

2013

E-learning implementation strategies for an ICT-challenged environment : case of the University of Ghana, Legon

Isaiah T. Awidi
Edith Cowan University

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**E-LEARNING IMPLEMENTATION
STRATEGIES FOR AN ICT-CHALLENGED
ENVIRONMENT:
CASE OF THE UNIVERSITY OF GHANA,
LEGON**

Isaiah Teye-Mensah Awidi

MSc (Edu. Tech), MBA (MIS),
Grad Dip (Monitoring and Evaluation);
BA (Stat & Soc)

Thesis submitted in fulfilment of the requirements for the award of

DOCTOR OF PHILOSOPHY

School of Education, Faculty of Education and Arts

EDITH COWAN UNIVERSITY

Perth, Western Australia

March 2013

DEDICATION

To my Parents and Children:

Francis Tettey Amanu Awidi

Patience Maseyo Narh-Awidi

And

Abigail Isamaria Kabuki

Grace Gloria Kabukuor

Kabu Awidi

The LORD is with YOU, so you CAN achieve

beyond whatever you set your mind on

TO THE GLORY OF GOD

“If it had not been the LORD who was on our side,”
Let Israel now say—
“If it had not been the LORD who was on our side,
When men rose up against us,
Then they would have swallowed us alive,
When their wrath was kindled against us;
Then the waters would have overwhelmed us,
The stream would have gone over our soul;
Then the swollen waters
Would have gone over our soul.”
Blessed *be* the LORD,
Who has not given us *as* prey to their teeth.
Our soul has escaped as a bird from the snare of the fowlers;^[a]
The snare is broken, and we have escaped.
Our help *is* in the name of the LORD,
Who made heaven and earth.

The Holy Bible, Psalms 124 verses 1 to 8, New King James Version (NKJV). The Lord
the defense of his people: A song of ascents of David

GREAT OH LORD IS THY FAITHFULNESS

“Great is Thy faithfulness,” O God my Father,
There is no shadow of turning with Thee;
Thou changest not, Thy compassions, they fail not
As Thou hast been Thou forever wilt be.
“Great is Thy faithfulness!” “Great is Thy faithfulness!”
Morning by morning new mercies I see;
All I have needed Thy hand hath provided—
“Great is Thy faithfulness,” Lord, unto me!

Thomas O. Chisholm (1923), Great is thy faithfulness.

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

E-learning implementation in higher education continues to gain prominence in both developed and developing countries, and while most universities in ICT-rich environments are exploring different ways of using ICT and multimedia resources to enhance teaching and learning, the same cannot be said about ICT-challenged environments. Nevertheless, the question of successful and sustainable e-learning implementation continues to remain a challenge, particularly in ICT-challenged environments.

The primary purpose of this research was to examine policy and strategy issues that have influenced the process of e-learning implementation at the University of Ghana (UG), given that previous ICT and e-learning initiatives failed to improve teaching and learning. The argument underlying this research is that successful e-learning is based on an institution's capacity and how effectively the available resources are mobilised, coordinated and managed to develop skills and competencies. Synthesising the theoretical models of Rogers' Diffusion of Innovation Adoption Model (2003), Collis and Moonen's 4-E model (2001), and other institutional experiences of e-learning implementation, this thesis argues that there are three thematic domains (Institution, People, and Technology) that e-learning implementation must focus on.

The results of this research show that acquiring technology infrastructure, organising workshops, and asking users to accept and adopt e-learning is not enough to promote and achieve a successful e-learning implementation. Policies, objectives, and strategic level checklists are critical for success using the framework developed in this thesis for ICT-challenged environments.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

- i) Incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education
- ii) Contain any material previously published or written by another person except where due reference is made in the text, or
- iii) Contain any defamatory material

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In beginning a PhD journey such as this, leaving family, a satisfying job, projects, partners, and friends to achieve this success could never have been attained if the LORD had not been with me. His grace and abundant provision throughout the journey and the support I received from my family, the institutions, and wonderful people who have been a great blessing and source of inspiration to me are sincerely worth my heartfelt gratitude.

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Ms Anita Kreffle (Student Information Office, Faculty of Education and Arts), you were a mother figure on my arrival in Perth. You made sure I was settled and comfortable. You

were really unique and detailed in all your work and you worked with such an excellent spirit. I salute you. Sarah Kearn, and Emma Chessell-Keevers, your dedication and commitment to work and all the support before and after my arrival and stay in Perth are worth acknowledgement. Dr. Alistair Campbell, Dr. Susan Hill, Heather Williams, Narelle Jones (“My Boss”), Martine Hawkins and all the other GRS staff, I salute you all. It was a really great joy knowing and working with you. I could not have got this far without expressing my appreciation of gratitude to Mrs. Miranda Cooper; you were the third eye to everything I wrote. Linda Larson, thank you for proof reading some of my Chapters for me, I remember your last words before our departure “Let your faith be in the God you believed in and He will see you through”. Thank you.

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ACRONYMS, ABBREVIATIONS AND DEFINITIONS

AAU	Association of African Universities
AVU	African Virtual University
CBAM	Concerns-Based Adoption Model
FGD	Focus Group Discussion
HR	Human Resource
ICT	Information Communication Technologies
ITS	Integrated Tertiary System
KEWL	Knowledge Environment for Web Learning
LMS	Learning Management System
NOC	Network Operations Centre
PA	Public Address System
UG	University of Ghana
VPN	Virtual Private Network

CHAPTER 1

INTRODUCTION

1.0 Background of Study

At the time of this research trends in public universities in Ghana were showing that the educational environment in which they had operated over the previous decade had changed significantly (Mason, 2006; OECD, 2005; Tan, 2011). Universities throughout the world attempt to reconcile their income with optimising the educational provisions for their students. The pressure Ghanaian universities face to raise funds is greater than in many other nations due to the economic climate of the country. This was one of the factors leading the universities to incorporate e-learning (Hanson, 2009).

While universities were worried about savings and raising funds (Sawyer, 2004), their learners were demanding more flexibility and a quality higher education. Lecturers were also demanding better wages and reduced workloads (Brookes & Becket, 2007; B. Collis & Moonen, 2001; Dogbevi, 2007). The universities were experiencing these changes because funding continued to be reduced whilst demand for higher education continued to increase beyond the availability of institutional resources, particularly in Ghana (Awidi, 2008; Dogbevi, 2007; MacKeogh & Fox, 2009; Sawyer, 2004). Changes in the characteristics of the students they enrol, the mode of delivery, and in teaching and learning point to a technological intervention being necessary (Adam, 2003; Ravjee, 2007). Evidence from universities adopting e-learning demonstrates that they have the capacity to promote access to higher education, enhance flexible learning and improve lecturers' teaching activities (Allen & Seaman, 2007; B. Collis & Moonen, 2001; Curran, 2004; Deepwell, 2007).

Ghanaian universities are therefore exploring ways of adopting Information and Communication Technologies (ICT) and e-learning as an alternative method of course delivery, or as a complement to existing approaches (H. Jones, 2008; Marfo & Okine, 2011). E-learning is one possible solution to some of the major problems facing the University of Ghana (UG): the disproportionate increase in student enrolments; the decline in resources which contributed to a fall in standards; and challenges of technology adoption to support teaching and learning in UG (Daniel, 2007).

Previous research demonstrates that initiatives involving ICT integration in teaching and learning in Ghana failed to meet the expectations of management, lecturers and students (Dadzie, 2009; Marfo & Okine, 2011). This research revealed that the problems were multi-dimensional and entrenched in inadequate infrastructure and support to meet expected teaching requirements, though some ICT resources have been acquired (Asunka, 2008; Daniel, 2007; Marfo & Okine, 2011; Obuobi, Richards, & Watts, 2006; Sawyer, 2004). The universities continue to rely on conventional educational delivery approaches which has cast some doubts about whether ICT and e-learning will have the desired impact on education that was projected by the United Nations (UN) Millennium Development Goal (MDG) (UNESCO Institute for Statistics, 2008). The goals were aimed at using ICT to achieve quality and equal educational opportunities for all in affordable and sustainable ways by 2015. It was therefore valuable to research how to best implement e-learning with the view of providing access to higher education, particularly in developing ICT-challenged environments, given the significant increase in demand for higher education. The UG environment was chosen as a case for this research because it had the characteristics of an ICT-challenged environment. The research will verify e-learning adoption processes in the UG and determine whether a successful e-learning implementation framework could be developed. The research explored some best practice models and compared them with the culture and environmental context of the UG. This framework has the potential to be applied in other institutions with similar characteristics.

1.1 Purpose of Study

The purpose of this research was to investigate factors that affect e-learning implementation with the aim of developing a framework that will guide successful implementation in the UG and other institutions with similar characteristics. The university's operations are directly and indirectly affected by the ICT environment (the global and economic setting, teaching and learning practice). Thus the research explored factors within and outside the university that motivated or de-motivated lecturers and students to adopt ICT resources to enhance their teaching and learning. This was based on the background that the university participated in the African Virtual University initiative and later launched an open-source Learning Management System

To achieve this, the researcher examined lecturers' and students' perspectives of ICT and e-learning to understand why the resources were not adopted regularly even though

e-learning tools and ICT resources exist. Equally, the research explored management, technical staff and users' perceptions of workable successful implementation strategies and compared them with successful approaches given in the literature. The purpose of this approach was to gain understanding of limiting and motivating factors affecting acceptance, adaptation, and integration of e-learning. The researcher believed that the number and variety of stakeholders at the UG might reveal varied perceptions and expectations for e-learning. Hence this research was positioned to draw from some best practice approaches and adapt them to the context of ICT-challenged environments to provide a guide to successful e-learning implementation. The findings were intended to inform higher educational management with characteristics similar to the UG about workable approaches to successful e-learning implementation. The framework may contribute to improving institutional perceptions of e-learning; improving adoption of e-learning; and improving institutional policy, objectives and strategies for successful e-learning implementation through strategic planning processes.

Primary Objectives of the Research

The primary objective of the research was to identify e-learning strategies that are workable in widening access to university education and enhancing the quality of teaching and learning in ICT-challenged environments. Research in some developed countries suggests that e-learning improves the quality of teaching and learning, expands access to higher education, promotes instructor career development and above all enhances learning (B. Collis & Moonen, 2001; Curran, 2004; Deepwell, 2007; MacKeogh & Fox, 2009). Hence, considering the experience of institutions that have successfully implemented e-learning, it was anticipated that the current research would help develop workable implementation strategies that fit the cultural context of the UG.

The focus during the research was therefore three fold: 1) Investigate the characteristics of various implementation models and e-learning strategies at universities that have successfully implemented e-learning. Identify the strategic processes, success factors and the challenges that lecturers and students experienced during implementation; 2) Investigate the use of ICT in learning and teaching at the UG. Compare findings with successful e-learning environments. Design a workable framework that can be used in ICT-challenged environments such as universities in Ghana; 3) Recommend appropriate e-learning strategies that best fit the cultural context and ICT capabilities of the universities in Ghana.

1.2 Significance of the Research

Several reports have documented effective e-learning implementation and the resultant effect of an increase in access and high quality education predominantly in ICT-rich environments. However, very little research exists for Africa. There was no evidence that research has been undertaken in Ghanaian universities to develop a framework for successful e-learning implementation. Equally, there was no evidence of adequate research on the perspectives of management, lecturers, students, and technical staff. There was little understanding of factors that inform step-by-step approaches to successful e-learning implementation in a traditional public university in Ghana. Though some publication regarding e-learning exists, research that has explored institutional limitations and factors influencing effective user adoption and diffusion of e-learning was not available. Thus, an intended outcome of this research was to provide key stakeholders and decision makers in an ICT-challenged environment with relevant information about strategic processes and factors that influence successful e-learning implementation. Equally important was some understanding about factors critical for acceptance by users.

Internationally, there was no known universally acceptable strategy or successful e-learning implementation framework for higher education in developing countries (2007-2012). Hence, this research is an attempt at contributing to a workable framework that will facilitate successful e-learning implementation in mainly ICT-challenged environments. Significance was further perceived in the benefits that the institutions will obtain by successfully adapting e-learning; these include a guide for policy decision and workable strategies. It is envisaged that the results of this research will inform national policy in implementing e-learning in public universities in Ghana, help revitalise and strengthen relevant strategies, and establish new initiatives regarding educational technologies in the universities.

There are four significant benefits of this research for the UG: 1) the research sought to explain why some ICT projects were initiated but suffered setbacks leading to rejection and failure. A model framework of strategic options will help the university widen future access to higher education (Essel, 2009; Ghana News Agency, 2007, 2008); 2) the research aimed to stimulate faculties to adopt best practice approaches in adapting and diffusing of e-learning. It was anticipated that findings may lead to appropriate strategies that will support the university's set goals for ICT integration in teaching and

learning (Ghana News Agency, 2008); 3) it was anticipated that proper use of the framework within an institutional context will stimulate both faculty and student interest in e-learning. It was estimated that experiences from well-known e-learning implementation best practices will be useful to examine workable e-learning implementation approaches that can suit the UG; 4) the research will stimulate the review of institutional policy and strategies for e-learning integration. In summary, this research outcome will inform management and faculties about policies and strategies that would make e-learning implementation in the UG successful with the consequence that teaching and learning processes will be improved.

1.3 Research Questions

Considering the requirements of ICT-challenged environments, it is important to identify factors that are considered critical in e-learning implementation to ensure success. Accordingly, the broad research question guiding the entire study was: “In the context of the University of Ghana what policies and strategies would effectively inform and guide an e-learning implementation?” Sub-questions guiding the study included:

1. What are the factors surrounding e-learning implementation in an ICT-challenged environment?
2. What are the factors that motivate the effective use of e-learning in an ICT-challenged environment?
3. Which implementation strategies are likely to be successful in an ICT-challenged environment?

The approach to answering the questions will be described in the Conceptual Framework (Chapter 2) and Methodology (Chapter 3) sections of the thesis. One assumption underlying the broad concept of the research approach was that the knowledge acquired from literature can be analysed and refined to improve an existing situation. Factors around e-learning best practice were therefore identified and contextualised in the UG to address the research question.

Factors surrounding e-learning implementation

The rationale for this first research question was to investigate and identify the reasons why neither faculties nor students were using the available ICT and e-learning resources at the UG. In addressing the broad research question, the research sought to identify factors that could inform policy and strategy planning for e-learning. An understanding

of why different approaches to ICT and e-learning adoption were scattered across the university was important in explaining the factors encountered by management, lecturers, students, and technical staff. The factors were synthesised from interviews with management, lecturers, and students, and from a survey of lecturers and students. Figure 1.1 shows how the various research instruments fed the research questions used as a basis for the framework.

