the right hand to be realised. For example, for a positive impact on the ease of use, the target individual should perceive eLearning to be easy to use.

Table 4.4 Effects of the variables of the study on adoption of eLearning

Proposition (keywords only)	**Impact**
Individual	
Attitudes toward eLearning	
▪ Perception of ease of use	Positive
▪ Perception of the relative advantage	Positive
▪ Perception of compatibility	Positive
▪ Perceived Availability	Positive
▪ Perception of demonstrability	Positive
▪ Personal self-efficacy	Positive
▪ Perception of complexity	Negative
Innovativeness	Positive
Innovativeness need and motivation	Positive
Communication behaviour	
▪ Interpersonal communication	Positive
▪ Exposure	Positive
Prior Experience	Positive
Organisational	
Top management support	Positive
Availability and support of champions	Positive
Organisational structure	
▪ Large in size	Positive
▪ Centralisation	Negative
▪ Formalisation	Negative
▪ Complexity	Negative
▪ Stratification	Negative
Organisational culture	
▪ Resilience to change	Positive
▪ Effective communication flow	Positive
▪ Absorptive capacity	Positive
Social, system and environmental factors	
Community and cultural values	
▪ Small power distance	Positive
▪ Individualism	Positive
▪ Weak uncertainty avoidance	Positive
▪ Masculinity	Positive
Technological infrastructure	Positive
Funding and income	Positive
Education	Positive
Policy and regulation	Positive/Negative
Critical mass and Bandwagon effect	Positive

4.4 Conclusion and way forward

The conceptual framework presented in this chapter identifies the factors that influence the adoption of eLearning in higher education. These factors, and ensuing combination matrix, are from different fields, disciplines and contexts and therefore their applicability in

eLearning adoption in higher education need to be empirically tested and ascertained. The research cannot therefore be complete without the testing of this framework. The testing of the framework involves the collection of data that would be used to test the propositions that have been formulated in this chapter. Consequently, this chapter has formed a foundation for the empirical research phase discussed in chapters five and six.

Chapter Five: Methods and procedures

5.1 Introduction

In essence, the overall aim of this research is to describe and explain the complex social phenomena of the eLearning adoption in Higher Education Institutions in Eastern and Southern Africa. That is, an investigation of the eLearning adoption determinants in order to develop a framework that enumerates the necessary conditions, factors and issues that might affect eLearning adoption, as well as explain how negative conditions and perceptions could be avoided. The assumption of the study, as stated in chapter three, is that eLearning adoption is beneficial to the adopting unit. In other words adopting eLearning would be beneficial to the adopting unit as it could realise the benefits (for example social, economic, administrative) of using eLearning as discussed in section 2.4.1.

In order to determine the factors that influence eLearning adoption in HEIs this research study employed an exploratory and mixed methods approach using both quantitative and qualitative data. The purpose of using quantitative survey data, as well as qualitative interview data, was to provide both breadth and depth of information concerning eLearning adoption. Investigating a wide array of adoption and implementation process information necessitated the use of multi-method research procedures. Details of the methodology are described in the following sections: (1) Research terminology and contextual definitions, (2) Research methodology, (3) The exploratory design phase, (4) Quantitative data collection phase, (5) Formation of the eLearning adoption framework phase, and (6) Summary.

5.2 Research terminology and contextual definitions

5.2.1 Research paradigm:

The term paradigm has been understood differently by a number of researchers. For instance, Brunner (2006) sees it as a collectively accepted explanation or justification of scientific processes and claims; while Burrell and Morgan (2003) posit that paradigms are "fundamentally different assumptions concerning the nature of the social science and the nature of society, that is, the 'commonality of perspectives which binds the work of a group of theorists together'". Arguments are also abode of a paradigm being a disciplinary matrix, whose elements are held and shared by practitioners in the discipline (Fong, 2006). Similarly, there are numerous definitions of what a research paradigm is. For example, Entman (1993:56) defines research paradigm "as a general theory that informs most scholarship on

the operation and outcomes of any particular system of thought and action". Chen, (2005:63) envisages a research paradigm as a "dynamical system of scientific works, including their perceived values by peer scientists, and governed by intrinsic intellectual values and associated citation endurance and decay." Ponterotto (2005) argues that a research paradigm is the "location" of the inquiry within the four different parameters of the philosophy of science, namely ontology, epistemology, axiology, rhetorical structure and methodology. These four parameters together determine the methodology of a scientific inquiry. Ponterotto's definition is used in this study as it encompasses the acceptability of a theory within a dynamic scientific system by locating it within the different parameters. These four aspects of a research paradigm are important for this research, namely ontology, epistemology, axiology and rhetorical structures and are discussed below.

5.2.1.1 Ontology

Research is about answering questions, and for the right answers to be found, the right questions and contexts should be identified. Ontology deals with the nature of reality and being (Ponterotto, 2005) where a "formal and explicit specification of a shared concept that forms the basis for communications" (Gruber, 1993:Online) within what is being communicated about, is identified (Bergeron, 2003). That is, ontology's aim is to study "being as being" (Rowe, Truex III, & Kvasny, 2003), and in a social world forms the assumptions about the being and the reality under the study. In other words, it is the "exploitation of being structures ... and questioning of the existence of being" (Sartre 1943:358-359) and defining the objects existing in the world that is being communicated or studied.

Some areas of the application of ontology have been identified as communication, inference, and knowledge reuse and organisation (Daneshgar, 2004). The communication aspects are concerned with the formation of "the common vocabulary and agreed semantics" that allow for the understanding of the communicating entities. Inference on the other hand is concerned with the representation and manipulation of the information about the being and the reality. The reuse and organisation of knowledge looks at the various ways the information can be structured and organised (Daneshgar, 2004). This research investigates ways of categorising knowledge and formulating a framework for eLearning adoption in higher education. Derived from previous research on adoption of innovation, it partly uses common vocabulary and almost similar ways of representing the information as in similar research.

5.2.1.2 Epistemology

The structure and organisation of knowledge cannot be devolved from the inquirer and knowledge itself. This leads to the next axiom in the philosophy of science, the epistemology which is concerned with "how we know what we know and our authority for claims to knowledge" (Williams, 2000:151). It deals with the "assumption, foundations, and nature of knowledge as well as its extent and validity" in relation to the society where that knowledge is used or exists. In doing so, it seeks to answer questions such as: What is knowledge? What is the relationship between the inquirer and the known? How do we come to know what we claim to know? What counts as knowledge? What can be taken as evidence to convince us that something is "true"? (Krauss, 2005:759). The epistemological foundations frame the research design. Although a mixed methods research design is used, there is a high level of empiricism – core to the positivist view of reality – due to the generalisations made when designing the eLearning adoption framework.

5.2.1.3 Axiology

Axiology is the study of values and value judgments (DeLuca & Kock, 2007:8), that is, the *good* and the *evil*, and how people perceive or differentiate between them. Axiological issues and problems arise in the reflections "upon conditions of life, the structure of reality, the order of nature and man's place in it" (Hart, 1971:29). These reflections define the role of values, the set of morals or/and the set of ethics for any human endeavour. Defining the role of values encompasses value judgment that leads to preferences and prejudices: praise *versus* condemnation, like *versus* dislike, good *versus* bad, noble *versus* mean, beautiful *versus* ugly, and pious *versus* impious, among others (Hart, 1971).

Value in marketing research has been equated to "utility" or "desirability" (Sánchez-Fernández & Iniesta-Bonillo, 2007) which applies to commodities, and the different ways consumers perceive their value. In this thesis, as stated in chapter 3, the *pro-innovation* bias towards eLearning is assumed, *that is*, eLearning in and of itself is desirable and valuable to the adopting unit. However, there are issues that need to be addressed in the axiological approach to this study. The scientific method of inquiry applied to the value judgement must be in such a way that the accomplishment of the aim of the research is scientifically sound, and at the same time show both the distinctive and common nature of the propositions arrived

at in Chapter 3 in respect of eLearning adoption. This scientific method characterizes the progression of the thesis (Ponterotto, 2005) as communicated through rhetorical structures.

5.2.1.4 Rhetorical Structure

Rhetoric has been defined as the art of persuasion (Garsten, 2006) or the "different techniques of presentation to project divergent assumptions about the world and different means to persuade the reader of its conclusions" (Firestone, 1987:16). Rhetorical structures are therefore the complex constructions used to communicate and present knowledge in order to persuade the reader. In contemporary writing, rhetorical devices are used to elicit or evoke emotional responses from the audience. In research, however, rhetorical structures are seen as the different designs and instrumentations (research methodologies) used to persuade the reader of the value of the research and the content of the knowledge, and at the same time, showing how errors and bias in the design and instrumentation were eliminated or dealt with (Firestone, 1987). As a consequence, the research paradigm battles between quantitative and qualitative research are brought to the fore during the communication process of the research findings as shown in table 5.1.

Table 5.1 Distinctions of the rhetorical structures and approaches to research writing

Element	Qualitative	Quantitative
Persuasion	Less attention is given to describing procedures and how individual judgment discipline the study	De-emphasising individual judgement and stressing the use of established procedures
	Uses rich depiction and strategic comparisons to persuade the reader	Often compares pairs of agencies known to be different in order to discover what might explain their differences
Assumptions	Describes people acting in states – with limits and opportunities that the researcher needs to take into account and use	Portrays a world of variables and static states
	Emphasis is on choice (of the sample) and instrumentation and procedures that shape the researchers response to the limitations and opportunities that present themselves along the way	Emphasis of the study is on randomness (of the sample) and instrumentation procedures to reduce amount of error.

(Source: Firestone, 1987:18-19)

Quantitative research approaches *must* give rich descriptions that show the researcher's engagement with the settings in as much details as to make the reader understand the situation. On the other hand, the qualitative research should depict and explain the assumptions about the socially defined multiple realities (Firestone, 1987) which was done in the first phase of this research.

5.2.1.5 Methodology

Methodology deals with the principles, processes and procedures of a scientific enquiry (Ponterotto, 2005). The choice of method is dependent on the ontology, epistemology, axiology and the rhetorical structures that exist in the domain within which the researcher is working on. Section 5.3 brings these issues together and shows how they inform the choices made in this research.

5.3 Research methodology

While the discussion about the various aspects of the philosophy of science have been done in isolation, in practice they are intertwined and have a very fine line between them. For instance, researchers are always choosing the best approach in order to produce evidence (method), for providing answers to a set of questions (ontology), on the basis of what is agreed-upon as knowledge and can be taken as evidence (epistemology) by drawing upon consensual values worth understanding and transforming (axiology) and communicating the evidence using structured approaches to the wider community (Rhetorical Structures) (Ortega, 2005). These philosophical aspects, and the different methods that can be used in research, form the Research Methodology.

Because of the different standpoints taken by researchers in their application of, and understanding of the philosophical assumptions and underpinnings, research has been classified into different paradigms – for instance, Burrell and Morgan (2003) identify four research paradigms: functionalism, interpretivism, radical structuralism, and radical humanism. Using the research methodology aspects, researchers have come up with three research paradigms – quantitative paradigm, qualitative paradigm and the mixed-methods or multi-method paradigm (Creswell & Plano Clark, 2007) each falling in the continuum between functionalism to radical humanism according to the Burrell and Morgan classifications. Other epistemological classifications are positivist, interpretive, critical social theory, constructivism and social constructivism (Klein & Myers, 1999). This classification has been seen by some researchers (for example Weber, 2004) as mere rhetoric.

5.3.1 Research methodology used in this study

This research sought to understand the adoption and non-adoption of eLearning in HEI settings as they naturally exist, and therefore engaged in their business in order to provide as much detail as possible. To get a better understanding of the issues, and answer the research

questions raised, a host of pragmatic and eclectic research approaches (commonly known as mixed-methods research) were used (Miller & Fredericks, 2006:567). Mixed methods research has been defined as both philosophical assumptions and inquiry methods that guide the collection and analysis of data using both qualitative and quantitative approaches in one or more studies to provide a better understanding of the research problem that otherwise would not be well addressed by a single approach (Creswell & Plano Clark, 2007). The use of both approaches ensured that the traditional quantitative research methods that are dominant in Information Systems research and the qualitative research approaches complimented each other. A mixed method was favoured for this research because of its multi-disciplinary and complexity nature touching on the information systems, educational policies and principles, political studies, and marketing, among others. This multidisciplinary nature and complexity of the research lead to the choice of methods that complemented each other to arrive at the best answers to the formulated research questions (Gilbert, 2006; Johnson & Onwuegbuzie, 2004).

Mixed methods research has a variant of typologies that can be used and many more are continually being developed as mixed methods research evolves (Creswell & Plano Clark, 2007; Leech & Onwuegbuzie, 2007; Petter & Gallivan, 2004). For instance, Creswell and Plano Clark (2007) classify mixed methods research by using the functional purpose of research, and formulated four typologies: triangulation, embedded, explanatory and exploratory mixed methods. Leech and Onwuegbuzie (2007) uses three constructs of a) level of mixing (partial or full) b) timing of the choice of the research approach, namely concurrent or sequential, and c) weight of each of the research approaches on the study (e.g. more weight on the qualitative phase) and the emphasis on the design decision (equal status versus dominant status). Based on the three constructs they eventually formulated eight typologies that fall within a continuum between "partially mixed concurrent equal status designs" to "fully mixed sequential dominant status designs."

For this research, Creswell and Plano Clark's (2007) exploratory mixed method design was used, although it may be argued that whatever mixed methods design is used, it would as well fall within the continuum identified by Leech and Onwuegbuzie (2007). The choice was motivated by the unavailability of instruments and a unified framework for studying eLearning adoption in HEIs in Africa. Indeed, Creswell and Plano Clark (2007) posit that exploratory mixed methods approaches are suited for exploring phenomenon like eLearning

adoption, and are particularly useful in situations where researchers need to develop and test research instruments and further generalize the results to different groups. Accordingly, the exploratory nature of the study that began with an analysis of existing literature, and the status of eLearning adoption with the aim of developing and testing a quantitative instrument, that further guided the qualitative testing and building on the prepositions made during the qualitative phase to generate a framework for successful eLearning adoption Table 5.2 represents the ontological, epistemological, methodological and data analysis aims of the quantitative and qualitative approaches as used in this study.

Table 5.2: Traditional distinctions associated with quantitative and qualitative methods

	Quantitative	Qualitative
Ontology	Tangible reality	Intangible reality
Epistemology	Regularities established through knowledge constructed during empirical research and social interaction/hermeneutic	Deductive/inductive reasoning understanding
Methodology	Hypotheses testing	Hypotheses generation
Data analysis	Verification/falsification	Interpretation of meaning

(Source: McEvoy & Richards, 2006:68)

The qualitative approach dealt with the ontological paradigm showing the intangibility of the reality surrounding eLearning adoption with the aim of understanding the factors affecting eLearning adoption in order to generate hypotheses and interpret meaning from the understanding. The quantitative approach on the other hand reduced the reality to tangible artefacts that could be measured to test if the hypotheses generated are supported or not.

5.3.2 The research procedure

As mentioned earlier, the research procedure used was Creswell and Plano Clark's exploratory instrument design mixed methods. The research procedure is summarised in Table 5.3.

Table 5.3: An extended exploratory instrument design mixed methods

Timeline	Study Phase	Methods	Products	Scale Development
Phase I 12 months	Qualitative data collection	In-depth analysis of the research literature on adoption of eLearning and related technologies both qualitative and quantitative.	Generalisable theories, antecedents, determinants and factors of eLearning adoption	1. Determine what is to be measured
	Analysis of the qualitative data	Key coding of the theories, antecedents, determinants and factors of eLearning adoption.	Develop possible questionnaire items.	2. Generate item pool
		Expert review of the questionnaire. Using 12 experts drawn from various disciplines to review the questionnaire on a 4 level qualitative coded item	Refining of the questions and the overall questionnaire	3. Determine measurement format 4. Expert review
		Review of the questionnaire tool with a statistical consultant		5. Piloting the tool
	A revised version of the questionnaire available	Validating the questionnaire with input from the statistical consultant.	Complete questionnaire with validation items	6. Include validation item
Phase II 4 months	Quantitative data collection	Identifying the sample	Sample recruited	7. Data collection and survey administration
		Survey administration (email and web-based)	Survey completed	
	Qualitative data analysis	Factor analysis and item correlation	Results available	8. Evaluate items 9. Optimise scale length
Phase III 2 months	Framework formation	Designing of a framework, graphical and textual from the results of the quantitative phase	eLearning adoption framework	10. Develop eLearning adoption framework

(Source: Creswell & Plano Clark, 2007:126; Worthington & Whittaker, 2006:813-5))

5.4 Phase I: Exploratory design

An exploratory design was used to discover the main variables, as well as form the foundation for the systematic and rigorous generation of propositions to be tested in the subsequent phases. Exploratory designs are used to "identify the cause-effects relations and explain the how and why phenomena occur" (Arnold, 2006:9). Exploratory designs are used when "measures or instruments are not available, the variables are unknown, or there is no guiding framework or theory" (Creswell & Plano Clark, 2007:75). The information for the exploratory phase was collected using two complimentary sources. First, through a systematic and thorough review, and meta-analysis of adoption research that is applicable to eLearning adoption. Second, the extensive involvement of the researcher in eLearning projects in higher education. As of the time of this study, there was no conclusive study done on the adoption of eLearning in higher education institutions in Africa geared toward formation of a framework that brings together the various variables and factors of eLearning adoption in this specific context.

The literature review and meta-analysis sought to establish the determinants of adoption of eLearning in relation to the potential adopting unit (individual, department or whole institution), as well as the university teaching staff. The systematic review and meta-analysis entailed:

- Identification of relevant studies and supporting literature that were considered for review;
- Development of a template to obtain the themes, and the variables of measure in the studies reviewed;
- Identification of the common themes and agreements on the findings of the studies in relation to their effects on eLearning adoption and the formulation of propositions;
- Generation or finding of questions to measure the propositions that eventually resulted in the questionnaire that was used in the study;
- Refining the questions and the questionnaire; and
- Validating the questionnaire with selected experts.

5.4.1 Identifying relevant and supporting literature

Seminal literature that sought to develop theories and models of understanding innovation and innovation adoption was used. Consequently, studies based on these theories and models were

extensively reviewed to elicit the major variables and emergent findings. Initially studies that dealt with meta-analysis of other studies were reviewed to provide the major themes of importance to this study. Specifically, meta-analysis literature were studied covering individual adoption of innovation (Jeyaraj, Rottman, & Lacity, 2006), organisational adoption of innovations (Damanpour, 1991), the type of innovation being considered (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004), in addition to seminal works on diffusion of innovations (Rogers, 2003), theory of reasoned action (Fishbein & Ajzen, 1975), theory of planned behaviour (Ajzen, 1991), technology acceptance model (Davis, 1989), cognitive theory (Bandura, 1989), unified theory of acceptance and use of technology (Venkatesh, Morris, Hall, & Davis, 2003), concerns based models, and mathematical models (Bass, 1969).

5.4.2 Development of a coding system

Studies using the theories and models identified were analysed for generalised findings on the predictors of adoption of innovation with special reference to eLearning. To start with, the eLearning adoption was seen as being influenced by decisions of individuals within the organisations on one side, as well as by the organisations within which the individuals work. Further, these decisions are influenced by four core factors:

- the characteristics of eLearning;
- the individuals;
- the organisation; and
- the context of all the stakeholders, processes and procedures.

Three things have to be considered regarding the context of eLearning adoption. First, there is the social setup in which the individual and the organisation (in this case the higher educational institutions) find themselves. Secondly, there are the system factors that deal with the processes, procedures and power structures at the individual and organisational level, as well as the wider national or regional levels. Finally there are the environmental factors that mainly deal with the availability or lack of resources (physical infrastructure, human capacity, capital investments, among others).

Development of the coding system involved identifying from previous research the factors and variables that affect the decisions making in conformity with the four factors, namely, *eLearning*, the *individual*, the *organisation*, and the *contexts*. Of special importance to the development of the coding system were meta-analysis studies on the adoption of innovation (Jeyaraj, Rottman, & Lacity, 2006; Lee & Xia, 2006; Leseure, Bauer, Birdi, Neely, & Denyer, 2004; Damanpour, 1991). (The variables common to these studies were grouped into the four core factors. Table 9.1 in Appendix II shows a detailed list of some of the variables that have been studied).

5.4.3 Merging the common themes and agreements

Chapter four has given a detailed view of how the different themes were merged to create the initial framework for this study. Given the context of this study, and the unique characteristics of eLearning, the entries for each of the four core factors were reduced to manageable components. The reduction was done meticulously to eliminate chances of over simplification that would render generalisation of findings of the emergent model difficult or invalid. Section 4.3.4 outlines the major items of the themes identified and the consequent propositions that formed the initial framework.

5.4.4 Generating questionnaire items

From the themes identified, it was necessary to generate items to measure each of them. In particular, item analysis procedures were employed to seek generalisations to the measures that could be used with the intended representative sample and eLearning adoption decisions. The initial item pool is presented in Chapter Four alongside the themes and constructs they are measuring.

5.4.5 Questionnaire refinement

The questionnaire refinement was done concurrently with the questionnaire validation. Questionnaire refinement involved several iterations with the aim of developing constructs for gathering and collecting all the required data concerning eLearning adoption in higher education. The refinement process is depicted in Table 5.4 below.

Table 5.4: Questionnaire refinement process

Stage	Creation	Development 1	Development 2	Pilot
Study Group	Theoretical	2 Experts	12 Lecturers	29 Lecturers
Stage validity	Content	Content and construct	Content and construct	Reliability 0.85 except 1 factor* and construct

*Cronbach's alpha based on number of items in the pilot stage.

Table 5.4 shows the process used during the questionnaire refinement process. During the initial development of the questionnaire, an item pool was designed based on the theoretically grounded application of the various constructs as discussed in chapter four. Subsequently, two experts were extensively and iteratively consulted. One of the experts is a statistician and the other is an expert in adoption of innovation. The aim of these consultations were to ensure that, a) all the items adequately capture the themes identified, b) that all the themes are adequately measured by the items, and c) ensuring that the measures are statistically measurable.

The version that emerged from the incorporation of suggestions and comments of the two experts was further subjected to an expert review with 6 (from a pool of 12, only 6 responded) academics with significant experience in the use of eLearning to ensure content coverage of the constructs and clarity of the questions asked.

Finally, the instrument was tested during a pilot study of 29 lecturers from 6 different higher education institutions in the region of study. The multiple phases of the development led to refinement not only on the questionnaire items, but also on its structure. In addition, it assisted in establishing the initial validity of the questionnaire.

5.4.6 Questionnaire validation

Questionnaire or research instrument validity has three facets: the content validity, the construct validity and reliability (Straub, 1989).

5.4.6.1 Content Validity

Content validation addresses the representation of all the properties under investigation. Content validation is ensured through the generation of an "item pool", a database of questions for each

and every property from which the questions are selected from. Further content validation was done through the repeated review of the questionnaire by experts in the field of investigation until an agreement was reached (Dornyei, 2003; Straub, 1989). To ensure content validity, an item pool was generated and a group of 6 experts were identified and used to validate the content of the questionnaire.

5.4.6.2 Construct Validity

Construct validation addresses the balance between the measures used in the questionnaire and the methodology used. It answers questions such as "are the data a reflection of true scores or artefacts of the kind of instrument chosen?" (Straub, 1989:150). In other words, the construct forms the "the initial concept, notion, question or hypothesis that determines which data is to be gathered and how it is to be gathered" (Golafshani, 2003:599). Construct validity was assessed using standard correlation tests (principal component factor analysis) during the piloting of the tool. During the construction of the questions, guidelines for question writing improved the construct validity of the questionnaire. These guidelines includes using simple sentences, avoiding double-barrelled items, avoiding items that might be answered the same way by everybody, avoiding leading or loaded items, avoiding ambiguous items, mixing positively and negatively worded items, and avoiding items that would not elicit a response (Dornyei, 2003). In addition to these guidelines, construct validity was ensured by borrowing items from tested tools, as well as using experts during the content validation process. In addition to construct validation, some items were reworded and repeated to check on the internal validity and reliability.

5.4.6.3 Reliability

Reliability is ensuring that the errors in findings and data collection are kept to the minimum so that the results are not discredited (Green & Salkind, 2005). Reliability is assessed through standard correlation measures, for example Cronbach's alpha coefficient of reliability. Using Cronbach's alpha as a measure of reliability or internal consistency, high scores are indications that the tools are reliable. For this research, the questionnaire was piloted using 29 people. The piloting sample was drawn from three HEIs in 2 countries. From the pilot data, all items except one had a Cronbach's alpha of more than 0.85.

5.5 Phase II: Quantitative data collection

5.5.1 Population and sample

The study targeted public and chartered private HEIs in Eastern and Southern Africa that offer degrees in more than two disciplines. Further, HEIs in these regions whose mode of instruction or whose official documents are not in English (e.g. some of the French and Portuguese speaking institutions) were excluded because of the language barrier.

The target population for the study in these HEIs was the eLearning support members and academics using, or intending to use eLearning. Random samples drawn from staff lists were used to identify individual research subjects. Of importance to the selection and determination of the sample size is the accuracy and quality of the research findings which might be greatly influenced (negatively) by inappropriate, inadequate or excessive sampling (Bartlett, Kotrlik, & Higgins, 2001). Indeed, researchers over time have developed means of estimating the required sample sizes for survey research in order to improve on quality and accuracy. They used elaborate error estimation and survey results variance estimates, often with no definitive answer to the question of the required sample size (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005; MacCallum, Widaman, Preacher, & Hong, 2001; Hinkel & Dale, 1983). Hogarty and others (2005) and MacCallum (2001) call for a reduction on emphasis of sample sizes as a rule in favour of careful selection of measurement variables that ensure that each and every factor of measurement is clearly and sufficiently represented by a number of variables, and at the same time ensuring high communality of the variables. The communality of a variable is "the proportion of the variance of the variable that is accounted for by the common factors" (Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005:204). Retrospectively, if communalities are high and factors being measured have sufficient variable representation, population factors in sample data are considerably good regardless of sample size.

In addition to accuracy and quality, there is the question of reliability due to among other factors sampling errors and non-response. There was need therefore to cater for these issues during sampling of the population.

5.5.2 Data collection

5.5.2.1 Determining the need for data collection

The lack of sufficient secondary data measuring or dealing with the adoption of eLearning in Higher education in Southern and Eastern Africa necessitated the data collection for this study. Following a thorough investigation of the literature as reported in chapters 1 to chapter 4, indeed, there was lack of conclusive data on eLearning adoption that could model a framework for its adoption in HEIs in Eastern and Southern Africa.

5.5.2.2 Determining the method of data collection

The choice of data collection method is always influenced by practical and quality considerations in line with the kind of data being collected (Fink, 2005). The quality of the measures ensures reliability and validity of the data collection tool (Fink, 2005). Surveying was chosen as the method of data collection because the study needed to capture factual and behavioural data over a very large and dispersed population within certain time and budgetary constraints. The survey data would be used for "logical, deterministic, general, parsimonious and specific" deductions about eLearning adoption in HEIs in Eastern and Southern Africa (Baker, 2002:187). Specifically, an online survey was chosen because of its low cost, speed of data collection, convenience, improved anonymity and wide regional reach amongst the research sample. (Grandcolas, Rettie, & Marusenko, 2003; Couper, Traugott, & Lamias, 2001; Epstein, Klinkenberg, Wiley, & McKinley, 2001).

Baker (2002:188) identifies issues regarding the use of surveys as the ability (or inability) and willingness of respondents to provide the required data, and the questioning process' influence on the respondent. However, this issue can be significantly reduced through "careful design and execution" of the survey and survey process.

5.5.2.3 The survey instrument

Design considerations

The design of self administered research instruments is important in ensuring non-biased responses as well as to encourage the respondents to participate. A number of recommendations have been made regarding the design of good research instruments (Choi & Pak, 2005;

Tourangeau, 2004 Dornyei, 2003; Biemer & Lyberg, 2003; Sanchez, 1992). In the case of surveys these recommendations include:

- Ensuring that proper wording of questions is adhered to by avoiding ambiguous questions, complex questions, double-barrelled questions, technical jargon, uncommon words and vague words;
- Ensuring that the data being collected is sufficient for the intended purpose, that is, all the factors being measured are adequately represented;
- Ensuring that the scale used does not have overlapping intervals, insufficient categories that might force respondents to make a choice, and also ensuring that the scale format is easily understood;
- Avoiding leading questions and intrusiveness;
- Ensuring that the formatting and layout of the survey is attractive and easy to use, to avoid that respondents skip questions;
- Ensuring grouping of similar items or measurement factors to improve on statistical correlation;
- Ensuring that the questionnaire is not unnecessarily long; and
- Ensuring that the questionnaire has a cover letter stating the intended use of the data being collected, outlining the definitions of some of the terms used and explaining some specific aspects, for example those relating to confidentiality.

Just like the layout of questions in paper-and-pencil based instruments, visual layout and components for example colour, graphics and images and interactive form feedback used in web-based survey instruments are very important. (Grandcolas, Rettie, & Marusenko, 2003; Couper, Traugott, & Lamias, 2001; Epstein, Klinkenberg, Wiley, & McKinley, 2001).

During the design of the survey instruments, some of the design issues considered were the use of multiple related items per screen, minimum user effort during user input through the use of radio buttons and check boxes and a progress indicator showing where the participants is based on the number of screens (Couper, Traugott, & Lamias, 2001).

All these design criteria and recommendations were met in the design of the web-based questionnaire, and were specifically addressed as follows:

- The first screen of the questionnaire provided, among other things, the purpose of the questionnaire, the definition of key terms, special instructions on completing the questionnaire and a note on confidentiality and treatment of responses and respondents;
- Subsequent screens were grouped according to the specific themes, each with items to collect data for the theme to ensure consistency. The grouping of items was based on the propositions to improve on statistical correlation;
- Use of visuals for ease of responses; and
- Use of 7-point Likert scale (*1=Strongly Agree, 7=Strongly Disagree*) to measure attitudes since it enables the relative ease in scoring and analysing results. For relative ease of completion, radio buttons were used.

Appendix VIII shows a sample screen shot of the web-based survey tool used.

5.5.2.4 Pilot study

To do an initial test of the scale, and to establish validity and reliability of the questionnaire, a pilot test was done. The pilot was also used to inform on the changes that were needed on the method and data collection procedure as well as in the purification and revision of the questionnaire (Churchill, 1979).

5.5.3 Data collection procedure

5.5.3.1 Confidentiality

Confidentiality, privacy and respondents' anonymity are considered as the greatest risks in survey based research, especially in online research (Kraut, Olson, Banaji, Bruckman, Cohen, & Couper, 2004). Confidentiality of both collected and respondent information should be maintained and highly guarded at all times. To safeguard the confidentiality of the data and respondents, the following measures were taken:

- Ensuring anonymity in all the responses to the questionnaire. Nowhere in the questionnaire was the respondent asked to provide identifying information. The trade off to deal with while using this method of anonymity, is the danger of respondents

completing the questionnaire multiple times (Gosling, Vazire, Srivastava, & John, 2004). Gosling and others (2004) developed a method of screening consecutive entries to "identify duplicate or near duplicate entries" by using mainly the anonymously logged in Internet Protocol (IP) addresses with each response. This method was used by comparing the demographic data emanating from the same IP address, and where duplicates were found, they were eliminated.

- Email addresses used during the initial introductions to the survey were not disclosed to anyone outside the research project.
- Computer systems security was kept at the highest level possible all through the research, and any identifying data, for example, email addresses were deleted immediately after the final analysis was done.
- The statistical analysis were done and presented in a manner that individual responses could not be identified.

5.5.3.2 Issues and sources of errors in web surveys

Response and non response

Response bias has been defined as "the systematic tendency to distort responses to rating scales so that observed scores are unrelated to the true score of the individual by either selecting extreme or modest answers (extreme or modesty response bias) or a shifting of responses to either end of the scale (acquiescence response bias)" (Fischer, 2004:263), This is usually the result of what the respondent thinks is the most favourable, or most unfavourable response, required for the particular survey. While response bias has got all to do with the respondent, researchers have come up with methods of eliminating or reducing the bias. These methods include measures to improve on the content and construct validity of the questionnaire tool (Dornyei, 2003) as well as standardization (Fischer, 2004).

As explained, content and construct validity was addressed during the survey design. Non-response is the failure to get responses or measurements for some or all items used in a survey. This failure leads to non-response bias or error, which is the "the differences between respondents and non-respondents, on the variables of interest" (Grandcolas, Rettie, & Marusenko, 2003:4-5). It is increasingly difficult to ascertain the non-response rate in web-based

surveys, especially where the invitation to participate was done through online mailing lists. However, Grandcolas and colleagues (2003) have attributed non-response to respondents' interest in the topic, privacy concerns and technical problems. Some of the suggested ways of dealing with non-response in web-based surveys are: increasing the sample sizes (Deutskens, de Ruyter, & Wetzels, 2006), prior warning and follow-up mailing (Dillman, 1991), and using multilevel analysis for modelling variations in response rates (Lyness & Kropf, 2007; Rogelberg & Stanton, 2007). Other methods identified by Rogelberg and Stanton (2007:197) for facilitating responses include: publicising the survey, using careful designs, providing incentives, managing survey length, using reminder notes, providing response opportunities, and monitoring survey response. To address non-response and to facilitate response, a number of measures were employed increasing the time, email prior warnings and reminders, and using simple designs.

Coverage

Coverage is "a mismatch between the target population and the frame population, which results in a difference on the surveyed statistic between those covered and those not covered" (Grandcolas, Rettie, & Marusenko, 2003:4). In this study, the coverage bias was introduced by the use of a web-based survey, because arguably, not all lecturers who would have responded to the survey would have internet connectivity during the time of the survey. Biemer and Lyberg (2003:80) suggested three methods of reducing or eliminating coverage bias: removal of duplicates and erroneous inclusions from a sample frame, using more than one frame, and using auxiliary data to check on missing population from the sampling frame.

Although the target population of the study was the whole of the teaching fraternity in Higher Education institutions, the tool was biased toward those who are using computers and by extension have an idea what eLearning is. It was therefore assumed that the target population that has access to the internet was sufficient for the study.

Sampling

Sampling errors arise from the sampling process because not all members of the target population are measured that "contributes to the difference between the sample estimate and the value of the population parameter obtained through a complete count" (Grandcolas, Rettie, &

Marusenko, 2003:4). Sampling error was reduced by ensuring that the sample used was a representative of the whole population of the academic staff in higher education institutions as possible.

Measurement

Measurement error is the "deviation of the answers of respondents from their true value on the measure" (Grandcolas, Rettie, & Marusenko, 2003:5), which is introduced by among other things the design of the instrument; conditions under which the instrument was responded to; the individual respondents' interests, mood and health; and the cross-cultural issues where the survey touches on different cultures (Wilson, 2004; Dornyei, 2003; Grandcolas, Rettie, & Marusenko, 2003).

Wilson (2004) recommends three ways of dealing with measurement errors: internal consistencies coefficients, *test-retest* coefficients, and alternative form coefficients. Because of the data collection procedure that ensured anonymity and the web-based approach, the test-retest coefficient, where a respondent is made to fill in the instrument twice and the reliability coefficient is calculated by correlating the two responses, could not be used for this study. Similarly, the alternative form coefficient could not be used because it requires the use of a different set of items for the instrument, which are then administered in two locations. The coefficients are calculated by correlating the two sets of responses. In this study therefore, the internal consistencies coefficient was used. In this method, only data from a single administration of the questionnaire is used to calculate the variability of the responses. Internal consistency of the instrument was ensured by having more than one item to test a single factor. In addition, during the analysis of the data, separation reliability and the Cronbach's alpha of the instrument were calculated.

5.5.4 Data coding

Data coding for the questionnaire was done during the design phase. The Likert-scale based items were coded from 0 to 7 (for example in some items 0 referred to Strong Agreement (SA) and 7 to Strong Disagreement (SD)). The True/False items were given a value of 1 for True and 0 for false. Items that required users to choose more than one item were coded using a binary

value progression, while those that required respondents to type in information were analysed manually, one at a time.