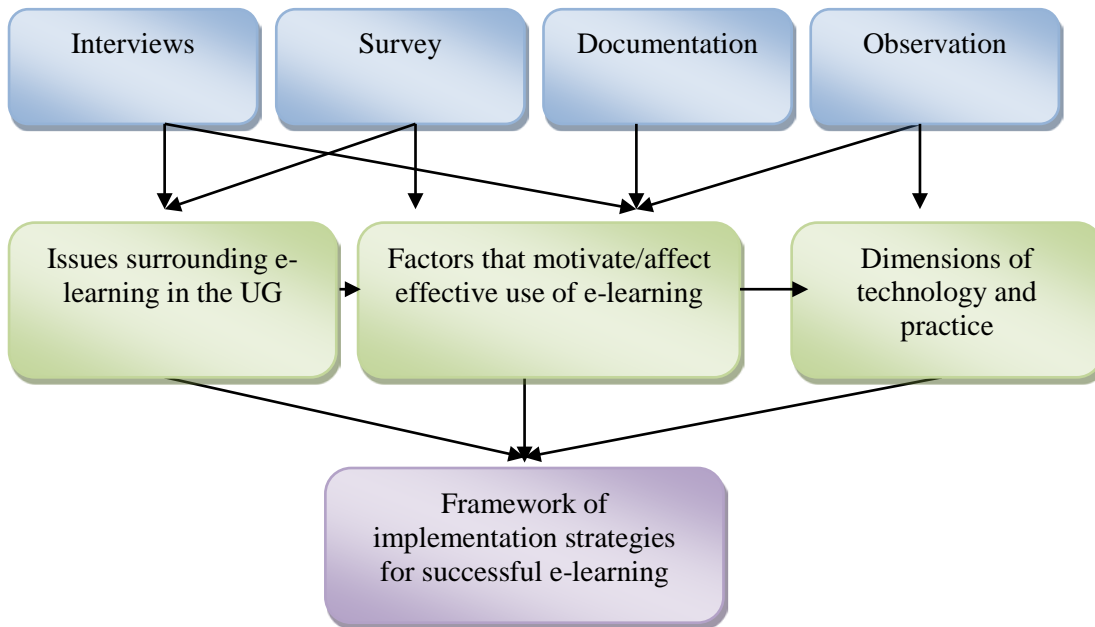


Figure 1.1 Approach to answering the research question

Factors that motivate effective use of e-learning

The second research question sought to provide some understanding of factors that motivate or discourage the adoption and adaptation of effective use of e-learning resources from the lecturers' and students' perspectives. It helped to highlight the contradictions existing between the various perspectives. The researcher assumed that given adequate support and incentives for adoption, lecturers would adopt e-learning (MacKeogh & Fox, 2009; Shea, 2007). Students would be motivated to adopt e-learning if lecturers engaged them to use the resources which in turn could provide students with superior educational alternatives to traditional lectures (Singh, O'Donoghue, & Worton, 2005). Data informing the factors that motivate effective use of e-learning were gathered from the interviews with all stakeholders, a survey, documentary evidence and observations.

Implementation strategies for successful e-learning

A proposed e-learning implementation strategy was synthesised from the various perspectives collected. Workable strategies were gathered from the interviews, survey, documentary evidence and the researcher's observations. The assumption was that by understanding the factors surrounding e-learning at the UG and factors that motivate and de-motivate e-learning adoption, the dimensions that were critical for successful e-learning could be developed. A framework for successful e-learning implementation was then developed.

1.4 Context of the Research

The research took place in Ghana, which originally had a British educational system that was modified over the years towards the American semester system. The Ghana Statistical Service (2012) population census report of 2010 indicated the national population was 24.7 million people with an annual growth rate of 2.5%. According to the report few households (7.9%) had their own laptops or desktop computers in 2012 with a relatively higher proportion of the ownership located in urban areas. The report indicated that though 64.2% of households use electricity as their main source of lighting, only 7.8% had Internet facilities and access was concentrated in the urban cities. Power supply in Ghana remains unstable with periodic rationing, which has negative impacts on the implementation of ICT in most parts of the country.

Over the past decade, universities in Ghana have built ICT infrastructure and human capacity with an objective of integrating ICT in their educational delivery. The initiative, which was supported by the Association of African Universities (AAU) in 2000, developed the "ICT maturity framework for African Universities" as a standard for infrastructure development. It was used as a guide for appropriate infrastructure for the universities, and to advise on how ICT should be integrated into the institutions' teaching and learning (AAU, 2002). By the year 2006, most public universities had built Wide Area Networks (WANs) and Local Area Networks (LANs) with some central and faculty ICT laboratories. Most of these ICT projects were made possible through the support of partnership institutions and the Ghana Education Trust Fund (GETFund), in line with the government ICT policy.

The government ICT policy document on education encouraged ICT integration in the school curriculum from basic to tertiary levels (Ministry of Communication, 2005). At

the tertiary level the focus of the integration was to increase students' access and build a database to manage student records and ICT resources that would facilitate administrative procedures. By the year 2005, public universities started distance education programmes to absorb some of the applicants they were unable to admit into the mainstream teaching rooms. However, these programmes were paper-based with students having to travel long distances to attend sessional lectures, and long vacation conference meetings. Meanwhile, the educational resources had been overstretched, with the public universities admitting less than 35% of eligible Senior High School (SHS) graduates (Brobbey, 2009). Although technology has been a catalyst for change in higher educational delivery, offering a wide range of tools that support both students and academics (J. Johnson & Dyer, 2006), adopting and adapting these technologies in Ghana has been very slow. E-learning has so far not been successful in any of the public or private universities, although some attempts have been made (Asunka, 2008; Dadzie, 2009; Marfo & Okine, 2011).

The UG enrolls the largest proportion of eligible applicants of all universities in Ghana. In November 2007, the UG formally admitted the first cohort of its distance education programme (Ghana News Agency, 2007, 2008). The goal was to use technology to support distance education (Ghana News Agency, 2008). It was therefore important to use the UG as a case study in this research to identify factors that should be considered workable for e-learning implementation in an environment where technological resources are limited and where human and technical problems limit the effective use of the available resources.

1.4.1 Background of the Research Context

The UG was established in 1948 with the primary objective of training middle and high level manpower to accelerate development in the country after independence (Daniels, 1996). The UG runs a dual educational delivery programme (full-time on-campus or part-time) with three campuses; the Main-Campus, the Accra City Campus and the Korle-Bu Medical School. The UG also has learning centres in each of the ten regional capitals in the country (Ghana News Agency, 2008). At the time of this research, enrolment in the UG was 42,692 students. Lecturer to student ratio was estimated at 1:36 instead of the National Accreditation Board's (NAB) recommended standard norm of 1:18. However, a report presented by a visitation panel set up by the university, revealed that a ratio of 1:1200 students existed in most faculties (Daniel, 2007).

According to Daniel's (2007) report "Without a commensurate scaling up of infrastructure, faculty strength and resources, and administrative and management systems, this enrolment explosion has steadily degraded the quality of the University's teaching, learning and research functions" (p. 39). The report indicated why standards have fallen, and attributed some of the causes to unmanageable class size and the unacceptable teacher/student ratio. It was therefore important to have an ICT-enabled system that would enhance the quality of delivery and support the increasing student numbers at remote sites. An e-learning implementation strategy is relevant for the UG.

In considering the leverage that electronic teaching and learning has provided in developed economies, it was anticipated that developing an e-learning framework (based on the experiences of successful e-learning institutions) will promote the integration of ICT in teaching and learning, improve the quality of teaching and learning, and provide support for lecturers in the design and delivery of courses.

1.4.2 Trends in ICT development in the University of Ghana

Between the 1980s and 1998, the UG network was virtually non-existent. Computers were mainly available in offices, with a few in computer laboratories. The Internet could be accessed mainly from the library and a café on campus. Bandwidth size at the time was 65 kbps. By the year 2008, the university network covered about 90% of all academic buildings. The university adopted corporate e-mail services which were accessible through the Intranet and over the Internet. Staff access was available in the offices while student access was available in faculty computer laboratories and the ICT centre at the University. The bandwidth was 9 mbps, which was among the highest in Ghanaian educational institutions. By the end of 2008, the student to computer ratio was approximately at 35:1 (Owusu-Oware & Awidi, 2008) i.e. 35 students : 1 computers.

By 2010 the library had 82% of its services automated with collections accessible over both the Intranet and Internet and both students and lecturers could access electronic journals from the Intranet. It was observed that although a Learning Management System (LMS) named KEWL was introduced in 2004, faculties did not use it except for two courses in the Faculty of Science. In 2009, the ICT infrastructure predominantly supported the administrative aspects of University work. Students could access their student financial and academic records, while lecturers could access information about their students online and upload their examination grades. Finance and HR

management systems were in use and were accessible over the Intranet (Owusu-Oware & Awidi, 2008). The university tasked two directorates with the responsibility of managing the ICT resources at the UG. These directorates currently have over 30 professional ICT personnel, while the technical staff in the library manages the e-Library materials. Resources were available at the UG, but management structure, connectivity, access and power stability were major problems. Most of the computers were obsolete and lacked legal institutional applications. The university's strategic plan proposed ICT integration into teaching and learning; however, the emphasis was placed on improving administrative services than on ICT.

1.5 ICT and Higher Education in Africa and Ghanaian Universities

In this section findings from documents examined regarding ICT and higher education in Africa and Ghana, and a brief background of ICT in the UG is described. This is done to provide some depth into the context of the research environment; country and institution.

1.5.1 ICT and higher education in Ghana

Research has shown that computer and Internet access in Africa, and particularly in Ghana, has significantly increased over the years, though it is still heavily concentrated in the regional and urban capital cities (Alemneh & Hastings, 2006; Sey, 2011). Government efforts to motivate adoption and adaption were evident in initiatives to develop ICT educational sector policies and in a national curriculum document that focused on integrating ICT in higher education (Mereku, 2011; Ministry of Education and Sports, 2006). In taking advantage of the provisions made by government, universities in Ghana initiated ICT projects focused on improving the quality of teaching, learning and research. Some studies into the use of ICT to support teaching and learning have shown problems with the way it is adopted at individual and institutional levels. At the institutional level, ICT was emphasised as a subject rather than as a means of learning, focusing on developing students' skills in the use and operation of ICT resources rather than as a support for learning (Mereku, 2011). Mereku estimated that, in Ghana in general, while lecturers to computer ratios were 1:1, student to computer ratios were very high (50:1) suggesting a primary challenge was access. Another challenge has to do with what lecturers can do to support the students to learn

effectively using the ICT resources available. The critical factor observed by the researcher was an appropriate approach to adoption in support of teaching and learning despite the ratios.

As in other parts of Africa, all the universities in Ghana have common problems: unstable power supply, poor bandwidth capacity, lack of funding for education and ICT projects, user problems and use of inappropriate technologies (Adam, 2003; Anamuah-Mensah, 2011; Onguko & Hennessy, 2010). Though most of the universities claimed they were integrating ICT in teaching and learning, usage was focused mainly on non-academic activities such as e-mailing, chatting, playing games and downloading entertainment material from the Internet (Asunka, 2008; Sey, 2011; Sife, Lwoga, & Sanga, 2007). Related studies of students' attitudes towards e-learning in public and private universities identified management commitment, among others, as important for any successful e-learning implementation in Ghana (Asunka, 2008; Awidi, 2008). Asunka emphasised the need for environmental factor strategies for e-learning implementation, suggesting that the introduction of technology in teaching and learning is not a technical factor but a sociological experiment. Hence, the problems of ICT integration in teaching and learning should not be considered only in technical terms but also in the unique cultural context of the institution. Although the studies were relevant for the context of Ghana, they lack information about the perspectives of management, technical staff and lecturers and the pedagogical factors that affect e-learning implementation in higher education.

1.5.2 The University of Ghana

Little has been written about ICT integration in teaching, learning and e-learning at the UG. Dadzie (2009), whose study examined student use of e-learning and library services at the UG, focused on the prospects and challenges of adopting ICT.

Dadzie (2008) noted that four years after the launch of the KEWL e-learning system, one lecturer in both the Faculties of Arts and Social Sciences partially used the systems; and most lecturers were unaware of and unfamiliar with the learning platform. Those who indicated awareness of the system were not prepared to use it, citing time constraints, little knowledge about the web technology, and difficulty in understanding the training sessions as the servers were down during most training sessions. Lecturers cited their lack of confidence in the capacity of the system. Students knew about the learning platform but mainly through participation in a computer literacy programme

organised by the university and not from their lecturers. Some accessed the learning platform out of curiosity, while others visited the learning environment because their friends informed them about it and not because it offered learning resources and learning activities. The few students who indicated use of the resources cited access to assignments, lecture notes and course syllabi as the main activities they engaged in.

On the matter of enabling technologies to support teaching and learning, Dadzie (2008) observed that lecturers at the UG had laptops and access to computers provided by the university. The lecturers also had access to Internet facilities either in their offices or at the staff resource centre. However, unlike the lecturers, most students did not have Personal Computers (PCs), but relied on the limited number of computers provided by the university in various computer laboratories dotted around the campus, and they accessed these Internet facilities at two main locations. The students' complaints about the challenges they faced included: network overload, non-availability of PCs, unfamiliarity with the technology, lack of time and access, slowness of the network and filters blocking access to relevant sites.

Dadzie's (2008) findings suggested that lecturers were willing to use this learning tool if properly introduced to the system. They were prepared to upload course syllabi, course notes, assignments, and quizzes to enhance the teaching and learning process. Training in the use of the e-tools was emphasised. The lecturers also expressed concerns about the efficacy of the system to support effective teaching and learning and the reliability of the Internet and Intranet. Significant among the concerns raised was the lack of an institutional policy regarding the use of e-learning in the UG. It was clear from the finding that although e-learning was prominently featured on the university's website, the adoption and diffusion of the e-learning remained a challenge.

To craft an appropriate implementation strategy would therefore require the understanding of factors raised by both stakeholders and primary users in order to stimulate adoption and diffusion of e-learning. In exploring the concerns raised by Dadzie (2008), this thesis examines some reasons why ICT was necessary for the context of Ghana, the challenges that e-learning faces in higher education, and appropriate strategies that can emerge from empirical and theoretical evidence. Some common themes will emerge to guide the discussion of appropriate strategies. These themes are synthesised to investigate the situation at the UG and to design an appropriate strategy that will facilitate the successful implementation of e-learning.

1.5.3 E-learning in African Universities

To bridge the learning gap between developed and developing countries most African Universities have initiated e-learning projects (Awidi, 2008; Odunaike, Olugbara, & Ojo, 2013; Rasmussen & Ryttonen, 2010). In most cases particular reference and emphasis were made to distance learning in collaboration with universities outside the continent. However, some researchers have argued that, most African educators have little knowledge about, or interest in the usage of learning management systems. They argued that there were considerable infrastructural constraints to be overcome before widely adoption for open and distance learning could be possible across the continent (Unwin et al., 2010). Furthermore, although some institutional experiences are shared, the processes of adoption were not clearly defined. They show clear gaps in stakeholders' role in successful e-learning implementation processes (Dagada; Jokovljevic & Stoltenkamp, 2005; Rhimi, Beer & Sewchurran, 2012). It can be argued that, the research observations notwithstanding, when the current efforts are prioritised with good strategic processes and management commitment successful implementation may be achieved. This study argues that, adequate human capacity has been built over the year through partnership cooperation, although the infrastructure challenges exist, an appropriate approach to e-learning implementation is needed.

According to Ryttonen (2010) although universities in Eastern Africa prioritised e-learning in policy papers, they were not backed by action plans and specific budgets. The decisions were top-down with no input from the users. While the e-learning had no focus on pedagogy, feedback and evaluation processes, there were no plans of motivating students to use the resources to enhance their learning. Like most countries in the regional blocks in Africa, they had narrow bandwidth and unstable power supply. The experiences from East African universities imply that a system approach with clearly defined strategies were required to make e-learning successful.

An e-learning African report 2012 of 41 countries also showed that although e-learning was generally described to cover education, learning and teaching with technology as an enabling tool, the emphasis was more on Internet connectivity and economic priorities. They described the technologies mostly used for e-learning to include computers, projectors, and mobile phones, with PowerPoint, Moodle, and Microsoft applications as the software they use most. The motivation for using the resources were listed mainly to include; improving the quality of teaching, developing 21st century skills, improving

access to education in remote areas and promoting creativity and critical thinking. The descriptions of e-learning suggest that, the approach to teaching and learning in the classrooms were transferred into an electronic environment through the use of Projectors and PowerPoint presentation. These are evidence of lack of clearly defined strategic plan processes that will enhance e-learning implementation in the universities.

1.6 E-Learning Initiatives in Ghana

Just as in other parts of the world, universities in Ghana hope that the educational possibilities of ICT are a means of improving access, enhancing quality and minimising the cost of education (Farrell & Isaacs, 2007; LaRocque & Latham, 2003). The UG joined with the African Virtual University (AVU) to improve teaching and learning using ICT. However, the challenge of developing ICT as an integral part of the educational system was still a significant factor. The problem is that as demand for higher education continued to increase; the solutions to ICT appeared to be more elusive because higher education is driven by broad economic, technological and social factors. This section attempts to explore some factors and motivating factors in the UG's initiative with the AVU.

1.6.1 Case experience of the African Virtual University (AVU)

The AVU initiative started in 1997, a time when government funding and support for higher education in African countries had been significantly decreased, and when universities were struggling with their budgets to enrol more students (Juma, 2006). The initiative was therefore seen as a means of solving some of the problems of higher education. However, technological resources were outmoded in addition to inadequate staff, limited space and the inability of most institutions to mount effective engineering and technology disciplines (Juma, 2006; Ngome, 2009). The objective of the AVU project was to develop ICT capacity, enhance science and technology programmes and train staff to develop various distance and e-learning courses (Quandzie, 2012).

The growth in the number of learning centres and number of students who have graduated from the AVU makes its approach to e-learning implementation significant for the purpose of this thesis, particularly as the universities in Ghana have similar characteristics to those in sister African countries. The AVU e-learning implementation initiative in Ghana started with three universities in Ghana offering courses in Mathematics, Physics, Chemistry, Engineering and Computer Science. The focus of the

project was to use ICT resources to increase access to education, and to enable the universities to supplement their existing courses/programmes with enhanced technological resources. Once the project was planned, the implementation process was scheduled in three phases. Firstly, the universities in the project were required to provide space and a project team. Satellite equipment and computer laboratories with Internet connection, using e-mail, fax, Web, and audio/video recording equipment were provided by partner institutions (Juma, 2006). In the first phase, there was further training of the technical staff of participating institutions. According to Baranshamaje (2009), a pilot phase was used to establish the feasibility of the AVU and this provided the foundation for implementing the operational phase. Capacity building activities included training in the development of content, teaching technical staff the skills to run the network, and training in the marketing of academic and non-credit programmes. In view of the capacity building effects of the training, this researcher considers continuous training as a cardinal component of a sustainable e-learning implementation, considering the dynamic nature of the technologies involved.

In the second phase, with the equipment and available space ready, undergraduate programmes from leading universities around the world were offered to students. The third phase of the model was sharing the technological resources based on degree course units among the institutions in South Saharan Africa. The key drivers in the AVU framework were project coordinators comprising a campus coordinator, technical and library coordinators, course moderators and office/technical assistants (AVU Ghana project, 1998). Baranshamaje (2009) indicated that the technical and academic infrastructure and implementation arrangement was designed and managed by consultants with input from the universities participating in the project. Managing the programmes was the responsibility of coordinators (campus, technical, academic) and the classroom facilitators. Training and visits by the AVU staff and the consultants were conducted periodically, while all technical services including satellite coordination, Internet gateway housing, and a 24 hour help desk were to be outsourced. The structure role of the AVU showed the significance of having a project team and a structured plan, which ensured that resources and structures were well in place for a successful implementation.

The project team was well resourced; nevertheless, there were several set-backs in the running of the AVU programmes in Ghana. It would be expected that, with advertised soundness or potential of the AVU programmes to increase access, they would become

an integral part of the universities' curriculum. This, however, was not the case. The unstable power supply and intermittent breaks in the satellite connection made it difficult for both coordinators and students to access the information as and when expected. AVU programmes in the universities were not seen as an integral part of the regular programmes at the universities. Most lecturers were not aware of or even familiar with the AVU programmes on campus. These characteristic problems underscored the ICT-challenged environments in which the AVU operated.

Thus, it appears there was no critical evaluation of institutional context to identify strengths and limitations before the initiatives began. Once the institutions provided the space and basic resources, they offered the courses without critical consideration of independent institutional integration. It was clear that with the emphasis on learning resources coming from well-established institutions world-wide, the people factor involving building local capacity for lecturers was not a major priority. This can explain the continued failure of independent integration of e-learning in the university curricula. Students who enrolled in the programmes were expected to learn within the new mode, with assistance from the course moderators. It was also clear that there was an over emphasis on the technology and technical components of the implementation process. These failures must be reviewed. Hence, assessing an institutional case within its context may help explain the holistic approach to strategic factors that can make e-learning successful and sustainable; as in the case of the UG.

1.6.2 Strategic review of model implementation

The approach to virtual learning implementation by the AVU has shown some essential factors that are important for successful e-learning implementation. Case studies from Ghana and Kenyatta University showed that the implementation processes were preceded by clear objectives and plans guiding each process (AVU Ghana project, 1998; Juma, 2006). The objectives are evident in the manner in which AVU delivery models described how content providers delivered their resources to an on-line library (textbooks, course notes and journals) which were then accessed by the students, with readily available support when needed. There were periodic support sessions between the support staff and students on one hand, and the content developers and support staff on the other hand. The pedagogical approach was explained to all students, who were guided by the classroom facilitators to construct knowledge. Using this approach, technology resources already in the universities served as a technology hub thus

supplementing the available ICT resources. This makes a clear objective statement on implementation strategies for e-learning.

In examining the influence of AVU and factors influencing ICT adoption in Africa, Farrelle, Glen & Trucano (2007) identified policy framework and implementation, advocacy leadership, infrastructure and access, policy and collaboration, and human and learning resources as limiting adoption. Though well structured, the AVU centres at the universities were separated from the mainstream activities of the universities (Juma, 2006). In addition, experiences for both Kenyatta University and the universities of Ghana, it was evident that the AVU curriculum and activities were not recognised within the general framework of the universities. The budgetary allocation, management planning, and administration were foreign to the university. It can be concluded that because the AVU model and implementation processes were not recognised as integral parts of the curricula, influence over e-learning campus wide was not achieved. It is therefore appropriate to have a model that is not dependent on foreign consultants, but one that is institutionally based and recognised as an integral part of the curriculum of the university. This research therefore seeks to extract relevant approaches from within the AVU implementation procedure that would be useful for successful implementation at the UG.

1.6.3 Ghana Governmental ICT policy for higher education

In the Ghana ICT in education policy, government strategies were highlighted. These were drawn from the Ghana ICT for accelerated development (ICT4AD) document (Ministry of Communication, 2005; Ministry of Education and Sports, 2006). The document describes how the government intends to use ICT to drive all sectors of the economy as in well developed countries where governments build the infrastructure for other sectors of the economy to take advantage of the resources provided. Seven main issues were identified from the document and highlighted for purposes of this thesis:

1. Modernise Ghana's educational system using ICTs to improve and expand access to educational, training and research resources and facilities;
2. Promote electronic distance education and training and virtual learning systems to complement and supplement face-to-face campus based education and training systems;
3. Mainstream ICTs throughout the entire educational system to promote life-long learning;
4. Encourage collaboration between local and international educational universities to facilitate educational exchange and the promotion of ICT education and training;

5. Develop an educational intranet to provide educational materials and tools at all levels of the educational system;
6. Leverage the use of electronic distance learning networks to enhance the delivery of ICT education and training;
7. Promote Internet access to all educational universities including the schools, universities, and colleges.

The objectives suggest government's intents to promote e-learning in the universities in efforts to increase access to higher education. Universities were however, responsible for identifying such government provisions and strategies they could take advantage of. Knowledge of government provisions was therefore important for management, as they are responsible for the development and implementing policies.

1.7 Chapter Outline

This thesis has six Chapters. Chapter 1 describes the background to the research area highlighting the educational system in Ghana and the particular context of the UG. Relevant literature relating to e-learning implementation strategies is discussed in Chapter 2. The Conceptual Framework is discussed in Chapter 3, highlighting key elements that the research focused upon. In Chapter 4 the methodology and methods used in data collection and the analyses used are described. The research findings and analyses are presented in Chapter 5. Chapter 6 discusses the research findings while in Chapter 7 the Implementation Framework and Recommendations are presented. The Conclusion provides a brief overview of the entire thesis and what the proposed framework offers to users.

Definition of Terms

While many of these terms can have varied meanings, in the context of this research they are defined as below:

Technology: Technology used in this thesis refers to computers and computer-based resources which include Internet, wireless and multimedia resources.

E-learning: The use of ICT devices, Internet, Intranet, and World Wide Web resources, as an instrument to construct knowledge, to support teaching and learning in synchronous and/or asynchronous modes.

Policy: A formal statement of guiding principles or rules of approved ways of doing things, to guide decisions on how the university expects community members to operate or act in a particular area of its operational activities.

Strategy: Institutional plan of short and long-term goals showing an organised stage-by-stage approach to integrate a system or process in its operational activities to achieve a desired objective base on the institutions' goals.

Strategic priorities: Management efforts and approaches drawn from the vision and mission statements of the university to enhance the quality of teaching and learning.

Implementation: The process of translating the institution's strategies into functional action activities through a structured plan and allocation of resources to achieve the goal.

ICT-challenged environment: Institutions where basic ICT infrastructure exists to achieve functional objectives, but are limited by resources with common characteristics including unstable electricity supply, poor Internet connection and access, low bandwidth size and lack of capacity to fully use the resources for the intended benefit.

Capacity for e-learning: Institutional skill, knowledge and competencies that have been developed, nurtured, retained and used which serve as a basis for providing effective and efficient e-learning performance.

Innovative Technology: Use of ICT and computer resources for teaching and learning which were traditionally unknown in the university.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction and Overview

In this chapter, theoretical concepts, models and research regarding successful e-learning implementations are reviewed. Some institutional approaches and strategic management principles of effective system implementation are also reviewed. The literature review is discussed in four sub-sections. Section 2.1 discusses definitions for e-learning, which are used to define e-learning in the context of this research. Theories and models underpinning e-learning implementation are discussed in Section 2.2. A brief discussion of some contemporary approaches to e-learning implementation strategy is presented in Section 2.3. Section 2.4 discusses some experiences of e-learning implementation failures in higher education.

The research context described in Chapter 1 established that, at the time of this research, the environment in which the UG operated had significant challenges that frustrated attempts to implement e-learning. It can be described as an environment that has become more uncertain with both institutional and governmental challenges to successfully implementing e-learning. To break from both institutional and governmental limiting factors and achieve successful e-learning implementation, the UG may learn from theoretical and good practice experiences from ICT-rich environments. Several authors have suggested effective policies and strategies as the major instruments for successfully implementing e-learning (B. Collis & Moonen, 2001; Farrell & Isaacs, 2007; Fisser, 2006; Hardaker & Singh, 2011; Khan, 2005; Lin, Ma, & Lin, 2011). Institutions that have achieved successful implementation through policy and strategic processes have shared their experiences and these can be examples to other institutions. It is therefore not surprising that the advent of ICT in education has seen universities, in both developed and developing countries, building and investing in the use of technologies to improve teaching and learning. In Ghana, many university websites show initiatives to take advantage of benefits that technologies offer through e-learning. However, after building the infrastructure these universities have experienced frustrations in integrating the ICT resources effectively in teaching and learning. The primary stakeholders (lecturers and students) have not adopted the resources while those who engaged with the resources have not used them enough to influence teaching and learning (OECD, 2005). Hence, there has been a clear gap between the intended

purpose of usage, user-adoption, and successful implementation of e-learning in Ghanaian universities.

2.1 Defining E-Learning

The absence of a universally accepted definition for e-learning has made the term a buzz word because different researchers have defined the term to suit the context of their environment, background, perception and exposure to the learning system (Cohen & Nycz, 2006; Guri-Rosenblit & Gros, 2011; Lamerias, Paraskakis, & Levy, 2007). Some national and institutional bodies, like the Australian Flexible Learning Framework and Guide Training Authority and American Society for Training and Development (ASTD) Learning, have defined e-learning to include the use of electronic and multimedia resources to facilitate teaching and learning (Backroad Connections Pty Ltd., 2004; Boere & Kruger, 2008; Ellis, 2004). Such electronic media include the Internet, Intranet, Extranet, the World Wide Web, satellite broadcast, audio/video tapes, interactive TV and CD-ROMs, that make learning more flexible for students.

Sangra, Vlachopoulos, Lanzo, and Bravo (2011, pp. 20-21), in their work towards an inclusive definition of e-learning, examined various definitions and divided them into four main categories; technology driven, delivery system oriented, communication oriented and education driven. In their pool of responses from e-learning experts, and works of published scholars, differences in the terminologies used to describe e-learning could be observed. These four main categories mentioned above formed the basis for defining e-learning within the context of this research in Ghana.

The various definitions use various terminologies to describe the term e-learning, making it hard to distinguish between the definitions, and it also makes the discourse on e-learning and related research somewhat loose (Donohue & Howe-Steiger, 2005; Guri-Rosenblit & Gros, 2011). It was noted that the discourses in terminologies “reflect the ambiguity as to their roles and function and highlights the fact that the domain of e-learning has not established itself yet as a well-defined field of study and research” (Guri-Rosenblit & Gros, 2011, p. 4). However, the focus of all early and contemporary definitions reviewed (Cohen & Nycz, 2006; Curran, 2004; Koohang & Harman, 2005; Piskurich, 2003; Romiszowski, 2004; Rosenberg, 2001) showed the use of technology resources to support or enhance teaching and learning. It was observed that all context-specific definitions of e-learning were foreign to Ghana with its unique characteristics and challenges. Hence, drawing from the various definitions, e-learning for the purpose

of this research was defined as “*the use of ICT devices, Internet, Intranet, and World Wide Web resources, as an instrument to construct knowledge, to support teaching and learning in synchronous and/or asynchronous modes*”. E-learning in this study covered both on-campus and distance learning, which some contemporary research has shown to be successful (Sharpe, Benfield, & Francis, 2006; Zuvic-Butorac, Nebic, Nemcanin, Mikac, & Lucin, 2011).

2.2 Theories and Models Underpinning E-Learning

Implementation

There are several models designed to guide successful e-learning implementation. While some of the models emerged from institutional initiatives, others referred directly to generic theoretical models that have been extensively explored by researchers (Darby, 2003; Liverpool, Marut, Ndam, & Oti, 2009). Widely applied theoretical and empirical models for innovation implementation in education are directly related to change theory and instructional design. The theoretical models include the Diffusion of Innovation Adoption Model (Rogers, 2003) and the Concerns Based Adoption Model (CBAM) (Hall & Hord, 2001). Also, an instructional design model, initially developed by the US military, is the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) Model (Molenda, 2003). Another model, based on the Diffusion of Innovation Adoption Model and the CBAM, is the 4-E Model developed by Collis and Moonen (2001) to guide institutions when implementing technology innovation in education. Therefore, the literature forming the foundation of this thesis falls into two broad areas; change management theories and instructional design models. This thesis is not focused on change management or instructional design, but on e-learning implementation strategies. However, the change management theories and instructional design literature point to important variables for this thesis. These variables involve people and the use of technology innovation in higher education. It must be clarified that what follows is not an exhaustive review of change management literature, but rather a review of key factors. Reference is made to instructional design because e-learning involves course design and development.