5.5.5 Data treatment

All completed and submitted questionnaires were exported to the analysis software (SPSS version 17 and Microsoft Excel 2010). SPSS was used to do most of the analysis and statistical tests including the cross-tabulation, the Mann-Whitney U test, and reliability testing. Microsoft Excel was mainly used for formatting and editing results. It was also used to confirm the run results from SPSS and to generate graphs.

5.5.5.1 Descriptive statistics

Descriptive statistics were used to give data summaries, tables, and graphs for describing the measured sample. Frequency tables were generated and the mean, mode and median calculated to form a foundation for doing further statistical analysis on the variables.

5.5.5.2 Inferential statistics

To be able to draw meaningful conclusions regarding the teaching staff in higher education, factor analysis was done to determine the homogeneity of the measured items, and to allow for generalizations and predictions. This enabled the testing of the propositions made in Chapter Four and the further refinement of the proposed eLearning framework.

5.6 Phase III: The development of an eLearning adoption framework

The final phase of the research involved refining the eLearning adoption framework and testing the refined framework.

Findings from the inferential statistics were used to identify the key components of the framework that was structured in Chapter Four. These key components provide an understanding and a *generalisable* theory based on the conditions of eLearning adoption in HEIs. During the model development and refinement, evidence of framework integration, predictions, relations, representation and description of the variables associated with eLearning adoption were taken into consideration.

5.7 Summary

An exploratory mixed-method research design guided this research inquiry. The choice of this approach was pertinent to the elucidation of information that shed light on the research propositions made. A research instrument was developed, validated and administered online to research participants via the Internet. The instrument provided quantitative data that was analysed using standard statistical applications, namely SPSS for Windows and Microsoft Excel. The methodologies and procedures used added possible new dimensions to the understanding the nature of eLearning adoption in HEIs.

In the next chapter, the data analysed is presented with the aim of determining the support for the propositions formulated in chapter four. Consequently, a framework for eLearning adoption in higher education in Eastern and Southern Africa is formulated.

Chapter Six: Data Analysis and Representation

6.1 Introduction

As indicated in chapter 5, the exploratory design employed in this study encompassed three phases. Although in this chapter the data has been presented differently, the first two phases are not mutually exclusive; neither did they occur in the chronology they have been presented here. The data for the study were analysed using the Statistical Package for the Social Sciences (SPSS) version 17.5. In addition, Microsoft Excel 2007 was used for the formatting of output and cleaning the data. Internal consistency reliability, descriptive statistics, and Exploratory Factor Analysis (EFA) were used in the first part of the data analysis. Internal consistency reliability of survey instruments is a measure of the reliability of different survey items intended to measure the same characteristic. One of the most commonly calculated measures of internal consistency reliability is Cronbach's alpha coefficient. Cronbach's alpha, which is used in this study, is an estimate of the proportion of variance. Descriptive statistics involve tabulating, depicting, and describing sets of data. In this study, descriptive statistics were used to classify and summarise the data, and to describe the basic features, mainly by using cross tabulation. Exploratory Factor Analysis (EFA) was used to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables that manifest the unobservable factors in eLearning adoption.

This chapter is presented in five sections: 1) Data preparation 2) Descriptive statistics 3) Testing the propositions 4) The development of the eLearning adoption model and 5) Factors that influence the adoption of eLearning.

6.2 Data preparation

The data preparation involved the migration of the data from the web-based database, and then doing the cleaning and reliability analysis. An automated program was used to convert the data from the web-based database into a Comma Separated Values (CSV) format file. The CSV file was further exported to Excel, where cleaning and variable coding was done. The cleaning involved removal of all the incomplete and inconsistent records in the data. The original Excel file had 167 records, with 76 (45.5%) complete records. Of the incomplete records, 9 were saved

by respondents, a possible indication that they intended to come back to complete the questionnaire. However, because of the confidentiality settings of the questionnaire, it was not possible to determine who they were and to ask them to finish the questionnaire.

Cleaning up the data involved verifying the origin and integrity of the data. In the origin verification, the host Internet Protocol (IP) was compared with the country information provided[20]. Of the 76 completed questionnaires, 8 were unusable for the analysis: 5 were rejected because of the host Internet Protocol (IP) addresses used were not originating from the countries of the study and had inconsistent data. Two were completed by people who indicated in some of the open question fields that they were doing it to see the kind of questions asked, probably other research students. One was filled by the researcher when testing the online questionnaire. After the clean up, the 68 usable records were exported into SPSS.

6.2.1 Reliability of the Measure

For a measure to be reliable, it should be free of errors, and it should have consistent scores across the administration of the questionnaire (Green & Salkind, 2005; Peterson, 1994). The most widely used measure of the reliability of a scale is Cronbach's alpha, mainly because unlike the test–retest or inter-rater reliability tests it does not require the administration of more than one questionnaires raters (Green & Salkind, 2005; Streiner, 2003; John & Benet-Martinez, 2000; Peterson, 1994). Cronbach's alpha is a measure of internal consistency reliability, with values between 0 and 1. When Cronbach's alpha is very low, it indicates that the scale was too short or there are no commonalities in the items. Generally, Cronbach's alpha values of 0.90 or greater are excellent and acceptable for high-stakes tests, while values of 0.70 to 0.90 are considered to be acceptable/good and appropriate for medium-stakes tests. Cronbach's alpha values below 0.5 are considered unacceptable (Dornyei, 2003; Swailes & McIntyre-Bhatty, 2002; Peterson, 1994; Straub, 1989).

Cronbach's alpha is affected by three things, namely, the length of scale, the dimensionality of the scale and the scale width, centrality and normality (Cortina, 1993). For example, the alpha

[20] The website http://www.ip2location.com/ was used to cross-check IP addresses against the country – always with an accuracy of 95%, which was considered sufficient for this study.

increases with the number of items, for example, “an average inter-item correlation of 0.70, alpha rises from 0.83 for a two-item scale to 0.94 for seven-item scale” (Swailes & McIntyre-Bhatty, 2002:530). Cronbach’s alpha is good in the assessment of scores of one-dimensional data-sets. Multi-dimensional datasets could erroneously give high alpha values that do not necessarily indicate homogeneity of the scale (John & Benet-Martinez, 2000). The number of points on a scale could influence the alpha, but Swailes and McIntyre-Bhatty (2002) indicate that the effect often is negligible for a range of four to seven response points. In addition, scales with a central point (odd number of points e.g. 5 and 7) tend to generate higher alphas than those with even points (e.g. 4 and 6). Skewness (or lack of statistical symmetry) of the data affects the “estimation of error variance” which influences the alpha coefficient (Swailes & McIntyre-Bhatty, 2002).

For this study, Cronbach’s alpha was calculated in two stages. First, all the items on the whole instrument consisting of all the 106 Likert Scale-based measures were considered which gave a Cronbach’s alpha of 0.941. Secondly, Cronbach’s alpha was estimated for all the subscales, or groupings of the main constructs of the instrument. This yielded the results shown in table 6.1 below.

Table 6.1: Reliability alpha of the measure

Number	Element of measure	Alpha	Items
1	How easy is it to use eLearning	0.913	4
2	What are feelings regarding the benefits accrued in using eLearning?	0.913	3
3	How compatible is eLearning to my teaching? (items need reversal)	0.703	4
4	Perception of the availability of resources	0.815	2
5	To what extent are the results of using eLearning visible?	0.76	4
6	Measure of self-efficacy	0.834	6
7	How complex is using eLearning? (some items need reversal)	0.808	5
8	Personal innovativeness	0.751	11
9	Innovativeness need*	0.699	11
10	Communication behaviour	0.767	5
11	Prior experience**	0.511	2
12	Top management support	0.945	10
13	Degree of formalisation	0.911	9
14	Change culture (explanation, or not used – one reversal)	0.721	5
15	ELearning decision making	0.936	12
16	Participation in policy decision	0.952	5
17	Availability of champion	0.916	3

* Contained items that need to be reversed
** The relatively small number of items is lowering the Cronbach's alpha for this item

The reliability of the measure was satisfactory for all the factors except two: prior experience had only two items, which lowered its Cronbach's alpha. Innovativeness need had items that needed reversal after which the Cronbach's alpha became 0.71.

6.3 Descriptive statistics

Descriptive statistics were categorised into three sections: demographics, experience with eLearning and availability of quality information as discussed below.

6.3.1 Demographics

Table 6.2 below gives a summary of the demographic characteristics of the respondents.

Table 6.2: Summary of demographic details

Age	Group	Frequency	Percent	% using eLearning
	25-30 Years	9	13.2	22.2
	31-35 Years	14	20.6	50.0
	36-40 Years	9	13.2	55.6
	41-45 Years	9	13.2	33.3
	46-50 Years	14	20.6	71.4
	Over 50 Years	13	19.1	76.9
Gender	Female	24	35.3	62.5
	Male	44	64.7	50
Academic Rank	Professor	7	10.4	85.7
	Associate Professor	4	6.0	50.0
	Senior Lecturer	14	20.9	78.6
	Lecturer	23	34.3	56.5
	Assistant Lecturer	6	9.0	16.7
	Graduate Assistant	7	10.4	14.3
	Other	6	9.0	33.3
Role Description	Visiting	2	2.9	50.0
	Adjunct	1	1.5	0
	Teaching	47	69.1	61.7
	Clinical	4	5.9	25.0
	Extension	1	1.5	0
	Research	7	10.3	28.6
	Other	6	8.8	66.7
Experience	Less than 1 year	5	7.4	20.0
	1-2 Years	3	4.4	0
	2-5 Years	14	20.6	14.3
	5-10 Years	17	25.0	52.9
	10-15 Years	11	16.2	81.8
	Over 15 years	18	26.5	88.9
Employment Status	Permanent	45	66.2	62.2
	More than 5 year contract	4	5.9	50.0
	2-5 Year contract	7	10.3	71.4
	1-2 year contract	5	7.4	20.0
	6-12 Month Contract	3	4.4	0
	< 6 Months Contract	1	1.5	0
	Other	3	4.4	33.3
Country	Kenya	19	27.9	21.1
	South Africa	26	38.2	84.6
	Others	23	33.8	47.8

Age: The results of the table 6.2 shows that the majority of the respondents (that is academic staff) in the universities are more than 35 years of age (66.2%) and only 9 (13.2%) were below 30 years. This is in line with previous research (Sawyerr, 2002) which lamented the aging factor of academics in African higher education institutions. It would also seem that more older people than younger people are using eLearning in their teaching, contrary to expectations that young people, who are more accustomed to digital technologies, would be on the forefront.

Gender: Of the 68 completed and usable questionnaire results, 24 or 35.3% were females, and 44 or 64.7% were male, probably showing that a) the higher education sector and in particular the lecturing positions are dominated by males, or b) gender has a bearing on the use of technology given the questionnaire was online. However, the gender and technology use thesis is not supported as the analysis of eLearning usage by gender shows that 50% male and 62.5% female are using eLearning.

Academic rank and role description: The majority (34.3%) of the respondents are designated as lecturers. Most of the people responding had an academic title (80.6%) of Assistant Lecturer to Professor. The focus of the research was on the teaching staff of the university, which represents 69.1% of the respondents. In addition, the research role in a university could also be synonymous to teaching, especially where the researcher is guiding students on their research projects. Cumulatively, the teaching and research respondents account for 80.2% of respondents.

Experience: Most of the respondents (67.6%) have more than 5 years of teaching experience. Only 8 (11.8%) have been teaching for less than two years. Interestingly, the more experienced people are in teaching higher education, the more likely they are to adopt the eLearning. This could probably be attributed to the fact that the more comfortable a person is with teaching, the more willing he/she would be to try new things. However, this is also not supported as scrutinising the construct of prior experiences most respondents indicated that they could use eLearning only if it fits into the *status quo*.

Employment status: A great number of respondents are on long term or permanent contracts: 66.2% are permanent, 5.9 are on contracts of more than 5 Years. A very small number of

respondents (5.9%) are on contracts of less than one year. The employment status seems to have an effect on eLearning adoption as the majority of those on permanent and long term contracts are using eLearning compared to those on shorter term contracts.

Countries: The majority of the respondents were from South Africa (38.2%). Kenya had 27.9% of the respondents, while 33.8% were from other countries in Eastern and Southern Africa.

6.3.2 Experience with eLearning

Most of the respondents, as per table 6.3 below, have had some experience with eLearning with a good majority (56.1%) using it for their courses. A number (43.9%) of the respondents have attended a course on eLearning. Only 3% of the respondents do not have any experience on eLearning. Respondents could select more than one item and therefore the percentage of cases exceeds 100%.

Table 6.3: What kind of experience have you had with eLearning?

	n	Percent	Percentage of cases
None	2	1.5%	3.0%
I have seen colleagues using it	27	19.9%	40.9%
I have seen it being advertised at my University	24	17.6%	36.4%
I attended a course on eLearning	29	21.3%	43.9%
I am using it for teaching and learning	37	27.2%	56.1%
I heard about it from colleagues at another university	17	12.5%	25.8%
Total	136	100.0%	206.1%

6.3.3 Availability and quality of information on eLearning

The popularity of eLearning in the region is high, with only 2.9% of the respondents indicating they have never heard any information on eLearning. More than half of the respondents (55.9%) indicated they often receive information on eLearning as represented in table 6.4.

Table 6.4: How often do you receive information about eLearning?

	Frequency	Percent
1 (Very Often)	23	33.8
2	15	22.1
3	6	8.8
4	13	19.1
5	6	8.8
6	3	4.4
7 (Never)	2	2.9
Total	68	100.0

The quality of information presented at universities with regard to eLearning is highly rated on five constructs, namely timeliness, accuracy, adequacy, completeness and credibility as shown in table 6.5 below.

Table 6.5: Perception of eLearning communication quality within university (%)

	Strongly Disagree	**Tend to Disagree**	**Disagree**	**Neutral**	**Agree**	**Tend to Agree**	**Strongly Agree**
Timely	11.8	8.8	13.2	22.1	11.8	22.1	10.3
Accurate	8.8	4.4	10.3	25	17.6	20.6	13.2
Adequate	14.7	14.7	13.2	14.7	13.2	20.6	8.8
Complete	11.8	20.6	13.2	25	7.4	14.7	7.4
Credible	2.9	11.8	5.9	27.9	25	14.7	11.8

From Table 6.5 it is evident that the majority (44.2%) of the respondents consider the information presented as timely, while a third of them (33.8%) consider the information untimely. The accuracy of the information provided scored the highest (51.2%) with only 23.5% of respondents considering the information inaccurate. The credibility of the information provided was also high, with 51.5% of the respondents indicating that there is credibility in the kind of information disseminated concerning eLearning at their University. However, on completeness of information, only 29.5% of the respondents found the information provided at their universities with regard to eLearning as complete while the majority of the respondents (46.6%) consider it to be incomplete.

6.4 Testing the propositions

Twenty one propositions were generated from the literature for this research, 14 of which were to be tested with the collected data in this research. The propositions are grouped into three broad categories: Individual attitudes, characteristics and traits; organisational characteristics; and social, system and environmental factors. In testing the propositions, data was presented in a graphical format, showing the responses of each of the groups with regard to the items of measure. In addition, the Mann-Whitney U test (also called the Mann–Whitney–Wilcoxon (MWW), Wilcoxon rank-sum test, or Wilcoxon–Mann–Whitney) was used to evaluate the propositions. The Mann-Whitney U test was chosen because it makes no assumption about the normality of the distribution, especially when measurements are made on a continuous scale. It furthermore caters for the particular situation because of the relatively low number of measurements, and the ease of ranking of the potential sample data (Ozturk & Wolfe, 2000; Bergmann, Ludbrook, & Spooren, 2000).

6.4.1 Individual attitudes

Under individual attitudes, *that is*, the degree to which an individual – negatively or positively - values the use of eLearning, it was postulated that:

P:1 An individual's attitude towards eLearning adoption decision will have a significant influence on its adoption. Where that attitude towards the eLearning adoption decision is positive, there will be positive influence and where the attitude is negative, there will be a negative influence.

This proposition is measured using the constructs of ease of use, benefits or relative advantages, compatibility, availability of resources, demonstrability of results, self-efficacy and complexity.

6.4.1.1 Ease of use of eLearning

The relative ease with which the academic staff can manage their teaching and learning is captured under the construct of perceived ease of use. Under this construct, it is postulated that:

P1a. An individual's perception of the ease of use of eLearning will have a significant positive influence on its adoption.

As expected, and consistent with many studies, most (56.1%) of the lecturers using eLearning perceived it to be easy to use, which is not the case with the 43.9% of the respondents who are not using eLearning as shown in chart 6.1 below.

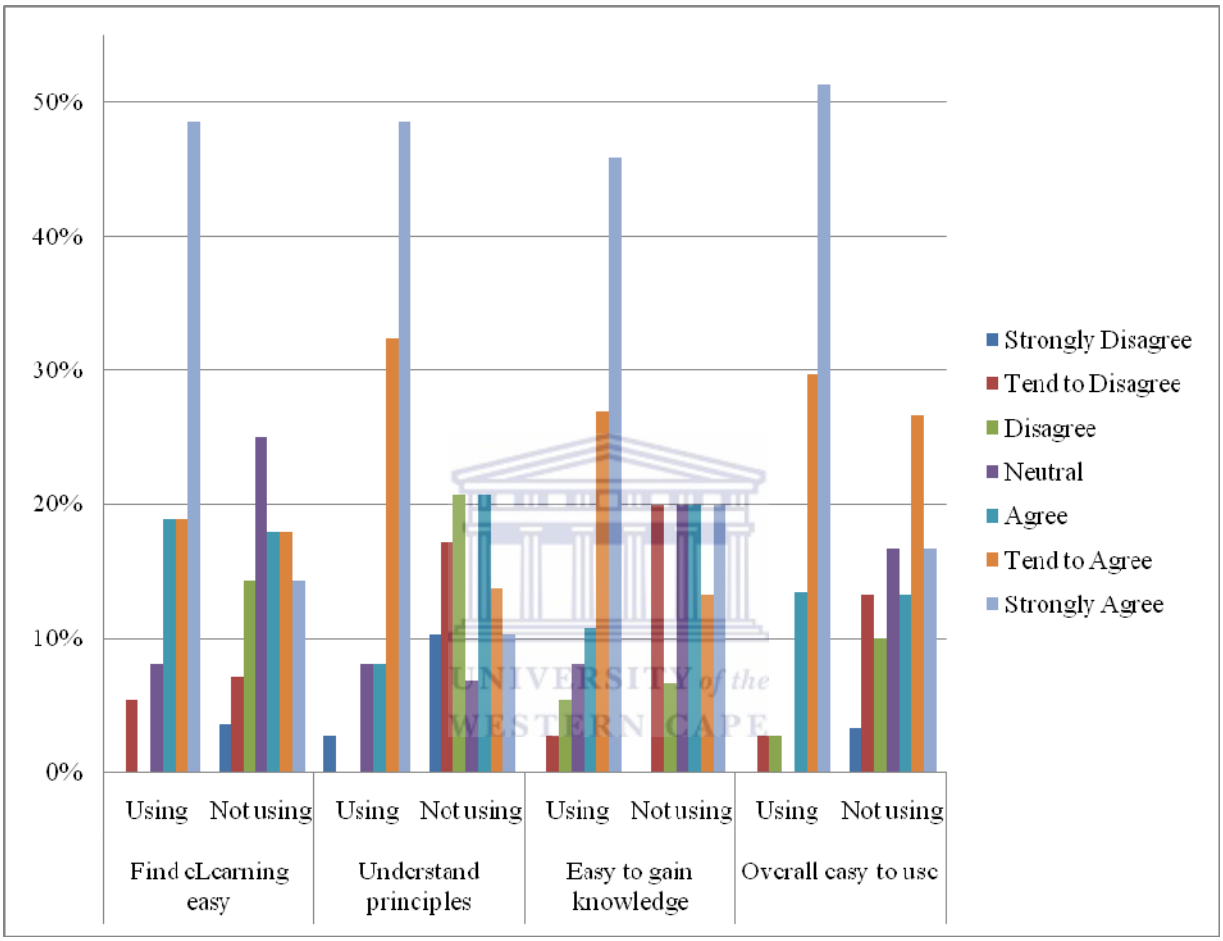


Chart 6.1: The perception of ease to use

In addition, a Mann-Whitney U test was conducted to evaluate the proposition that those who are already using eLearning would perceive it as easier to use than those not using it. The results of the test were in the expected direction and significant, ($-4.641 < z > -3.141$), $p < 0.05$ for the four items. Those using eLearning had an average rank ranging between 39.80 and 42.96, while those not using eLearning had an average rank ranging between 21.43 and 25.93. This shows that the proposition is supported.

6.4.1.2 Relative advantage

The relative advantage of eLearning is in its ability to offer teaching and learning in a better way than the other modes, for example, face to face learning. In this construct, it is hypothesised that:

P1b. An individual's perceptions of the relative advantage in using eLearning for teaching and learning will have a significant positive influence on the adoption decision.

Chart 6.2 presents the aggregated response on the three variables measuring the relative advantage of eLearning. More than 50% of those using eLearning "*strongly agree*" in all the items that eLearning is relatively advantageous, compared to just over 35% of those not using eLearning.

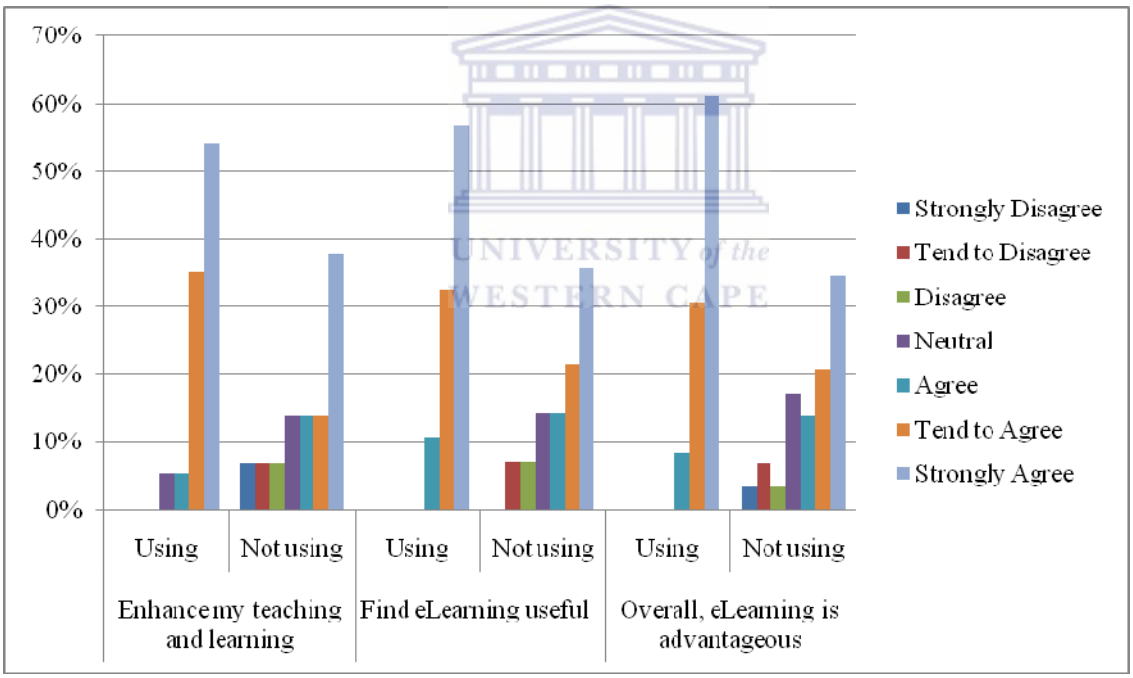


Chart 6.2: The perception relative advantage on those using eLearning

The Mann-Whitney U test to evaluate the proposition was performed. The results confirmed that those using eLearning perceived it to be relatively more advantageous than those not using it for all three variables ($-3.057 < z > -2.503$), $p < 0.05$ with a ranking average of between 38 and 38.97

for those using eLearning and between 25.59 and 27.24 for those not using eLearning. This proposition was supported.

Similarly, as shown in chart 6.3, more respondents, who have attended a course on eLearning, perceive it as relatively more advantageous than respondents who have not attended a course.

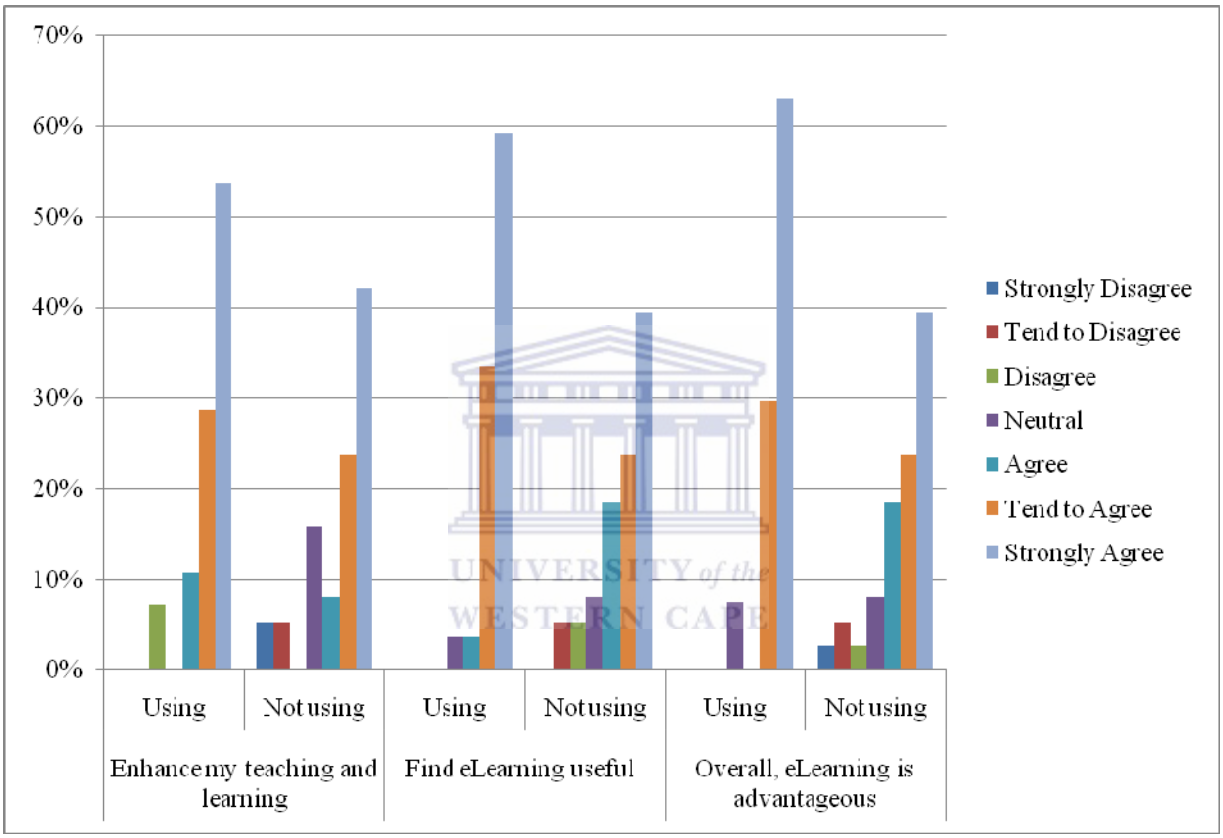


Chart 6.3: The perception of the relative advantage of eLearning of those who have attended eLearning training

On the assumption that people who attend training on eLearning, and those using it, perceive it as relatively advantageous, the research, and the Mann-Whitney U test revealed that the results confirmed this in all but one of the variables. The variable "*Using eLearning (would) enable(s) me to enhance my teaching practices*" was found to be in the expected direction, but insignificant, z=-1.392, p=0.164 with the ranking means of 37.09 and 30.86 respectively for those who have attended a course on eLearning and those who have not attended.

6.4.1.3 Compatibility

Compatibility in eLearning is measured using perceptions of convenience and suitability and against the existing modes of teaching. Using perceived compatibility, it is postulated that:

P1c. An individual's perception of the compatibility of eLearning with the traditional teaching and learning methods will have positive and significant effects on its adoption.

The perception of respondents with regard to the compatibility of eLearning with traditional learning is presented in chart 6.4 below.

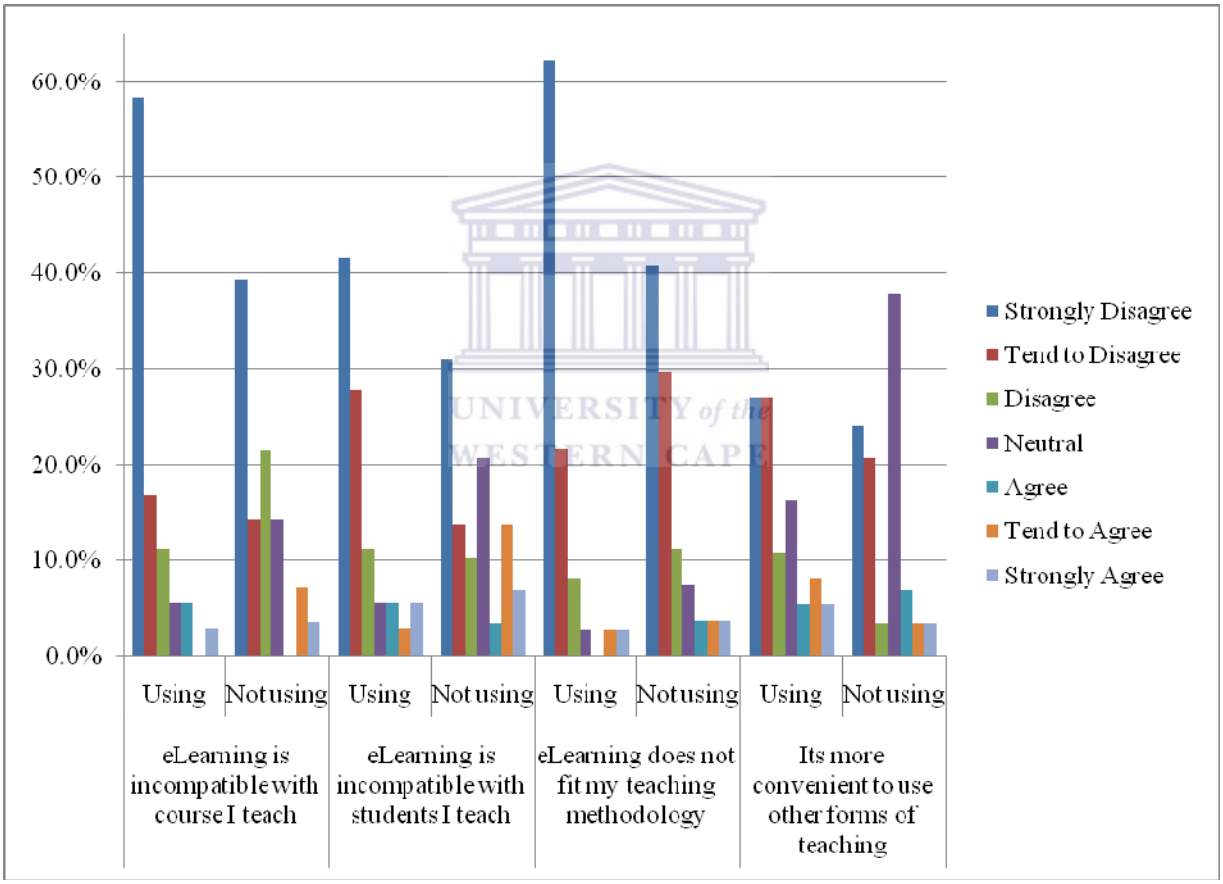


Chart 6.4: The perception incompatibility on those are using eLearning training

From the data as depicted in Chart 6.4 above, there is no revelation of any significant difference in the perceptions of incompatibility of eLearning with other teaching methods or the courses and the students. For example, with regard to the variable "*It's more convenient to use other*

forms of teaching", 27% of those who are using eLearning, and 24.1% of those who are not using eLearning do "*strongly disagree*" with the statement, while 27% and 20.70% respectively "*tend to disagree*". Although this description seem to show strong confirmation of the propositions, the Mann-Whitney U test revealed that although the variables were in the expected direction, ($-1.735 < z > -0.517$), with the ranking averages between 34.55 and 36.40 for those using eLearning, and between 28.18 and 32.16 for those not using eLearning, they were not significant, $p>0.08$ for all the variables. This proposition was supported.

6.4.1.4 Availability of resources

Experimentation and the use of eLearning are pegged on the availability of resources. Two variables were used to measure the effect of availability of resources and the adoption of eLearning:

P1d. The extent to which eLearning tools and technologies are availed to an individual for experimentation will have a significant impact on the individual's decision to adopt eLearning.

The availability of eLearning resources to respondents for experimentation is depicted in chart 6.5 below.

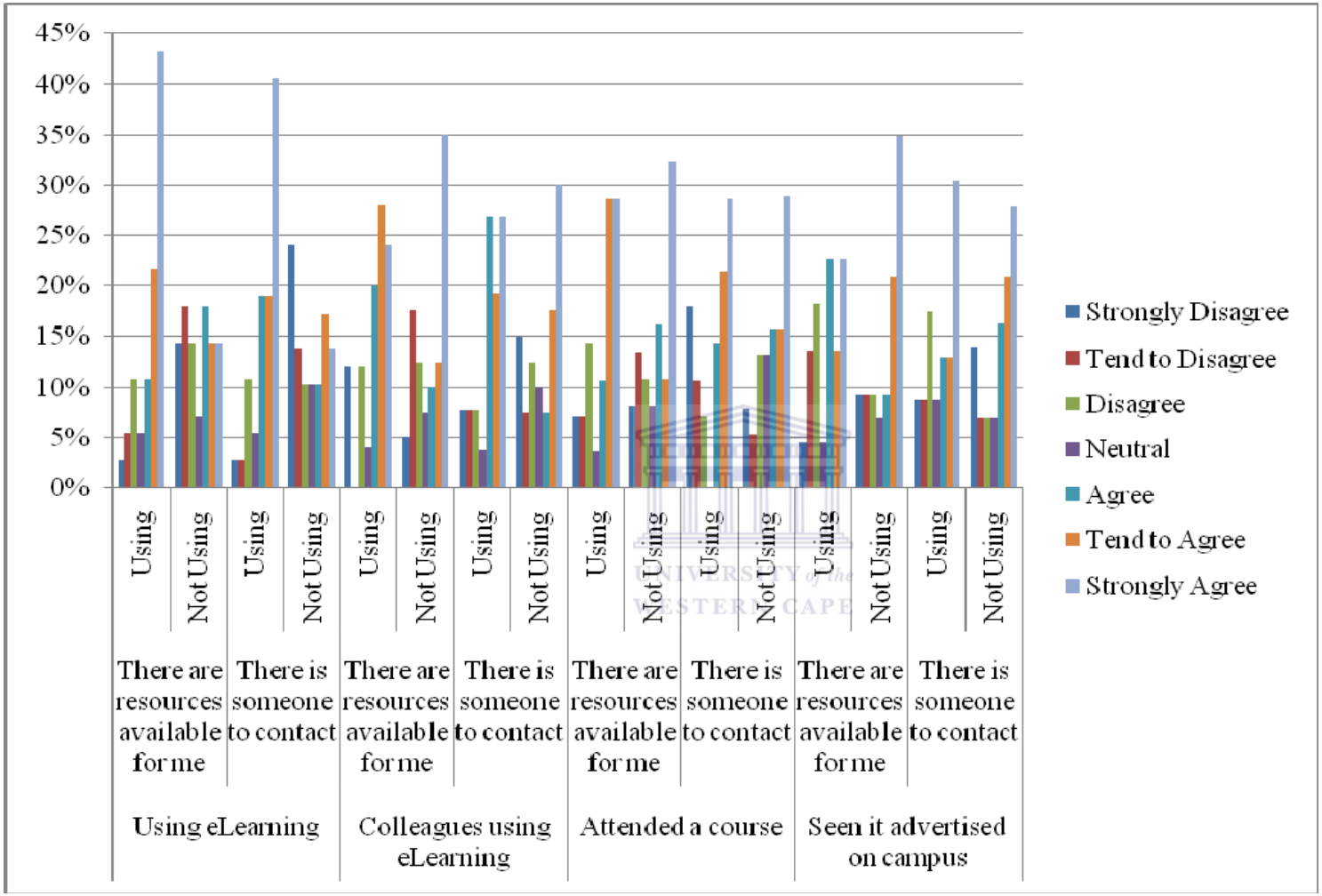


Chart 6.5: The extent of the availability of resources for use in eLearning

The results show that, consistent to other studies and the expectations, respondents using eLearning perceive it to be available, and also agree that there is someone to contact should they need help in using eLearning. In addition, the percentage of those agreeing with the resource availability are lower for categories of respondents who have seen colleagues using eLearning, attended courses on eLearning or have seen eLearning advertised in their institutions, than those who are actually using it. In fact, there is some inconsistency as respondents who have not seen colleagues use eLearning or attended a course on eLearning seem to agree there are resources available for them should they need to experiment on eLearning. The Mann-Whitney U test confirmed the proposition, z>-3.126, p>0.05, and the means were between 39.24 and 40.23 for those using eLearning, and 24.75 and 24.91 for those not using eLearning. A further analysis using the Mann-Whitney U test show results that are not significant for those who have attended a course on eLearning (p>0.6), those who have seen it advertised on campus (p>0.3), and those who have seen it advertised on campus (p>0.6).