The following section describes the rationale for using the implementation models (Sub-Section 2.2.1) and the theoretical models that were used as the basis for this thesis. In Sub-Section 2.2.2 and 2.2.3 Rogers’ Diffusion of Innovation Adoption Model the 4-E Model are discussed respectively. The review focuses on examining various

components of the models, and how these components could be categorised to guide successful e-learning implementation.

2.2.1 Rationale for the theories and models

The most fundamental problem reported in educational reforms is that people do not have a clear and coherent understanding of the reasons for educational change (Fullan 1991, p. 30). People have tended to grapple with their current situation and have been challenged with how to proceed from accepted and entrenched practices to a new practice. Fullan (1991) stated that the misunderstanding of change (reform) from the traditional way of doing things sometimes results in confusion, stagnation, and often unwarranted and misdirected resistance. While the focus of this thesis is not on the theory of change but rather on the process of implementing technology innovation in teaching and learning, it is important to have a model that will represent the reality of the process in order to provide a good understanding of the steps to accomplish sustainable change.

Therefore, the e-learning implementation model for the purpose of this thesis is described as a representation of the realities of the processes of implementation; a systematic means to explain the processes of technology innovation in higher education, from initiation to institutionalisation. It is the intention of this research to present models that provide clarity to the UG to deal with the complexities in successfully implementing effective e-learning.

2.2.2 Rogers' Diffusion of Innovation Adoption Model

Evidence from the literature (Sherry, 1998; Venkatesh, Morris, Davis, & Davis, 2003) has shown that there has been ongoing research into technology acceptance and integration in teaching and learning which has yielded several competing models with different sets of determinants emerging from the theories. Most researchers referred to Rogers' (1995; 2003) Diffusion of Innovation Adoption Model for technology integration in teaching and learning from which other models emerged (Ensminger, Surry, Porter, & Wright, 2004; Omwenga, Waema, & Wagacha, 2004; Sherry, 1998).

Common among these models are the Integrated Technology Adoption Model (Sherry, 1998) and the Unified Theory of Acceptance and Use of Technology Model (Venkatesh et al., 2003). Using Rogers' (1995) work, Sherry (1998, p. 141) argued that the Diffusion of Innovation Adoption model "fails to explain the intricacies of the learning

and adoption process that takes place when an evolving technology innovation is introduced". The statement was based on the perception that innovative change occurs piecemeal instead of in a systematic process. Making a case for the Integrated Technology Adoption and Diffusion Model, Sherry (1998, p. 113) asserted that components like technology, individual, organisation and teaching and learning factors did not fit into Rogers' Diffusion of Innovation Adoption Model. It is clear from Sherry's proposals that the Integrated Technology Adoption and Diffusion Model identified technology, individual characteristics (personal and task concerns), organisational, and teaching and learning (instructional) factors as major components for technology integration in higher education. It can therefore be argued that critical factors of e-learning implementation depend mainly on people, technology and institutional domain factors. Alternatively, Rogers' model provided details from which institutions can adopt aspects to suit the context of their environment to guide adoption and diffusion of e-learning. Hence, Rogers' (2003) model is a preferred option for this research.

Venkatesh, et al. (2003) combined eight Technology Acceptance and Component Determinant Models. They compared the models and their extension in corporate organisations, leading to the development of the Unified Theory of Acceptance and Use of Technology (UTAT) Model. This model explained intentions for using technology and the individual behaviour that occurred because of the usage. It suggested four constructs that are direct determinants of usage intentions and behaviour (performance expectancy, effort expectancy, social influence and facilitating conditions). Venkatesh et al. (2003) indicated personal characteristics (gender, age, experience and voluntariness of usage) as factors that mediate the impact of the four key constructs on usage intentions and behaviour. While gender and age are relevant to technology integration it can be argued that they are not critical components in higher education, and may not have significant effects on strategic approaches to e-learning implementation. Using a structured questionnaire, the model was used by researchers to verify the process of lecturers' and students' adoption of e-learning in universities (Keller, 2006; Keller, Hrastinsk, & Carlsson, 2007); Park, 2009).

It was evident that while some determinant variables of the UTAT Model proved successful in the various experiments, most researchers based their arguments on Rogers' (1995; 2003) Diffusion of Innovation Adoption Model. All the models focused mostly on the factors related to people rather than institutional and technical support

factors, which confirms the importance of considering people in any implementation process. When considering a holistic systems approach to e-learning implementation, Rogers' (2003) model is preferred as a basis for crafting successful e-learning implementation strategies. It provides an understanding of the management role for successful implementation of innovative technologies for e-learning.

A. *Diffusion of Innovation Adoption*

Rogers' earlier work (1995) provided some understanding of the factors that facilitate the acceptance or rejection of innovation in organisations. Rogers (2003) described diffusion as the process by which an innovation is communicated through certain channels over time among members of a social system (p. 11). Four main elements stand out in the description of diffusion; innovation, communication, time and consequences. Communication links all the elements together. It was assumed that individual decisions are not based on force, or influenced by an authoritative structure, or determined by a collective decision urging everyone to use the innovation system. Instead, it was argued that it is based on the individual's independent decision to accept or reject an innovation. The identification of four stages of diffusion suggested that people were exposed to the innovative process, through various channels of communication, which with time, allowed the individual to form an opinion of the innovation. Therefore, communication is identified as a key element of a sustainable e-learning implementation, and is worth investigating in this research. The commonly accepted ideas of Rogers (2003) include the innovation decision process; attributes of innovation; and adopter categories. These variables are used to identify user acceptance in the UG.

B. *Innovation Decision Process*

Rogers (2003) stated that innovations are influenced by previous experiences of the adopter, which requires identification of the adopter's problems and needs for which the innovation is relevant (p. 136). Hence, understanding both user and organisational needs before introducing an innovation is critical for a successful implementation. This research follows this approach, examines the needs assessment process adopted by the UG, and asks how e-learning will meet the needs of both students and lecturers. It may help the UG to adopt e-learning alongside its other teaching and learning approaches. Rogers (2003, p. 168) described five stages that make up the diffusion of innovation process. The stages of innovation adoption are:

1. Knowledge – the individual is exposed to or made aware of new ideas or interventions but does not have information to make a decision.
2. Persuasion – awareness is created and the individual shows interest and seeks more information to accept or show disinterest in the new idea or intervention.
3. Decision – information, based on the new idea or intervention, is evaluated and the individual makes a decision based on the evaluation, and applies the innovation to present and future situations
4. Implementation – the new idea or intervention is trialled or tested
5. Confirmation – the individual makes a decision to continue or discontinue with the use of the new idea/intervention. The dissonance experienced by the individual on which a decision is made to continue or discontinue.

This Researcher opines that the innovation decisions, as described above, focus on the individual. However, the principle behind the theory may also be applied to technological and institutional factors. Knowledge of an innovation (like introducing e-learning) is very important to individuals who have not been aware of how the new teaching and learning experience can benefit them. The persuasion stage assists the individual to form a favourable or unfavourable attitude towards the innovation. Similarly, when management is well informed about, and has experience of, the innovation there is a higher likelihood they will effectively coordinate resources to embrace it. Thus, management is able to present the innovation in a manner that may persuade users to also gather sufficient information to decide whether to accept or reject it. For example, if lecturers and students are informed about, and experience e-learning as friendly, flexible, well supported, scalable, and a product that meets their needs, they may adopt the system and be more eager to use it.

In the decision phase, management evaluates and matches the innovation to institutional goals and objectives and decides to commit resources to upscale or reject it. Similarly, users also evaluate the innovation, and make a comparison between the current approach and the future perspective to make a decision of adoption or rejection.

In the implementation stage, Rogers (2003, p. 179) argued that people adapt or change innovations to suit their needs. The more people can reinvent an innovation to suit their needs, the more likely the innovation will succeed in being accepted. Individual users and institutions, operationalise the innovation at the implementation phase in order to ascertain the responsibilities and challenges associated with using the technology. Thus, by piloting the use of the technology with a department or faculty, and aligning it with individual and institutional objectives, policies can be crafted to guide use of the

system. The active commitment and involvement of all stakeholders is an overt behaviour change towards the innovation. Rogers' (2003) theory implied that attaining successful implementation does not happen in a day, but over a period of time to enable the key players to make informed decisions. This phase of the theory forms the basis of examining the UG and individual rationale for accepting e-learning.

In the confirmation phase (Rogers, 2003, p. 189), management, lecturers and students, having been exposed to the technology, seek re-enforcement of their decision to continue its usage or reverse their decision and reject the technology. Within the confirmatory stage Rogers (2003) argued that the individual seeks reinforcement of the decision from others. Also, Rogers (2003) indicated that using mass media to communicate at the beginning stages, and interpersonal channels of communication at later stages, of the implementation process have high potential for successful adoption. Thus, the implementation and confirmation of the innovation by both innovators (management or faculty) and adopters (users) is based on the awareness and knowledge gained. They analyse their situation and that of the institution regarding the desired and expected outcomes. This may be described as the cost benefit analysis between institution and individual.

In summary, management and users are more likely to adopt the technology if it is seen as improving the human performance of operational activities. The knowledge and awareness and benefits users will gain from e-learning are relevant in persuading them to use the innovative technology. Innovative technology processes may be initiated from faculty or management. In either case, the final decision will also depend on the innovative decisions of other members within the faculty and the UG at large. It can be drawn from the preceding arguments that lecturers and students are important targets for data collection for an innovation decision process. Data about their perception may be used as basis of persuading them to adopt and adapt e-learning in the UG.

C. *Innovation Adopter Categories*

Rogers (2003, p. 283) explained that the acceptance of an innovation goes through five main stages that are computed quantitatively and graphed. According to Rogers (2003), "... innovativeness is the degree to which an individual is relatively earlier in adopting new ideas than other members of a system" (pp. 283-285). The categories of adopters described include; innovators, early adopters, early majority, late majority and laggards.

The most relevant observation for successful e-learning implementation is that, it is the early adopters that have the most significant influence on others' adopting e-learning, and not the innovators or originators of the idea. This is because initiators of the implementation process are usually perceived to be far from the existing social system (Hardaker & Singh, 2011) and therefore, not good role models or opinion leaders for change. This research therefore examines the extent to which the UG management select faculty members as opinion leaders who can make an impact on the implementation process as part of the strategy.

D. Attributes of Innovation and their Rate of Adoption

The driving force for innovation diffusion in an institution may take from few to many (at least 20) years (B. Collis & Moonen, 2001; Rogers, 2003), which suggests that individual and institutional rates of adoption may vary, hence the need for a strategy. Rogers (2003, p. 219), described attributes that affect the rate at which an innovation could be adopted, and that also show how perceptions of the characteristics could predict the rate of change. Rogers (2003, p. 221) described the rate of adoption as “the relative speed with which an innovation is adopted by members of a social system”. Most of the variance in the rate of adoption is explained by the five attributes shown in Table 2.1.

Table 2.1
Attributes of Innovation and Research Domain Categories

Category	Description
Relative Advantage	The degree to which an innovation is perceived as better than the idea it supersedes
Compatibility	The innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters
Complexity	The degree to which an innovation is perceived as difficult to understand and use
Trialability	The degree at which an innovation may be experimented with on a limited basis
Observability	The degree to which the results of an innovation are visible to others.

Rogers (2003, p. 221) argued that, an individual-optional innovation-decision is generally adopted more rapidly than when an innovation is adopted by an institution. Rogers (2003) added that when many people are involved in an innovation decision it results in a slower rate of adoption, while altering the units of decision to fewer individuals speeds up the rate of adoption. Therefore, this justifies a systematic approach to implementation through parallel pilot projects.

In summary, the rate of diffusion of adoption is determined by the perceived attributes of the innovation; the type of innovation (optional, collective, authority); the nature of communication channels for the diffusion process; the nature of the social system; and the extent of change promotion efforts. The descriptions suggest that Rogers' (2003) model is most suitable within institutions where innovations exist. The theory behind the model provides a means of assessing the acceptance or rejection of the innovation, and whether there is a need to upscale or abandon the innovative system. Since the UG already has an institutional LMS (KWEL), and technology infrastructure (Network, Internet connectivity, computers, servers) that can support teaching and learning, the Researcher believes that combining relevant elements from the models may provide a clear understanding of successful implementation.

E. Relating Attributes of Diffusion of Innovation to e-learning Implementation

In this sub-section, the attributes of diffusion of innovation are related to e-learning implementation in the UG.

Relative advantage: This may be established through effective planning for users' engagement with the learning system, by establishing the innovation's convenience to the user and satisfaction that may be gained by using the innovation. Management level relative advantage may be established by identifying the system's Strengths, Weaknesses, Opportunities and Threats (SWOT) relative to its objectives. The benefit of the SWOT assessment may help the UG set and craft policies as well as design appropriate strategies to guide a pilot process that will help users make informed decisions. This may be comparable with the analysis stage of the ADDIE Model.

Compatibility: The UG, through a pilot project, may examine the extent to which e-learning can be compared with the traditional system of teaching and learning to justify an institution wide trial. This may determine whether the e-learning technologies are consistent with the needs of lecturers and students in terms of delivery and learning outcomes. The outcomes of the e-learning technologies need to be as good as, or better than, the outcomes from traditional teaching and learning. Thus, the support outcomes must be better than existing methods of delivery and learning values of lecturers and students, and their previous experiences. Comparable outcomes must be sufficiently consistent with institutional clear objectives, policies, and strategies for teaching and learning in the UG.

Complexity: Rogers (2003, p. 257) asserted that users are unlikely to adopt an innovation if they perceive the innovation is relatively difficult to understand and use. Computer hardware and software perceived as flexible, friendly, scalable, and meeting all user requirements and needs, has the likelihood of being accepted by all users. For example, if lecturers and students consider the learning technologies to be flexible and user friendly, then there is the likelihood of adoption. To overcome issues of complexity, training is required for lecturers, students and technical support staff. Training is particularly needed for the technical support staff on whom the effective running of the system will depend; they will require skills and competencies to manage the network traffic, bandwidth, and developing a redundancy plan.

Trialability: Rogers (2003, p. 258) asserted that the extent to which an innovation is trialled and tested, where limitations to the innovation are low and the gains are high, there is likelihood of acceptance. This raises issues of hands-on demonstration and engagement with the e-learning technologies to assist the decision-making process of adoption or rejection. Thus, management influence and effective planning within the context is very important for users to appreciate and accept the innovation.

Observability: A significant improvement in teaching and learning outcomes will be evidence of the e-learning technology's ability to enhance individual performance. Rogers (2003, p. 258) argued that individuals are willing to adopt an innovation when they are convinced (visibly shown) that the innovation improves performance or outcomes of set objectives. The focus of this research is a formative and summative evaluation of the implementation process. The focus will be to examine the UG's evaluation procedure to show users the potential of e-learning to support teaching and learning.

In summary, aspects of Rogers' (2003) Diffusion of Innovation Adoption Model are used to shape the focus of this thesis in crafting a strategy for successful e-learning implementation. There is a particular need for assessment to establish the relative advantage of implementing e-learning in the UG. The model demonstrates a need for a strategic process that creates awareness of diffusion of adoption by individuals and the institution as a whole (innovation-decision process, nature of communication process). It explains to managers what is required of them in designing the function process of implementation. Rogers' (2003) model also highlights the need for the following: evaluation at every stage of the implementation process (Trialability); training, and involvement of all stakeholders (lecturers, students and technical staff); integrating

curriculum and pedagogy in the technology innovation (complexity); and management policies and plans for sustaining the innovation process (compatibility).