6.4.1.5 Perception of demonstrability of eLearning

For eLearning to be adopted, the adopting units should perceive it as demonstrable, *that is*, having proven that eLearning works. The assumption therefore is that the potential adopters would see eLearning as good for their image and/or have proof or evidence that eLearning has been successfully used by others around them. Using this assumption, it is hypothesised that where there is demonstrability in the use of eLearning, there is likely to be higher usage of eLearning:

P1e. The extent, to which the results of using eLearning are demonstrable to the potential adopter, will positively influence the potential adopters' decision on eLearning.

The extent, to which eLearning results are demonstrable to the respondents, is displayed in Chart 6.6 below.

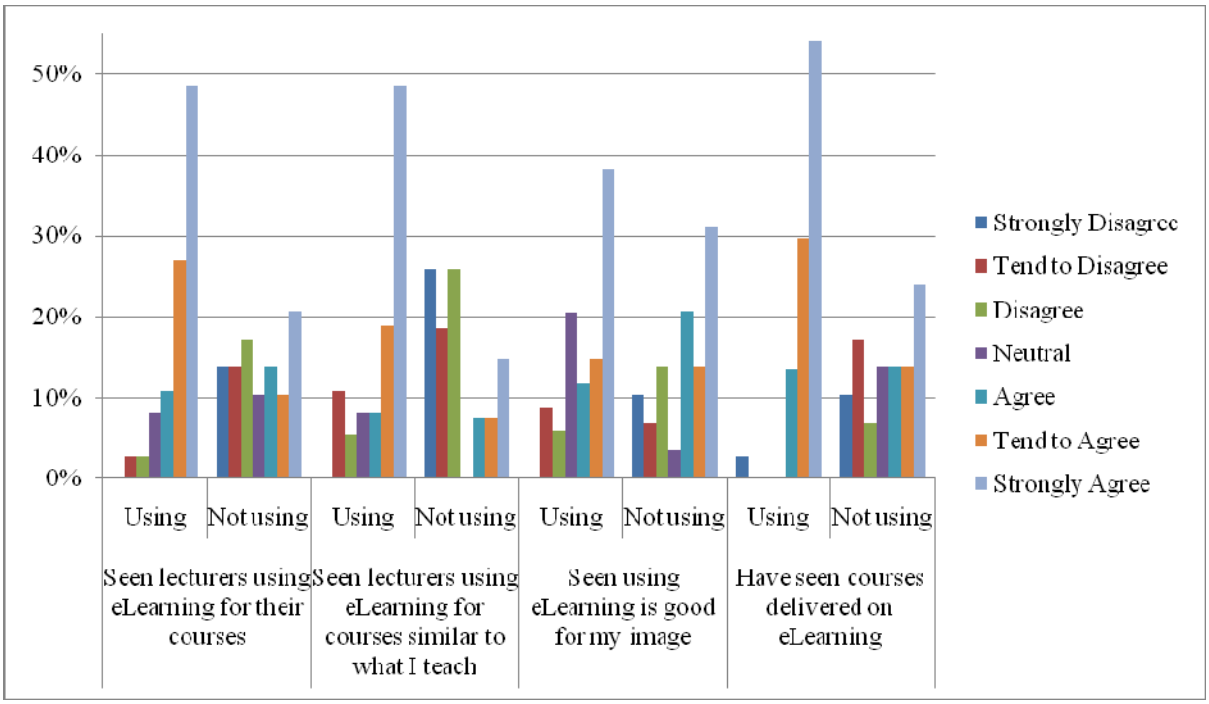


Chart 6.6: The extent of demonstrability

According to Chart 6.6, evidence of others using eLearning indeed has a positive effect on the decision to adopt eLearning. However, the perception of "goodness of image", although having a positive impact, does not have as great an effect as the visibility of the actual use of eLearning. Perhaps this can be explained by the factors affecting the motivation to use eLearning, as explained in section 4.3.3 on intrinsic *and* extrinsic motivation. In agreement, the Mann-Whitney U test confirmed that those who are using eLearning and those who are not using eLearning differed significantly in all the variables except the "goodness of image" as shown in Table 6.6:

Table 6.6: Demonstrability of eLearning

	Mann-Whitney U	Z	*p*
I have seen lecturers use eLearning for their courses.	258.000	-3.710	.000**
I have seen lecturers use eLearning for courses similar to what I teach.	209.000	-4.053	.000**
I think being seen using eLearning is good for my image.	**433.000**	**-.850**	**.395***
I have seen courses delivered on eLearning.	261.500	-3.711	.000**

***p value less than 0.01; *p value greater than 0.3*

6.4.1.6 Self-efficacy

The perception of self-efficacy is a measure of the expectation of success in using eLearning. It is postulated that where the expectation is high, there is a high likelihood of eLearning adoption:

P1f. High self-efficacy in the use of eLearning tools and technologies will have a positive influence on the adoption of eLearning.

Chart 6.7 shows that, although there are subtleness in the support for the proposition, there are elements of the responses that are worth noting. Most of the people who are not using eLearning would consider using it if there is online support available for them and they would also consider using eLearning if they are afforded more time to develop their online courses. In addition, having (someone to offer) assistance, is not motivation enough for respondents to use eLearning. Possibly because the attitudes developed concerning eLearning would not be changed by the availability of assistance.

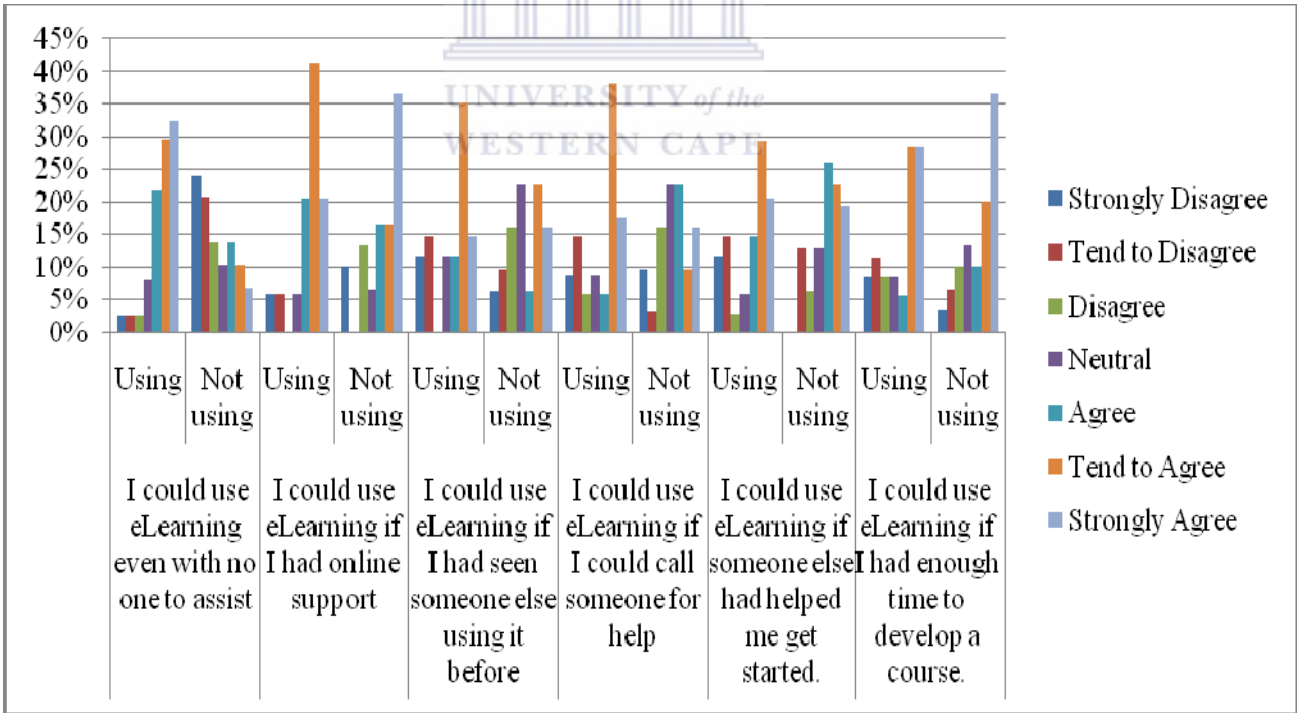


Chart 6.7: The effect of self-efficacy on the use of eLearning

Table 6.7 shows the results of the Mann-Whitney U test in the effect of self-efficacy on the use of eLearning.

Table 6.7: Perception of self-efficacy			
	Mann-Whitney U	Z	***p***
I could use eLearning even if there was no assistance available	**196.500**	**-4.458**	**.000**
I could use eLearning if I had online support on using eLearning.	508.000	-.028	.978
I could use eLearning if I had seen someone else using it before.	494.000	-.442	.659
I could use eLearning if I could call someone for help.	453.000	-.986	.324
I could use eLearning if someone else had helped me get started.	512.000	-.201	.841
I could use eLearning if I had enough time to develop an eLearning course.	475.000	-.676	.499

Except for the variable "*I could use eLearning even with no one to assist*" where ***z***= -4. 458, ***p***<0.05 with the ranking means of 42.69 for those using eLearning and 21.78 for those not using eLearning, all the other variables were not significant (***p***>0.3).

6.4.1.7 Complexity

Complexity in eLearning is measured using, among others, how cumbersome it is to use, ease of acquiring eLearning skills, and elements of frustrations in using eLearning. It is postulated that the lesser eLearning is perceived to be complex, the more likely is the decision to adopt it.

P1g. The extent to which eLearning is perceived to be complex by its potential adopters will negatively influence the potential adopters' decision regarding eLearning.

Interestingly, unlike the related measure of perceived ease of use, complexity variables do not show significant differences between those who are already using eLearning and those who are not as depicted in chart 6.8 below. In fact, more people not using eLearning (respectively 48.3%, 41.4%) "strongly disagree" that "Using eLearning will be a frustrating experience" and don't believe that eLearning is cumbersome, than the people using it (respectively 44.4%, 35.1%).

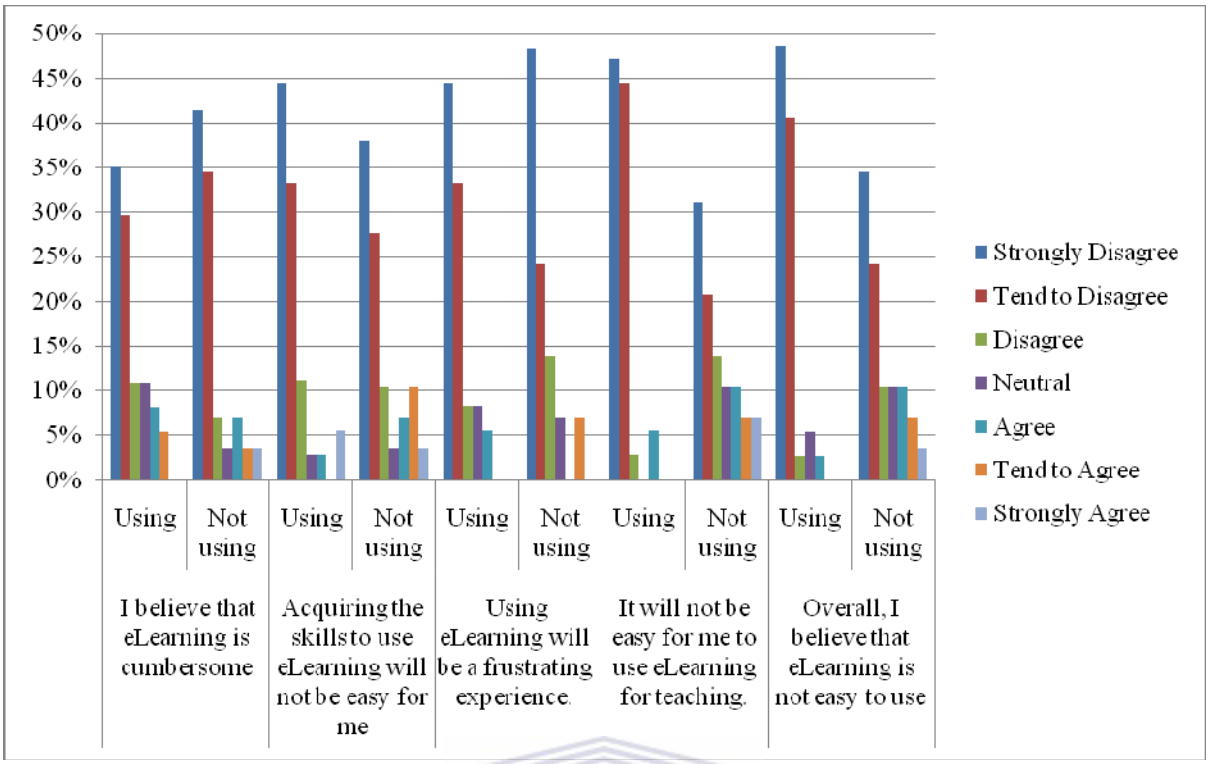


Chart 6.8: The measure of complexity of eLearning

Indeed, the Mann-Whitney U test reveal that two variables: "*it will not be easy for me to use eLearning for teaching and learning*" and "*overall, I believe that eLearning is not easy to use*" differ significantly with regard to those using eLearning and those not using eLearning (respectively z=-2.641, p=0.008 and z=-2.169, p=0.03). All the other variables have z<-0.014 (that is, in the expected direction) but very low significance p>0.30. This proposition was not supported.

Most aspects of the attitude towards eLearning were supported, namely, ease of use, relative advantage, availability of resources, demonstrability. However, aspects of compatibility, self-efficacy and complexity were not fully supported.

6.4.2 Personal innovativeness

Innovativeness in this research is the willingness of the respondents to try new ideas and concepts about eLearning. It is hypothesised that the higher the willingness to try out new (and related) eLearning ideas, the higher the likelihood of eLearning adoption:

P2: Personal innovativeness will have a positive influence on the decision to adopt eLearning.

The results of the Mann-Whitney U test for the personal innovativeness construct are shown in table 6.8.

Table 6.8: Personal Innovativeness Mann-Whitney U test

	Mann-Whitney U	Z	p
If I hear about a new information technology for teaching and learning, I would look for ways to experiment with it.	453.000	-1.379	.168
In general, I am hesitant to try out new information technologies for teaching and learning.	500.000	-.493	.622
Among my peers, I am usually the first to try out new information technologies for teaching and learning	**396.000**	**-2.046**	**.041***
I like to experiment with new information technologies for teaching and learning.	411.000	-1.939	.052
When it comes to deciding whether to use new teaching and learning methodologies, I don't rely on experienced colleagues	443.500	-1.261	.207
I decide to use new teaching and learning technologies without relying on the opinions of colleagues who have been using them.	481.000	-.770	.441
I do not rely on colleagues for information about new teaching and learning technologies prior to making up my mind about whether or not to use them in my class	417.000	-1.604	.109
My peers often ask me for advice or information on using eLearning	**273.500**	**-3.314**	**.001****
I am aware that I am usually one of the last persons in my department to accept new things	473.000	-1.110	.267
I tend to feel that the old ways of teaching and learning is the best	540.000	-.195	.845
I am challenged by unanswered questions on eLearning	**362.500**	**-2.152**	**.031***
*** p value less than 0.01*			
**p value less than 0.05*			

Only three items of the 11 measures of personal innovativeness were significant following a Man-Whitney U test: *I am challenged by unanswered questions* (***z***=-2.152, ***p***=.031); *My peers often ask me for advice or information on using eLearning* (***z***=-3.314, ***p***=0.001); and *Among my peers, I am usually the first to try out new information technologies for teaching and learning (****z***=-2.046, ***p***=0.041). However, all the variables were in the expected direction, with subtle differences between those using eLearning and those who are not using eLearning.

6.4.3 Innovativeness needs or personal motivation

Intrinsic and extrinsic motivation towards eLearning is hypothesised to influence its adoption. Intrinsic motivation, where an individual's use of eLearning brings about enjoyment, personal satisfaction or personal gratification is hypothesised to affect eLearning adoption positively:

P3a: The individual's personal satisfaction or gratification with regard to eLearning use will have a positive influence on the individual's eLearning adoption decision.

Intrinsic motivation seems to have a favourable impact on the use of eLearning, with most of the respondents using eLearning agreeing with all the measures of intrinsic motivation as represented in chart 6.9 below.

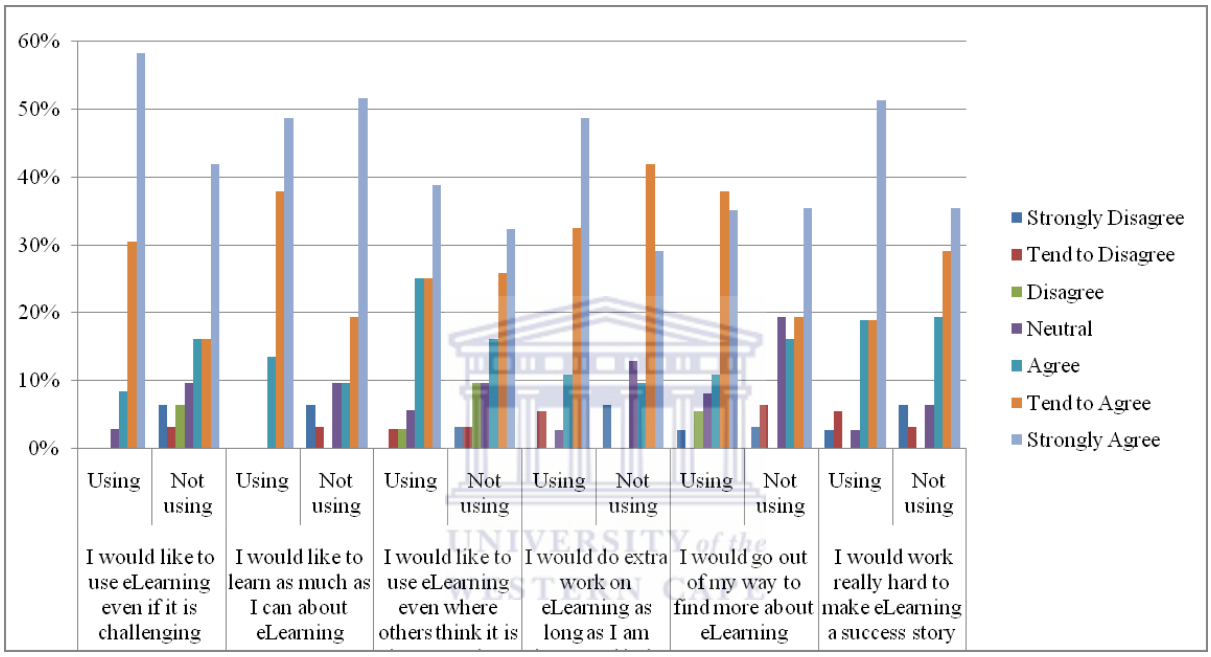


Chart 6.9: Effects of intrinsic motivation on eLearning adoption

However, using the Mann-Whitney U test to evaluate the differences between those using eLearning and those not using eLearning, insignificant differences became apparent in all the variables, except one. The variable "I would like to use eLearning even if it is challenging" differed significantly with z=-2.245, p =0.025. However, the test shows that the results are in the expected direction for all the variables. This proposition was not supported.

Extrinsic motivation on the other hand is where an individual expects some form of reward or sanctions for using eLearning. The rewards and sanctions can be monetary, coercive or punishment. It is postulated, then, that an individual's personal outcome expectations of these rewards or sanctions would have an effect on eLearning adoption:

P3b: The individual's personal outcome expectations with regard to using eLearning will have a positive and significant influence on the individual's eLearning adoption decision.

As expected, comparison of chart 6.9 above and chart 6.10 below seems to show that the effects of intrinsic motivation are a stronger indicator of willingness to use eLearning amongst most of the respondents. However, most of the people not using eLearning would like to be sent to an eLearning course before they start using eLearning and most people using eLearning seem to agree that they would use it if it is mandatory for the courses they are teaching.

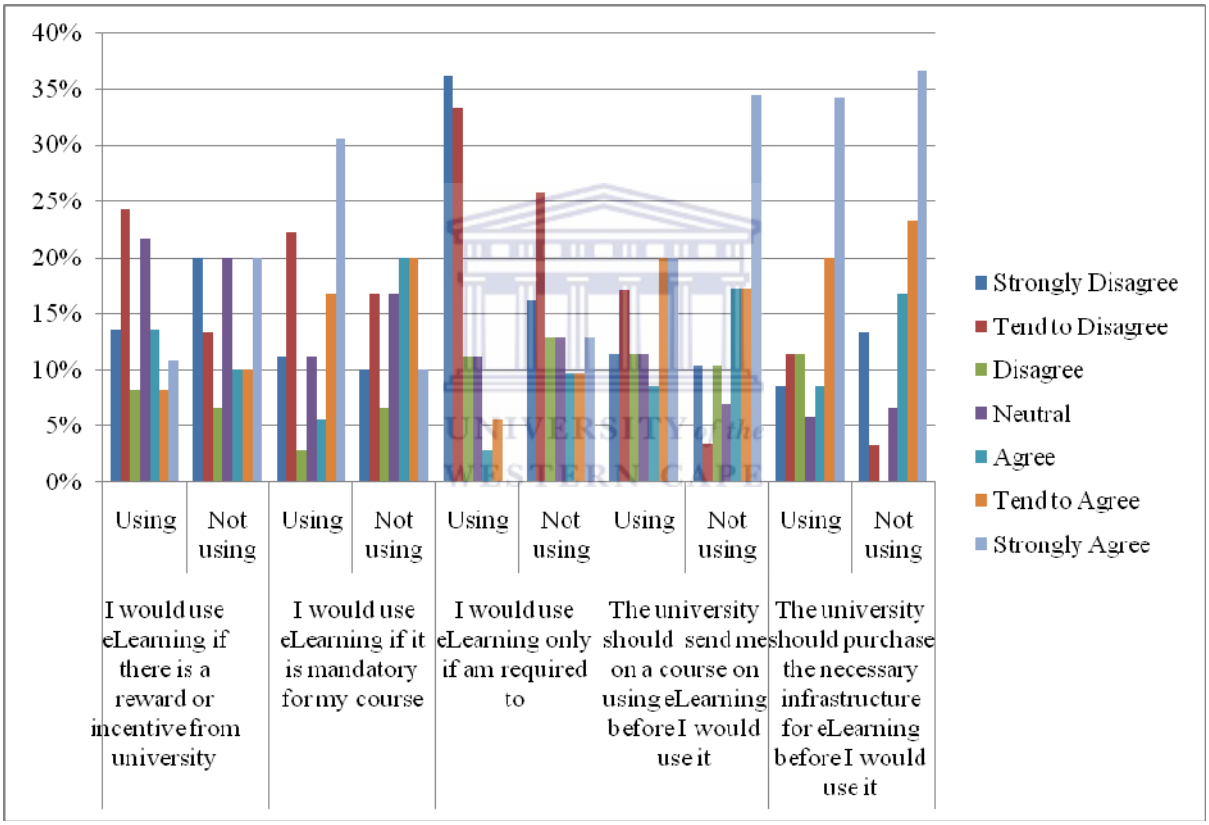


Chart 6.10: Effects of extrinsic motivation on eLearning adoption

A Mann-Whitney U test was conducted to evaluate the proposition that extrinsic motivation has a positive influence on eLearning adoption of eLearning. The result of the tests were in the expected direction for all the variables, but significant in only one of the five variables: "*I would use eLearning only if am required to*" with z= -2.684, p=0.007. This proposition was not supported.

6.4.4 Communication behaviour

It is hypothesised that an individual's exposure to people using eLearning, and communication with them will have a positive impact on the individual's adoption of eLearning, with greater effect if the communication is personal:

P4a: Interpersonal communication about eLearning will lead to higher adoption rates of eLearning.

P4b: An individual's exposure to others engaging in eLearning within higher education will have a positive influence on the individual's adoption decision.

Communication behaviour was measured using five variables as shown in chart 6.11. From the face of the data, most respondents using eLearning seem to support the propositions.

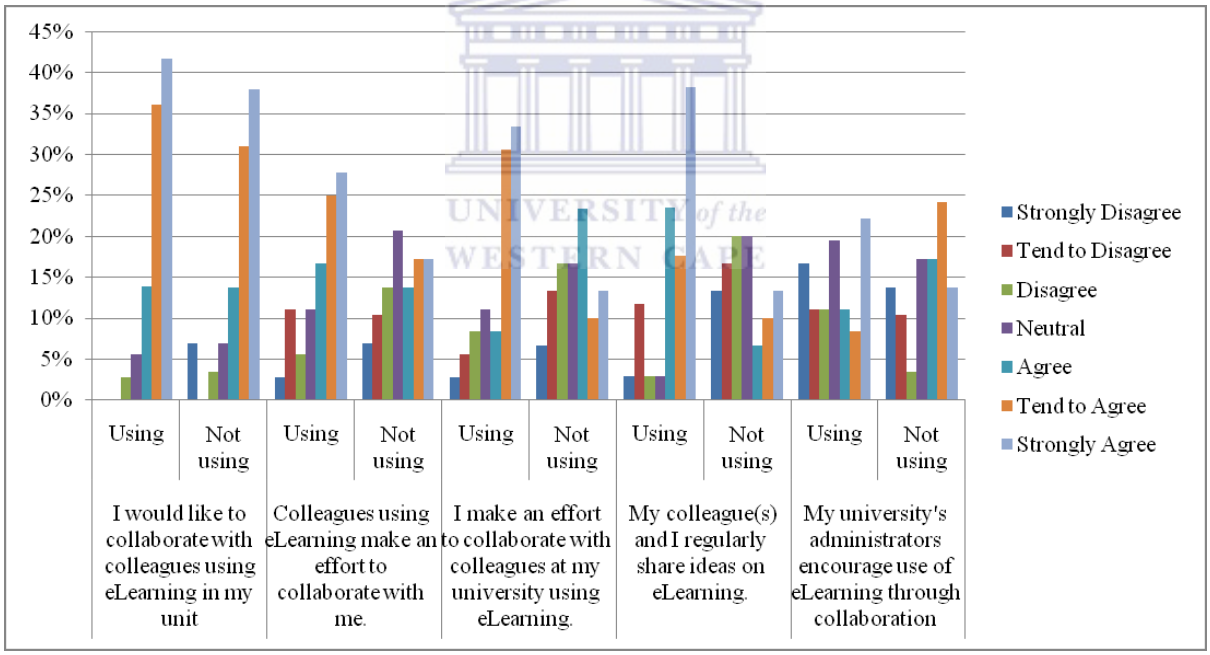


Chart 6.11: Effects of communication behaviour on eLearning adoption

Although the chart above seem to support the proposition, the Mann-Whitney U test done to evaluate the propositions, reveal that only two variables, the ones concerned with the interpersonal communication support the hypothesis. The variables "*I make an effort to collaborate with colleagues at my university using eLearning*" and "*My colleague(s) and I regularly share ideas on eLearning*" are in the expected direction and significant

(respectively z=-2.782, p=0.005 and z=-3.212, p=0.001). All the other variables are in the expected direction, but insignificant. Therefore, the proposition on interpersonal communication (P4a) is supported while the proposition on exposure (P4b) is not supported.

6.4.5 Prior Experience

An individual's past exposure to, and interactions with eLearning and other similar innovations, is proposed to have an effect on his/her adoption of eLearning. If the past exposure was pleasant, he/she is likely to adopt eLearning, and if the experiences were not good, he/she will reject eLearning:

P5: An individual's prior experience with teaching and learning technologies will have a significant effect on the individual's eLearning adoption decision: where the prior experience was good or satisfactory the influence will be positive; where the prior experience was bad or unsatisfactory the influence on the adoption of eLearning will be negative.

The limited number of variables rendered this proposition inadequate to ascertain the true measure of its applicability. However, prior experience has an influence on the adoption of eLearning, as is depicted in chart 6.12 below. From the chart it is apparent that more of those who are using eLearning than those not using eLearning are in agreement that they would use eLearning if their students are not on campus regularly. On the same note, more of those not using eLearning are in agreement that they would use eLearning only if it does not interfere or change the way they teach their students.

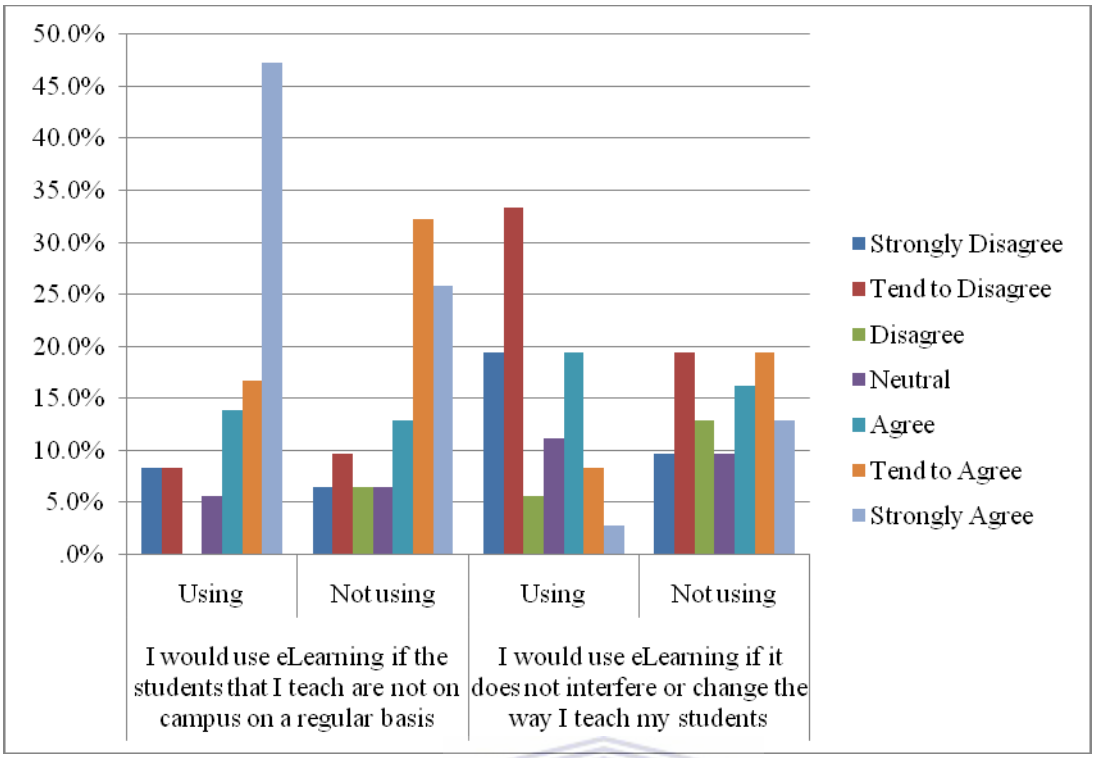


Chart 6.12: Effects of prior experience on eLearning adoption

Applying the Mann-Whitney U test confirm the above results in terms of the expected direction, but fall short on the significance of the results (respectively, z=-1.219, p=0.223 and z=-2.110, p=0.035). The proposition on the effects of prior experience on eLearning adoption is could not be adequately ascertained.

6.4.6 Organisational Factors

ELearning adoption is hypothesised also to be affected by a number of factors within organisations. These factors include top management support, availability of champions and championship behaviours, organisational structure, and organisational culture.

6.4.6.1 Top management support

As in all other initiatives where management of organisations is involved, it was proposed that where top management shows a concerted effort to support eLearning, it could lead to a higher adoption rate:

P6: Top management's favourable attitude towards and support of eLearning will positively influence the adoption of eLearning.

The effect of top management support on the adoption of eLearning by respondents is presented in Chart 6.13 below.

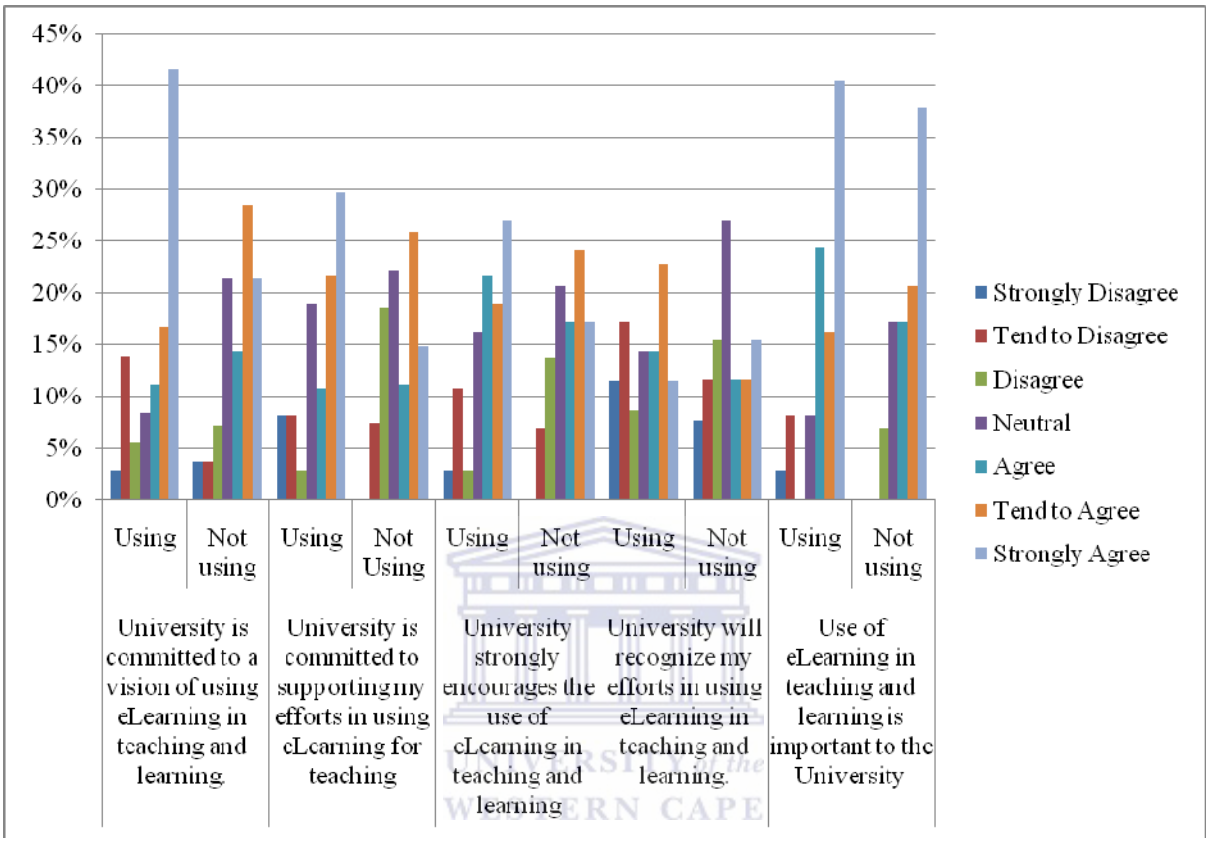


Chart 6.13: Effects of top management support on eLearning adoption

Although there seems to be agreement that most universities' administration is in support of eLearning adoption, this support does not translate to individual adoption of eLearning as shown in chart 6.13 above. The Mann-Whitney U test evaluation of this construct is presented in table 6.9.