2.2.3 Collis and Moonen's 4-E Model

Collis and Moonen (2001) used the CBAM to illustrate the challenges related to people that institutions should expect in their approach to technology innovation in education. Drawing from Hall and Hord's (2001) CBAM and Rogers' (2003) Model, they summarised the successful factors that influenced the success of implementation in a 4E Model. They used conceptual models to explain the process of moving from a vision through initiation to institutionalisation. The 4E Model explains the likelihood of individuals adopting ICT as the preferred alternative to the traditional approach to teaching and learning. Collis and Moonen (2001, p. 25) argued that the likelihood of individuals making use of technological innovation (e-learning) for the purpose of teaching and learning depends on the following '*Environment*' (institutional context); '*Educational Effectiveness*' (perception and expectation of the users); '*Ease of use*' of the technology and resources; and '*Engagement*' (how the individual responds to the technology and change).

To understand how the 4E Model works within an implementation process, Collis and Moonen (2001) attributed the continuous increase in research in technology integration in teaching and learning to the gap between individual and institutional potentials and the use of resources in practice (p. 45). However, research attempts to identify the characteristics of a successful e-learning implementation continue to be elusive, suggesting there are complexities in implementing e-learning. This fact is particularly true in ICT-challenged environments like Ghana.

Collis and Moonen (2001) identified a three-step process for successful implementation of technology integration in teaching and learning. The steps are: initiation of the change; scalability, or diffusion of the change; and sustainable institutionalisation of the innovative technology. Fisser' (2006, p. 7) stated that the initiation process may be top-down, based on an institutional strategic plan to adopt e-learning, or bottom-up, where the initiative builds up from the departments or faculties and grows institution wide. Therefore, Collis and Moonen's four perspectives of initiation (2001, p. 47) may be summarised into top-down, bottom-up or a combination of top-down and bottom-up for the purpose of this research. This is because contemporary research has confirmed that in either of the initiative options an implementation leader or team needs to be

assembled to lead the implementation process for success to be achieved (Deepwell & Beaty, 2005; Fisser, 2006; Sheehy, Marcus, Costa, & Taylor, 2006). At the scalability phase, which describes the implementation process, Fisser (2006) supported Collis and Moonen's (2001) argument that success depends on on-going formative evaluation, guided by the institution's vision, goal and objectives.

Institutional experiences have shown that formative and summative evaluation are good for revision and fine tuning of the methods or plan of approach to achieve successful implementation process (Deepwell, 2007; Deepwell & Beaty, 2005; Deepwell & Syson, 1999). Another critical aspect for success is management of the innovation beyond enthusiastic users and early participants to one of sustaining the implementation process. The third aspect is up-scaling the implementation process to departments and faculties of the university, which Fisser (2006) described as institutionalisation of the innovative technology. This overview provides a holistic perspective of what is involved in e-learning implementation, as against studies that centre implementation processes on students and lecturers.

Collis and Moonen (2001, p. 48) further showed that the implementation process is a cycle that is time-bound, and that success cannot be rushed as various institutional approaches are unique and they may not necessarily go through all the strategic phases of implementation described above. Their observations of the implementation cycle provide a good rationale for a strategy implementation process, which this research seeks to achieve. Collis and Moonen's (2001) observations showed that institutional vision statements were often not translated into operational measurable goals, and that there may be varied sub-innovations, which must be managed during the implementation process. Critical observations included: failure of collective memory of the steps of implementation; the entry and exit of participants; and non-completion of the implementation process.

Collis and Moonen (2001, p. 49) also showed that initiation factors have a significant impact on the success of an implementation process; success is improved by creating a strategic plan and setting up responsibility for managing and carrying out the implementation phase. Factors considered as critical elements for institutional strategic planning are shown in Table 2.2 adapted from Collis and Moonen (2001, p. 49).

Table 2.2

Elements for an Institutional Strategy-adapted (Collis & Moonen's, 2001)

Elements	Descriptions
Pedagogical goals	Enunciated at university level; enunciated at faculty/programme level; developed in response to new indicatives and strategic positioning of the university
Infrastructure requirement	Level of access and service; capital and recurrent cost. Off-campus network access; Reliability/robustness
Evaluation, Dissemination and debate	Monitoring practice internally; monitoring practice elsewhere
Quality Factors	Ensuring best practice standards
Expertise for development, production distribution	Staff development; resourcing for support; links to similar groups outside; potential for strategic alliances with other institutions
Funding developments	Negotiation and allocation of funds to support technology initiatives (internal budgets); support for drafting of funding proposals to external agencies.
Resourcing of planning	Resource for the development of a technology strategy and its implementation; mechanism for review and updating of plan

Even though Collis and Moonen (2001) acknowledged there was institutional variation, they identified three approaches for assigning responsibilities for the implementation phase; they are integrated, parallel and distributed approaches. They stated that choice of approach is critical for leadership and acceptance of the innovation. Collis and Moonen (2001) argued that

...the choice is often constrained by the operating procedures in the institution: existing teaching and learning support may not agree to be overlapped by new units and the local politics will require that they be given the leadership of the initiative even if they are not particularly in tune with its ideas of the initiative or in contact with its pioneers (p. 49)

The process of moving from initiatives to actualisation of institutional goals for e-learning was influenced by 12 change entities. These are as shown in Table 2.3. Nevertheless, the factors are unique to various institutions, and while most of the factors may apply to an institution, others may not be applicable. Fisser (2006, p. 2) used the factors listed in Tables 2.2 and 2.3 to propose a simplified view of the implementation process. The process begins with identification and initiation of the innovative technology, which is then piloted and, based on feedback from the environment, decisions are made and the processes modified to suit users. Formative and summative evaluation of the process finally leads to implementation. Fisser (2006) placed the management role in decision-making at the centre of any successful e-learning implementation process, and identified the middle level manager as the key factor (p. 11).

Table 2.3

Change Entities Influencing the Implementation (Adapted from Collis and Moonen, 2001, p. 51)

Change entities	Values
Institutional culture	Innovative culture; conservative culture; in between
Strategic initiation target	Flexibility for students; new or growing number of students; effective use of resources; strategic choice, to be ahead of other; new learning methods
Key figures involved in initiation	University board or dean; small group of innovators or pioneers; no particular key figure.
Budget sources	Grant or special funding; own resources; no extra budget
Strategy: top-down or bottom up	Top down; bottom-up; combination
Project team characteristics	Project management background; technical background; educational background
Pedagogical emphasis	Group-based learning; active learning; project work; problem solving; flexibility in learning; other
Fit of initiative with existing institutional practices	Fit; no fit; partial fit
Quality of hardware/network	Quality hardware and network; deficiencies
Sources of technology product	Build the product oneself; acquire the product from other; build some, acquire some
Embedding of technology use in institutional practices	Embedding of use; no embedding of use; not yet but expected embedding of use
Relationship with structural support group (as opposed to special project team)	Structural support available; no structural support available

The primary argument is that they have the potential to influence success of the implementation process. However, to focus on management as the most critical factor may result in several setbacks during implementation process, because the process involves a series of complex relationships, which must be managed. Factors that affect implementation include; implementation agents (people identified with the responsibility of e-learning implementation); technical support staff; institutional politics; and other human and technological factors.

A. *The 4E Model and E-learning Implementation*

Collis and Moonen (2001) investigated implementing innovative technologies and paid close attention to the factors that influence implementation. They designed the 4E Model to explain the likelihood of user adoption. The 4E was described as factors influencing an individual's use of a technology innovation in learning related practice

(Collis & Moonen, 2001; p. 53). A summary of the model, which forms the basis of likelihood of successful implementation, is shown in Table 2.4.

Table 2.4

The 4E Factors Influencing Use of Innovative Technology (adapted and modified from Collis and Moonen, 2001, p. 53)

Factors Influencing e-learning Implementation	Key sub-factors and indicators
Environment:	Organisational context
The institution's profile with respect to technology use	<p>The vision, support and actual level of use within the institution for technology use for learning-related purposes</p> <p>The readiness to change among the people in the institution when it comes to the use of technology in education</p> <p>Institutional policy and strategy for innovative technology adoption</p> <p>Governmental factors</p> <p>National policy on ICT in Higher Education</p> <p>Provision of physical infrastructure</p>
Educational effectiveness:	Long-term pay-off
Gain from the technology use	<p>Likelihood of long-term tangible benefits for the institution and/or individual</p> <p>Short-term pay-off</p> <p>Pay-off such as efficiency gains, doing routine tasks associated with learning more quickly</p> <p>Learning effectiveness</p> <p>New forms of valuable learning experiences, improved communication, improved capacity to individualise aspects of the learning experience, valuable support to the existing curriculum</p>
Ease of use:	Hardware/Network
Ease or difficulty in making use of technology	<p>The network is convenient to access, adequate in terms of speed and bandwidth and reliable. Computer and printer access is convenient</p> <p>Software</p> <p>Software associated with the technology is user-friendly</p>
Engagement:	Self-confidence
Personal engagement about technology use for learning related purpose	<p>Personal orientation towards trying out new ways to carry out learning-related tasks, being interested in new technological development and sharing these interests with others</p> <p>Pleasure with the World Wide Web (www)</p> <p>Particular interest in new technologies, currently the Internet and wireless applications</p>

B. Relationship of the 4E variables and the implementation process

Fisser (2006) showed that the 4E Model can be used to understand the initiators of an innovative technology and their relationship with the implementation process. In the view of Collis and Moonen (2001, p. 52), the model identified factors that most influence the likelihood of an individual making use of e-learning, with each of the variables having sub-factors. In their 4E Model, Collis & Moonen (2001) hypothesised that the likelihood of an individual using a network-related application in his or her teaching and learning (assuming a voluntary choice is involved) can be expressed in terms of four main features (perceived) *educational effectiveness*, and *ease of use*, (personal) *engagement* and (institution) *environmental* factors. These ideas from the model relate to Rogers' (2003) innovation adoption decision process described in Section 2.2.3. The *educational effectiveness*, *ease of use* and *engagement* are expressed as vectors, which Collis and Moonen (2001) interpreted as the user likelihood vector and the *environmental* variable as the vector that determines the height of the likelihood to use threshold (see Figure 2.1). Movement of the vector variables places the model in a perspective that can be aligned to explain successful implementation of e-learning. The *environmental* factor in the model is the key determinant of the level of success threshold. Collis and Moonen (2001) explained that a stronger environmental climate pushes the threshold lower so that the vector sum to the other three vectors does not have to be as high as when the threshold is associated with a weaker environmental vector (p. 25). Figure 2.1 (1) illustrates an individual with a weak level of *engagement*, a moderately positive *educational effectiveness* and *ease of use*.

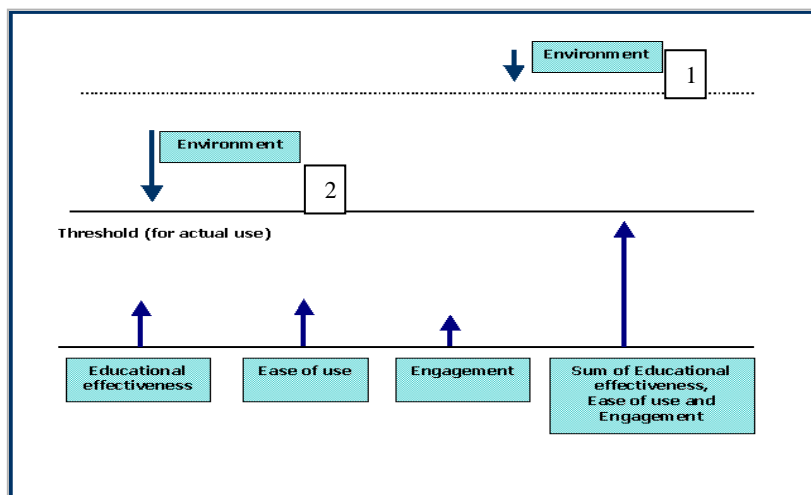


Figure 2.1 The 4-E Model: Adopted and modified from Collis and Moonen (2001, p. 25)

Figure 2.1 suggests that when the individual vector sum of *educational effectiveness*, *ease of use* and *engagement* are high enough within the conditions of the *environment* marked 2, the individual is likely to make use of the innovation. However, in *environmental* condition 1, the push from the environmental vector is too weak and thus the threshold is too far away; the individual lecturer is not likely to make use of the innovation.

In relating the 4E Model to the initiation phase, Fisser's (2006) work confirmed that the process may be top-down or bottom-up. The main factors at the initiation phase relate to the vectors of *environment* and *educational effectiveness*. The *environment*, which is related to institutional factors, focuses on key variables including: vision for the technology; actual level of technology usage; readiness to change; funding and incentives; and past experiences with innovative technology. However, the variables in developing routines span beyond those described by Collis and Moonen (2001). For example, governments and social factors have a direct effect on higher education, therefore, governmental agencies and provisions may be added to the profile. In addition, critical variables that should be included in *educational effectiveness* are: the assurances that the innovation will solve personally relevant educational problems; provide new forms of learning experience; and provide support for existing curriculum.

In relating the 4E Model to the implementation phase, Fisser (2006) confirmed Collis and Moonen's (2001) assertion that implementation begins when the innovative technology process is initiated. Collis and Moonen (2001) related the implementation process to *ease of use*: This factor includes: ensuring that lecturers have up-to-date computers and good network connection; arranging for subsidised cost for network connection for lecturers and students; and that the software will not require specialised training, or specialised client application to use. The *engagement* factor relates to building user confidence that their first experience of working with the new technology fits with previous experience and beliefs, and begins with successful experiences.

The 4E Model is relevant to this research because e-learning adoption and diffusion in higher education has become a complex exercise. It can be argued that even institutions that have reported successful e-learning implementation are saddled with the task of up-scaling their use of technology resources in teaching and learning. Such institutions have continued to research in order to optimise results. Therefore, it is gratifying to note that using the models helps to visualise the relationship among the components and variables that can promote sustainable implementation.

C. Components of the 4-E Model

Collis and Moonen (2001, p. 13) stated that the first step towards implementation is to develop consensus within the institution as to what the institution accepts and means by e-learning. The relevant factors for consensus are the stakeholder inputs, and the understanding that to make e-learning operational it must be expressed in terms that can be turned into manageable options. The extent to which the various components within the model are pulled together determines the actual operations. Although individual factors are emphasised in the component parts, pedagogy and implementation strategy are discussed in broad terms to identify primary stakeholders' perspectives in this thesis. The components technology, pedagogy, implementation and institution are discussed in the following section.

1) **Technology:** Successful e-learning requires various categories of physical (hardware) and technical (software) infrastructure components that can typically be used to support teaching and learning. However, the computers and networks can do nothing without software tools and applications, which must be able to support teaching, learning and research work (Collis & Moonen, 2001, p. 18). Acceptance of a specific resource depends on how easily the users find its use, how it influences their education and their preparedness to engage in using it.

2) **Pedagogy:** Pedagogical descriptions focus on the approaches that lecturers adopt to organise and implement courses they teach to engage students learning. For the purpose of this thesis, pedagogy is referred to as the teaching and learning approaches adopted by lecturers to stimulate student learning to construct knowledge, and to build skill and competence in their chosen programme of study. Collis and Moonen (2001, p. 20) cited categories of activities that can be identified to meet teaching goals. The set of categories cited include; general course organisation, lecture contact sessions, self-study assignments, major assignments, testing and mentoring communication. Within this context, both lecturers and students are influenced by *educational effectiveness, ease of use, engagement* and the *environment*.

3) **Implementation:** Fisser (2006) presented a strong case that supported Collis and Moonen's (2001) assertion for the need of an effective manager and implementation strategic plan, with incentives as a means of motivating lecturers to get involved. Incentives are necessary because few lecturers were self-motivated to choose to use innovative technologies and pedagogies for learning.

The 4E Model (Figure 2.1) indicates that there is a greater likelihood of use if the threshold of the *environment* (actual use) comes down closer to the sum of the *educational effectiveness*, *ease of use* and *engagement*. On the other hand, the likelihood to use the innovative technology decreases when the gap between the *environment* and sum of the *effectiveness*, *ease of use* and *engagement* is far apart. Aligning the 4E Model to this research, the focus will be to examine how emerging factors can be used to determine the success or otherwise of e-learning implementation in the UG. The 4E Model can also be used to guide the development of an appropriate e-learning implementation strategy.

4) ***Institutional***: Institutional support for teaching and learning differs, and is described by Collis and Moonen (2001, p. 26) to include firstly, direct support during the course itself, in terms of persons available to assist in some of the course-execution tasks, or support during the preparation of the course. Secondly, support offered more generally in terms of helping lecturers gain new skills and insights relating to their pedagogical practices. Thirdly, support related to library services and technological infrastructure available to the instructor for use in the teaching process. These levels of support are also relevant for students and technical staff. In particular, support is required for technical staff to train and build skills and competencies to enable them to support the implementation process. The focus of this research will consider support from a holistic perspective, involving primary stakeholders (lecturers, students and technical staff). Fisser (2006) confirmed Collis and Moonen's (2001) position that institutional aspects relevant for effective integration of innovative technology include: the professional and social climate of the institution; the management style of its leadership, and the institution's previous experiences with technology related change. Other cited aspects that influence efforts towards successful e-learning include the vision of leadership and of key persons with influence in the institution. In this thesis, the institutional factors will be examined to see how they influence e-learning implementation.

2.3 Contemporary Approaches to E-Learning

Implementation

This section describes e-learning implementation strategies that are underpinned in the theories and models described in section 2.2. It is observed that there is no widely accepted e-learning implementation strategy. Models described in the literature are generally based on a classroom course-based implementation processes that researchers

have experienced. The strategies are normally context-based. It can be argued that institution-wide implementation processes have complexities of institutional dynamics, and others go beyond course-based implementation processes. However, lessons can be learned from context-specific experiences to avoid re-inventing the wheel through processes that were found to be workable.

Section 2.3.1 discusses strategy implementation principles generally accepted in an institution's adoption of innovations and widely embedded in innovation theories. Section 2.3.2 outlines how various researchers used the theories and models in implementation strategies, and highlights key variables. These variables are described in Section 2.3.3 and categorised into key component dimensional domains for e-learning implementation.

2.3.1 Strategy implementation principles

Teaching and learning approaches adopted by lecturers and students differ in many ways. Hence, adopting an appropriate approach that suits both lecturers and students will require an effective combination of available resources and communication. Rosenberg (2001) opined that gaining institutional acceptance can be done through access to well-designed information, by using new performance enhancing tools, and through experiences and from each other (p. 31). This opinion confirms Rogers' theory on diffusion through communication as discussed in Section 2.1.

However, with complex interactions between e-learning and the institution's and people's attitudes, a more strategic approach is necessary to ensure that e-learning has the best possible chance to succeed (Rosenberg, 2001). According to Rosenberg (2001, p. 32) a true strategy certainly addresses issues of technology and learning effectiveness, but it also addresses issues of culture, leadership, justification issues, talent and change. Hence, having a strategy as a measure of the intended institutional goal helps the initiators to know if the e-learning initiative has the potential for success. A comprehensive and well-defined e-learning strategy also helps all stakeholders to know where the institution is headed (Rosenberg, 2001).

Implementation Process

Pearce and Robinson (2009) argued that the successful implementation of a chosen strategy must be one that translates the strategy into a carefully implemented plan. Although their work referred to corporate organisations, the principles may also be applied to higher education.

To translate strategy into careful operational daily activities for faculty members implies that the chosen strategy and university policy must become one. The strategy must reflect the university's values and how teaching and learning are organised. Management of the university must direct and control actions and outcomes, and monitor how the various units within the university would adjust to the change. Pearce and Robinson (2009) categorised the institution's action for successful implementation into four interrelated steps. Firstly, the creation of clear short-term objectives and action plans. Secondly, the development of specific functional tactics that creates a competitive advantage. Thirdly, the empowerment of operating personnel through policies to guide decisions made. Fourthly, the implementation of effective reward systems to motivate users.

Pearce and Robinson (2009) further explained that short-term objectives and action plans guide implementation by converting long-term objectives into short-term actions and targets, while functional tactics translate the university's strategies into activities that build advantage. The policies empower operating personnel by defining guidelines for making decisions, while the reward systems encourage effective results. These views are aligned with the position of Dess, Lumpkins and Eisnes' (2009) on what institutions must do to ensure successful implementation.

Dess et al. (2009) also argued that the managerial task of implementing a chosen strategy entails assessing what it will take to develop needed organisational capabilities to reach the targeted objectives on schedule. Thus, management must indicate what should be done to put the strategy in place, carry it out proficiently and produce good results. Dess et al. (2009) indicated that the strategy implementation process consists of four interrelated managerial tasks. First, it requires forming a strategic vision of where the institution is heading. This vision would help faculties provide long-term direction and explain what kind of target students and approach by which the university wishes to reach them. Therefore, the university could infuse into faculties and departments a sense of purposeful action on e-learning. Thus, implementation strategy models must have a clear vision and be based on sound policies (Dess et al., 2009; Pearce & Robinson, 2009).

The second management task requires setting clear and smart objectives to convert the strategic vision (of the university on teaching and learning approaches) into functional activities within specific action plans. This is also consistent with Pearce and Robinson's (2009) first and second activities for successful strategy implementation.

Thus, an implementation process must be pinned on clear and smart objectives. In the third task, there must be a crafted strategy for implementing the teaching and learning approaches to meet the increasing demands on both lecturers and learners. That is, it must clearly identify the mode of teaching and learning approaches (face-to-face, blended learning, online-learning). The fourth managerial task requires implementing the strategy effectively and efficiently. According to Pearce and Robinson (2009), this is the critical stage where various tasks and activities are set out to work. It is observed that Pearce and Robinson's (2009) approach provides a clear guide to an implementation process, which suits the purpose of this research. It requires an action plan, which must first identify clearly specified functional tactics and required activities for weeks, months, quarterly or yearly. Second, the action plan must have a clear time-frame for completion of activities, and third, management must identify, who should be responsible for each action in the plan. This accountability is important to ensure that actions plans are well executed. The objectives must be stated in the following way: specific; acceptable by all; realistic; reliable; measurable; and time-bound.

In summary, the process for successful e-learning implementation must show how the interrelated activities described by Pearce and Robinson (2009), and Dess et al. (2009) clearly guide the implementation process. Collis and Moonen (2001, p. 46) recommended that a technology innovation in an educational institution should include a bottom-up approach. Decision makers may build on the bottom-up approach by choosing an institutional direction, and making the choice clear and operational, based on educational principles. Critical factors for success include; having a strategic plan indicating how the institution is moving from the current situation; assembling an implementation team and leader; determining an appropriate technology and methodology of implementation; and having an ongoing evaluation process to institutionalise the innovation. Collis and Moonen (2001, p. 49) indicated that the institution's implementation strategy must also include elements such as pedagogical goals, infrastructure requirements, evaluation, dissemination and debate, quality factors, expertise for development and production distribution, and funding and resource planning. These recommendations are aligned with Pearce and Robinson (2009) and Dess et al. (2009) arguments regarding the strategic process for successful implementation. This confirms the focus of this thesis by showing that the strategic process can be aligned with e-learning in higher education like the UG.

To integrate innovative technology, such as e-learning in higher education, primary users firstly, have to be aware of the innovative technology and the benefits it offers to support them. They then need to gather sufficient information to make an informed decision, trial the technology, compare it with their activities and finally confirm their decision. Management knowledge about these theories and models can better inform the coordination of strategic approaches that will make e-learning successful.

2.3.2 Relating strategies to theories and models of implementation

In the following section, various arguments for e-learning implementation are categorised into proponents of adoption and diffusion of e-learning (A), initiator perspectives of e-learning (B) and strategic dimensional factors (C).

A. *Proponents of Adoption and Diffusion of e-learning*

The identification of components, theories and models that influence the success or failure of an innovative process has been described by researchers as critical success factors (CSFs). These CSFs were examined and elements considered workable were identified as critical for the diffusion of innovation processes.

Different researchers have used models discussed in Section 2.1 to explain effective innovative approaches that have been used for implementation in context-specific environments. They have also been used to describe user adoption and institutional approaches to up-scaling e-learning throughout a university. Others have combined the models to examine how lecturers and students adopt e-learning (Keller, 2006; 2007). Some of the approaches are examined in this thesis to be used as a basis for identifying variables that can be used in designing a conceptual framework.

Proponents of the innovation adoption and diffusion approach examined and explained individual factors that influence successful implementation of e-learning (Ensminger et al., 2004; Hardaker & Singh, 2011; Nichols, 2008). Ensminger et al. (2004) focused on determining the underlying relationships between Ely's (1999) eight conditions that facilitate implementation. The conditions (dissatisfaction with status quo, adequate time, resources, knowledge and skill, reward and incentives, participation, commitment and leadership) are based on the Diffusion of Innovation Adoption Model, and provide more insight into individual factors. However, the discussion did not extend to how the factors directly relate to strategic vision, clear objectives, functional activities and institutional policies. Although Ensminger et al. (2004, p. 68) showed that there is an

underlying relationship between these eight conditions, and recommended the application of change theories, models and strategies, as well as knowledge about the factors that facilitate implementation, they failed to provide strategies for an implementation process.

In a paper that examined the diffusion of institutional e-learning in various parts of the world, Nichols (2008) built on Rogers' (2003) Diffusion of Innovation Adoption Model to examine practical approaches to e-learning diffusion. Nichols (2008) found that the institutional context (internal culture, institutional structure and systems) was very important for successful e-learning implementation. He revealed that clear emphasis was on the power structure within the institutions, as there were institutions that never followed any plan or strategic approaches to e-learning (p. 601). In some of the institutions, the infrastructure was fractured along faculty and departmental lines, which is a common characteristic in most universities in Ghana. The findings also showed that two institutions, using the same diffusion strategies, got two entirely different results because of the commitment, or otherwise, of management (Nichols, 2008).

Stakeholders from some of the institutions indicated the need for a clear vision and strategy for e-learning to provide visionary direction (Nichols, 2008, p. 601). Other findings emphasised the need for policies, citing e-learning policy as a catalyst for facilitating successful implementation in some of the institutions. According to Nichols (2008) the important factors that accounted for the success of diffusion for all sustainable e-learning in the institutions included; the centre of power; strategic ownership and acceptance of e-learning; institutional readiness; alignment of policy and system with e-learning activity; professional development; and the dynamics of change in large, medium and small participants in the institutions (p. 603). Nichols (2008) showed that, e-learning implementation strategies can be aligned with the Diffusion of Innovation Adoption Theory by embedding the variables in strategy implementation processes as described by Pearce and Robinson (2009) and Dess et al. (2009). Sustainability of the institutional adoption of e-learning was seen to be dependent on consistent commitment, continuous investment and adaptation of new possibilities. The focus in this research is to examine how the critical variables of the implementation process can be used to achieve sustainable e-learning within the context of the UG.

Hardaker and Singh (2011) combined two theoretical approaches (Giddens's Theory of Saturation, and Diffusion of Innovation Adoption Model) for a comparative case study of five universities. Their findings revealed that the institutional structure (strategies,

training, access to technology, technical support, and time resources) and level of adoption were critical for successful e-learning implementation (p. 230). Although their work did not highlight how the variables of the theories directly related to the implementation process, it showed the significance of having clear policies and strategic plans for successfully implementing e-learning (Hardaker & Singh, 2011).

The Diffusion of Innovation Adoption Model has been shown to be useful for implementing successful e-learning, when combined with factors other than just the factors related to people. The Diffusion of Innovation Adoption theories and models were based on the fact that the intentions to use and the actual use of computers for teaching and learning are different, and are influenced by attitude, skill and motivation. Such attitudes are informed by the diverse background of the users' computer skills, beliefs and interests, resulting in different perceptions towards e-learning and its effectiveness (Mital, 2010; Sanchez, Bauer, & Paronto, 2006). Thomas, Compeau, and Higgins (2006) argued that the professional development and expectations of users informs their attitudes, in either initiating, adopting or exploring the use of the technologies.

Using the theories and models to explain how diffusion of technology innovation can occur, empirical studies have shown that the initiation of innovation may originate from management or individuals within the institution. These initiatives are described here as the *Initiator approach*. Key variables that emerged from discussions of the Diffusion of Innovation Adoption Models include the institutional context and structure, emphasised by Nichols (2008) and Hardaker and Singh (2011). Individual (factors relating to people) factors examined by Ensminger et al (2004) identified variables that can guide an e-learning implementation strategy: they include; level of satisfaction, time, knowledge and skill, and participation. From the institutional perspective, issues of resource allocation, reward and incentives, and commitment and leadership, can be highlighted under the management role for successful implementation.

B. Proponents of Initiator Approach

There are several *Initiator Approaches* considered workable in ensuring successful e-learning implementation in higher education. For example, Ensminger et al. (2004, p. 61) indicated that the top-down approach is recommended for implementing technology innovation in education. Management provides the plan, leads in the implementation process by providing all the needed resources and support, and constantly evaluates the

entire process to ensure that it is accepted and works well. This approach is considered relevant for scaling-up implementation projects in an institution (Hardaker & Singh, 2011). Hardaker and Singh (2011) referred to the top-down as a macro-level approach and affirmed that the process is concerned with systematic change that transforms the entire institution through organisational and structural change (Hardaker & Singh, 2011). However, some research findings have also shown that there are complexities with up-scaling e-learning in higher education when using the top-down approach initiated by management.

Hardaker and Singh (2011, p. 229) also found that the macro-level approach was not always workable, as it faced resistance in some institutions largely because stakeholder concerns were not captured. This shows the need to relate management initiatives to a strategic process that considers the perspectives of primary users because, as noted by Salmon (2005) and Hardaker and Singh (2011), the individuals and departments in the universities have their own desires, abilities and other factors that influence their decision to adopt the innovation. Hardaker and Singh (2011, p. 223) agreed with Birch and Burnett (2009) and Eyon (2005) that a “shift in innovation research from solely macro and micro-level perspectives towards a more interactive view, which emphasises the interactions and interconnections between individual actions and structural influence” will enhance effective implementation. Some research has shown that the bottom-up or micro-level strategic approach has resulted in successful innovative technology integration in higher education (B. Collis & Moonen, 2001; Curran, 2004; Hardaker & Singh, 2011). This further confirms the position that initiation for successful e-learning implementation may be top-down, bottom-up or a combination of the two approaches. This therefore, provides a perspective for this research to focus on how a combination of management initiatives and individual initiative actions may influence the acceptance and diffusion of e-learning in the UG.

In relating the initiation process to component parts of an implementation process involving pedagogy, technology, culture, organisation and methodology, Collis and Moonen (2001, p. 140) found those individuals who use the innovation to have high personal engagement levels. Such persons are convinced of the value of new technology innovative learning activities, while those not engaged in use of the technology have low or negative values for personal engagement, learning effectiveness and ease of use. A description of Collis and Moonen’s (2001) model, from start of

initiation to institutionalisation, describing the key components of implementation (p. 147) is summarised in Table 2.5.