Table 6.9: Top Management Support Mann-Whitney U test			
	Mann-Whitney U	Z	***p***
The University is committed to a vision of using eLearning in teaching and learning	442	-0.861	**0.389**
The University is committed to supporting my efforts in using eLearning for teaching.	432.5	-0.928	**0.353**
The University strongly encourages the use of eLearning in teaching and learning.	486.5	-0.658	**0.511**
The University will recognize my efforts in using eLearning in teaching and learning.	454	-0.015	**0.988**
The use of eLearning in teaching and learning is important to the University.	531.5	-0.067	**0.946**

Even though the results are in the expected direction, the proposition is not supported because of its low level of significance **(*p* > 0.3).**

Chart 6.14 presents the results of middle management support of eLearning:

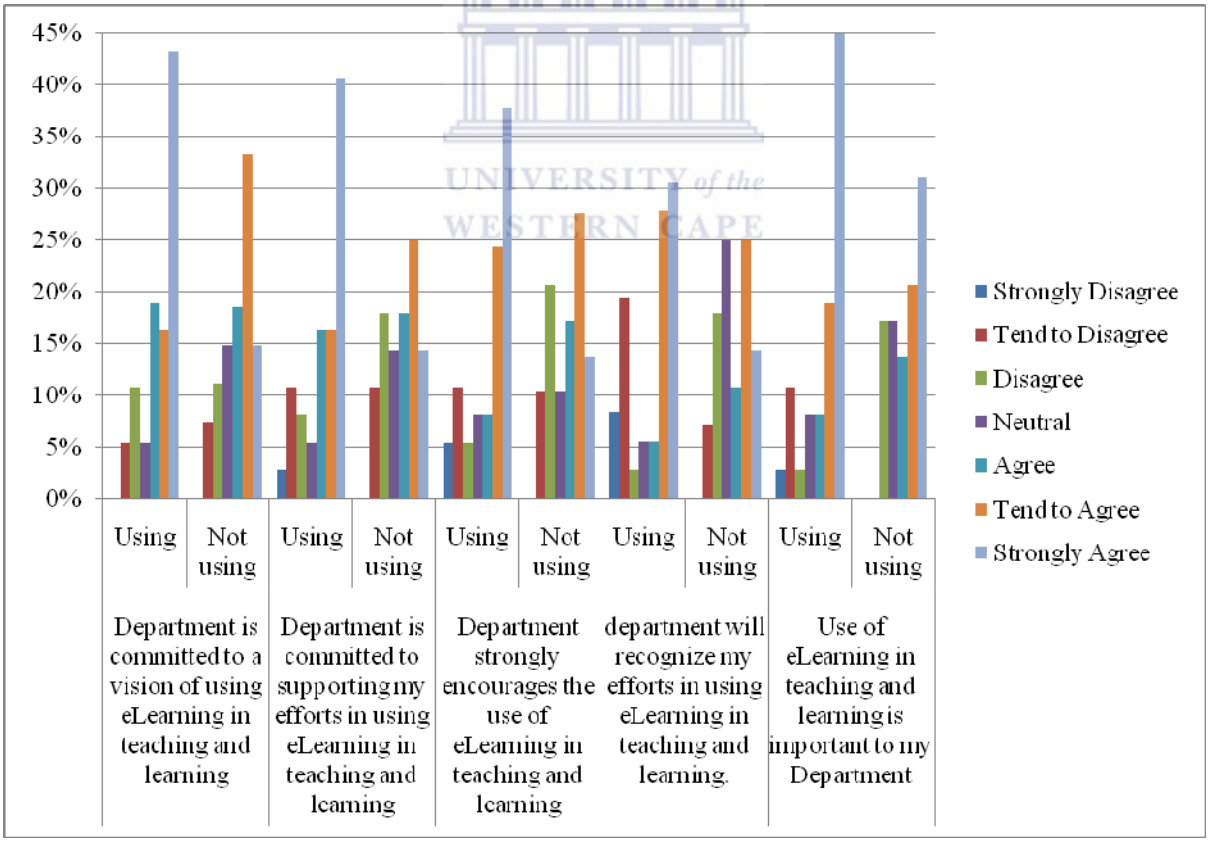


Chart 6.14: Effects of middle management on eLearning adoption

As with the top university management, departmental level support does not always lead to individual adoption of eLearning. Indeed, as with the top management support, the Mann-Whitney U test is in the expected direction ($-1.703 < z > -1.138$) but insignificant $p > 0.092$.

6.4.6.2 Availability of a champion

When there is a visible and influential champion of eLearning, it is proposed that there is a high likelihood of eLearning adoption:

P7: The availability of eLearning champions in higher education institutions will have a significant positive influence on the adoption of eLearning.

Most of the respondents acknowledged the availability and recognition of an eLearning champion. In all the questions, the percentage (number) of those not using eLearning who are either uncertain or do not recognize anyone in their institution who qualifies to be an eLearning champion are higher than those who recognise the existence of champions (It is also true that a higher number of those using eLearning recognise the availability of a champion than those not using eLearning) like demonstrated in chart 6.15.

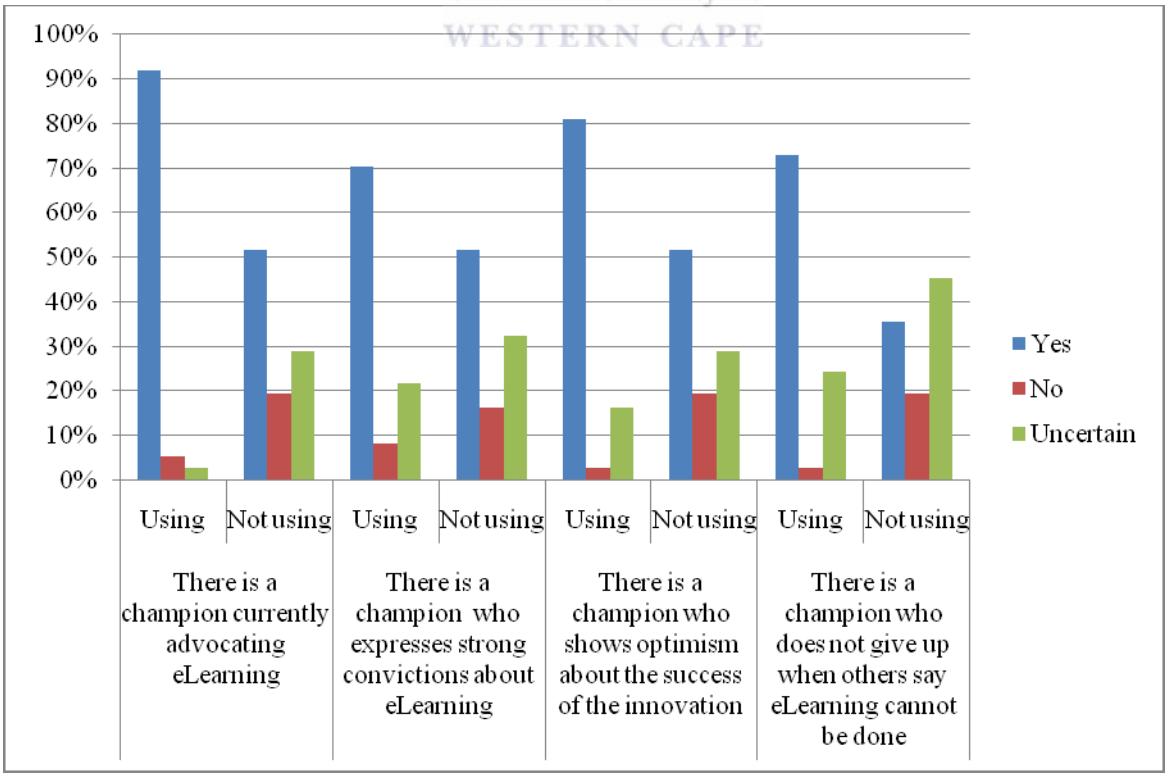


Chart 6.15: Effects of availability of an eLearning champion on eLearning adoption

Table 6.10 shows the results of the Mann-Whitney U test.

Table 6.10: Availability of a champion Mann-Whitney U test

	Mann-Whitney U	Z	*p*
There is a champion currently advocating eLearning	336.500	-3.775	.000
There is a champion who expresses strong convictions about eLearning	**471.500**	**-1.456**	**.145**
There is a champion who shows optimism about the success of the innovation	418.000	-2.324	.020
There is a champion who does not give up when others say eLearning cannot be done	378.500	-2.709	.007

In fact, all but one item show results in the expected direction, and are significant on the Mann-Whitney U test and therefore the proposition is supported.

6.4.6.3 Organisational structure: centralization

It is proposed that in organisations where decision making is devolved, a higher adoption of eLearning is expected:

P9: Concentration of decision making in higher education will have a negative influence on the adoption of eLearning.

While there seems to be slight differences regarding the adoption of eLearning based on the degree of centralization of decision making, chart 6.16 shows that the differences are not significant.

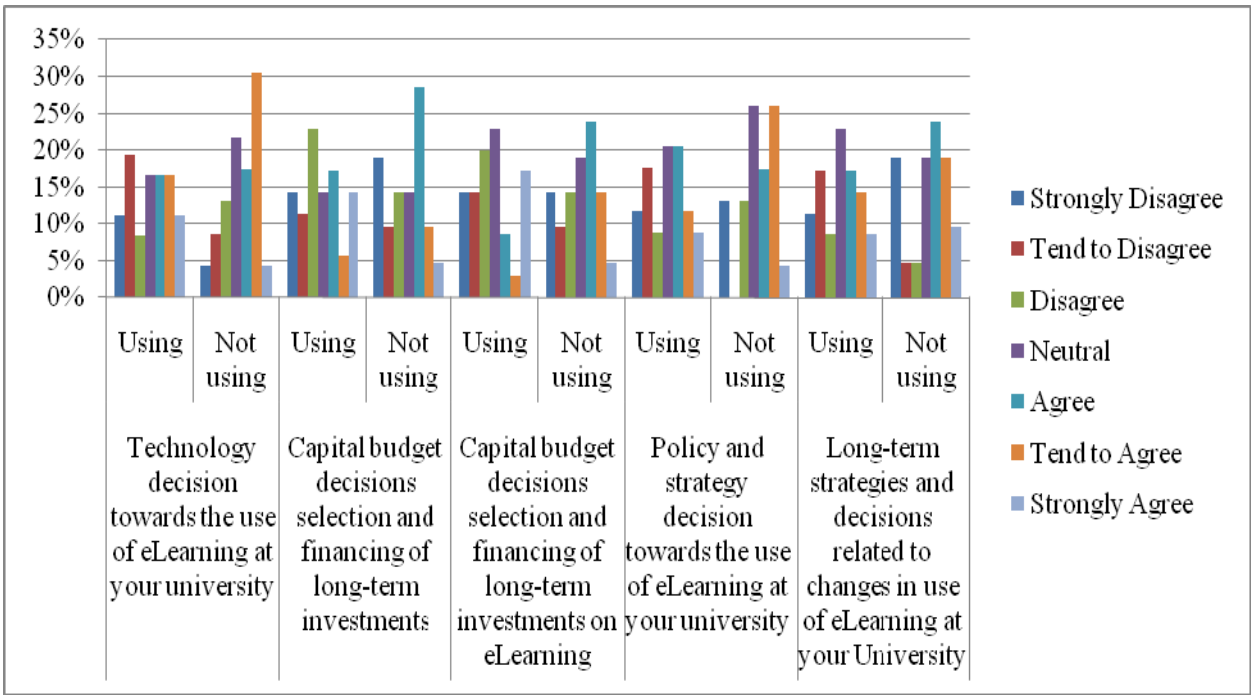


Chart 6.16: Effects of centralization of decision making on eLearning adoption

Indeed the Mann-Whitney U test of the proposition reveal that the results are in the expected direction (-0.859<*z*>0.094) but not significant for all the variables ***p***>0.319. This proposition is not supported.

6.4.6.4 Organisational Structure: Formalisation

A high degree of formalisation, *that is*, a strong emphasis on rules, procedures and defined roles in the performance of a task are proposed to have a negative influence on the adoption of eLearning:

P10: The degree of formalisation in a university will be negatively related to the decision to adopt eLearning.

As with organisational centralization, there are slight but insignificant differences on the adoption of eLearning as a result of formalisation as shown in table 6.11.

Table 6.11: The degree of formalisation- Mann-Whitney U test			
	Mann-Whitney U	Z	p
Employee roles in my university are concretely defined	431.000	-1.387	.166
Employee positions in my university have written job descriptions	452.500	-.886	.376
The authority structure in my university is clearly defined	475.000	-.588	.557
The authority structure in my university is formalised in writing	472.500	-.629	.530
The university emphasizes written communication between colleagues	397.000	-1.841	.066
There are established channels of communication in my University	458.000	-.864	.388
The university has written rules and policies to be adhered to by all lecturers	488.000	-.420	.675
The policy also stipulates the sanctions and penalties for violating the rules and policies of the University	433.000	-.942	.346
There is a strict training program for new staff members in my university	457.000	-.339	.735

The Mann-Whitney U test of the proposition is not supported because the significance level (for all items p>0.066) even though the results are in the expected direction (-1.841 < z > -0.339).

6.4.6.5 Organisational culture

The organisational culture aspect in eLearning adoption for this study is seen as composed of three main constructs: reaction to change, communication behaviour, and the organisation's absorptive capacity.

Reaction to change

Reaction to change measures an organisation's receptivity to new ideas. If an organisation's 'reaction' to imminent change is favourable, *that is*, it shows some form of resilience, the organisation is highly likely to be receptive to new ideas such as eLearning. It is thus hypothesised:

P13: Higher education's resilience to change and support for experimentation will have a positive influence on the eLearning adoption decision.

Respondents were asked what their university's interpretation would be in the event of changes in eLearning and the results are shown in Chart 6.17. Chart 6.17 below shows a summary of the responses that indicate slight differences between those using eLearning and those not using eLearning.

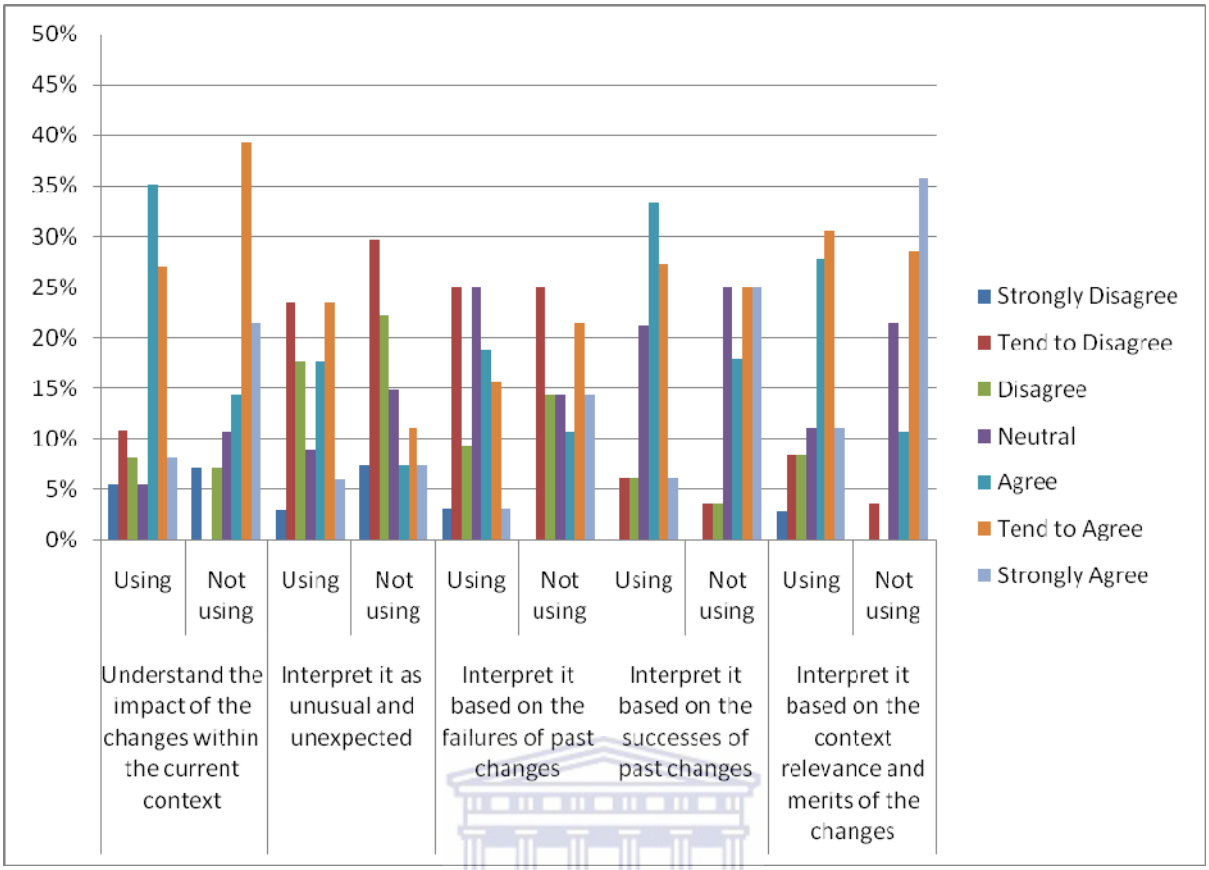


Chart 6.17: Effects of an organisation's resilience to change on eLearning adoption

The summary in Chart 6.17 indicates slight differences between those using eLearning and those not using eLearning.

Table 6.12 below shows the Mann-Whitney U test for the proposition.

Table 6.12: Analysis of the resilience to change

	Mann-Whitney U	Z	p
...understand the impact of the changes within the current context	387.000	-1.786	.074
...interpret it as unusual and unexpected	371.000	-1.301	.193
...interpret it based on the failures of past changes	389.000	-.890	.373
..interpret it based on the successes of past changes	375.500	-1.285	.199
...interpret it based on the context relevance and merits of the changes	351.500	-2.116	.034

Overall, the results are in the expected direction ($-2.116 < z > -0.890$) but not significant, $p > 0.034$ and therefore the proposition is not supported.

Communication behaviour

Communication characteristics and behaviour within an organisation can be measured using the existence of a participative climate, presence of collaboration in solving problems, existence of information exchange initiatives, and support for ideas. As a vital component of any change in the organisation, and to its culture, how communication is handled within the organisation is hypothesised to have an influence in the adoption of eLearning:

P14a: The perception of quality information on eLearning will positively influence the adoption of eLearning

P14b: A higher degree of constructive communication will positively influence the adoption of eLearning

Section 6.2.3 dealt with the availability and quality of information. Chart 6.18 below shows a summary of the responses that indicate, just like in the resilient to change constructs, slight differences between those using eLearning and those not using eLearning.

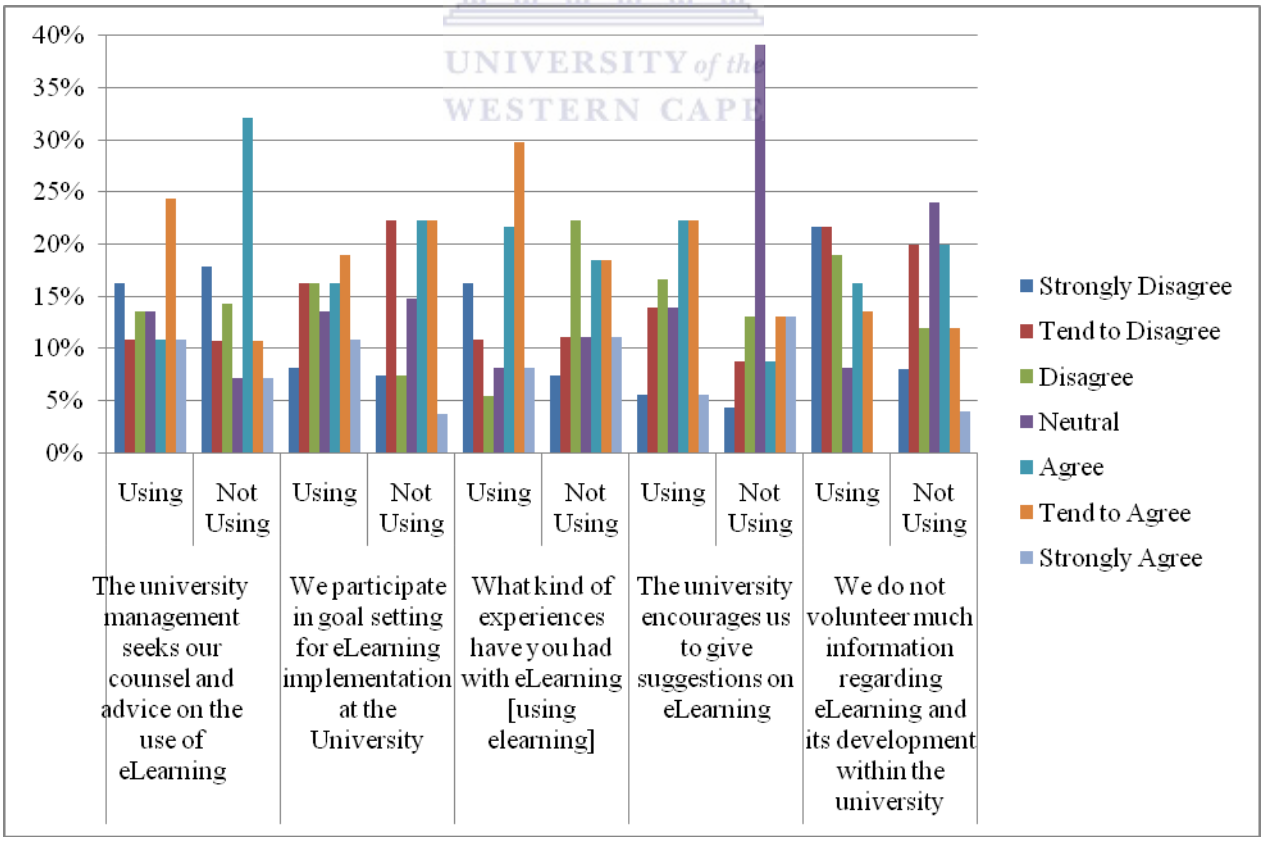


Chart 6.18: Effects of organisational communication behaviour on eLearning adoption

Further, table 6.13 represents the results of the Mann-Whitney U test.

Table 6.13: Analysis of organisation's communication behaviour

	Mann-Whitney U	Z	*p*
The university management seeks our counsel and advice on the use of eLearning	477.500	-.543	.587
We participate in goal setting for eLearning implementation at the University	483.000	-.227	.820
The university encourages us to give suggestions on eLearning	480.500	-.262	.793
All parties using eLearning keep each other informed of their needs and/or new developments	409.500	-.071	.943
We do not volunteer much information regarding eLearning and its development within the university	366.000	-1.405	.160

From table 6.13 above it is evident that the results are not significant ($p > 0.160$) although they are in the required direction ($-1.405 < z > -0.071$). Propositions 14a and 14b are therefore not supported.

Absorptive capacity of the organisation

Absorptive capacity is an organisation's ability to recognise, value, assimilate and apply an innovation. Absorptive capacity for eLearning has been theorised to be influenced by two sets of variables: the organisations ability to assess prior knowledge on eLearning in the light of the existing organisational model and the nature of eLearning technologies available (Martin, Massy, & Clarke, 2003). It is therefore assumed that organisations with a high absorptive capacity, will have a higher rate of eLearning adoption.

P15: A high absorptive capacity in higher education institutions will have a significant and positive influence on eLearning adoption.

As with all the organisational culture-related adoption constructs, there is a slight difference in the adoption of eLearning as a result of the measured absorptive capacity between respondents using eLearning and respondents not using eLearning..

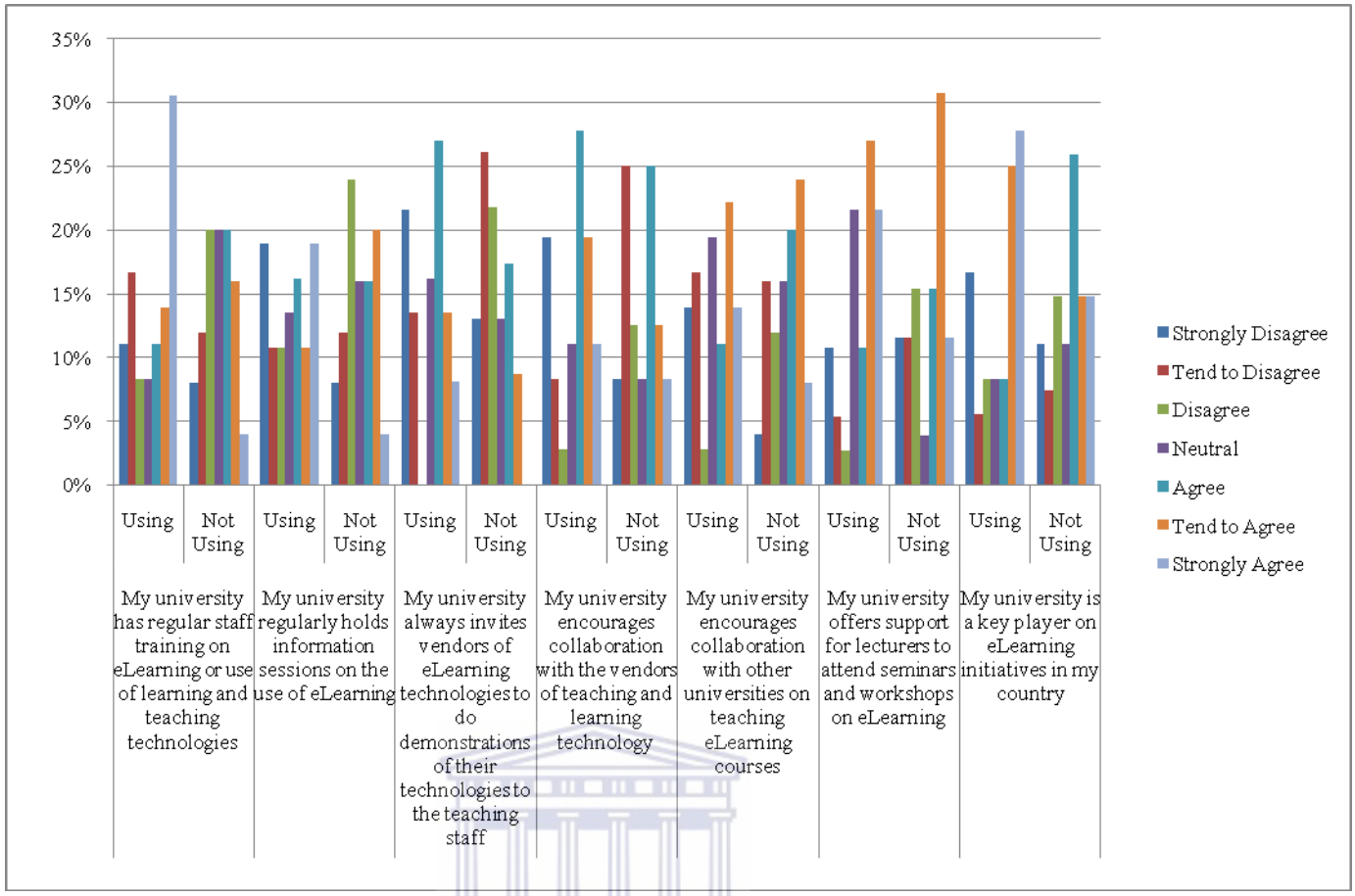


Chart 6.19: Effects of organisational absorptive capacity on eLearning adoption

As shown on table 6.18 below, the Mann-Whitney U test of the proposition fails on the significance level (for all items p>0.21) even though the results are in the expected direction (-1.253 < z > -0.218).

Table 6.14: Analysis of the absorptive capacity

	Mann-Whitney U	Z	p
My university has regular staff training on eLearning or use of learning and teaching technologies	365.500	-1.253	.210
My university regularly holds information sessions on the use of eLearning	447.500	-.218	.828
My university always invites vendors of eLearning technologies to do demonstrations of their technologies to the teaching staff	347.000	-1.212	.225
My university encourages collaboration with the vendors of teaching and learning technology	389.000	-.660	.510
My university encourages collaboration with other universities on teaching eLearning courses	435.000	-.223	.823
My university offers support for lecturers to attend seminars and workshops on eLearning	417.000	-.910	.363
My university is a key player on eLearning initiatives in my country	417.000	-.972	.331

Proposition (P15) is thus not supported (for all items p>0.21).

Overall, there seems to be stronger links to the adoption of eLearning at an individual level (that is individual attitude, characteristics and traits) than at the organisational level.

6.4.7 Social, system and environmental factors

There are issues on which individuals, or the organisations they are working for, have little or no influence. These external conditions (external to the individuals and the organisation) form a larger scope of what is discussed here as social, system and environmental factors. For this thesis, these factors are considered under community and cultural values; technological infrastructure and related innovations; and education and general literacy.

Community and cultural values

Research on the national culture commonalities and between-national differences have dwelt on the relationship between power distance, individualism, uncertainty avoidance, and masculinity and adoption of innovations (Steenkamp, Hofstede, & Wedel, 1999), issues that were beyond the scope of this research.

Technological infrastructure and related innovations

Infrastructural measures and capabilities can be used to determine the level of technological infrastructure that can be used for eLearning. On the assumption that a country's income would signify more resources for investing in universities, and in technologies, two hypotheses are linked to this assumption:

P17: Higher education institutions in countries with well developed communication infrastructure are likely to have higher levels of eLearning adoption than countries where there are constraints in communication infrastructure.

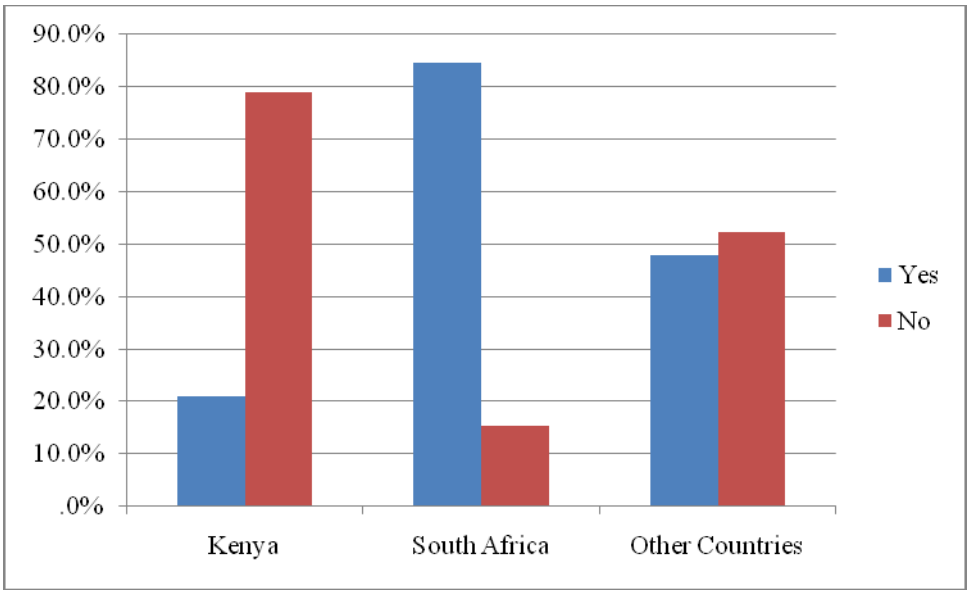


Chart 6.20: Inter-country adoption of eLearning

Extending the assumption that South Africa with the highest GNI (US$11710, compared to Kenya's US$1300 and Namibia with US$8110, which is the highest in the "Others" group) (World Bank, 2007), this hypotheses seems confirmed on face value. However, the Mann-Whitney U test reveals that the confirmation is insignificant p=0.167, although the results are in the expected direction z=-1.382, and the mean rank is 37.53 for those using eLearning, while those not using eLearning had an average rank of 31.10. Therefore the proposition is not supported.

Education and general literacy

With regard to education and literacy, it was expected that there would be higher adoption of eLearning in countries where the literacy rate is high:

P19: Higher education institutions in countries where there are high levels of adult literacy will have higher levels of eLearning adoption.

In this case, it would translate to Kenya and South Africa having almost matching adoption rates of eLearning since their adult literacy rates are 85.1% and 86.4% respectively as of 2006 (CIA, 2007). However, this does not seem to be supported by the data as there are huge differences on the adoption rates of eLearning in the two countries as depicted in chart 6.20. Therefore the proposition (P19) is not supported.

6.5 The development of the eLearning adoption model

The summary of the literature review in chapter four listed the factors for the initial model of eLearning adoption. However, not all factors were used in this study. The constructs being investigated are depicted in Figure 6.1 below. These factors are divided into three broad categories namely eLearning characteristics, individual characteristics and Organisational characteristics. Further, there is the overall ecosystem in which the three set of characteristics are manifested. In this study, the concern is with the individual and organisational characteristics. As explained in Chapter 4, the eLearning characteristics are manifested through the attitudes of the individuals.

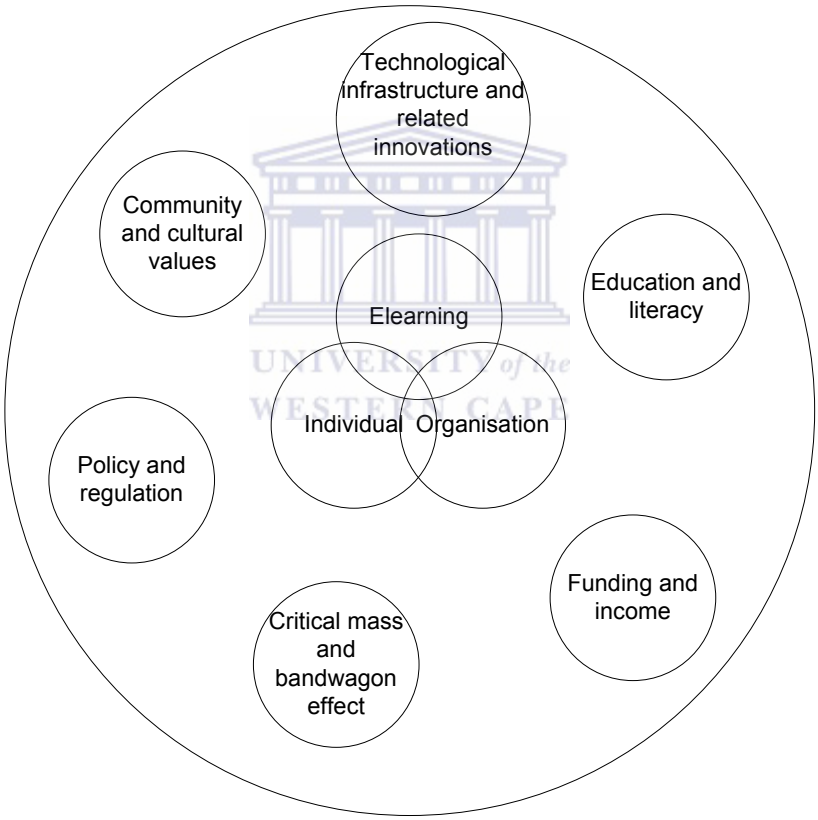


Figure 6.1: The ecosystem of the eLearning adoption model

6.5.1 Individual characteristics

Under the individual characteristics, there are the attitude toward eLearning, personal innovativeness, innovativeness need, communication behaviour and prior experience. The attitude toward eLearning is further divided into 6 factors, to capture the perception of the eLearning characteristics These factors are perceived ease of use, perceived benefits,

perceived compatibility, perceived trialability (or availability), perceived demonstrability (or visibility) and perceived complexity. Figure 6.2 shows a graphical reduction of these factors.

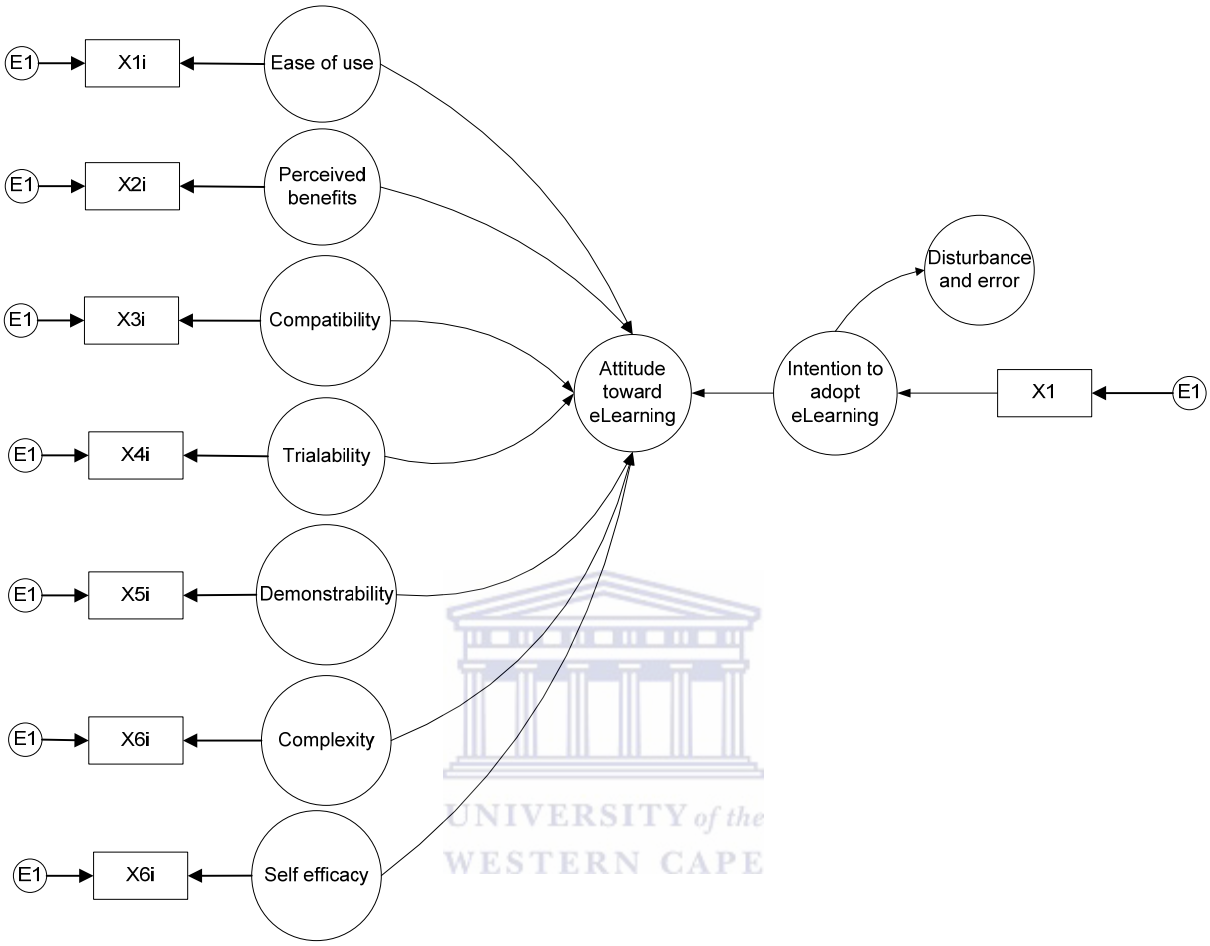


Figure 6.2: eLearning factors perceived by individuals

6.5.2 Organisational characteristics

Four constructs of organisational characteristics were identified, namely, top management support, organisational structure, organisational culture and availability of a champion within the organisation as shown in figure 6.3.

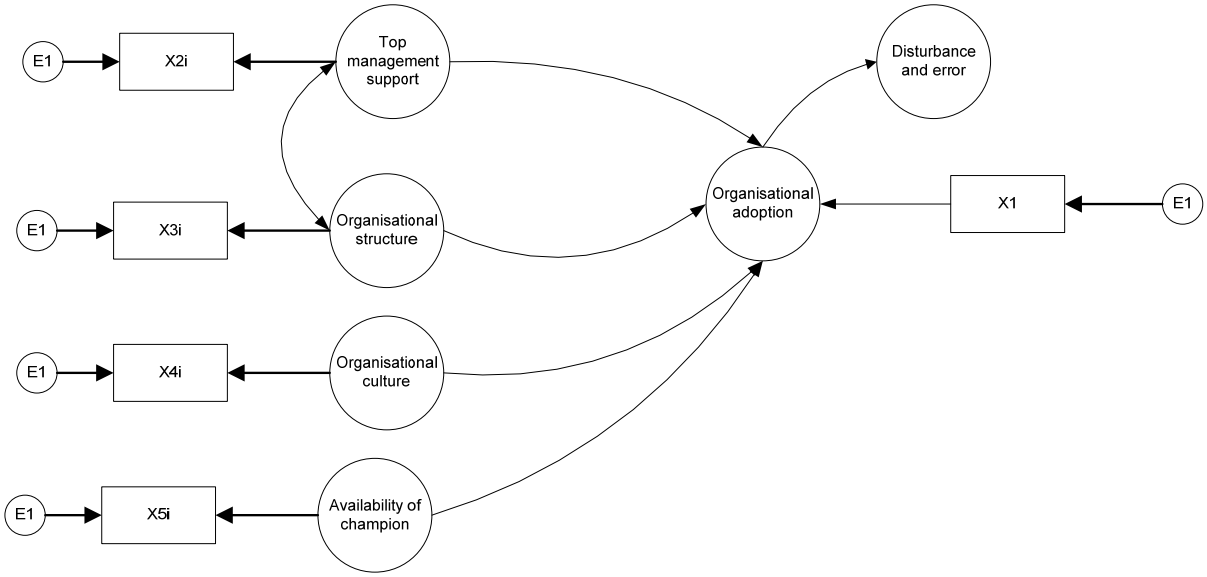


Figure 6.3: Organisational factors of eLearning adoption

The organisational culture and organisational structure constructs were further decomposed into three and two factors each respectively (see section 4.2.3.3). The organisational structure is thought, for this study, to be made of the degree of formalisation within the organisation on one hand, and on the level of centralisation of decision making on the other as show in figure 6.4.

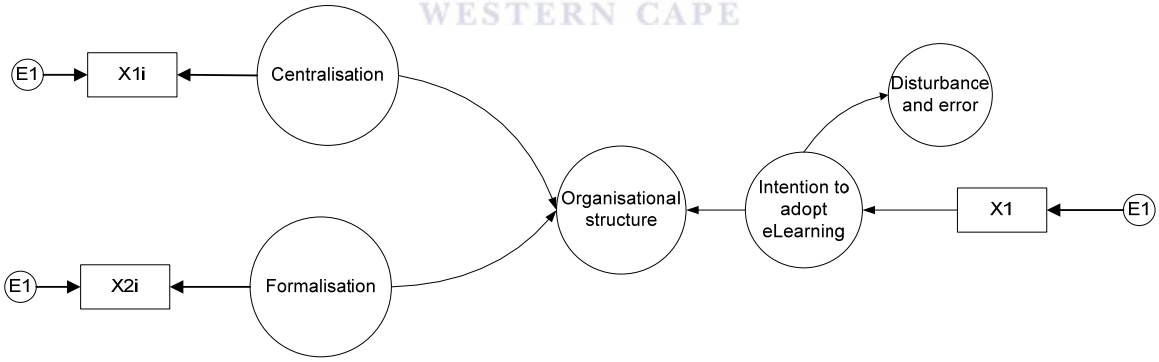


Figure 6.4: Decomposed organisational structure constructs

Figure 6.5 illustrates the decomposition of the organisational culture into its constituent parts identified as the communication behaviour within the organisation, organisation's resilience to change and its power and ability to absorb new ideas and technologies (see section 4.2.3.4).

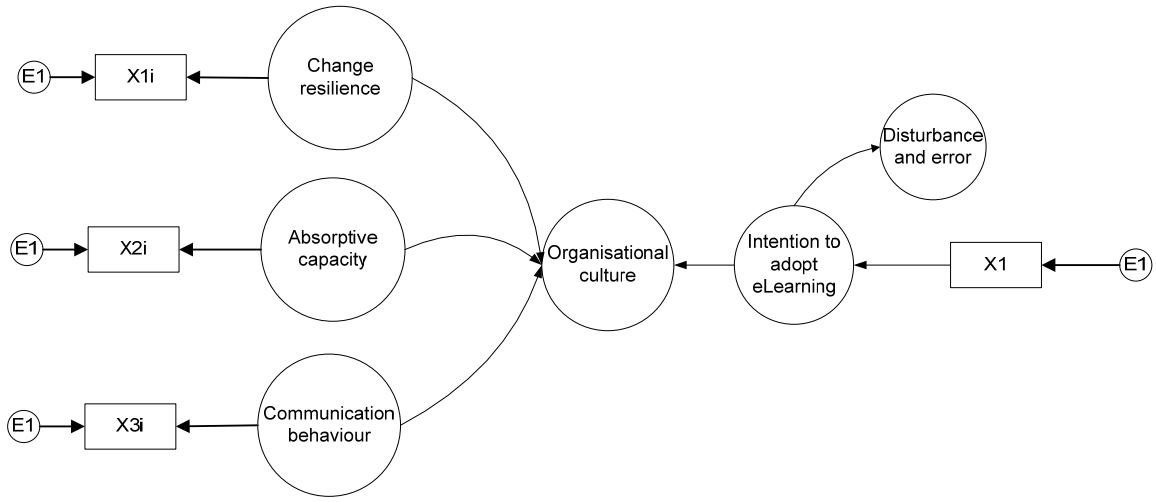


Figure 6.5: Decomposed organisational culture constructs

6.6 Factors that influence the adoption of eLearning

The assumption of the research is that there is linearity underlying the unobservable or latent factors. Therefore, Factor Analysis (FA) was used to identify underlying variables, or factors, that explain the pattern of correlations within a set of observed variables that manifest the unobservable factors. Exploratory factor analysis (EFA) using Principal Component Analysis (PCA) was used because of its ability to bring the numerous interrelated variables that characterise the main constructs of this research together (John & Benet-Martinez, 2000; Churchill, 1979). EFA is appropriately used in this instance to evaluate and specify the models of adoption of eLearning, (Hurley, *et al.*, 1997). The choice of PCA for this research was informed by, among others, its advantage of not assuming the distribution characteristics of the data. When compared to other model fitting procedures like Maximum Likelihood, PCA does not produce "improper results" (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Although PCA has limitations in the computation of confidence intervals and goodness-of-fit indices, any model-fitting procedure used could lead to similar results if the model is reasonable and distributional assumptions are not present (Stewart, 2001; Fabrigar, Wegener, MacCallum, & Strahan, 1999).

The applicability of PCA in this instance is based on three assumptions (Shlens, 2005). First, there is linearity in the data on the adoption of eLearning in HEIs based on some combinations. Secondly, the mean and covariance of the data set is statistically important, especially because PCA uses eigenvectors of the covariance matrix, with Gaussian

elimination that must converge after a number or iterations. Thirdly, there is large variance in the eLearning adoption data set, which has important dynamics because PCA performs coordinate rotation. Consequently, PCA uses three successive steps, namely condensation, extraction and rotation (Coste, Bouée, Ecosse, Leplège, & Pouchot, 2005). **Condensation** involves the computation, with standardised variables, of the Principal Components (PCs) that are uncorrelated linear functions of observed correlated variables. Using the standardised variable, the coefficients defining the linear functions (or factor loadings) are used to identify the PCs. The "proportion of the variance of the original variables 'accounted for' by a given component is equal to ***l/p*** where ***l*** is the eigenvalue associated with the component" and ***p*** is the number of original or dependent (outcome) variables. (Coste, Bouée, Ecosse, Leplège, & Pouchot, 2005:642). **Extraction** is the "selection of the number of components ***m*** to retain (***m*** **<** ***p***)" with ***m*** being number of measures and (usually continuous) independent variables. The ***m*** "defines the dimensionality of the reduced space and corresponds to the underlying latent variables or *factors*". The remaining (***p-m***) components representing residual variability as a result of the measurement error and 'unique factors' (Coste, Bouée, Ecosse, Leplège, & Pouchot, 2005:642). **Rotation** (or linear transformation) of retained components on the other hand is done to make interpretations easier and more reliable in indentifying the "latent" structure (Coste, Bouée, Ecosse, Leplège, & Pouchot, 2005; Abdi, 2003).

In conducting the EFA therefore, communalities, eigenvalues, and scree plots are used to analyse the data to unearth the underlying constructs and patterns, as well as to determine which variables to keep or discard during the factor analysis. The communality of a variable is "the proportion of the variance of the variable that is accounted for by the common factors" (Hogarty, Hines, Kromrey, & Ferron, 2005:205). Variable communalities are considered high if they are above 0.8, while low communalities of less than 0.4 indicate that there is a low inter-items correlation, or further items need to be explored, *that is,* the item has a low reliability (Hogarty, Hines, Kromrey, & Ferron, 2005; Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999). Communalities of between 0.4 and 0.7 are considered satisfactory. With high communalities, the effects of sample size are insignificant, however, for low communalities, sample size should be used to compensate for them (Worthington & Whittaker, 2006; Russell, 2002). An eigenvalue represents the amount of variance in the data that is explained by the factor with which it is associated. The eigenvalue is "computed by squaring the loadings on a factor and summing them together" (Russell, 2002:1632-3). Eigenvalues are used to determine the variables and factors to retain in EFA,

with the default for most researchers and statistical applications being 1.0 since an eigenvalue of less than one represent a potentially unstable factor (Worthington & Whittaker, 2006; Costello & Osborne, 2005; Hayton, Allen, & Scarpello, 2004). A scree plot provides a graphic image of the eigenvalue for each component extracted (Eigenvalues are plotted on the Y or vertical axis, and the factors are plotted on the horizontal or X-axis.). Factors before the breaking point or elbow of the scree plot are retained (Hayton, Allen, & Scarpello, 2004).

In the first instance, the goal of EFA was to reduce the dimensionality of data then explain the inconsistencies in the observed variables in terms of underlying latent factors (John & Benet-Martinez, 2000; Churchill, 1979). EFA was used to describe, summarise, or reduce data to make it more easily understood so that further analysis and deductions can be made (Hurley, *et al.*, 1997). Varimax rotation was used because of their ease of interpretation compared to the other forms of rotation (Abdi, 2003). In addition, independent Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and the Bartlett's Test of Sphericity tests were performed on grouped factors to check the suitability of the data for EFA. The Bartlett's Test of Sphericity was used to evaluate "whether each sequential eigenvalue is significantly different from the remaining eigenvalues" in an attempt "to reveal the point where the PCA summarizes a spherical distribution of points" and estimate the number of non-trivial components (Jackson, 1993:2207). Varimax rotation has a small number of large loadings, and a large number of (zero or) very small loadings. These loadings are used to determine the share of each factor in the adoption of eLearning. For this thesis, the Rotated Component Matrix tables are shown in the analyses that follow (Costello & Osborne, 2005), with factor loading of less than 0.45 suppressed. Missing values were treated using a listwise deletion (LD) method for each of the EFAs. Factors with eigenvalues greater than 1.0 were retained. In addition, scree plots are used for the visualization of the factor analysis.

Table 6.15 below presents the results of the Kaiser-Meyer-Olkin (KMO) scores of scale.

Table 6.15: The Kaiser-Meyer-Olkin (KMO) scores of the scale

Number	Element of measure	Number of items	KMO
1	How easy is it to use eLearning	4	0.843
2	What are feelings regarding the benefits accrued in using eLearning?	3	0.758
3	How compatible is eLearning to my teaching?	4	.615
4	Perception of the availability of resources	2	Few items
5	To what extent are the results of using eLearning visible?	4	0.758
6	Measure of self-efficacy	6	0.715
7	How complex is using eLearning	5	0.762
8	Personal innovativeness	11	0.721
9	Innovativeness need	11	0.802
10	Communication behaviour	5	0.745
11	Prior experience	2	Few items
12	Top management support	10	0.886
13	Degree of formalisation	9	0.764
14	Change culture (explanation, or not used – one reversal)	5	0.606
15	ELearning decision making	12	0.859
16	Participation in policy decision	5	0.871
17	Availability of champion	3	0.697

The KMO measures were satisfactory because they ranged between 0.606 and 0.886 (A value closer to 1 is better).

Three groupings of exploratory factor analyses were conducted - one for each of the first order latent variables – in order to explain the variance in the observed variables in terms of the underlying latent factors. The observable factors were first divided into two large groups: those falling under individual characteristics (items 1-9); and those that fall under the organisational characteristics (items 10-17). The individual characteristics were further divided into two distinct categories: individual attitudes towards eLearning, and personal innovativeness and innovativeness need. Although environmental characteristics were identified as pertinent during the exploratory stages of the instrument development (refer to chapter 4), they were not considered for the study because their data collection mainly relies on secondary data.

6.6.1.1 Individual characteristics

Individual attitudes toward eLearning

In the proposition design stage, the individual attitudes towards eLearning was hypothesised to be made up of six factors: *perception of ease of use, perception of relative advantage, perception of compatibility, availability of experimentation experience, demonstrability of eLearning results, measure self-efficacy in using eLearning; and perception of complexity of eLearning.* On running the factor analysis, six factors were extracted contributing to 78.92%

of the total variance of the items which converged after 7 iterations. The communality of the variables was sufficient (ranging between 0.541 and 0.894). In addition, the KMO-test of 0.734 is satisfactory for the particular sample. Bartlett's test of sphericity indicated that the matrix was suitable for factor analysis (χ^2=1412.807; sig=378; p<0.0001). The factors were conceived given the reductions as: perceived usefulness (PU), availability of resources (RA), demonstrability of results on using eLearning (DEMO), perceived ease of use (PEOU), perceived complexity (PX) and perceived compatibility (PC) in that order as shown in table 6.16 below showing the rotated component matrix of the variables.

Table 6.16: Rotated component matrix of individual factors of eLearning adoption

	1	2	3	4	5	6
Using eLearning (would) enable(s) me to enhance my teaching practices.	.863					
Overall, eLearning is advantageous	.843					
I (would) find eLearning useful for teaching.	.841					
It is (would be) easy to gain knowledge in the use of eLearning for my teaching.	.757					
There are resources available for me to test and experiment with eLearning for teaching.	.724					
Overall, eLearning for teaching would be/is easy for me.	.659					
I (would) find eLearning for teaching easy to use.	.656					
Overall, I believe that eLearning is not easy to use	-.641			.517		
I could use eLearning if someone else had helped me get started.		.931				
I could use eLearning if I had seen someone else using it before.		.898				
I could use eLearning if I could call someone for help.		.894				
I could use eLearning if I had enough time to develop an eLearning course.		.858				
I could use eLearning if I had online support on using eLearning.		.730				
I have seen courses delivered on eLearning.			.853			
I have seen lecturers use eLearning for their courses.			.791			
I have seen lecturers use eLearning for courses similar to what I teach.			.787			
I could use eLearning even if there was no assistance available.			.509	-.491		
I clearly understand the principles of eLearning			.508			
I think being seen using eLearning is good for my image.			.503			
Using eLearning will be a frustrating experience.				.849		
It will not be easy for me to use eLearning for teaching.				.796		
I believe that eLearning is a cumbersome mode of teaching				.743		
It is more convenient to use other forms of teaching (e.g. classroom) than eLearning					.794	
Acquiring the skills to use eLearning will not be easy for me.					.738	
eLearning is incompatible with the students I teach.						.891
eLearning is incompatible with all courses I teach.						.870
eLearning does not fit in with my teaching methodology.						.647
Initial Eigenvalues: Total	10.672	3.936	3.38	1.593	1.293	1.224
Initial Eigenvalues: % of Variance	38.115	14.057	12.07	5.689	4.618	4.372
Extraction Sums of Squared Loadings: Total	10.672	3.936	3.38	1.593	1.293	1.224
Extraction Sums of Squared Loadings: % of Variance	38.115	14.057	12.07	5.689	4.618	4.372
Rotation Sums of Squared Loadings: Total	6.385	4.338	3.501	3.494	2.393	1.987
Rotation Sums of Squared Loadings: % of Variance	22.805	15.493	12.503	12.479	8.545	7.095

Extraction Method: Principal Component Analysis. **Rotation Method**: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

The scree plot for individual attitude towards eLearning

The scree plot is a graphic representation of the eigenvalue for each component extracted (from the total variance explained output of SPSS). The amount of variance accounted for by successive components initially plunges sharply as successive components are extracted as shown in chart 6.21 It can be seen that the 'scree' break at the sixth factor. Considering the eigenvalues and scree plot, it was reasonable to suggest that a six factor model of individual attitude be retained.

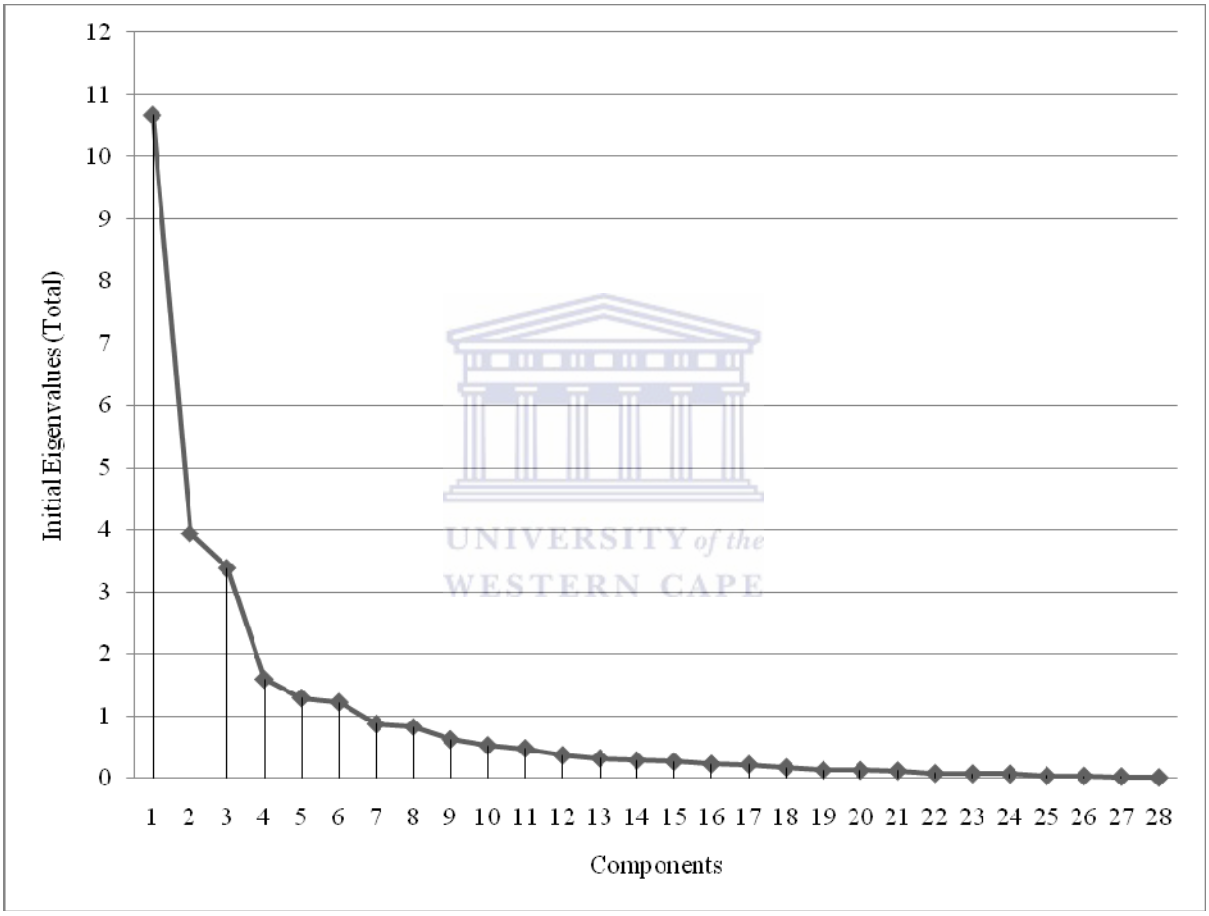


Chart 6.21: Scree plot: Individual attitude of eLearning adoption

Modified measures of individual's attitude toward eLearning

From the rotated matrix table 6.16, and the scree plot in figure 6.21, six factors were extracted as a measure of individual attitudes toward eLearning, namely perceived usefulness, self efficacy, demonstrability, perceived ease of use, perceived complexity, and perceived compatibility.

Seven variables of perceived usefulness variables loaded positively on the same factor. One variable, "*Overall, I believe that eLearning is not easy to use*" was not considered for subsequent analysis because it loaded both on the perceived usefulness and perceived ease of use. Congruent to other research on the adoption of innovation, perceived usefulness came on top of the factor analysis.

The modified measures' reliability score and KMO values are shown in table 6.17.

Table 6.17: Reliability and factorability of attitude toward eLearning measures

Factor	Number of Variables	Cronbach's alpha	KMO
Perceived usefulness	6	0.919	0.863
Self efficacy	5	0.893	0.741
Demonstrability	3	0.887	0.715
Perceived ease of use	3	0.737	0.619
Perceived complexity	2	0.720	0.5
Perceived compatibility	3	0.687	0.610

Except for one variable, the reliability of the adjusted score is high with a Cronbach's alpha greater than 0.7 for five factors. The factorability of the variables can be considered acceptable for all factors (>0.5) following the KMO test.

6.6.1.2 Personal characteristics and traits

In the initial design, the 4 factors that contribute to the personal characteristics and traits were identified as *personal innovativeness, innovativeness needs or personal motivation, communication behaviour, and prior experience*. The KMO test (0.708) and the Bartlett's Test of Sphericity (χ^2=860.433, Sig=253, p<0.0001) were satisfactory and therefore factoring was done. In addition, the communality of the variables was sufficient (ranging between 0.620 and 0.873). After reduction, six factors (with total variance of 76.224%) were extracted as shown in Table 6.18 but only five had more than 2 items with a factor loading greater than 0.7 (with a total variance of 69.334%): Intrinsic needs and motivation, collaboration and communication, extrinsic needs and motivation, subjective norm, and personal innovativeness. It is interesting to note that, although in the initial design no major apportionment was done between extrinsic and intrinsic motivation, the distinction became apparent after the factor loading, with intrinsic motivation loading higher than extrinsic motivation. Another key observation, and probably a confirmation of Ajzen's (1991) construct of perceived behavioural control and its influence on the adoption of innovation.

Personal innovativeness or need to experiment loaded lowest, perhaps because for one to experiment there should first be some motivation for the experimentation.

Table 6.18: Rotated component matrix of personal characteristics and traits

	1	2	3	4	5	6
I would do extra work on eLearning as long as I am interested in it	.896					
I would like to learn as much as I can about eLearning	.864					
I would like to use eLearning even for subject areas where others think it would be inappropriate	.858					
I would work really hard to make eLearning a success story for me.	.856					
I would go out of my way to find more about eLearning	.853					
I would like to use eLearning even if it is challenging	.803					
My colleague(s) and I regularly share ideas on eLearning.		.898				
Colleagues using eLearning make an effort to collaborate with me.		.866				
I make an effort to collaborate with colleagues at my university using eLearning.		.842				
My peers often ask me for advice or information on using eLearning		.741				
I would like the university to send me on a course on using eLearning before I start using it			.837			
I would like to see the university purchase the necessary infrastructure for eLearning before I start using it			.801			
I would use eLearning if it is mandatory for a course that I am teaching			.700			.472
I would use eLearning only if am required to			.528			
When it comes to deciding whether to use new teaching and learning methodologies, I don't rely on experienced colleagues				.773		
I decide to use new teaching and learning technologies without relying on the opinions of colleagues who have been using them.				.773		
I do not rely on colleagues for information about new teaching and learning technologies prior to making up my mind about whether or not to use them in my class				.670		
I would use eLearning if it does not interfere or change the way I teach my students			.513	.611		
In general, I am hesitant to try out new information technologies for teaching and learning.				.537	-.481	
I like to experiment with new information technologies for teaching and learning.					.737	
Among my peers, I am usually the first to try out new information technologies for teaching and learning					.718	
I am challenged by unanswered questions						.789
If I hear about a new information technology for teaching and learning, I would look for ways to experiment with it.						.709
Initial Eigenvalues: Total	6.619	3.192	2.662	2.325	1.459	1.275
Initial Eigenvalues: % of Variance	28.778	13.876	11.576	10.107	6.344	5.542
Extraction Sums of Squared Loadings: Total	6.619	3.192	2.662	2.325	1.459	1.275

Extraction Sums of Squared Loadings: % of Variance	28.778	13.876	11.576	10.107	6.344	5.542
Rotation Sums of Squared Loadings: Total	4.884	3.334	2.811	2.635	2.283	1.585
Rotation Sums of Squared Loadings: % of Variance	21.235	14.495	12.223	11.456	9.925	6.89

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The scree plot for personal characteristics and traits

The scree plot is a graphic representation of the eigenvalue for each component extracted (from the total variance explained output of SPSS). The amount of variance accounted for by successive components initially plunges sharply as successive components are extracted as shown in chart 6.22. It can be seen that the 'scree' break at the sixth factor. Considering the eigenvalues and scree plot, it was reasonable to suggest that a six factor model of personal characteristics and traits be retained. Variables with more than two loadings were omitted.

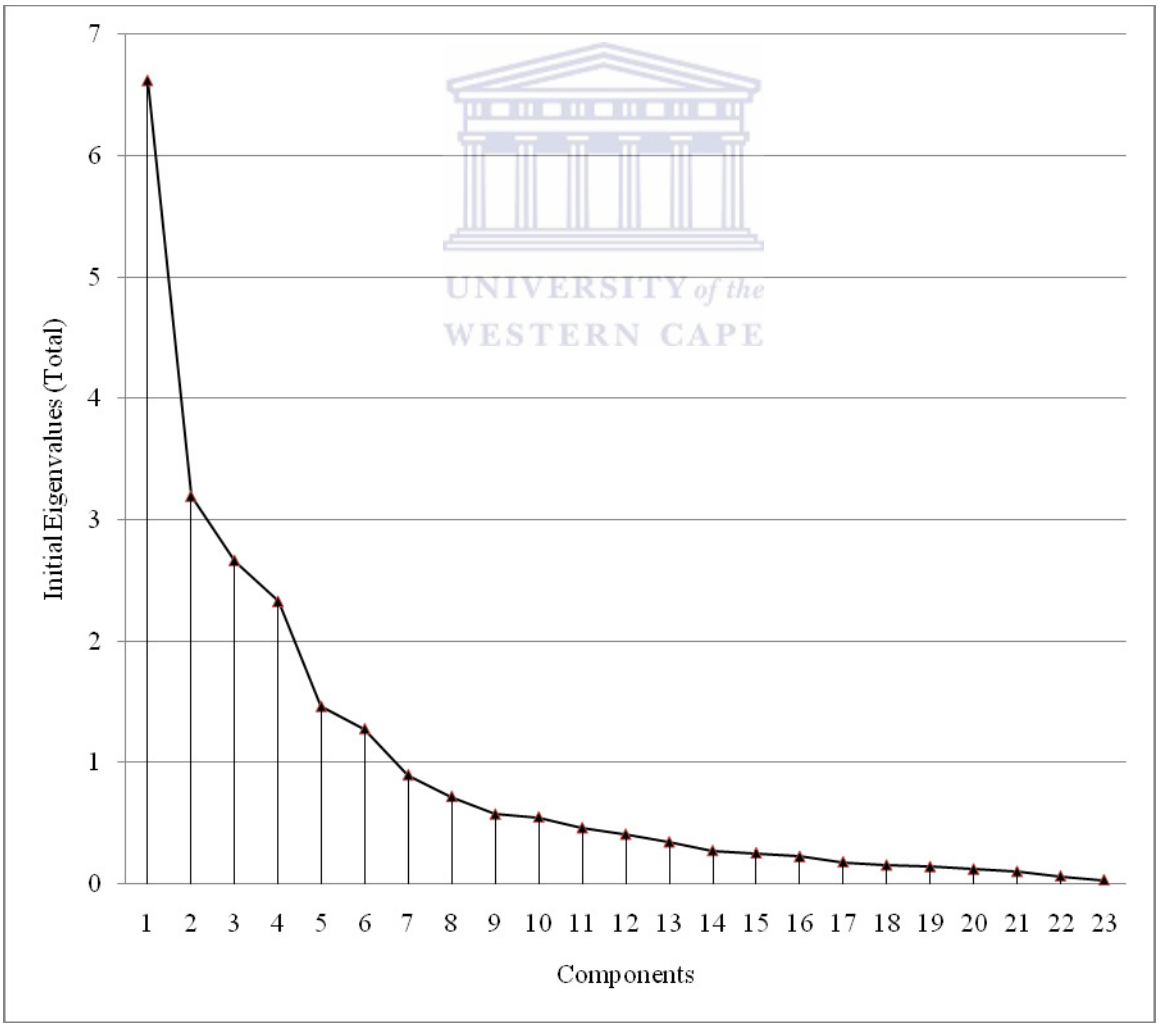


Chart 6.22: Scree plot: personal characteristics and traits

The new adjusted reliability score for the factors are as shown in table 6.19 below.

Table 6.19: Modified individual factors of eLearning adoption

Factor	Number of Variables	Cronbach's Alpha	KMO
Intrinsic motivation	6	0.935	0.855
Collaboration and communication	4	0.901	0.752
Extrinsic motivation	3	0.715	0.645
Subjective norm	3	0.729	0.718
Personal innovativeness	2	0.802	0.678
Experimentation*	2	0.661	0.494

* Not considered for further analysis.

Except for one variable, the reliability of the adjusted score is high with a Cronbach's alpha greater than 0.7 for five factors. In addition, the factorability of the variables can be considered acceptable for all factors (>0.5) following the KMO test.

6.6.2 Organisational characteristics

For the study, the initial constructs to be measured under organisational characteristics were the *top management support of eLearning, organisational level of centralization in decision making, level of formalisation, organisational reaction to change, communication behaviour, and organisational absorptive capacity*. The communality of the variables was satisfactory ranging between 0.633 and 0.906. After reduction, all six factors were extracted with a total variance of 80.784% and the KMO test was satisfactory for factoring at 0.647. In addition, the Bartlett's test of sphericity indicated that the matrix was suitable for factor analysis (χ^2= 1635.981; sig=528; p<0.0001). The Higher Education Institutions' absorptive capacity ranked highest among the factors, while organisational change culture was the lowest. The other factors in order from highest to lowest are top management support of eLearning, communication behaviour, organisational centralization in decision making, and level of formalisation.