Table 2.5

Implementation Model summarised from Collis and Moonen (2001, p. 147-148)

Components	Method and activities	Initiator	Responsible Stakeholder
Pedagogy	Educational philosophy fit with educational practices	Bottom-up	Faculty and department
Technology	Quality hardware, network, software, key features to initiate, and embedding of use.	Top-down and bottom-up	Management and users
Culture	Innovative culture, key features to initiate, purchase of hardware, software, embedding to use	Top-down and bottom-up	Management, faculty and students
Organisation	Initiative culture, budget, initiation target, project team, structural support group, embedding of use.	Top-down and bottom-up	Management and users
Methodology	Project team, structural support group	Top-down and bottom-up	Management and users

Table 2.5 shows that at each component level, except for pedagogy, the management role is essential for successful implementation, although the roles of lecturers and students are also important. The Researcher's observation from the arguments on the role of the initiators suggests that the implementation approach was well described and documented. However, structures of implementation that emerge from the bottom-up or top-down interventions expose the entire process to challenges of rejection. Although emphases on CSFs, as described in Section 2.3.2, were not clearly visible in any strategy implementation process, the Initiator Approach provides a perspective for this thesis to examine how initiatives affect the component parts for successful implementation.

The Researcher opines that variations in the success of the various models and approaches confirm the dynamic and subjective nature of the strategic approach based in the environmental context and culture of the institutions. It can therefore be concluded that, effective and sustainable e-learning implementation, by any approach, is largely dependent on institutional policy and strategy, as it causes structural changes within the institutions (Cook, Holley, & Andrew, 2007; de-Freita & Oliver, 2005). Hence, successful e-learning implementation must therefore be supported by a management policy decision (Attwell, 2004; Rosenberg, 2001), either initiated by enthusiastic users or a combination of top-management and users of the system. The

focus of this research will be to examine policy and strategy factors of e-learning for the UG. A critical variable in the Initiator Approach considered in this thesis underscores a combined mode strategy (top-down and bottom-up), which examines the concerns of stakeholders in policy and strategic plan formulation.

C. Proponents of Strategic Dimensional Factors

In addition to human factors and initiating factors it is worth examining arguments that focus on strategic dimensional factors (B. Collis & Moonen, 2001; Khan, 2005). Khan (2005) proposed eight dimensional factors, which include the institution, management, technology, pedagogy, ethical, interface design, resource support and evaluation. Khan's (2005) model demonstrated that although e-learning projects are unique the necessary factors that support successful implementation depend on the goals and scope of the project. The goals must fit into the various dimensions with a carefully planned strategy to achieve the objectives. Other experiences have shown strong evidence for the development of a comprehensive strategic plan for e-learning initiatives, which must be supported by funding and resources for delivery and monitoring of e-learning (B. Collis & Moonen, 2001; Hardaker & Singh, 2011; Lin et al., 2011; Rosenberg, 2001).

Significant factors identified at the initiating stage include needs and readiness assessment and change management options, which enable the institution to decide who participates in the adoption process (Khan, 2005, pp. 23-25). Analysing the context enables the university to compare the operational situation with the desired institutional system in order to establish the gap. The SWOT analysis must be the basis upon which recommendations and action plans are drawn. The entire process must take into account the complex dynamics between pedagogy and management. Support for pedagogy is critical, while within the dimensions the activities and their roles must be clearly defined (Fisser, 2006). Within the technology dimension, physical and technical infrastructures were directly related to management, design and resources support. Khan (2005) argued that various stages of the e-learning implementation can be managed through planning, designing, production, evaluation, delivery and maintenance, as proposed by the ADDIE Model. The management focus on the technical infrastructure was on creating e-learning materials and making them available to users, storing and maintaining content, and identifying the technical resources needed for content creation and development (Khan, 2005, p. 104).

Khan (2005, p. 110) stated that the critical factors that management should be concerned with at the initiation stage should cover budgeting, staff, technology requirements, timeline and deliverables of the technology. The designing, planning, building, maintaining of staff and technical infrastructure are based on institutional technological capabilities to deliver and manage e-learning (Collis & Moonen, 2001). Various scholars argued that the essential requirements for a successful e-learning implementation process include; efficient and reliable network; competent technical staff; standard guidelines for creating and sharing learning content; and policies employed for technical infrastructure (B. Collis & Moonen, 2001; Khan, 2005; Rosenberg, 2001).

In summary, the dimensional factors must blend during planning, designing, evaluation and implementation of e-learning modules or programmes. This Researcher argues, based on Khan's (2005) model, that for higher education the institution is represented by management, while the system implementation is related to system design, resource support and evaluation. Pedagogical factors were directly related to the activities and efforts of lecturers.

2.3.3 Institutional experiences

In his evaluation and institutional approach to virtual learning Deepwell (2007) identified individual technology champions, as well as ways in which they were supported with continuous professional development and management support and commitment. In addition, formative evaluation carried out at various stages of implementation and at faculty and departmental levels, assisted management to craft policies that supported the implementation process. Deepwell (2007) also showed that management policy decisions regarding integrating online learning were supported by specific programmes that were measurable, achievable and with time-bound goals. This included an educational development unit that was given the responsibility of implementation and integration of the process and was headed by a Pro-Vice-Chancellor, to ensure that all barriers to successful implementation were removed. Deepwell (2007) described six phases of strategic activities that led to successful e-learning implementation in the case of Coventry University. The phases include: first, awareness creation (sharing the vision); second, management commitment and support (top-management involvement at every stage of the process – technical, user support and training); third, engagement process (engaging key stakeholders in the use of the

system); fourth, faculty and technical support (faculty presence of system experts and administrators who are reliable and approachable with enquiring and assertive skills); fifth, building on existing practice (maintaining good practice of training, making key stakeholders in charge of the system); and sixth, flexibility of process change (prepared to embrace change and upgrade existing system when necessary). Some critical factors from the findings are that there was funding available, as well as management commitment and support, something that is not commonly available in ICT-challenged environments such as Ghana. However, the strategic approach appears to be suitable for the case of Ghana where funding of public universities and faculty is dependent on government and central administration (management), and the culture of respecting leadership directives is upheld.

Surry (2002) also proposed a model that included resources, infrastructure, people, policies, learning, evaluation and support as major factors for successful technology integration in teaching and learning. The best practice factors are evaluative, and include needs assessment, aimed at bringing out the needs of the institution that justify e-learning (Alfred, 2008; Stiles, 2004), and continuous staff development and motivation to engage faculty (Deepwell, 2007; Goolink, 2006; Oliver & Dempster, 2002). The strategic factors include the environment (Goolink, 2006), students (Sharpe et al., 2006), management (Deepwell, 2007) and policy (Awidi, 2008; Umwim, 2008; Waterhouse & Rogers, 2004).

Exploring Institutional Implementation Strategies and Plans

In reviewing online documentary reports on e-learning implementation strategies/plans of six universities, it was observed that management factors, training and technology infrastructure greatly influenced emphasis and direction of the strategies.

A common observation was that initiatives for e-learning originated from the faculties and departments with a commitment to use it as a tool to improve teaching and learning (Evans, 2009; Metros, 2003; Sheehy et al., 2006). Evans (2009, p. 2) however, indicated that within some contexts, although the implementation started at the micro-level, it was neither robust enough nor organised effectively to meet the institutions' vision and objectives. Proposals commonly included the setting up of a taskforce to lead the implementation process, which was led by senior management in the university (Deepwell, 2007; Deepwell & Beaty, 2005; Evans, 2009). Some of the implementation

teams developed e-learning strategies from which functional activities rolled out (ELAG, 2011; ELSG, 2011; Sbalele-Mayisela, 2009).

A common feature of the strategic plans was that the universities had provided a clear vision and an objective statement of what e-learning meant, and how they intended to use e-learning to achieve the goals and objectives of the institution. For instance, the e-learning vision statement of two universities that mirrored each other (Ohio State University (OSU) and University of Zululand (UniZulu)) indicated that the use of e-learning was to facilitate the creation and dissemination of knowledge, and the innovative use of technology was for teaching, learning, research and outreach (Evans, 2009; Metros, 2003).

The implementation strategies were categorised in phases, with some clearly showing how the models aimed for implementation (Sbalele-Mayisela, 2009). Other implementation strategies did not show any model or underlying philosophy upon which implementations were based. A common component of the phases included institutional analysis to compare current operational activities with desired objectives. Also, the implementation process showed goals, expected outcomes, objectives, responsibilities, tasks, benchmarks, evaluation and factors of quality control. For instance, as part of the strategy implementation process at the UniZulu and OSU, centrally administered human and financial resources associated with e-learning were incorporated into a single organisational unit and the leadership of the unit was charged with adopting the e-learning implementation strategy (Evans, 2009; Metros, 2003). At the implementation phase, five critical factors were identified that served as a foundation for the e-learning strategy. The five factors are:

1. Developing a cohesive vision and services across faculties and departments to support e-learning
2. Funding investment to support the implementation of e-learning
3. Policies and procedures to offer e-learning
4. Student access to e-learning resources and support
5. Technology infrastructure to support mission critical e-learning programmes

The e-learning implementation strategy and plan include a governance plan for UniZulu and OSU that addressed factors of the threats, risks and mitigating actions, and a reward plan for improving learning and access to knowledge. Financial implications for the implementation process were further outlined in terms of revenue and projected costs. It was observed that primary activities forming the process of implementation

comprised firstly, planning (integration of e-learning into programmes and modules) which aligns with the first stage of the ADDIE, Rogers' and Collis and Moonen's models of needs assessment (analysis) shown in Section 2.1. The primary activities comprised, secondly, instructional design and development of learning objects, thirdly, quality assessment (quality of user satisfaction) and fourthly, users' support (students and lecturers) (Evans, 2009). According to Evans (2009, p. 3), in the case of UniZulu, many of the tasks listed in the implementation plan did not need funding, but rather required the commitment of knowledge, time and energy of dedicated lecturing and ICT staff. The timeline for successful implementation was estimated at 3-5 years, which was consistent with Rogers' (2003) and Collis and Moonen's (2001) assertion that successful innovation does not happen at once, but may take several years. The implementation plan included an evaluation plan that was reviewed annually to reflect the progress and transition of new roles and responsibilities of coordinated cohesive e-learning efforts.

Institutions with e-learning strategies and implementation plans, showed clear distinctions between the strategy and implementation plan. Common factors included in the strategies were; short, medium and long-term priorities; policies, aims and objectives; and dedicated units responsible for the implementation. The generic implementation plans were an articulation of the strategies, which could be used by faculties and schools within the university. For example, the University of Loughborough, through its e-learning advisor group (ELAG), structured their implementation plan into eight broad themes of development (ELAG, 2011). According to the ELAG (2011), the first half of the plan described a series of actions classified as essentials, highly desirable and desirable, with various schools crafting e-learning plans and policies that were embedded in the university's main strategic plan, policy, and objectives. The themes were: curriculum design and delivery; policy; continuing professional development; e-learning support; student perspective; technical infrastructure; international piracy regulations; and funding. Each theme stated clear required actions, and specified the persons responsible for the required actions. Unlike the UniZulu and OSU which had timelines (Evans, 2009; Metros, 2003), it was not clear if timelines were set for the implementation, although medium and long-term goals were mentioned (ELAG, 2011). Priorities identified as significant and that aligned with the Diffusion of Innovation Adoption Model (Rogers, 2003) and CBAM (Hall & Hord,

1987) were the knowledge and awareness creation among all stakeholders, and ensuring that the learning technology meets the needs of users.

In other universities, although the frameworks showed headings of goals, action, timeline and responsibilities, the stated strategies sounded more like institutional objective strategies. For instance, the University of Ballarat, UB TAFE e-learning plan 2006-2010 included: six goals; our graduates; our encouragement; our students; our outstanding staff; and our work (Goodbourn, 2006). Each of the goals had what was described as 'broad strategies'. For example, the broad strategies for 'our graduates' were stated as, "provide learning that is current and relevant to the world of work", and "encourage student engagement within the UB community and beyond". 'Our students' included six broad strategy statements, while 'our outstanding staff' goals had five broad strategies. Unlike the UniZulu, OSU and University of Loughborough, whose documents indicated clearly how their themes and objectives were going to be achieved, it was not clear from the document and framework how the UB was going to achieve the 'broad strategies' described in the document.

In a framework approach that appears similar to the approach adopted by the UB but different in content, the University of Kent e-learning strategy implementation plan stated clearly the strategic aim and key areas for focus within a time frame (2011-12). An e-learning strategic group (ELSG) was given the responsibility of implementing the strategic plan. With a strategic aim of using ICT resources effectively, creatively and confidently to enhance students' learning experience, five focus areas were outlined (ELSG, 2011). Firstly, to use online resources to provide curriculum development workshops, consultation with faculty, costing and planning. Secondly, to provide a series of linked workshops and individual development work with academic staff. Thirdly, to use the quality of the learning platform to impact students' learning experiences. Fourthly, to provide support services and fifthly, to provide continuous professional development on the e-learning platform. The focus of the approach at the University of Kent (ELSG, 2011) was to use the resources to meet the institutional goals, as set out in the framework, which had clear strategic, and implementation objectives. Although the University of Kent had a structure to monitor progress and future actions, it was not clear if they had structured the process to be time bound, which provides direction on what to be achieved within a time frame. Their strategic objectives included:

1. Developing and strengthening capacity for provision of e-learning and related support

2. Support institutional strategies in learning and teaching and inform e-learning development in schools
3. Promote creativity and innovation in learning and teaching
4. Support and promote use of technology assessment
5. Support flexible delivery
6. Provide students with support
7. Support monitoring, evaluation and quality assurance
8. Engage in research: learning technologies and/or their application in learning and teaching

An element of the University of Kent's implementation plan, which is unique compared to plans of other universities that were reviewed, is the use of a pedagogical innovation framework which had four quadrants. This is supported by Salmon's (2002a, 2002b) e-learning and pedagogical innovation framework. In applying Salmon's five phase framework (ELSG, 2011; Salmon, 2002a), ELSG (2011) stated that, "... it engages consideration of technology, pedagogy, objectives (e.g. curriculum development, new modules), mission (e.g. institutional, departmental), and markets, when evaluating current or future e-learning development".

2.4 Experiences of E-learning Failure in Higher Education

Research has shown that, although several universities in Europe and North America initiated e-learning with the aim of providing improved access to higher education at anytime, anywhere, and saving learners' time and cost, they have failed, with some closing their e-learning distance programmes. Several of the universities, who failed to reach their e-learning goals, may be described as some of the most famous, prestigious and most successful universities in the world (Bates, 2005; Keegan et al., 2007). E-learning initiatives described in the case studies were mainly governmental and institutional initiatives, which were not sustainable due to inconsistent policies, political disagreements on direction, and lack of adequate knowledge of the complexities of e-learning, which contributed to sub-optimal decisions (Keegan et al., 2007). The primary factors identified by Keegan et al. (2007) were historical experiences of the institutions with regards to online learning, technical factors, courses offered online, management strategy, and attitude and economy.

The primary reason for the failure of e-learning in most universities was attributed to lack of proper strategy, and in some cases the complete absence of strategy (Bates, 2005; Fee, 2007; Keegan et al., 2007). The failure of the e-learning initiatives can be

traced to the lack of clear understanding of the potential of the technologies to meet the needs learners. For instance, some learning systems were not compatible with the existing technologies, while bandwidths in some institutions were small and slow (Fee, 2007). In addition, access to software and hardware in some institutions was limited, with poor communication and inadequate support from technical staff (Fee, 2007). Furthermore, the processes of designing e-learning courses were, in some cases, cumbersome, expensive and time consuming, coupled with the lack of motivation of lecturers and students to accept and adopt e-learning (Fee, 2007; Keegan et al., 2007). Therefore it is evident that successful implementation depends upon proper management of these factors that have been identified as contributing to the failure of e-learning initiatives.