Table 6.20: Rotated component matrix of organisational characteristics of eLearning adoption

	1	2	3	4	5	6
My university always invites vendors of eLearning technologies to do demonstrations of their technologies to the teaching staff	.848					
My university encourages collaboration with the vendors of teaching and learning technology	.826					
My university has regular staff training on eLearning or use of learning and teaching technologies	.814					

My university encourages collaboration with other universities on teaching eLearning courses	.795					
My university regularly holds information sessions on the use of eLearning	.737					
My university offers support for lecturers to attend seminars and workshops on eLearning	.695					
My university is a key player on eLearning initiatives in my country	.590			.574		
My department strongly encourages the use of eLearning in teaching and learning.		.902				
My department is committed to a vision of using eLearning in teaching and learning.		.896				
The use of eLearning in teaching and learning is important to my Department.		.787				
My department will recognize my efforts in using eLearning in teaching and learning.		.701				
The use of eLearning in teaching and learning is important to the University.		.658				
The University strongly encourages the use of eLearning in teaching and learning.		.651				
The University is committed to supporting my efforts in using eLearning for teaching.		.629				
We participate in goal setting for eLearning implementation at the University			.832			
The university management seeks our counsel and advice on the use of eLearning			.831			
The university encourages us to give suggestions on eLearning			.818			
All parties using eLearning keep each other informed of their needs and/or new developments	.471		.713			
...understand the impact of the changes within the current context			.683			
The University will recognize my efforts in using eLearning in teaching and learning.			.508			
Capital budget decisions selection and financing of long-term investments on eLearning technology				.825		
Capital budget decisions selection and financing of long-term investments on training, and development				.810		
Long-term strategies (growth diversification, etc.) and decisions related to changes in use of eLearning at your University				.771		
Policy and strategy decision towards the use of eLearning at your university				.714		
Technology decision towards the use of eLearning at your university	.473			.638		
The authority structure in my university is formalised in writing					.880	
The authority structure in my university is clearly defined					.855	
Employee roles in my university are concretely defined					.833	
There are established channels of communication in my University					.792	
Employee positions in my university have written job descriptions					.790	
...interpret it as unusual and unexpected						.882
...interpret it based on the failures of past changes						.860

We do not volunteer much information regarding eLearning and its development within the university						.731
Initial Eigenvalues: Total	14.577	4.456	2.641	2.111	1.629	1.245
Initial Eigenvalues: % of Variance	44.172	13.502	8.004	6.397	4.937	3.771
Extraction Sums of Squared Loadings: Total	11.761	4.678	2.266	2.197	2.172	1.683
Extraction Sums of Squared Loadings: % of Variance	35.641	14.176	6.866	6.659	6.582	5.099
Rotation Sums of Squared Loadings: Total	8.582	4.781	4.267	3.884	1.648	1.595
Rotation Sums of Squared Loadings: % of Variance	26.007	14.489	12.93	11.771	4.993	4.833

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 7 iterations.

The scree plot for organisational characteristics

Chart 6.23 represents the amount of variance explained be each factor. It can be seen that the 'scree' break at the eighth factor but only six factors are above 1. Considering the eigenvalues and scree plot, it was reasonable to suggest that a six factor model of organisational characteristics be retained.

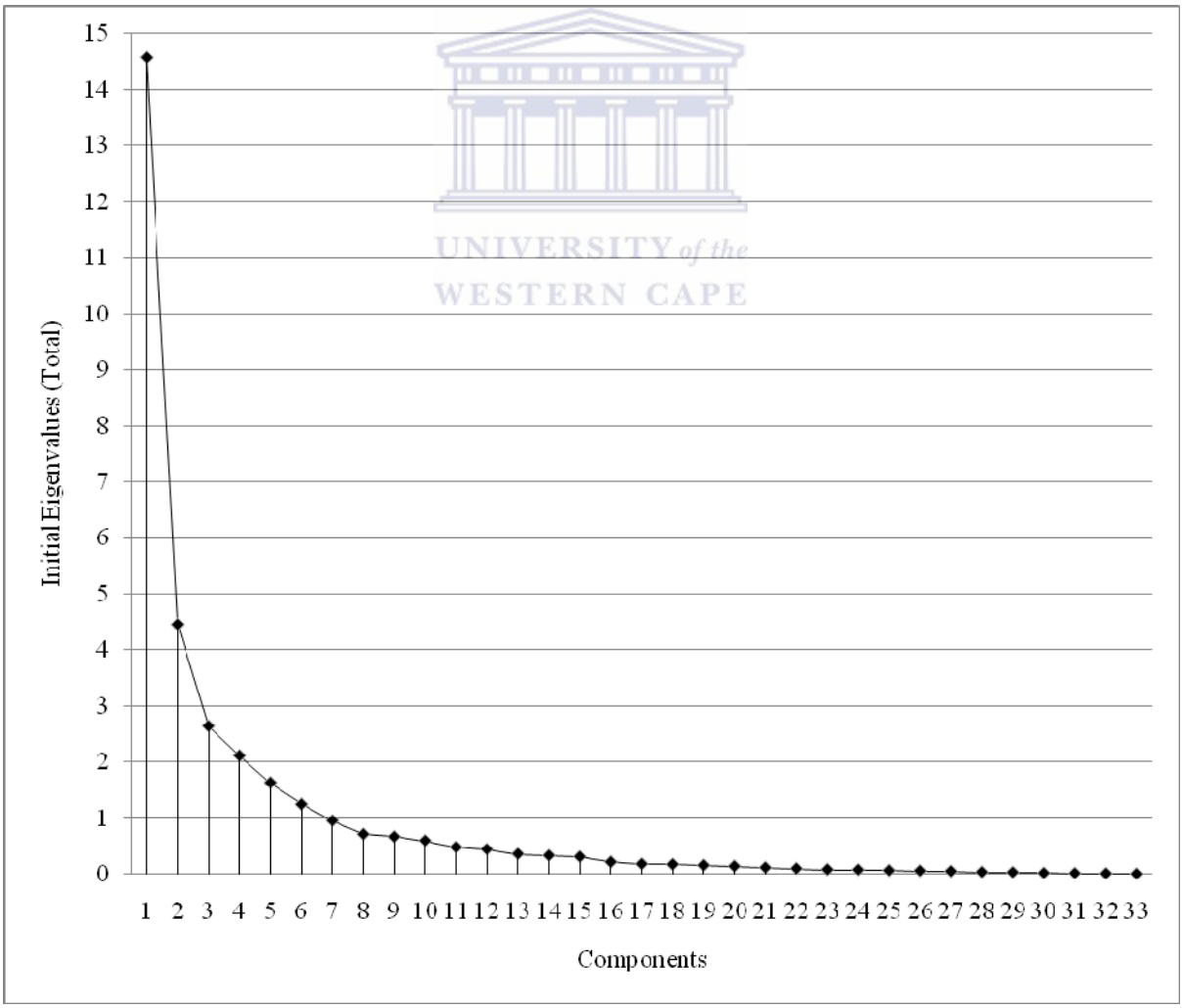


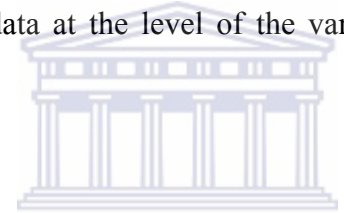
Chart 6.23: Scree Plot: Organisational factors of eLearning adoption

The new adjusted reliability score for the organisational factors of eLearning adoption are as shown in table 6.21 below.

Table 6.21: Modified organisational factors of eLearning adoption

Factor	Number of Variables	Cronbach's Alpha	KMO
Absorptive capacity	7	0.949	0.879
Management support of eLearning	7	0.928	0.812
Communication behaviour	3	0.947	0.772
Centralization of decision making	5	0.961	0.871
Level of formalisation	5	0.907	0.834
Organisational change culture	2	0.771	0.5

The reliability of the adjusted score is very high with a Cronbach's alpha greater than 0.7. In addition, the factorability of the variables can be considered "meritorious" (>0.8) for five factors, and acceptable in all the factors (>0.5) following the KMO test. This indicates there is a relational structure in the data at the level of the variables, individually, in pairs and collectively.



6.7 Conclusion and next step

This chapter has outlined a step by step analysis of the data, culminating into the testing of the propositions that were set, as well as refining the eLearning adoption model that was identified initially. While most of the constructs confirmed what was initially envisaged, there are critical breakpoints that need to be noted and highlighted. These breakpoints will be discussed in chapter seven – specifically dealing with the role and quality of the information on eLearning; issues of incompatibility and inconsistency between the findings of the current research and the envisaged model; the role of self efficacy on eLearning adoption in higher education; the relationship between self efficacy and motivation; the role of prior experience in eLearning adoption; the relative weak confirmation of the propositions on organisational culture in eLearning adoption; and the differences in confirmation of the propositions between the individual factors and the organisational factors.

Chapter seven: Discussion and Conclusions

7.1 Introduction

The use of technology, specifically Information and Communication Technologies (ICTs), represents an increasingly important place in the contemporary society, more so in institutions of higher learning. Reasons for the increased importance, among others, include the ever-reducing prices of technological products, the increased capabilities of these technologies in terms of communication, cooperation, collaboration and connection, and marketing by technology vendors and enthusiasts. However, even with the reduced price of technologies, the costs of implementing them in higher education in ESA, which are battling with declining funds and finances and lack of sufficient human capital among other odds, is still high. If higher education institutions risk their meagre resources to invest in these technologies, it should be on the understanding that it will be used by their faculty to improve the teaching and learning process of the students. It is therefore important for these institutions, as indeed with any other technology in education, to understand the factors that could lead to the adoption of these technologies in teaching and learning. This research was aimed at creating such an understanding.

The thesis so far has dwelt in great details on the achievement of the four objectives set at the beginning of the study namely:

- *To identify and analyse the adoption and adoption levels of eLearning in Higher Education Institutions in ESA.*
- *To identify and enumerate the critical success factors, in terms of perceptions and conditions that are associated with the successful eLearning adoption, and its continued use.*
- *To identify and enumerate the negative perceptions and conditions which hinder the adoption of eLearning in these institutions that might lead to its non-adoption, rejection or discontinued use.*
- *To formulate an eLearning adoption framework. The framework should encapsulate the success factors that can be replicated and enshrined in HEIs for successful eLearning adoption on one side, as well as how the negative influences can be dealt with, for example, turned into opportunities for success or learning opportunities, on the other side.*

This chapter takes a reflective perspective on how these set objectives have been met, and where they have not been met, possible reasons are identified. The first two of the three phases delineated in the research process in Chapter Five have been discussed in the

preceding chapters. Phase one involved the qualitative data collection and analysis where an in-depth analysis of the literature was undertaken to unearth the *generalisable* theories, models, antecedents, determinants and factors of eLearning adoption. Phase one (presented in chapter two through to chapter four) culminated into the development of possible questionnaire, which were subsequently refined and validated for data collection during Phase two. Phase two, therefore, involved the deployment of the questionnaire for data collection, the analysis of the data so that a framework of eLearning adoption could be formed in Phase 3. Subsequently, phase three, considered in this chapter, involves the discussion of the emergent eLearning adoption framework for higher education in Africa, as well as the concluding remarks of this study. It also advances the known limitations of the study and offers recommendations for research that could counter these limitations.

Accordingly, this chapter is presented in the following main sections: 1) Adoption and adoption levels of eLearning in Higher Education; 2) Factors affecting eLearning adoption; 3) The eLearning adoption framework for higher education; 4) Limitations of the research and future research; and 5) Conclusions.

7.2 Adoption and adoption levels of eLearning in Higher Education

Assessing the *status quo* of eLearning adoption in higher education institutions was important; not only to offer meaningful suggestions at the end of the research, but also to understand the context of the higher education institutions. Therefore, although the research took the dominant view of adoption of eLearning, that is, the adoption of eLearning by and in itself is the right thing to do for higher education (Fichman, 2004b; Moore, 2001), there was need to take stock of what is happening in this regard. This was to achieve the first objective, and answer the subsequent questions stated as:

Objective One: To identify and analyse the adoption and adoption levels of eLearning in Higher Education Institutions in Eastern and Southern Africa.

- *What is the current state of eLearning adoption in HEIs in Eastern and Southern Africa?*
- *What are the impediments and challenges to its adoption in these HEIs? What combinations of factors tend to make eLearning 'adoptable'?*
- *How should the HEIs in these countries align themselves to deal with the challenges of eLearning in order to realise its benefits?*

Owing to the fact that one cannot account for eLearning adoption and use levels in higher education without taking the contexts of higher education into consideration, chapter 2 offered an in-depth analysis of the contextually-based eLearning phenomenon. From the dominant view of eLearning adoption, the advantages of eLearning were identified as those of addressing the demand of higher education by increasing the geographical and time scope of the students; increased interactivity, support and communication through the use of technology; increased students' motivation, retention and success rates; creation of repositories of intellectual and human capital that can be modified and reused easily; provision of easy learning and learning process management; flexibility in terms of content and delivery, pace, place and time of learning; creation of continental and international networks without the need of transporting people; and creating a workforce that is knowledge-economy ready.

It was noted that there is relatively low adoption of eLearning in higher education in ESA despite the perceived benefits of eLearning. The initial part of this study attributed this to, among other factors, the type of leadership, governance and management in higher education; the funding and financing of higher education; staffing and human capacity in higher education; and issues to do with language of instruction and availability of ICT tools in these languages. These factors led to the challenges in eLearning adoption identified as lack of sufficient bandwidth, lack of supportive policies and regulations, lack of access to technologies and information including power and related infrastructure for eLearning's use, lack of university management's buy-in, resistance due to the new teaching and learning paradigms propagated by the use of eLearning, lack of sufficient human capacity, limited or lack of financial resources, and socio-cultural paradoxes and issues.

To deal with these challenges, or to benefit from eLearning, it was recommended that higher education should employ proper coordination and formation of flexible funding models; create proactive measures of dealing with human resources; foster relationships between HEIs, students and their environments, especially with regard to the provision of technologies for teaching and learning; and form networks that create opportunities for sharing knowledge and reaching new markets beyond their borders and at the same time creating a culture of collaboration and cooperation. However, the issues of non-adoption and rejection could not be sufficiently addressed using these recommendations. It was therefore essential to

determine the factors that are affecting the adoption of eLearning, and how the factors influence the adoption.

7.3 Factors affecting eLearning adoption

For this research, adoption is seen as the process through which a party responsible for decision making goes from the first knowledge of an innovation, to developing an opinion about the innovation that would determine the decision to use or reject it, to investing resources in the innovation and finally integrating the innovation into the daily life of the party through entrenchment and routine usage (Leseure, Bauer, Birdi, Neely, & Denyer, 2004; Rogers, 2003). Consequently, the adoption of eLearning in higher education is deemed to be determined by two sets of decisions, namely: a) decisions made by the higher education institutions, and b) decisions made by individual members within these institutions. In other words, there are decisions that are made by the institutions that affect an individual, while at the same time there are decisions made by an individual that might affect the whole organisation in terms of eLearning adoption.

In eLearning adoption decision making, individuals use the eLearning attributes to form perceptions through an evaluation process of eLearning's benefits or utility (Section 4.2.2). In this case, the attitude is seen as an indication of an individual's position toward eLearning on the evaluation continuum (Section 4.2.2.1). Most models of individual attitudes and conditions in decision making used in adoption of innovation research, show the causal linkages between consciously intended antecedents and their effect on the adoption, or use decision (Section 3.2). In common, they posit that beliefs and perception have significant influence on the user's intention to act or portray the behaviour in question. Another major commonality among the models and theories is the social influence or impact on adoption behaviour. Understanding the measures of perceptions that could be used in the evaluation of the benefits of eLearning was therefore necessary. To do this, the following two objectives were formulated:

Objective two: To identify and enumerate the critical success factors, in terms of perceptions and conditions that are associated with successful eLearning adoption, and its continued use.

Objective three: To identify and enumerate the negative perceptions and conditions that hinder the adoption of eLearning in these institutions and that might lead to its non-adoption, rejection or discontinued use.

Based on these objectives the following research questions were formulated:

- *Why is eLearning, despite its publicised potential benefits, being adopted so slowly in Higher Education Institutions in ESA?*
- *What are the valuable lessons from other related fields about individual and organisational capacity and inclination towards eLearning adoption?*

ELearning innovation in higher education is special in that it has products, services and process dimensions that need to be considered. This uniqueness of eLearning necessitated that the study of factors affecting its adoption be studied from different perspectives that would cover the three dimensions. To cater for these dimensions and to elicit the necessary variables to investigate eLearning adoption, the decision to adopt eLearning was hypothesised to be influenced or determined by the four set of factors namely, *eLearning factors*; *Individual factors*; *organisational or HEI factors*; and *social, system and environmental factors* within which they (eLearning, individual and the HEI) exist.

For eLearning factors as stated earlier, the assumption of the research was that eLearning offers great potential and promises. Accordingly, for a successful adoption of eLearning these potential and promises must be seen, and be of relevance to the *adoption decision making unit* – both at the organisational and individual levels. The perceived promises and potentials of eLearning could include economic incentives that surpass the alternative modes of teaching and learning that are available. Therefore, it was hypothesized that the perceived net benefit of eLearning has an important effect on individual and organisational adoption (section 4.2.1.1; Jeyaraj, Rottman, & Lacity, 2006). A number of theories and models derived from various disciplines were used to identify the pertinent attributes of eLearning that would influence its adoption (see chapter 3 for a full review). The perceived attributes of eLearning are likely to influence its adoption. Most conspicuous attributes of eLearning identified were identical to Rogers' (2003) innovation characteristics, namely the relative advantage of eLearning to the adopting unit, perceived complexity of using eLearning, perceived compatibility with the existing modes of teaching and learning, the observability of

eLearning and its results, and availability of resources to test and try-out eLearning (see chapter four, table 4.4 for other characteristics).

For the individual characteristics, the research posited that the individuals' engagement with eLearning has an effect on their decision to adopt it. From the theories and models of adoption, five factors were identified to have major influences on the adoption of eLearning. These factors are a) the individuals' attitude towards eLearning, b) personal innovativeness, c) innovativeness need or motivation to use an eLearning, d) individual communication behaviour, and e) their prior knowledge or experience with similar innovations. The attitude toward eLearning is a results of an individual's appraisal or evaluation of eLearning opportunities and resources available and the social pressures or expectations (Section 4.2.2.1). The innovativeness in eLearning use is seen as the degree to which an individual makes a decision to use eLearning independently of the communicated experience of others (sections 4.2.2.2 and 6.4.2). Innovativeness need is a consequence of purposeful behaviour that is ultimately directed toward the fundamental goal of using eLearning (Section 4.2.2.3). Communication behaviour looks at the kind of information about eLearning, and how it is communicated within the social system (Section 4.2.2.4), which is posited to affect the information's transmission and absorption between members of the society (Wejnert, 2002) and their eventual decision to adopt eLearning. Prior experience, an individual's interaction with the eLearning proponents, or the eLearning (or similar innovations) being introduced (Section 4.2.2.5), is posited to have an influence on the adoption of eLearning.

At the organisational level within the higher education spectrum, four main factors that influence the adoption of eLearning were considered for empirical examination as they were perceived to have the greatest effect that could be tested. These factors in higher education are a) top management support of eLearning initiatives, b) availability or appointment of an eLearning champion, c) the organisational structure and d) the organisational culture. The top management within higher education institutions, it was hypothesized, act as linkages between individuals and eLearning, and it is also one of the best predictors of continued use of eLearning (Section 4.2.3.1). Indeed, where eLearning aligns itself with the goals of management, and management is frequently involved and consulted, eLearning is more likely to be adopted. The presence of an eLearning champion within a unit or the higher education institution is likely to have a significant influence on the adoption of eLearning. A champion in this case is defined as an individual who steers the organisational adoption of eLearning by

overcoming the indifference and resistance that eLearning could provoke (Section 4.2.3.2). At the same time the champion has a personal commitment to eLearning that creates an environment to "willingly risk their position and reputation to ensure eLearning's success" (Howell & Boies, 2004:124). Five organisational structure attributes, namely, size, degree of centralisation of decision making, level of formalisation within the organisation, organisational functional differentiation and specification, and organisational stratification were identified to affect eLearning adoption. On the organisational culture, three aspects, namely, the organisation's support of experimentation and its resilience to change; the organisation's communication tendencies; and the absorptive capacity of the organisation, influence the adoption of eLearning.

At the societal level, eight factors were identified that are likely to influence the adoption of eLearning. These factors are a) community and cultural values, b) technological infrastructure and the presence of related innovations, c) funding and income, d) level of education, e) policy and regulations, f) critical mass and bandwagon effect, g) communication channels and h) organisational visibility.

From the factors identified, a number of propositions were formulated, some of which were to be tested empirically to formulate the eLearning adoption framework for higher education. From the propositions, a number of observable items were derived. These items were used to collect data that was analysed to form the basis of the framework in the next section.

7.4 ELearning adoption framework for higher education

Evident from the factors identified above, there is great complexity in eLearning adoption. Finding a solution to this complexity that would at the same time solve the problem of non-adoption of eLearning in higher education in contexts where there are numerous interconnected (yet nonlinear) factors is very difficult. There is no way of telling if there are a small set of factors that have big effects on eLearning adoption. Neither is there a way of telling whether some items cause multiple and separated effects on the adoption of eLearning. In addition, there are salient beliefs and perceptions about the entities identified in eLearning adoption that in them could be part of the problem to be solved in the process of determining which factors influence eLearning adoption. These characteristics make the eLearning adoption in higher education intrinsically uncertain, difficult to predict or prescribe and

probably also difficult to manage. The complexity of an eLearning adoption framework is aggravated by two issues. First, by creating a link between the success factors of eLearning adoption, while managing the expectations, motives and attitudes of stakeholders. Secondly, by ensuring that eLearning adoption is seen *as the right thing to do*.

Understanding and presenting these complexities is achieved by formulating a framework. This framework is a consequent of the testing of the factors, and propositions that were identified in section 7.3 above. This framework form part of the fourth and final objective of the study:

Objective four: To formulate an eLearning adoption framework. The framework could encapsulate the success factors that can be replicated and enshrined in HEIs for successful eLearning adoption on one side, as well as how the negative influences can be dealt with, for example, turned into opportunities for success or learning opportunities, on the other side.

The research questions following from the above objective are:

- *How can the conditions and perceptions towards eLearning adoption be identified? How can they be influenced to make eLearning adoptable? How can the negative influences towards the adoption of eLearning be identified and prevented? How can these conditions and perceptions be adapted for the different contexts in which the HEIs in Africa operate?*
- *What are the valuable lessons from other related fields about individual capacity and inclination towards eLearning adoption?*
- *What are the reasons for non-adoption, rejection and discontinued use of eLearning in East and Southern African HEIs? How can these reasons, if any, be dealt with to lead to adoption or continued use?*

Due to the fact that the factors were adapted from different disciplines and contexts, they had to be empirically tested to validate their applicability to eLearning adoption. It is only after the empirical validation (after the data analysis) that the development of the framework was done. The ensuing discussion is therefore an attempt to infuse meaning and understanding of the results to develop the eLearning adoption framework, specifically in the understanding that eLearning adoption is the result of decisions made by individuals and organisations. These discussions, therefore, consider the various characteristics that the individuals and

organisations should have in order for eLearning to be adopted. The discussion eventually leads to the proposed framework.

7.4.1 Individual factors of eLearning adoption

The purpose of the study was to propose a framework for eLearning adoption by a) identifying the measures that assess selected elements of the framework, and then b) empirically testing the measures. With respect to the overall framework, the current conceptualization of the individual factors of eLearning adoption is composed of six primary dimensions, namely attitude towards eLearning, intrinsic motivation, collaboration and communication behaviour of the individual, extrinsic motivation, subjective norm, and personal innovativeness. The following paragraphs present a discussion on how the results of the study relate to the review of the literature.

An evaluation of the literature dealing with individual adoption of innovation was used to develop a testable framework for assessing the individual characteristics of eLearning adoption. At the individual level, various researchers studies different dimensions including personal intentions, attitude and the subjective norm, perceived behavioural control, self efficacy and cognition, perceived usefulness, and perceived ease of use (See Chapter 4; Lippert & Davis, 2006; Workman, 2005; Vishwanath & Goldhaber, 2003; Morris & Venkatesh, 2000; Ajzen, 1991; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989; Bandura 1989;1977). Because there are characteristics of eLearning that shape the perception of the individuals, the issues of perceived availability of resources and perceived demonstrability of results in using eLearning that could not be adequately captured in any of the dimensions above, were added. From this, an initial model was developed comprising of 11 dimensions as shown in table 7.1 below.

Table 7.1: Dimensions and items in individual factors of eLearning adoption

Dimension	Number of Items
Ease of use of eLearning	4
Perceived benefits	3
Perceived compatibility	4
Perceived availability of resources	2
Perceived visibility of results	4
Self-efficacy	6
Perceived complexity	5
Personal innovativeness	11
Innovativeness need	11
Communication behaviour	5
Prior experience	2

The first 7 items in table 7.1 above measures the individual's attitude toward eLearning while the other three measure other traits that could not directly be regarded as attitude towards eLearning. Following the computation of an exploratory factor analysis, six factors were retained for attitude. These factors are the perceived usefulness of eLearning, self-efficacy, perceived visibility of results, perceived ease of use, perceived complexity and perceived compatibility. Perceived availability of resources was not used. Interestingly, six factors were loaded on the other traits that could not be grouped under the attitudes towards eLearning, namely, a) intrinsic motivation, b) collaboration and communication, c) extrinsic motivation, d) subjective norm, e) personal innovativeness, and f) prior experience. The innovativeness need construct was broken down into its constituent parts, namely intrinsic and extrinsic motivation. The personal innovativeness loaded with only the factors that were measuring the perceived behavioural control in using eLearning.

7.4.1.1 Attitude toward eLearning

Perceived usefulness of eLearning is perhaps the most prominent result from the factor analysis. This could be especially true, because even the other factors of perceived visibility of results, self-efficacy and perceived ease of use, have strong links with the usefulness of eLearning (Venkatesh & Bala, 2008). Indeed, earlier research by Venkatesh and Davis (2000), in what they called the Technology Acceptance Model 2 (TAM2), posits that perceived ease of use and result demonstrability will have a positive direct influence on perceived usefulness. In fact for the adoption of technology where the Technology Acceptance Model is routinely used, the perceived usefulness and perceived ease of use are seen to hold the key to helping in the design of effective interventions to influence the known determinants of adoption and the success of new Information Technologies (Section 3.2.2.3; Sabherwal, Jeyaraj, & Chowa, 2006; DeLone & McLean, 2003). DeLone and McLean (2003) further posits that the full understanding of the context or frame of reference in the perceived usefulness constructs as the 'net benefit' or usefulness, might be different for the different stakeholders. Initiatives aimed at showcasing the benefits of eLearning to the academic staff members should therefore be employed. This could be in the form of training, seminars and also demonstrations whose effect would be enormous if done by colleagues.

Self-efficacy or an individual's judgment of his or her own capabilities for performing a specific task or attaining a particular outcome (Bandura, 1989), is the other construct that is

important for eLearning adoption (Section 3.2.3). Taylor and Todd (1995), again from the adoption of technology, posited that self-efficacy is a determinant of the perceived behavioural control, which in effect has an influence on the adoption of technology. A high level of self-efficacy implies more confidence in making an adoption decision and fewer deterrents by the potential barriers (Lin, 2003). Actually, the beliefs of personal self-efficacy influence the standards people adopt, how they think about eLearning – positively or negatively, how they invest effort in eLearning, how they would persevere in the face of difficulties in using eLearning, among other things (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003). By implication, therefore, eLearning proponents should look at ways and means of improving not only the competence of, but also the perceived competence in using eLearning. More focus should probably be on the role of those disseminating the competence and their ability to allude confidence that would convert the inefficacy perception. Recognition of efforts made, albeit small with some form of reinforcement, could as well be used to improve eLearning self-efficacy (Pajares, 1996; 1977).

Perceived visibility of results. The visibility of results in using eLearning is measured using the tangibility, observability and communicability of the results (Berkun, 2007; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Rogers, 2003; Venkatesh & Davis, 2000). As stated earlier, there is a positive link between the perceptions of visibility of results and the perception of usefulness. In addition, the extent to which an individual perceive the results of eLearning to be visible, could influence their confidence in using eLearning and eventually lead to the achievement of the desired results, that is, improve on their self-efficacy. In addition to the improvement on the self-efficacy, if compatibility is measured on the differential in effort required to transform the learning from the traditional modes of teaching, then a gradual transformation would make it easier. A gradual transformation entails that what can be done easily and quickly using eLearning is done first, while the more challenging tasks are done over time. Similarly, if the complexity of eLearning is viewed from the number of difference in expertise required, then learning of these expertises can be broken down into manageable chunks that can be learnt incrementally and hence reduce the perceived conceptual gap in its complexity.

Perceived ease of use entails the extent to which individuals believe that eLearning will require minimal effort to use (Davis, 1989). Although loaded differently, the perception of complexity and that of compatibility are closely related to the perceived ease of use (Sections

3.2.2.3 and 6.4.1.1). Therefore, in the following discussion, the perceptions of ease of use, compatibility and complexity are discussed together. The *perceived compatibility* is a measure of how eLearning is perceived to be consistent with existing values, past experience (norms), habits, lifestyle, and discerned needs of adopters (Sections 3.2.1.1 and 4.2.1.3). The challenges of eLearning mentioned above (and in section 2.4.2) create some level of incompatibility of eLearning with the existing teaching and methods. In addition, where there is already an entrenched mode of teaching, for example, using the traditional face-to-face, it is not always clear what need eLearning would be fulfilling if there isn't anything wrong with the face-to-face approach (Njenga & Fourie, 2010). The *perceived complexity* is a measure of the ease of understanding eLearning (Rogers, 2003). It was hypothesized that the requirements to master new technologies and teaching approaches may add to the complexity (Section 2.4.2).

7.4.1.2 Other individual traits and characteristics

Intrinsic motivation is defined as "performing an activity for its own sake because of the satisfaction it provides" (Meyera & Evans, 2005:247) and was hypothesized to have influences on eLearning adoption that supersede those of extrinsic motivation. Intrinsic motivation was measured as the willingness to learn and succeed in using eLearning without the expectation of external reward. From research, there is a strong link between the perceived ease of use and intrinsic motivation (Venkatesh, 1999), suggesting that the same interventions could be employed to increase intrinsic motivation in the use of eLearning. In addition, playful and free environments could foster intrinsic motivation, not only during training, but also in the work place (Venkatesh, 1999).

Communication and collaboration - The movement and spread of information regarding eLearning within the social system affects the rate at which it is adopted (Rogers, 2003). Communication is also a vital ingredient in the collaboration within professional networks (Shrum & Campion, 2000) that aid in the adoption of innovations like eLearning. The use of interpersonal communication within homophilous groups (i.e. individuals who are similar or have similar interests), for example the teaching staff in this study, should be encouraged as it influences how the teaching staff would perceive eLearning's effect on their profession (Jones, Watson, Gardner, & Gallois, 2004; Rogers, 2003). The issue of communication and collaboration for this research was measured on the willingness to share experiences on eLearning among colleagues, as well as the perception of top management encouragement of

such sharing of ideas at the individual level. It is therefore important for stakeholders in the eLearning adoption in higher education to embrace more collaborative initiatives and at the same time cultivate openness in communication and ensure that the communication is always of high quality.

Extrinsic motivation. The effects of an external reward system, that is, performing behaviour with the expectation of achieving a goal, namely the use of eLearning (Venkatesh, 1999) loaded separately from the intrinsic motivation discussed above. While most of the questions measuring intrinsic motivation focused on the mandated measures established by the universities' management, it could as well give an indication that the existing infrastructure or policies within the universities are not conducive for eLearning. Extrinsic motivation has strong links with the perceived usefulness attribute (Howell & Higgins, 1990). To improve on, or increase extrinsic motivation, similar measures as those to improve perceived usefulness could be adopted. In addition, the formation of a reward structure could also be used to improve the motivation of lecturers to adopt eLearning. However, this should not be done at the expense of intrinsic motivation which has been shown to diminish with an increase in rewards or extrinsic motivation (Howell & Higgins, 1990).

Subjective norm. This "refers to the perceived social pressure to perform or not to perform the behaviour" (Ajzen, 1991:188) and in this case relates to how people deal with social pressures in making a decision on using eLearning. This aspect was measured based on how individuals rely on their colleagues during the decision making process. A positive influence, especially from superiors, on eLearning adoption could help in improving the subjective norm effects deemed important for eLearning adoption particularly in the early stages (Venkatesh, Morris, & Ackerman, 2000).

Personal innovativeness refers to the degree to which adopting units are willing to use new concepts, ideas, products, or services (innovations) and their awareness of the potential of these innovations (Rogers, 2003; Midgley & Dowling, 1978). This loaded on the willingness to experiment with eLearning before the persuasion or visibility of other colleagues using eLearning. Availing the necessary tools and technology for eLearning could hold the key to improving personal innovativeness. However, adequate access for professors in Higher Education in Africa to experiment with eLearning remains a problem. While a number of opportunities could be created where "pilot" or "tryout" courses can be run, the pilots and

tryouts should be done with care to avoid the situation Cross and Adams (2007) mentions, namely that higher education institutions are often dealing with reactive measures to respond to situations as opposed to proactive responses that would shape the direction the HEIs should take in implementing and facilitating eLearning adoption.

7.4.2 Organisational factors of eLearning adoption

As in the case of the individual characteristics of eLearning adoption, an initial literature review was used to elicit the original model. A number of factors were considered: a) top management support, b) availability of champions and championship behaviours, c) organisational structure (formalisation and centralisation), and d) organisational culture (resilience to change, communication and absorptive capacity) were tested for their effect on the adoption of eLearning at the organisational level. The factors represented in table 7.2 below with the items on each factor.

Table 7.2: Dimensions and items of organisational factors of eLearning adoption

Dimension	Number of Items
Top management support	10
Championship	7
Centralisation	4
Formalisation	9
Resilience to change	5
Communication	10
Absorptive capacity	7

After the factor analysis, all the factors except championship behaviour loaded and are discussed below in the order of their loading.

Absorptive capacity is a measure of the universities' ability to recognize the value of eLearning, assimilate eLearning and apply it for its benefits (Cohen & Levinthal, 1990). The absorptive capacity was measured by the universities' ability to assess prior knowledge on eLearning in the light of the existing organisational model and the nature of eLearning technologies available (Martin, Massy, & Clarke, 2003). This was captured on two fronts. Firstly, the training side where the university organises training and seminars on eLearning or encourages members to participate in such events happening outside the university. The other side is where the university offers encouragement of collaboration between members and other institutions and vendors of eLearning products. Since absorptive capacity relies on an initial knowledge of eLearning (Ruiz-Moreno, García-Morales, & Llorens-Montes, 2008), the

starting point for Universities to improve their absorptive capacity is in increasing the level of knowledge dissemination on eLearning.

The management support of eLearning effect on eLearning adoption is undeniable as top management form the linkage between eLearning and the individual members of the organisation (Leseure, Bauer, Birdi, Neely, & Denyer, 2004; Swanson & Ramiller, 2004; Sharma & Rai, 2003; Gallivan, 2001). Indeed, change theorists have posited that top management involvement and consultations in change initiatives in organisations, like the introduction of eLearning, spur the change in the right direction (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Pollard, 2003; Gallivan, 2001). The top management aspect was measured using the top management commitment to eLearning, encouragement of its use, and recognition of its importance at the university level and at the departmental level. The implication of this is that top management should legitimise the need for eLearning in higher education. The legitimisation process would entail formulation of conducive policies and procedures, and aligning them with the strategic position of the university; and publicly and explicitly supporting eLearning initiatives through personal commitments and allocation of the necessary resources (Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004; Pollard, 2003; Gallivan, 2001).

Communication behaviour in the case of organisational eLearning adoption looks at the way change in the employee's professional life is communicated. Indeed, the way the employees perceive an innovation's effect on their profession (Jones, Watson, Gardner, & Gallois, 2004) and how the organisation as a whole encourages constructive communication between the various stakeholders, has a significant influence on the adoption of innovation (Rogers, 2003). The communication behaviour was measured using two aspects: information quality and consultative and participative communication. These, coupled with the communication and collaborative behaviour dealt with at the individual adoption level, show the influence that communication has on the adoption of eLearning. With regard to information quality, five items on quality were investigated, namely, timeliness, accuracy, adequacy, completeness and credibility of the information being communicated. The consultative and participative communication aspect was measured using top management's openness to voluntary information or counsel from members, the encouragement of ideas and ease of propagation of information about eLearning. By implication therefore, it means that higher education institutions advocating the use of eLearning should endeavour to transmit quality

information – based on the five aspects mentioned – and at the same time foster an environment that allows not only consultation and participation, but also open communication and collaboration.

Centralisation of decision making is where organisational decision making is dominated by a single actor or unit (Ahuja, 2000; Adams, Bessant, & Phelps, 2006; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004). The over concentration of the decision making authority at the top stifles the development of innovative solutions (Damanpour, 1991), while decentralisation serves to enhance the required behaviour (Howell & Higgins, 1990) and facilitate innovation by increasing organisational members' awareness, commitment, and involvement (Damanpour, 1991; Pierce & Delbecq, 1977). Related to the communication behaviour above, centralisation of decision making in the higher education institutions would often lead to a communication breakdown, hence the lack of the essential awareness, commitment and involvement that would ensure a participative and consultative approach. This construct was measured on the level of staff members' involvement in long term planning, technology decisions, strategy and policy decisions and capital investment decisions. All these factors, except the technology decisions loaded strongly. It is therefore incumbent for the higher education institutions to employ a devolved or decentralised approach to eLearning decision making, or at the least ensure that there is proper information flow regarding eLearning to warrant success in its adoption.

The level of formalisation is "the degree of emphasis on following rules and procedures in role performance" (Adams, Bessant, & Phelps, 2006:33), which is evidenced by a "well-developed policies-and-procedures manual [that] ensures uniformity of service and adherence to a structured protocol" across the organisation (Meyer, Johnson, & Ethington, 1997). A high level of formalisation is known to stifle innovation and hence eLearning adoption. Conversely, flexibility and low emphasis on work rules facilitate innovation (Damanpour, 1991), as it permits openness, which encourages new ideas and behaviours (Pierce & Delbecq, 1977). The level of formalisation was measured using positions, authority structure, channels of communication, rules and policies, sanctions and penalties, and strict induction of new staff members. Higher education institutions with well defined positions, well defined authority structure, strict channels and procedures for communication, well formulated rules and policies governing the actions of employees, stipulated sanctions and penalties for non-adherence, and a regime of strict induction programs of new staff members is highly

formalised. Relaxation in most or all of these aspects would make an organisation less formalised, and in effect more amenable to the adoption of eLearning. It is therefore crucial to higher education institutions to adopt a less formalised approach in order to foster eLearning, and indeed other innovations.

Organisational resilience to change. Resilience is defined as the "ability to create and integrate new structures of thinking and behaving that provide us a more mature sense of coherence" (Wilson & Ferch, 2005:48). Resilience is often seen as seeing reality and judging the likelihood of the desirable outcomes when there are opposing forces to the desirable outcome. Wilson and Ferch (2005) underscore the importance of resilience in creating assurance in the disruption and integration processes, without which there would be disordered behaviour, stagnation, increased vulnerability and failure to reintegrate functional new structures. This could lead to destabilisation. At the organisational level, resilience is a part of its culture that dictates its reaction to imminent change. An organisational culture where there is *resilience to change* is most likely to succeed in innovation adoption (Erumban & de Jong, 2006; Greenhalgh, Robert, Macfarlane, Bate, & Kyriakidou, 2004). Consequently, the resilience to change was measured using the interpretive leaning of the change as either based on current values' and the context's merits, based on past failures or successes, or just as an unexpected phenomenon. An organisational culture that interprets change based on its value and contexts has high resilience to change as opposed to an organisation that bases it on past failures or successes. Central to this idea therefore, is that, higher education institutions should foster a culture that seeks to understand the value and the context of eLearning.

7.4.3 Proposed model of eLearning adoption and research implications

Based on the arguments above, a successful model for eLearning adoption should consider the features, summarised in table 7.3 below.

Table 7.3: Summarised factors affecting eLearning adoption in higher education

Level	Factor	Effect	Proposed intervention
Individual	Perceived usefulness of eLearning	High perception of usefulness will lead to high adoption	Showcasing the benefits of eLearning in different fora and methods for example training, seminars and demonstrations
	Self-efficacy	High level of self-efficacy will lead to high adoption	Continuous support and reinforcement to get rid of inefficacy, and promote the building of confidence in using eLearning
	Perceived visibility of results	High perception of visibility of results will lead to high adoption	In addition to the intervention on the perceived usefulness and self-efficacy, strategic and incremental training is important. This could ensure that less demanding tasks are trained first and as the confidence and perception gap is minimised, the more demanding aspects could be taught.
	Perceived complexity	A high perception of complexity will lead to low adoption or non-adoption	
	Perceived compatibility	High perception of compatibility with current way of doing things will lead to high adoption	
	Perceived ease of use	High perception of ease of use will lead to high adoption	
	Intrinsic motivation	Where intrinsic motivation is present, there is likely to be high adoption	Encouraging 'playfulness' and allowing copious freedom in the workplace enhances intrinsic motivation
	Communication and collaboration	Where there is easy communication, and encouraged collaboration, there will be high adoption of eLearning	The use of collaborative initiatives, and cultivation of open discussions.
	Extrinsic motivation	Where there are external rewards and recognition in using eLearning, there will be the likelihood of higher adoption	In addition to the measure of perceived usefulness, a reward or recognition system could be used to improve the motivation to use eLearning.
	Subjective norm	If an individual thinks that the role of peers' influence in using eLearning is important, and the influence is positive, there will be high adoption	At the early stages, management should make their influence known and support members in the adoption of eLearning
	Personal innovativeness	A person's ability and willingness to experiment could lead to adoption of eLearning.	Use of pilot projects or tryouts on eLearning, especially on courses or areas where there is a great deal of scepticism.
Institution	Absorptive capacity	Similarly, an organisation's ability and willingness to recognize the value, assimilate and apply eLearning for its benefits, could lead to high adoption	Increasing the level of knowledge and information dissemination on eLearning.
	Management support of eLearning	Explicit commitment and support from management for eLearning could lead to high adoption	Legitimisation of eLearning processes – for example through the formation of conducive policies and procedures, alignment of eLearning to core businesses, and a public and explicit statement of support from top management.
	Communication behaviour	An environment that values quality and unrestricted flow of information about eLearning will foster eLearning adoption	Encouraging consultative and participative communication and ensuring that information communicated is of the highest quality possible.
	Centralisation of	Over centralisation and lack of involvement of all	Devolution of decision making especially with regard to the use of

	decision making	stakeholders in decisions regarding eLearning could lead to non-adoption or rejection	technology in teaching and learning.
	Level of formalisation	High level of command-chains could lead to rejection or non-adoption of eLearning	Less formalised structures are fertile grounds of innovation and eLearning innovation could benefit from this.
	Organisational resilience to change	How an institution reacts to eminent change would have an effect on eLearning adoption. Where the reaction is in favour of the change there could be a high level of adoption.	Fostering a culture that seeks to interpret change based on value and context and being aware of the disruptions any change might bring.

Without an understanding of the factors that could contribute to eLearning adoption in higher education in Eastern and Southern Africa, the investments in eLearning technologies and initiatives will be in vain. The cascaded effects of these investments would be a loss of valuable resources that could have otherwise been used to better the teaching and learning initiatives. While knowing the factors that contribute to eLearning adoption is one thing, having a clear frame, or reference point, to the kind of interventions required to promote eLearning adoption, is of importance.

7.5 Limitations of the research and future research

It should be reported that the current study has several limitations which necessitate future research. Specifically, the researcher has identified four particular limitations. First, the predictive validity of self-reported behavioural measures is not always high, which may lead to overestimations of correlations of the various factors due to common-method variance and also social desirability bias (Sedera & Gable, 2004; Collopy, 1996; Presser & Stinson, 1998).

Secondly, there cannot be a claim that the proposed factors and items for the eLearning adoption are complete, since there are other factors that were either not fully explored or not explored at all that could have an influence in the adoption of eLearning in higher education. These factors could potentially form other factors that academic staff members in higher education perceive as credible antecedents to eLearning adoption. Indeed, the research did not endeavour to establish the factors the academics would see as influencing their adoption of eLearning, in the development of the instrument. The factors were rather sourced from an extensive survey of the literature. Although the literature was extensive and thorough, future research in the adoption of eLearning in higher education could benefit by conducting interviews with academics to get additional dimensions or factors of eLearning adoption.

Thirdly, by virtue of eLearning encompassing the use of computers and often the Internet, and the assumption that most academics are using the Internet, the choice of an online questionnaire might have caused a bias in that only those who are currently using eLearning have access to the Internet as per the assumption. In effect, this choice could have excluded respondents who might not have had access to the Internet and whose inputs could have been valuable. Additional studies using multiple methods of data collection may strengthen the generalisability of the proposed constructs and framework.

Fourthly, cross-sectional sampling was used in the data collection and therefore the results are not generalisable beyond the time the survey was carried out. It is therefore necessary to strongly recognise the fact that the individual perception regarding something may vary over time. For example, an academic may perceive eLearning to be complex at the beginning of the year, but after interventions like training and demonstrations may change that perception. Additional

research, therefore, may find it desirable to employ a longitudinal design to examine the factor structure of the proposed model. This could allow for the tracking of the variability in perceptions of the academic staff over the duration of time. In the end, this could provide a more accurate assessment of the academics' perceptions of the factors of eLearning adoption than it has been done here with a cross-sectional design.

Notwithstanding these limitations, the current research provided the stimulus for additional future research and testing opportunities. An evaluation of the dimensions of individual factors of eLearning adoption and organisational outcome expectations of the use of eLearning. The current research assumed that it is to the organisations' and individuals' best interest to adopt eLearning. However, there might be cases where the organisation might be discouraging the use of eLearning. Of specific importance though, is the situation where it is in the organisation's best interest to adopt eLearning and there are clearly set outcomes or goals that should be met in the use of eLearning. Probably, weighing the individual's perception of the eLearning dimension factors against a set of organisational outcomes might lead to insightful results.

The research could be extended further by using the modified model and scale as part of a study examining how the individual factors and organisational factors of eLearning adoption change over time. Nonetheless, it would be interesting and useful to understand the relevance of the changes in perception an individual goes through in a personal capacity as they experience eLearning. In addition, the improvement of the scale should be a continuous process so that the eLearning adoption phenomenon and the dynamics involved, as indeed the adoption of any new innovation, can be fully understood.

7.6 Conclusions

The review of the literature portrayed Higher Education Institutions (HEIs) in Eastern and Southern Africa (ESA), who with very limited resources and enormous challenges are committed to achieving their objectives of teaching, learning and research. Technology and specifically eLearning has been proven to have revolutionary potential in meeting these objectives by reaching new and wider markets, as well as serving the existing ones. This research set to investigate the challenges, conditions and perceptions pertaining to the adoption and continued

use of eLearning. Motivated by the lack in documented research in this field particularly in ESA, the research investigated eLearning adoption challenges and came up with a framework for eLearning adoption in higher education, and in particular higher education in developing countries.

The research set to find solutions to questions in the form of how, what and why. The 'what' questions took stock of what is being done and the successes of eLearning and what the HEIs need to do to overcome these challenges in order to adopt eLearning. The 'how' questions dealt with the interventions or approaches that are required to make eLearning adoption a success. To better understand the 'what' and 'how' questions, non-adoption, rejection and discontinued use were also investigated because failure of one of these key actions was not assumed to be "the mirror image of their success", hence the 'why' question. The solutions were sought using a number of research approaches: document analysis, survey and benchmarking to cater for the questions of validity, reliability and failure of getting sufficient data.

This research contributed to the body of knowledge by providing an understanding of the factors that influence eLearning adoption, and more importantly the interventions required to make eLearning adoption possible. The research should enable managers, decision and policy makers, and eLearning advocates to focus on how to improve an organisation's strategic reaction to positively influence eLearning adoption.

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Appendices

Appendix I – List of publications from the thesis

Articles

Njenga, J. K and Fourie, L. C. H (2010) The myths about e-learning in higher education, *British Journal of Education Technology*, 41(2):199–212.

Conferences

Njenga, J., K. and Fourie, L., C., H. (2008) eLearning adoption conceptual framework: the link between eLearning characteristics and adopters characteristics, *Proceedings of the 3rd International Conference on e-Learning University of Cape Town, Cape Town, South Africa* 26-27 June 2008 pp. 337-346

Stoltenkamp, J., Njenga, J. K & Kies, C. (2007). Building Training Networks for a Free eLearning System, Proceedings of the IST-Africa Conference, Maputo, Mozambique, 9 - 11 May 2007

Under review

Njenga J., K. and Fourie, L., C., H. Here and Now or Coming in the Future? eLearning in Higher Education in Africa (Book Chapter)

In Progress

Njenga J., K. and Fourie, L., C., H. eLearning Users' and Information Characteristics in Higher Education Institutions in Africa

Njenga J., K. and Fourie, L., C., H. Desirable individual attributes for eLearning adoption in Higher Education Institutions in Africa

Njenga J., K. and Fourie, L., C., H. eSkills and eLearning: The Role of Higher Education in South Africa

Njenga J., K. and Fourie, L., C., H. Socio-cultural paradoxes and issues in eLearning Adoption in Africa

Appendix II – Variables in adoption research

Table 8.1: Emergent variables from adoption research

ELearning	Individual		Organisational		Context
Adaptable innovation	Age	Internal pressure	Administrative intensity	Management characteristics and risk perception	Buying center participation
Communicability	Anxiety	Intrinsic motivation	Business computerisation	Managerial training	Communications media quality
Compatibility	Attitudes	Ease of task	Planning and control	Management support	Competition
Complexity	Behavioural intention	Job/role definition	Championship	Opinion leadership	Competitor scanning
Cost	Career ladder	Job/role rotation	Communication	Perceived status & image	Consequences
Ease of use	Communication amount	Learning responsibility	ELearning avoidance	Structure(centralisation)	Culture
Experimentation	Communication	Opinion leadership	Consequences	Structure (formalisation)	Power
Observability	ELearning avoidance	outcome expectations	Culture	Structure (integration)	Contextual complexity
Perceived benefits	Experience	Personal outcome expectations	Power	Structure (routinisation)	Environmental dynamism
Perceived usefulness	Self-efficacy	Perceived barriers	Support for eLearning	Structure (specialisation)	Environmental instability
Relative advantage	Consequences	Perceived behavioural control	End-user involvement	Performance outcome expectations	External pressure
Demonstrability	Culture	Personal innovativeness	Delegation of tasks	Performance gap	Government
Technological diversity	Support for eLearning	Playfulness	Evolution level	Process integration	Supply chain dynamics
Trialability	Education	Resources	External pressure	Production scale	Individualism
Uncertainty	User characteristics	Response to risk	Level of formalisation	Professionalism	Information intensity
Visibility	End-user involvement	Risk aversion	Hierarchical levels	Resources	Information sources
Social presence	Experience	Satisfaction	Image	Response to risk	Net dependence
	External pressure	Subjective norms	Coercive influence	Strategic role of eLearning	Network externality
	Extrinsic motivation	Teamwork	Extrinsic motivation	Teamwork	Network size
	Facilitating conditions	Tenure	Information intensity	ELearning policy	Resources
	Gender	Trust	Information sources	User involvement	Response to risk
	Impact on jobs	User support	Internal pressure	User participation	ELearning policy
	Peer influence	Voluntariness	Size	User support	Uncertainty avoidance
	Information intensity	Perceived visibility	Slack resources	Vertical coordination	Masculinity
	Information sources	Perceived credibility	Learning responsibility	Workforce skills	Image
	Experimentation			Perceived visibility	Critical mass
					Perceived visibility

Adoption factors: non-adoption, adoption, discontinuance, likely adoption, rejection, reinvention

Appendix III – Letter inviting experts for review

16 February 2008

Dear Mr./Ms. <<expert name>>,

You have been selected to participate in a review of a research instrument (questionnaire) as an expert for a study on the adoption and use of eLearning/Learning technologies in Higher Education Institutions (HEIs) in selected countries in Africa. The questionnaire seeks to gather information about the perceptions, motivation, organisational and environmental factors affecting the use of eLearning with the aim of understanding the kind of interventions required for faster adoption and continued use of eLearning. The results of a statistical analysis of the data will be used to make specific recommendations on the areas of personal characteristics and attitudes, organisational realignments, technology policy, implementation, and operations for HEIs for successful adoption of eLearning.

We would appreciate it if you could comment on the following:

1) **If the survey is easy to read and understand;**
2) **Approximately how long did it take you to complete reading and completing all the questions;**
3) **The relevance of the questions in the survey to your institution; and**
4) **Any other shortcomings or general comments.**

I would appreciate it if you could e-mail your answers to jkariuki@uwc.ac.za. If you have any questions or concerns, feel free to call or email us at the addresses below. For your convenience a reply form is annexed to this email.

This study is for the completion of the requirements of a doctoral thesis research in the Information Systems department at the University of the Western Cape, and your expert review is greatly appreciated.

Thanking you in advance.

James Njenga
Doctoral Candidate
Tel: +27 21 959 3200
Fax: +27 21 959 2031
Cell: +27 72 037 3284
Email: jkariuki@uwc.ac.za

Prof Louis Fourie
Supervisor
Department of Information Systems
Tel. +27 21 9593248
Fax. +27 21 9591554
E-mail: Lfourie@uwc.ac.za

Appendix IV – Expert review form

Expert Review Form of Adoption of eLearning Questionnaire.

1a. Did you find the survey easy to read and understand?

1b. Are there words or phrases that you found confusing? Which ones?

2. Approximately how long did it take you to complete the reading of the questionnaire?

3a. Did you find the items in the questionnaire relevant to your university or department?

3b. Are there questions you did not like or that are irrelevant to your university of department? Which ones? (*please list the section and question number e.g. I-2, II-13*)

4. Any other shortcomings or comments?

Appendix V – Letter of introduction for the online questionnaire

The eLearning Adoption Survey

Dear Academic,

Over the last few decades, there has been a worldwide surge in the use of information and communication technologies (or digital technologies). There have been reported mixed results of the 'digital revolution' to the different angles and spheres of our daily life including education. However, there is a perceived lack in terms of both research and success stories in African higher education institutions with regard to the adoption of digital technologies in teaching and learning despite their promise and potential. There is therefore need to study and document the contributing factors, and at the same time to develop frameworks and/or guidelines for successful use of digital technologies in teaching and learning, popularly known as eLearning.

You are kindly requested to participate in a research on the adoption and use of eLearning/Learning technologies in Higher Education Institutions (HEIs) in selected countries in Africa. The questionnaire seeks to gather information about the perceptions, motivation, organisational and environmental factors affecting the use of eLearning with the aim of understanding the kind of interventions required for faster adoption and continued use of eLearning. The results of a statistical analysis of the data will be used to make specific recommendations on the areas of personal characteristics and attitudes, organisational realignments, technology policy, implementation, and operations for HEIs for successful adoption of eLearning.

Please ***note*** that:

- there are no ***correct*** or ***incorrect*** responses;
- all the information gathered from this questionnaire will be ***totally confidential*** and the strictest confidentiality and anonymity shall be preserved. Your name shall not be publicised in the final report nor will there be any cross-references made that can link the results of the questionnaire to you.
- You can forward this mail to as many professional colleagues in the countries below as possible.

Only academics from ***Angola, Botswana, Burundi, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe*** are eligible to participate in the survey. If you are not from these countries, please ignore this communication. Please pass this email to your colleagues in these countries.

It will take you approximately 20 minutes to complete this questionnaire. For internal validity of the questionnaire, some items may appear as if they are repeated. To complete the questionnaire, copy and paste the following URL onto your browser: ***http://www.elearningfundi.net/survey/index.php?sid=37667*** OR ***http://tinyurl.com/64lmob***

I would appreciate it if you could e-mail your questions, concerns, comments and suggestions to jkariuki@uwc.ac.za. If you have any questions or concerns, feel free to call or email us at the addresses below.

This study is for the completion of the requirements of a doctoral thesis research in the Information Systems department at the University of the Western Cape, and your participation is greatly appreciated.

Thanking you in advance.

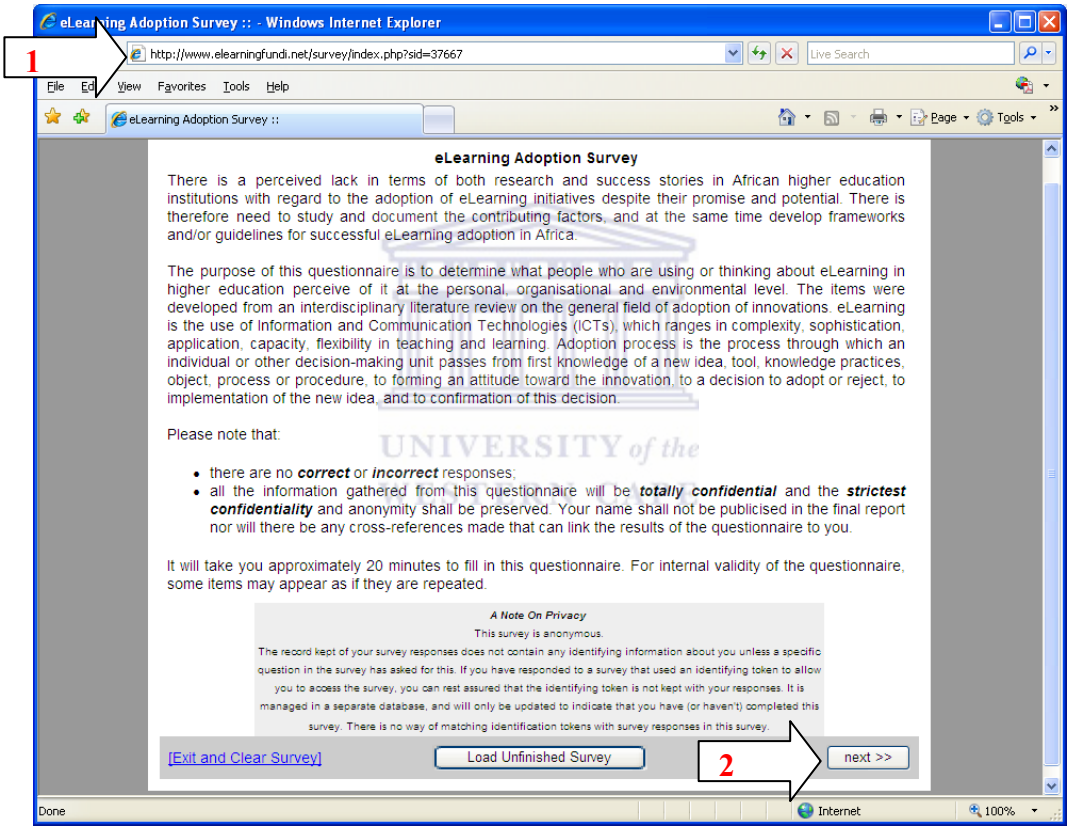
James Kariuki Njenga
University of the Western Cape
Tel: +27 72 037 3284/+27 21 959 3243
e-Mail: jkariuki@uwc.ac.za, jkariuki@gmail.com

Appendix VI – Instructions for completing the online questionnaire

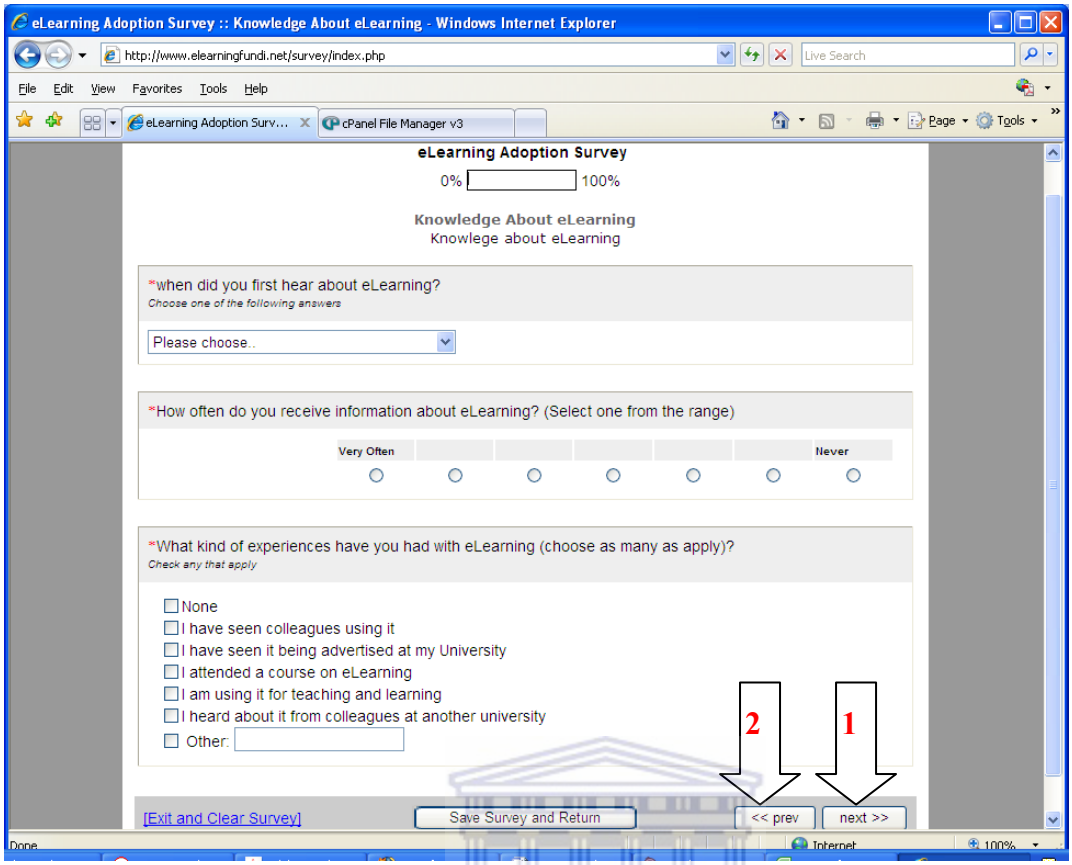
For you to participate, you should be an academic in the following countries in the Eastern and Southern Africa region:
Angola, Botswana, Burundi, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe.

Follow the following steps:

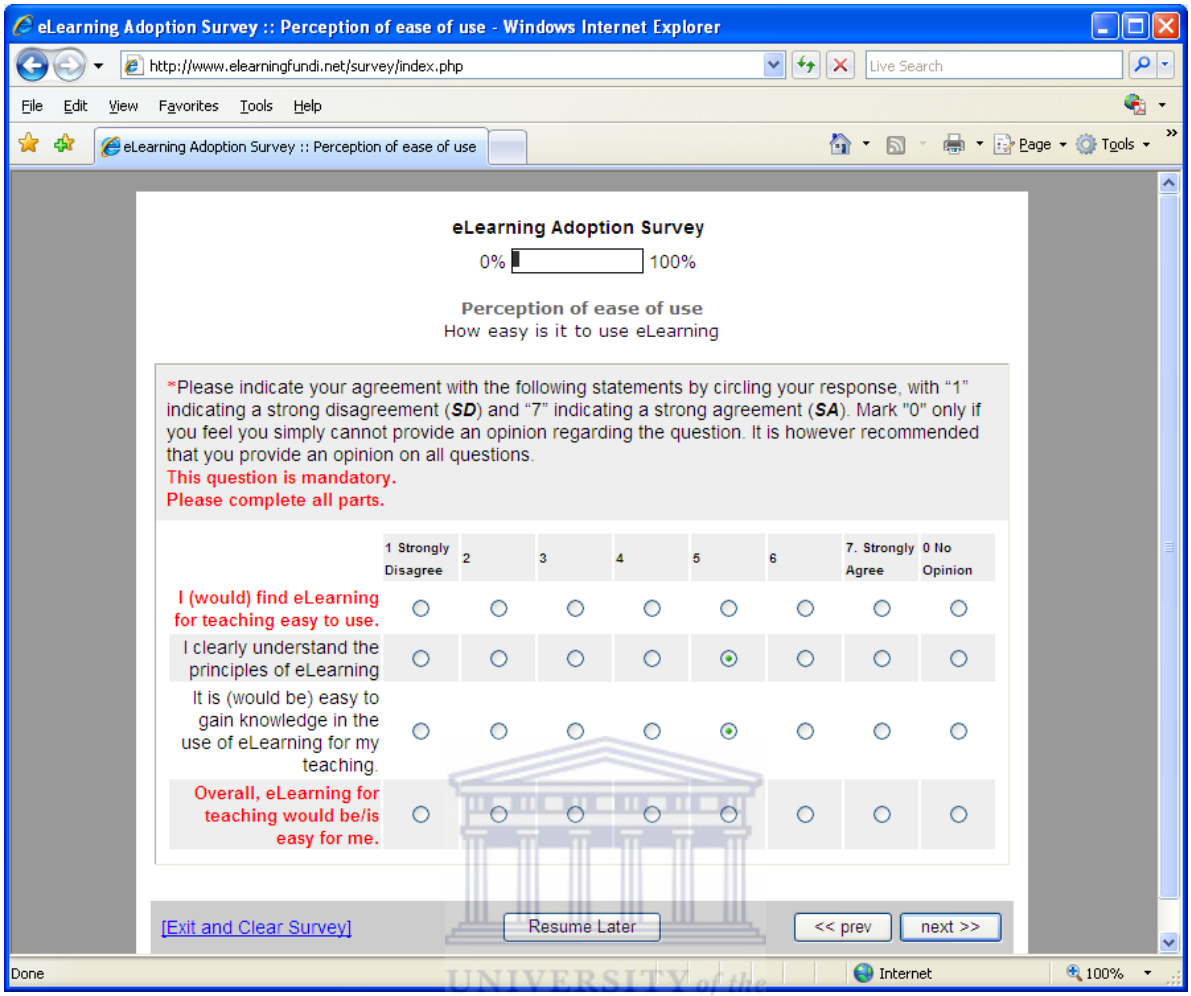
1. Visit the URL: ***http://www.elearningfundi.net/survey/index.php?sid=37667*** OR ***http://tinyurl.com/64lmob***
   This will lead you to the introduction page of the survey as shown.



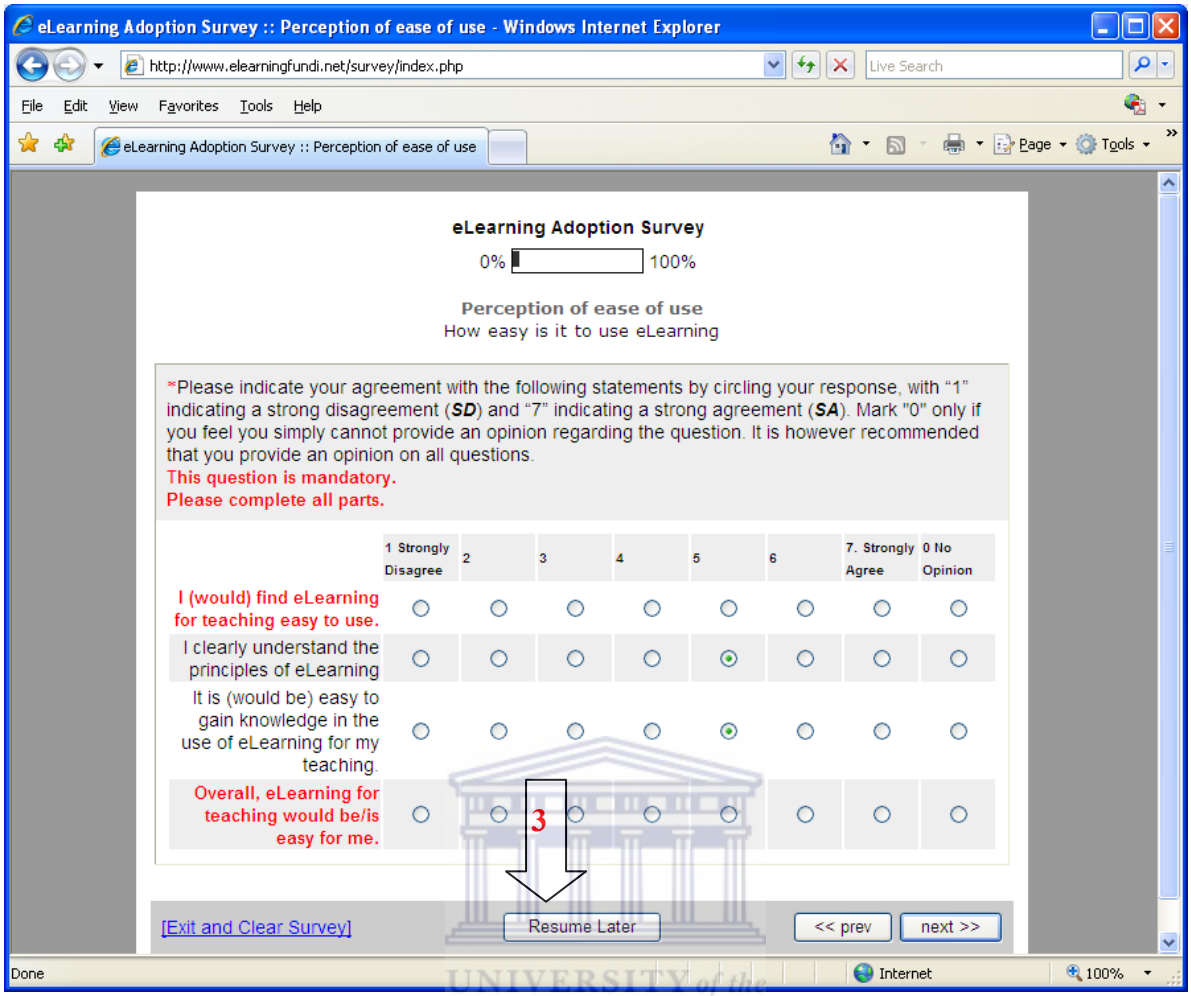
2. To start the survey, click on next>> (arrow marked 2). Read the content of the screen; specifically note the section on privacy. If you are returning to a saved unfinished survey, go to section 5.



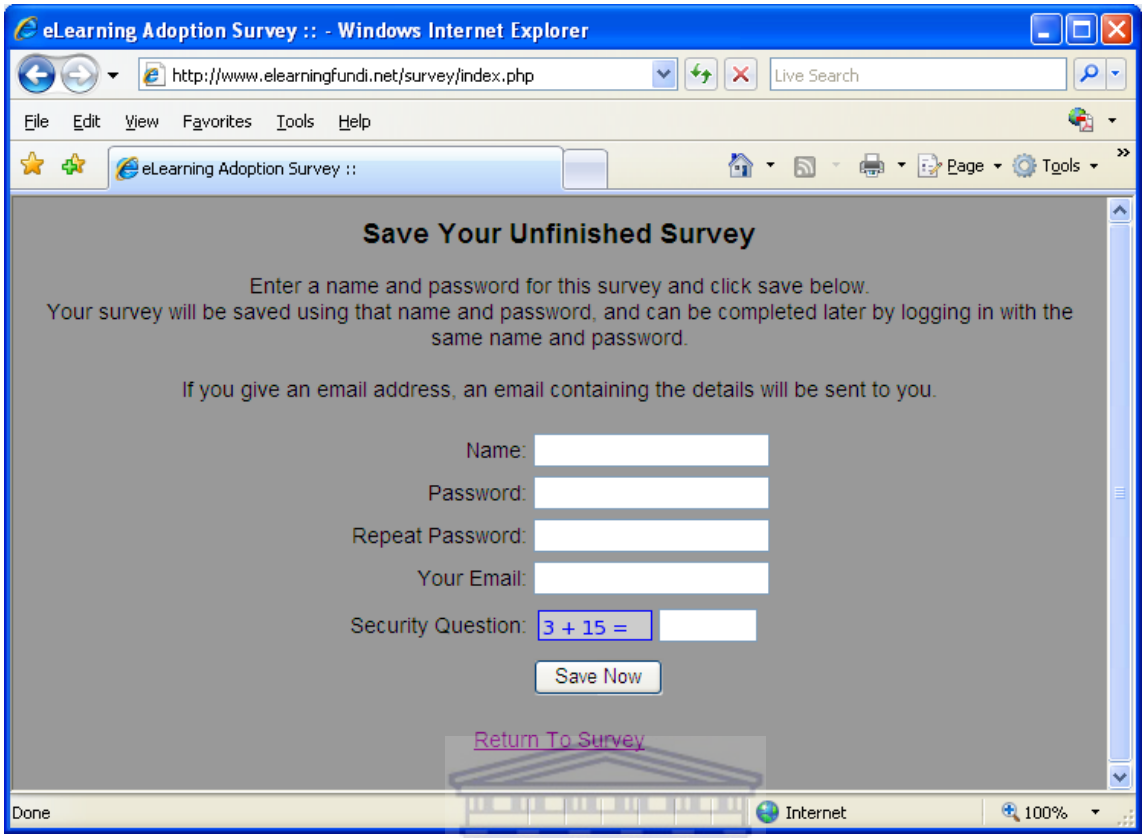
3. As you will see, most of the questions are easy to respond to, requiring the use of the mouse. When you are done with each section, click on the next>> (labelled 1) button to proceed. To go back to the previous page, click on the <<Prev button (labelled 2).



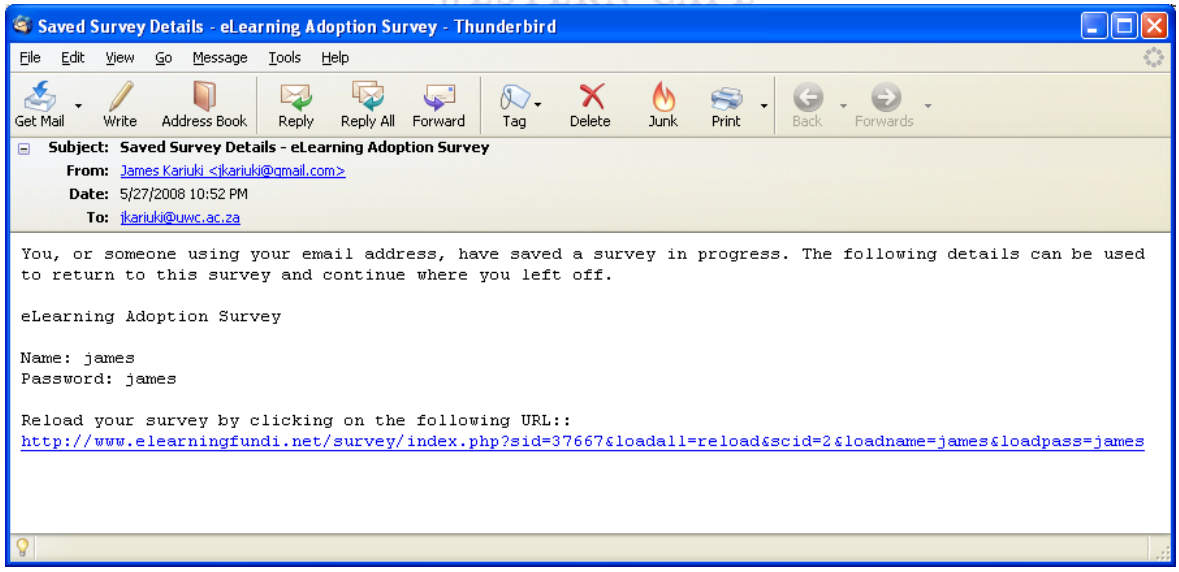
4. Most of the questions require you to provide a response. In the event that no response have been provided, the questions that are left blank will be highlighted as above for easy visibility.



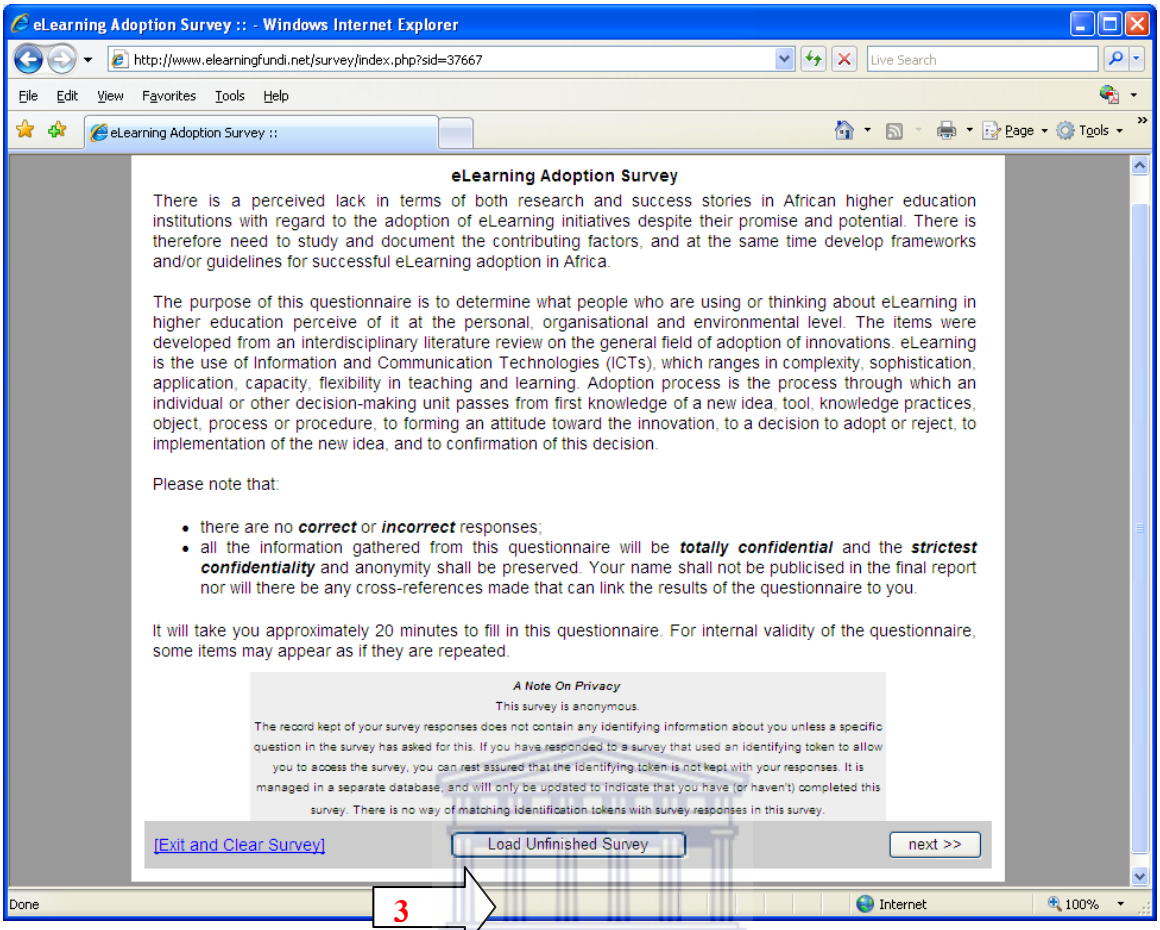
5. Saving the survey. If for some reason you cannot finish the survey, click on Resume Later (arrow 3). This will let you fill out some details that will authenticate you when you come back later. However, because of the relatively short time and effort required to complete the questionnaire, it is recommended that you do so in a single sitting.

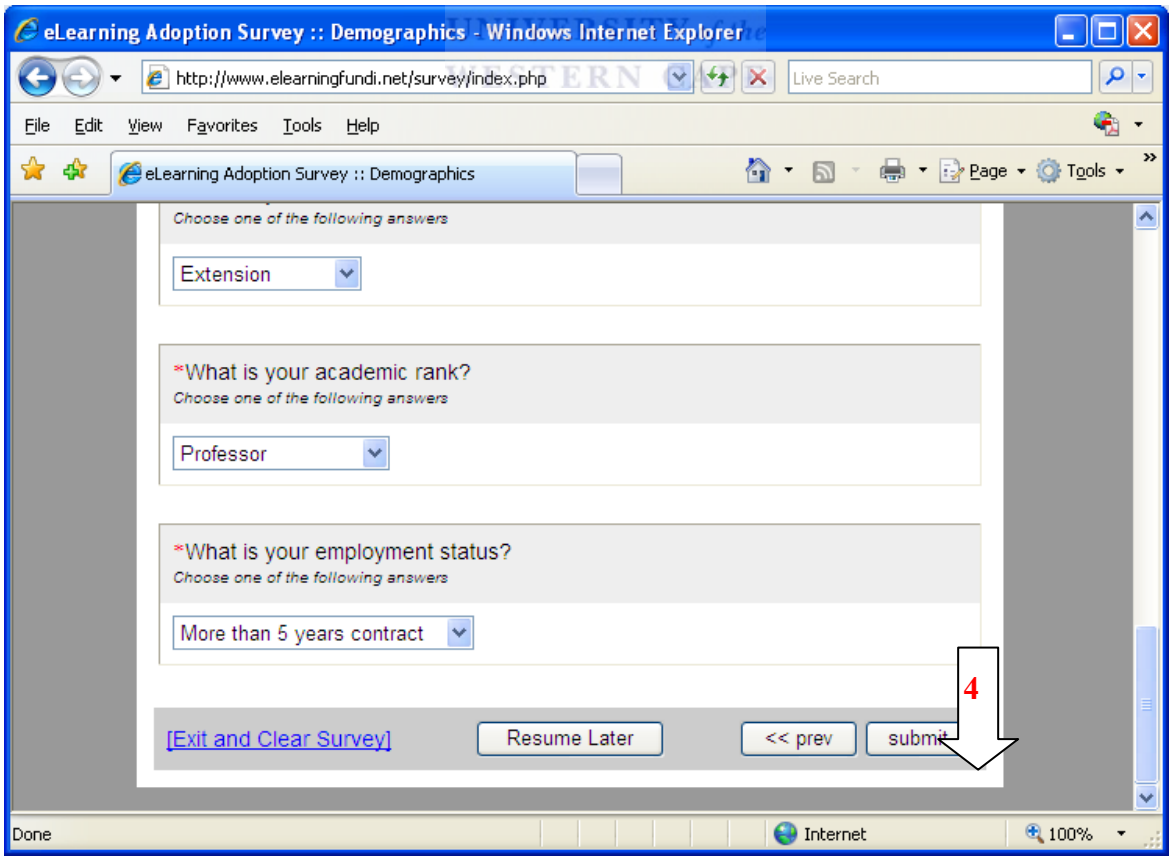


6. While saving the survey to resume later, your will be prompted to furnish some details. This information is required to reload the questionnaire when you resume. An email with the information you have provided will be sent to you as a reminder, with a link on how to resume the survey.

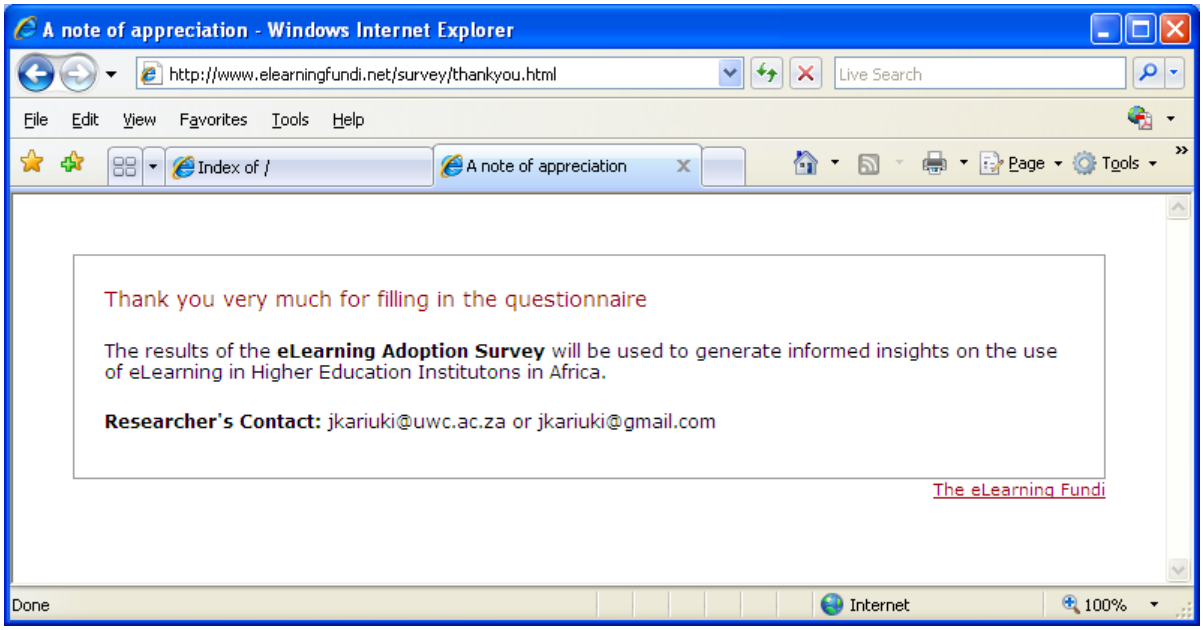


7. You can also resume the completion of the questionnaire by clicking on “Load Unfinished Survey” button (arrow 3) on the first page of the survey. In which case you will be required to reactivate the survey using the details you provided when saving it.


eLearning Adoption Survey :: - Windows Internet Explorer
http://www.elearningfundi.net/survey/index.php?sid=37667
File Edit View Favorites Tools Help
eLearning Adoption Survey ::
eLearning Adoption Survey
There is a perceived lack in terms of both research and success stories in African higher education institutions with regard to the adoption of eLearning initiatives despite their promise and potential. There is therefore need to study and document the contributing factors, and at the same time develop frameworks and/or guidelines for successful eLearning adoption in Africa.
The purpose of this questionnaire is to determine what people who are using or thinking about eLearning in higher education perceive of it at the personal, organisational and environmental level. The items were developed from an interdisciplinary literature review on the general field of adoption of innovations. eLearning is the use of Information and Communication Technologies (ICTs), which ranges in complexity, sophistication, application, capacity, flexibility in teaching and learning. Adoption process is the process through which an individual or other decision-making unit passes from first knowledge of a new idea, tool, knowledge practices, object, process or procedure, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.
Please note that:
there are no correct or incorrect responses;
all the information gathered from this questionnaire will be totally confidential and the strictest confidentiality and anonymity shall be preserved. Your name shall not be publicised in the final report nor will there be any cross-references made that can link the results of the questionnaire to you.
It will take you approximately 20 minutes to fill in this questionnaire. For internal validity of the questionnaire, some items may appear as if they are repeated.
A Note On Privacy
This survey is anonymous.
The record kept of your survey responses does not contain any identifying information about you unless a specific question in the survey has asked for this. If you have responded to a survey that used an identifying token to allow you to access the survey, you can rest assured that the identifying token is not kept with your responses. It is managed in a separate database, and will only be updated to indicate that you have (or haven't) completed this survey. There is no way of matching identification tokens with survey responses in this survey.
[Exit and Clear Survey]
Load Unfinished Survey
next >>
Done
Internet
100%
3


eLearning Adoption Survey :: Demographics - Windows Internet Explorer
http://www.elearningfundi.net/survey/index.php
Live Search
File Edit View Favorites Tools Help
eLearning Adoption Survey :: Demographics
Page
Tools
Choose one of the following answers
Extension
*What is your academic rank?
Choose one of the following answers
Professor
*What is your employment status?
Choose one of the following answers
More than 5 years contract
[Exit and Clear Survey]
Resume Later
<< prev
submit
4
Done
Internet
100%

8. The final screen in the process is providing some demographical data about you. To complete the questionnaire, click on the submit button (arrow 4).



Thanks once more for your participation. Should you want a copy of the final findings, please email me at jkariuki@uwc.ac.za.

Appendix VII – The questionnaire in a word-processor format

ELearning Adoption Survey

There is a perceived lack in terms of both research and success stories in African higher education institutions with regard to the adoption of eLearning initiatives despite their promise and potential. There is therefore need to study and document the contributing factors, and at the same time develop frameworks and/or guidelines for successful eLearning adoption in Africa.

The purpose of this questionnaire is to determine what people who are using or thinking about eLearning in higher education perceive of it at the personal, organisational and environmental level. The items were developed from an interdisciplinary literature review on the general field of adoption of innovations. *In the context of this research it is important to note that* ***eLearning refers to the use of Information and Communication Technologies (ICTs), which ranges in complexity, sophistication, application, capacity, flexibility in teaching and learning.*** *This study does not include technologies like overhead projectors, tape recorders, television o radio under the term eLearning.* Adoption process is the process through which an individual or other decision-making unit passes from first knowledge of a new idea, tool, knowledge practices, object, process or procedure, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision.

Please ***note*** that:

- there are no ***correct*** or ***incorrect*** responses;
- all the information gathered from this questionnaire will be ***totally confidential*** and the strictest confidentiality and anonymity shall be preserved. Your name shall not be publicised in the final report nor will there be any cross-references made that can link the results of the questionnaire to you.

It will take you approximately 20 minutes to fill in this questionnaire. For internal validity of the questionnaire, some items may appear as if they are repeated.

I. Your Knowledge of eLearning

1. When did you first hear about eLearning? (select one)

	Less than a month ago		Between Jun and Dec 2007		Between Jan and Jun 2007		Between 2005 and 2006		Between 2000-2004		Before 1999

2. How often do you receive information about eLearning? (Select one from the range)

Very often	1	2	3	4	5	6	7	Never

3. What kind of experiences have you had with eLearning (choose as many as apply)?

	None		I have seen colleagues using it		I have seen it being advertised at my University
	I attended a course on eLearning		I am using it for teaching and learning		I heard about it from colleagues at another university

II. Your attitude towards eLearning

For the following items, please indicate your agreement with the following statements by circling your response, with "1" indicating a strong disagreement (***SD***) and "7" indicating a strong agreement (***SA***). Mark "0" only if you feel you simply cannot provide an opinion regarding the question. It is however recommended that you provide an opinion on all questions.

		SD						SA	
1.	I (would) find eLearning for teaching easy to use.	1	2	3	4	5	6	7	0
2.	I clearly understand the principles of eLearning	1	2	3	4	5	6	7	0
3.	It is (would be) easy to gain knowledge in the use of eLearning for my teaching.	1	2	3	4	5	6	7	0

		SD						SA	
4.	Overall, eLearning for teaching would be/is easy for me.	1	2	3	4	5	6	7	0
5.	Using eLearning (would) enable(s) me to enhance my teaching practices.	1	2	3	4	5	6	7	0
6.	I (would) find eLearning useful for teaching.	1	2	3	4	5	6	7	0
7.	Overall, eLearning is advantageous	1	2	3	4	5	6	7	0
8.	ELearning is incompatible with all courses I teach.	1	2	3	4	5	6	7	0
9.	ELearning is incompatible with the students I teach.	1	2	3	4	5	6	7	0
10.	ELearning does not fit in with my teaching methodology.	1	2	3	4	5	6	7	0
11.	It is more convenient to use other forms of teaching (e.g. classroom) than eLearning	1	2	3	4	5	6	7	0
12.	There are resources available for me to test and experiment on eLearning for teaching.	1	2	3	4	5	6	7	0
13.	If I needed help on an issue with eLearning, I know who to contact	1	2	3	4	5	6	7	0
14.	I have seen lecturers use eLearning for their courses.	1	2	3	4	5	6	7	0
15.	I have seen lecturers use eLearning for courses similar to what I teach.	1	2	3	4	5	6	7	0
16.	I think being seen using eLearning is good for my image.	1	2	3	4	5	6	7	0
17.	I have seen courses delivered on eLearning.	1	2	3	4	5	6	7	0
18.	I could use eLearning even if there was no assistance available.	1	2	3	4	5	6	7	0
19.	I could use eLearning if I had online support on using eLearning.	1	2	3	4	5	6	7	0
20.	I could use eLearning if I had seen someone else using it before.	1	2	3	4	5	6	7	0
21.	I could use eLearning if I could call someone for help.	1	2	3	4	5	6	7	0
22.	I could use eLearning if someone else had helped me get started.	1	2	3	4	5	6	7	0
23.	I could use eLearning if I had enough time to develop an eLearning course.	1	2	3	4	5	6	7	0
24.	I believe that eLearning is a cumbersome mode of teaching								
25.	Acquiring the skills to use eLearning will not be easy for me.	1	2	3	4	5	6	7	0
26.	Using eLearning will be a frustrating experience.	1	2	3	4	5	6	7	0
27.	It will not be easy for me to use eLearning for teaching.	1	2	3	4	5	6	7	0
28.	Overall, I believe that eLearning is not easy to use	1	2	3	4	5	6	7	0

Overall, using eLearning for teaching and learning is a.. (Please choose a number on the scale)								
29. Bad idea	1	2	3	4	5	6	7	Good idea
30. Wise idea	1	2	3	4	5	6	7	Foolish idea
31. Something I don't like	1	2	3	4	5	6	7	Something I like
32. Something I find pleasant	1	2	3	4	5	6	7	Something I find unpleasant

III. Other individual traits and characteristics

For the following items, please indicate your agreement with the following statements by circling your response, with "1" indicating a strong disagreement (***SD***) and "7" indicating a strong agreement (***SA***). Mark "0" only if you feel you simply cannot provide an opinion regarding the question. It is however recommended that you provide an opinion on all questions.

		SD						SA	
1.	If I hear about a new information technology for teaching and learning, I would look for ways to experiment with it.	1	2	3	4	5	6	7	0
2.	In general, I am hesitant to try out new information technologies for teaching and learning.	1	2	3	4	5	6	7	0
3.	Among my peers, I am usually the first to try out new information technologies for teaching and learning	1	2	3	4	5	6	7	0
4.	I like to experiment with new information technologies for teaching	1	2	3	4	5	6	7	0

		SD						SA	
	and learning.								
5.	When it comes to deciding whether to use new teaching and learning methodologies, I don't rely on experienced colleagues	1	2	3	4	5	6	7	0
6.	I decide to use new teaching and learning technologies without relying on the opinions of colleagues who have been using them.	1	2	3	4	5	6	7	0
7.	I do not rely on colleagues for information about new teaching and learning technologies prior to making up my mind about whether or not to use them in my class	1	2	3	4	5	6	7	0
8.	My peers often ask me for advice or information on using eLearning	1	2	3	4	5	6	7	0
9.	I am aware that I am usually one of the last persons in my department to accept new things	1	2	3	4	5	6	7	0
10.	I tend to feel that the old ways of teaching and learning is the best	1	2	3	4	5	6	7	0
11.	I am challenged by unanswered questions	1	2	3	4	5	6	7	0
12.	I would like to use eLearning even if it is challenging	1	2	3	4	5	6	7	0
13.	I would like to learn as much as I can about eLearning	1	2	3	4	5	6	7	0
14.	I would like to use eLearning even for subject areas where others think it would be inappropriate	1	2	3	4	5	6	7	0
15.	I would do extra work on eLearning as long as I am interested in it	1	2	3	4	5	6	7	0
16.	I would go out of my way to find more about eLearning	1	2	3	4	5	6	7	0
17.	I would work really hard to make eLearning a success story for me.	1	2	3	4	5	6	7	0
18.	I would use eLearning if there is some form of reward or incentive from the university	1	2	3	4	5	6	7	0
19.	I would use eLearning if it is mandatory for a course that I am teaching	1	2	3	4	5	6	7	0
20.	I would use eLearning only if am required to	1	2	3	4	5	6	7	0
21.	I would like the university to send me on a course on using eLearning before I start using it	1	2	3	4	5	6	7	0
22.	I would like to see the university purchase the necessary infrastructure for eLearning before I start using it	1	2	3	4	5	6	7	0
23.	I would like to collaborate with colleagues using eLearning in my unit.	1	2	3	4	5	6	7	0
24.	Colleagues using eLearning make an effort to collaborate with me.	1	2	3	4	5	6	7	0
25.	I make an effort to collaborate with colleagues at my university using eLearning.	1	2	3	4	5	6	7	0
26.	My colleague(s) and I regularly share ideas on eLearning.	1	2	3	4	5	6	7	0
27.	My university's administrators encourage use of eLearning through collaboration	1	2	3	4	5	6	7	0
28.	I would use eLearning if the students that I teach are not on campus on a regular basis	1	2	3	4	5	6	7	0
29.	I would use eLearning if it does not interfere or change the way I teach my students	1	2	3	4	5	6	7	0

IV. Organisational factors

For the following items, please indicate your agreement with the following statements by circling your response, with "1" indicating a strong disagreement (***SD***) and "7" indicating a strong agreement (***SA***). Mark "0" only if you feel you simply cannot provide an opinion regarding the question. It is however recommended that you provide an opinion on all questions.

		SD						SA	
1.	The University is committed to a vision of using eLearning in teaching and learning.	1	2	3	4	5	6	7	0
2.	The University is committed to supporting my efforts in using eLearning for teaching.	1	2	3	4	5	6	7	0
3.	The University strongly encourages the use of eLearning in teaching and learning.	1	2	3	4	5	6	7	0
4.	The University will recognise my efforts in using eLearning in teaching and learning.	1	2	3	4	5	6	7	0
5.	The use of eLearning in teaching and learning is important to the	1	2	3	4	5	6	7	0

		SD						SA	
	University.								
6.	My department is committed to a vision of using eLearning in teaching and learning.	1	2	3	4	5	6	7	0
7.	My department is committed to supporting my efforts in using eLearning in teaching and learning.	1	2	3	4	5	6	7	0
8.	My department strongly encourages the use of eLearning in teaching and learning.	1	2	3	4	5	6	7	0
9.	My department will recognise my efforts in using eLearning in teaching and learning.	1	2	3	4	5	6	7	0
10.	The use of eLearning in teaching and learning is important to my Department.	1	2	3	4	5	6	7	0
11.	Employee roles in my university are concretely defined	1	2	3	4	5	6	7	0
12.	Employee positions in my university have written job descriptions	1	2	3	4	5	6	7	0
13.	The authority structure in my university is clearly defined	1	2	3	4	5	6	7	0
14.	The authority structure in my university is formalised in writing	1	2	3	4	5	6	7	0
15.	The university emphasises written communication between colleagues	1	2	3	4	5	6	7	0
16.	There are established channels of communication at my University	1	2	3	4	5	6	7	0
17.	The university has written rules and policies to be adhered to by all lecturers	1	2	3	4	5	6	7	0
18.	The policy also stipulates the sanctions and penalties for violating the rules and policies of the University	1	2	3	4	5	6	7	0
19.	There is a strict training program for new staff members at my university	1	2	3	4	5	6	7	0
For items 20-24, in the event of changes in eLearning, my university is likely to…									
20.	....understand the impact of the changes within the current context	1	2	3	4	5	6	7	0
21.	....interpret it as unusual and unexpected	1	2	3	4	5	6	7	0
22.	....interpret it based on the failures of past changes	1	2	3	4	5	6	7	0
23.	....interpret it based on the successes of past changes	1	2	3	4	5	6	7	0
24.	....interpret it based on the context relevance and merits of the changes	1	2	3	4	5	6	7	0
25.	The university management seeks our counsel and advice on the use of eLearning	1	2	3	4	5	6	7	0
26.	We participate in goal setting for eLearning implementation at the University	1	2	3	4	5	6	7	0
27.	The university encourages us to give suggestions on eLearning	1	2	3	4	5	6	7	0
28.	All parties using eLearning keep each other informed of their needs and/or new developments	1	2	3	4	5	6	7	0
29.	We do not volunteer much information regarding eLearning and its development within the university	1	2	3	4	5	6	7	0
30.	My university has regular staff training on eLearning or use of learning and teaching technologies	1	2	3	4	5	6	7	0
31.	My university regularly holds information sessions on the use of eLearning	1	2	3	4	5	6	7	0
32.	My university always invites vendors of eLearning technologies to do demonstrations of their technologies to the teaching staff	1	2	3	4	5	6	7	0
33.	My university encourages collaboration with the vendors of teaching and learning technology	1	2	3	4	5	6	7	0
34.	My university encourages collaboration with other universities on teaching eLearning courses	1	2	3	4	5	6	7	0
35.	My university offers support for lecturers to attend seminars and workshops on eLearning	1	2	3	4	5	6	7	0
36.	My university is a key player on eLearning initiatives in my country	1	2	3	4	5	6	7	0

Participation in policy decision

The extent to which participative, cross-functional discussions characterise decision making at top levels is measured on a scale ranging from 1 - rare use of committees or infrequent informal collaboration (***IU***) to 7 = frequent use (***FU***) of committees or informal interdepartmental collaboration in response to the following five items:

	IU						FU
37. Policy and strategy decision towards the use of eLearning at your university;	1	2	3	4	5	6	7
38. Technology decision towards the use of eLearning at your university;	1	2	3	4	5	6	7
39. Capital budget decisions selection and financing of long-term investments on eLearning technology;	1	2	3	4	5	6	7
40. Capital budget decisions selection and financing of long-term investments on training, and development;							
41. Long-term strategies (growth diversification, etc.) and decisions related to changes in use of eLearning at your University	1	2	3	4	5	6	7

For the following items, please indicate your agreement with the following statements by circling your response, with "1" indicating a **Yes** and "2" indicating a **No**.

Do you know a person in your university who….	Yes	No
42. ….is currently advocating eLearning use?	1	2
43. ….expresses strong convictions about eLearning?	1	2
44. ….shows optimism about the success of the innovation?	1	2
45. ….does not give up when others say eLearning cannot be done?	1	2

For the following items, please indicate your agreement with the following statements by circling your response, with "1" indicating a strong disagreement (SD) and "7" indicating a strong agreement (SA).

If your answer is "yes" to any of the questions 46-48: Does that person…							
	SD						SA
46. …refer problems on eLearning to those who can solve them?	1	2	3	4	5	6	7
47. …get the right people involved on eLearning issues?	1	2	3	4	5	6	7
48. …get key decision makers involved on eLearning issues?	1	2	3	4	5	6	7

To what extent do you feel that the communications within your university with regard to eLearning is								
49. Timely	1	2	3	4	5	6	7	Untimely
50. Inaccurate	1	2	3	4	5	6	7	Accurate
51. Inadequate	1	2	3	4	5	6	7	Adequate
52. Complete	1	2	3	4	5	6	7	Incomplete
53. Incredible	1	2	3	4	5	6	7	Credible

V. Demographics

1. What is your age in years?

	20-30		31-35		36-40		41-45		46-50		Over 50

2. Please indicate your gender.

	Female		Male

3. How many years of teaching experience do you have at the tertiary level?

	Less than 1		1-2		2-5		5-10		10-15		Over 15

4. What is your ***primary*** university affiliation?_____

5. Please indicate your faculty status using the table below.

	Select Rank Modifier(s)		Select Academic Rank		Select Status
	Visiting		Professor		Permanent
	Adjunct		Ass. Professor		> 5 years contract
	Teaching		Senior Lecturer		2-5 years contract
	Clinical		Lecturer		1-2 years contract
	Extension		Assistant Lecturer		6-12 months contract
	Research		Graduate Assistant		< 6 months contract
	Other (specify_____)		Other (specify_____)		Other (specify_____)

6. Which country in the Eastern and Southern African Region do you reside in or work?

_____

Thank You

You efforts and time in filling this questionnaire is very much appreciated and valued. Should you need a summary of the results of these research, please email me at jkariuki@uwc.ac.za or send me an SMS with your email address to my cell phone at +27 72 037 3284

Appendix VIII – Screenshot of online questionnaire

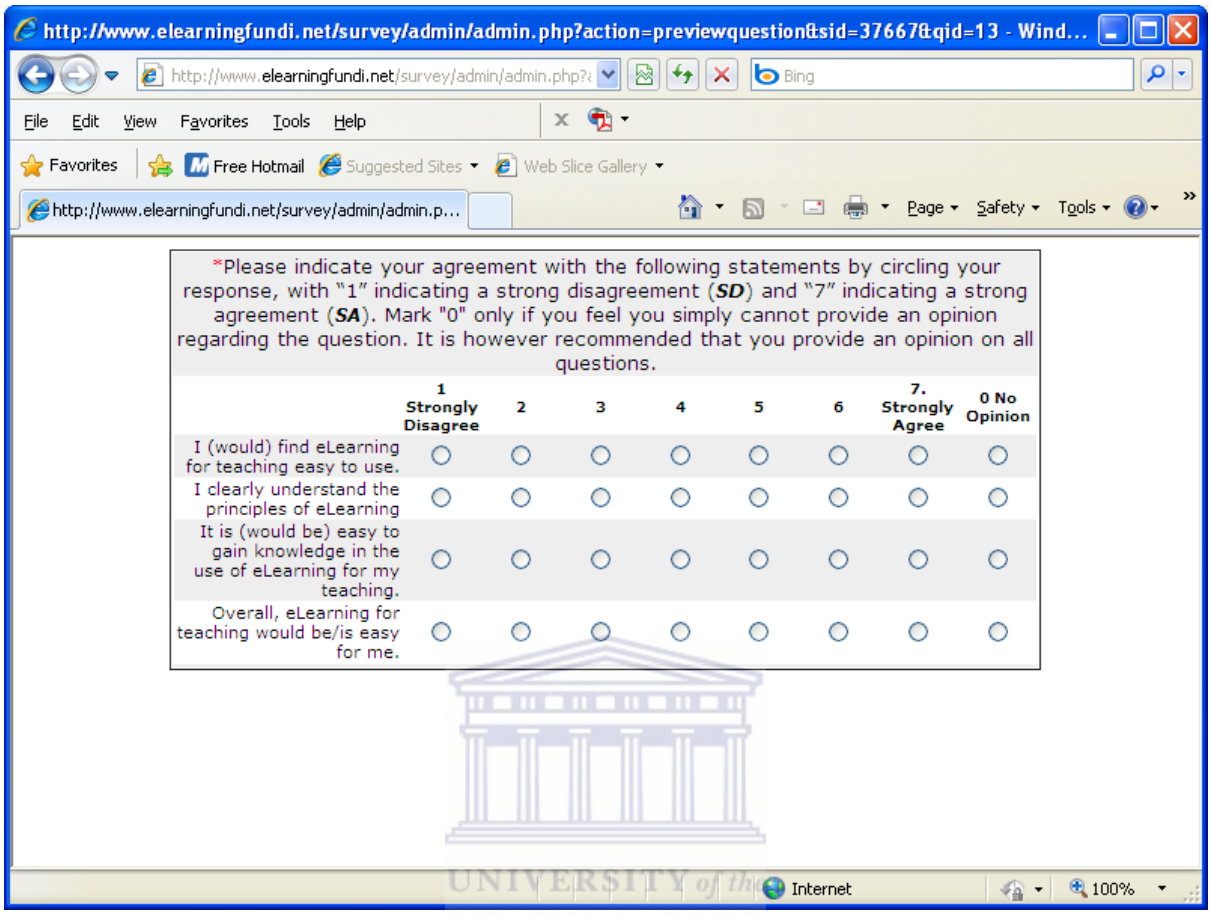


Figure 9.1: Sample screenshot of the online questionnaire