2.5 Summary

Rogers' (2003) Diffusion of Innovation Adoption Model provided a conceptual paradigm for management and change agents (persons with the responsibility of implementing e-learning) that outline some basic principles of innovative technology acceptance, adoption and diffusion in an institution. The Model is well aligned with Collis and Moonen's (2001) 4E Model that describes the likelihood of adoption.

Collis and Moonen (2001) provided a framework of processes that management and change agents may adapt to achieve successful e-learning implementation. From the arguments presented, it can be concluded that the primary intention of the 4E Model is to illustrate the likelihood of acceptance and adaptation of an innovative technology to support teaching and learning, from initiation through acceptance and adaptation to sustainability. It is based on the argument that, although different orientations and guidelines for predicting and improving e-learning implementation exist, the main concern however, of any institution is the primary users' acceptance and adaptation to meet institutional objectives. Although the contexts for most of the research presented by Collis and Moonen (2001) are different, it can be concluded that the initiation process and its factors are critical factors for successful e-learning implementation. Hence, the important factors worth investigating include: institutional strategic plan, which covers the pedagogical goal; infrastructure requirements; evaluation processes; quality factors; staff development; and funding and resourcing of the planning. Equally important are the approaches of assigning responsibilities to manage the implementation process.

The presence of the factors that enhance successful e-learning implementation were considered motivating factors; however, their presence as motivational factors within a context may not necessarily guarantee successful implementation. The Researcher believes that management commitment and management of the entire process, from initiation through implementation to up-scaling through the whole institution, is critical for successful implementation. Hence, investigating perspectives of all stakeholders may present factors that may span the 12 variables identified by Collis and Moonen (2001).

It is noted that, while Fisser's (2005) argument may be valid, the idea of an integrated team rather than an identified manager has a higher likelihood to achieve success. Hardaker and Singh (2011) described the social system that had the potential to frustrate the implementation process. At the initiation phase of an implementation process, the 4E Model can be used to determine or predict the implementation success. It can be concluded that for effective implementation, it must meet the needs and interests of users. A common indication from Rogers' (2003) Model and the 4E Model (B. Collis & Moonen, 2001) is that the innovation adjudged to be *educationally effective* and *easy to use* will motivate users to accept and engage in use of the technology, and would also encourage others to use it. The 4E Model suggested that once the innovation is proved effective and easy to use by its initial adopters, the threshold of the technology innovation's success would soon be reached. When management is committed to the implementation process and offers requisite facilities, the threshold will be lowered and success will be reached sooner (B. Collis & Moonen, 2001).

The 4E Model asserted the need for institutional management to link their goals and objectives to personal user problems, and for the strategic planning process to provide users with the assurance that the new form of teaching and learning will enhance their work (B. Collis & Moonen, 2001). It may also be concluded that a successful implementation process may involve a five-phase process, which may vary depending on the model being adopted (B. Collis & Moonen, 2001; Fisser, 2006; Rogers, 2003; Salmon, 2002a). The five-phase includes; Initiation, Piloting (acceptance), Implementation (adaptation), Diffusion (up-scaling) and Integration. The 4E Model emphasised the importance of paying attention to implementation, since it takes several years (at least 3 years) for early concerns to be resolved and later ones to emerge.

The contemporary approach to e-learning implementation, as demonstrated above, emphasised policy and strategy factors that involve students, lecturers, technical support

staff, management and infrastructure. The strategy implementation principles indicated that having an e-learning strategy by itself was not sufficient for successful implementation. Instead, it required translation of the strategic process to carefully plan functional activities directed by objectives and empowered through policies and reward systems. Proponents of the Diffusion of Innovation Adoption Model used various models to explain individual or people factors that influence successful e-learning implementation with an emphasis on individual users' behaviour, attitudes, leadership and commitment. However, other researchers focused on factors such as power dynamics in institutions, institutional readiness, policy, and ownership of the innovative system, among others.

Focus on the dimensional factors, as discussed above and summarised in Figure 2.2, revealed that the various components are drawn from both the diffusion of innovation and initiator factors. The dimensional factors also have strategic components of objectives, activities, goals that are time-bound and with persons to be held responsible for functional activities. Such components as institution, pedagogy, technology, technical and primary users all require policies as driving forces to the implementation process. However, the environmental context, culture and ethics are different for ICT-challenged environments, where the lack and inadequacy of funding, sustainable electric power and Internet connectivity are critical.

Figure 2.2 summarises the Researcher's categorisation of some contemporary emphases on components that must be considered in e-learning implementation (see Section 2.2 and 2.3). It was shown from the literature that an implementation process may focus on CSF or human elements; initiator factors; or dimensional factors with emphasis on the components. Each of the three component factors in Figure 2.2 are not independent; instead in all the components various variables are needed for successful e-learning implementation depending on the approach an implementer wishes to adopt. From the 'Initiating Factors' perspective, evidence of e-learning experiences showed that initiatives may be bottom-up, top-down or a combination. However, the dynamics of the initiators' influence within the social system of the implementing environment is an important determinant of success. Institutional experiences of e-learning implementation show that, regardless of the initiative approach, awareness creation, management commitment and support, engaging primary stakeholders, technical support, building on existing practice and flexibility of process change, are essential components of the implementation process. Best practice activities included needs

assessment, continuous professional development and motivation, and policy and planning of the processes. The dimensional factors shown in Figure 2.2 primarily categorise the factors in the CSFs and Initiating factors into components. This research focuses on these dimensional factors.

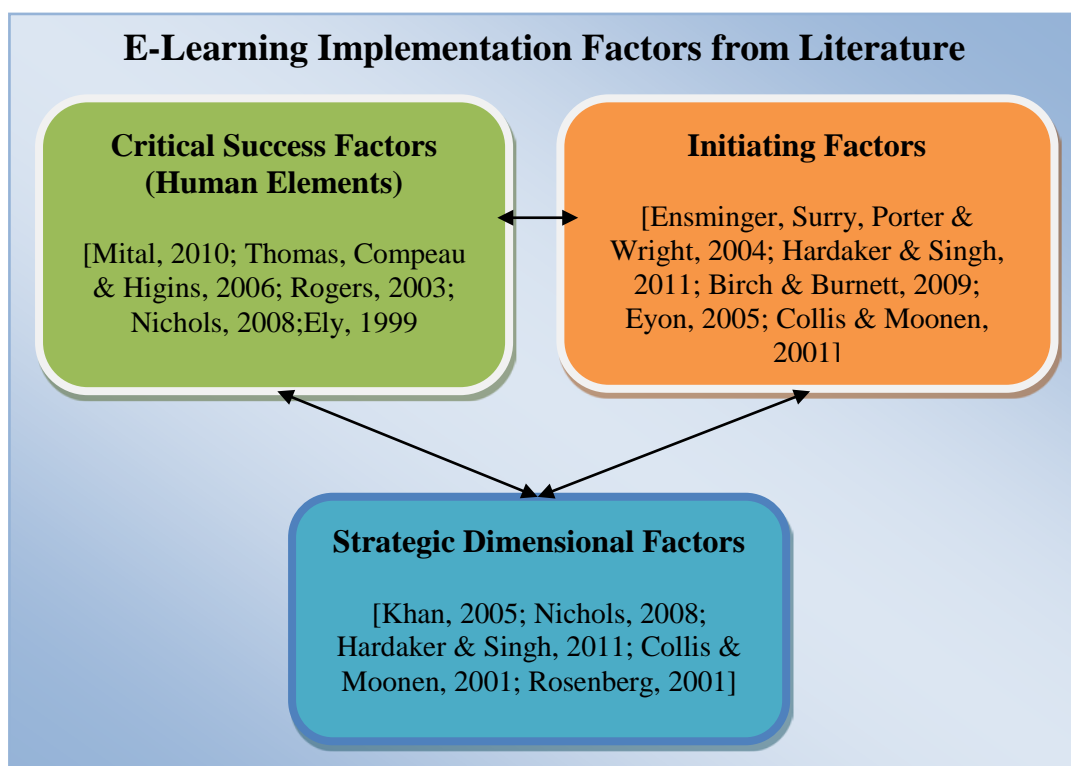


Figure 2.2. Critical components of e-learning implementation from Literature

As shown in Figure 2.2, a combination of the theoretical variables of individual human factors described as CSF, initiating factors and dimensional factors will result in successful e-learning implementation. Figure 2.2 shows that proponents of an e-learning implementation with a focus on human factors are inter-related with those who consider initiating factors and strategic dimensional factors. The initiating factors depend on the human elements and the strategic dimensional factors, which include institutions, technology, pedagogy, governments and users. Therefore, this thesis focuses on the dimensional factors as a basis for investigating e-learning implementation strategies that are workable within the context of the UG. Choice of the strategic dimensional factors is on the basis that the factors depend on initiators whose unique variables have an influence on successful implementation. They also depend on the human elements, normally described as CSF, for successful implementation.

The strategic dimensional factors were primarily drawn from Collis and Moonen's (2001) component factors for online learning, and Khan's (2005) eight dimensional

factors for e-learning implementation. This Researcher considers these components and dimensions as the most suitable for investigating e-learning in higher educational institutions. They are summarised to form the basis for developing a conceptual framework for e-learning implementation. The strategic dimensions provide a clear perspective for examining the context of the UG, and a basis for answering the research questions. Therefore, it is concluded from this literature review that the critical components worth investigating within the component and dimensional factors are the '*institutional*', '*people*' and '*technology*' factors. The focus will be on the institution, represented by management, the people (including lecturers, students and technical staff) and the technologies as the backbone for successful e-learning implementation.

The emerging knowledge from literature on the theories, models and good practice examples demonstrated by some universities show that when principles of the theories and models are adapted and applied with the unique context in mind successful implementation may be achieved. Although strict comparison could not be made between most African countries and the developed countries where good infrastructures are in place, with continues research and governmental support, lessons could be learnt. Considering the factors identified from the literature with particular reference to what universities in Africa are currently doing, a holistic or systems approach involving management (institution), the users (people) and technology is needed, as set-out to be investigated in this thesis. With particular reference to Ghana, the theories, models and best practice experiences provide basis for comparing the use of traditional methods of teaching and learning with an e-learning approach, where management lecturers, students and technical staff roles are clearly defined.

The next chapter describes the conceptual framework, drawn from the critical components of a theoretical e-learning implementation.

CHAPTER 3

CONCEPTUAL FRAMEWORK

3.0 Introduction and Overview

The conceptual framework draws from the literature with relevant portions applicable to the thesis being discussed in two Sections. In Section 3.1, the conceptual framework guiding this thesis is described. The relevance of the critical components for e-learning implementation is discussed. Emphasis is placed on the People, Institutional and Technological factors identified by this Researcher as the critical components for successful e-learning implementation. The rationale for the components of the e-learning capacity framework is discussed in Section 3.2. This Researcher argues that there is sufficient evidence to show that not all e-learning implementations were successful. Therefore, by focusing on the dimensional factors, critical components can be identified within the context of Ghana to facilitate e-learning adoption.

In particular, the functional activities leading to successful implementation were identified from the perspective of dimensional factors, which summarised the variables identified in Chapter 2. In synthesising the institutional experiences and strategic implementation principles, three issues were identified and categorised into People, Technology, and Institutional domains. These form the focus of discussion as leading to the development of a conceptual framework that serves as the focus of this research investigation.

As shown in Chapter 2, approaches to successful e-learning implementation were either centred on critical success factors (CSF), initiators of the implementation process or dimensional factors structured in components. The strategic approach varied at different universities depending on the variables they considered critical. Equally, the dimensional factors highlighted various aspects of the CSF and the roles required by initiators. The various components of the dimensional factors are categorised into Institutional, People and Technological factors within an implementation framework as shown in Figure 3.1.

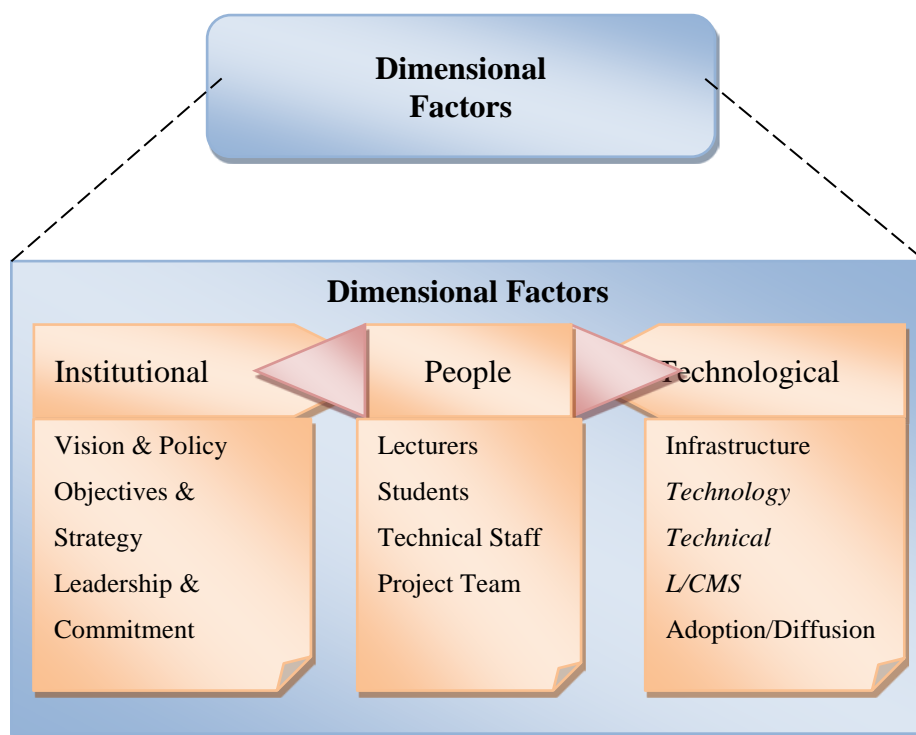


Figure 3.1 Critical dimensional components for e-learning implementation

Figure 3.1 shows that the People dimensional components include lecturers, students, technical staff and project team leaders. Institutional components focus on the institutional vision and policy, objectives and strategy, leadership and commitment, funding and resources, and reward systems, which are crafted, initiated and enforced by management. For the Technological components, the primary elements are infrastructure and technology adoption and diffusion. Adopting e-learning in an ICT-challenged environment like the UG means a change in the structure and approach to teaching and learning, which will require the university to carefully plan in order to meet users' needs. However, the question of what are the appropriate strategies to adopt in order to achieve success and how this might affect the quality of teaching and learning has been the greatest challenge for the UG. This will be investigated using the dimensional components described above. Drawing from both theoretical models and contemporary institutional experiences the conceptual framework was developed. It was designed to help explain the approach used in this research to determine the strategy that is appropriate for e-learning implementation within the context of the UG. It provided a basis to understand the context of the university and use examples from best practice experiences to develop a conceptual framework for successful e-learning implementation. Although various institutions have used different approaches, this framework helps to design the research process from a practical perspective.

3.1 Relevant Components for E-Learning Implementation Framework

To provide a good understanding of the processes within the dimensional factors, the various components are described as *domains* while elements within the domains are described as *dimensions*. Hence, the People Domain dimensional elements are lecturers, students, technical support staff and aspects of management that influence users' adoption of e-learning. Elements in the Institutional Domain focus on the management role in successful e-learning implementation, while the Technological Domain focuses on technological issues that inform successful e-learning implementation.

3.1.1 The conceptual framework

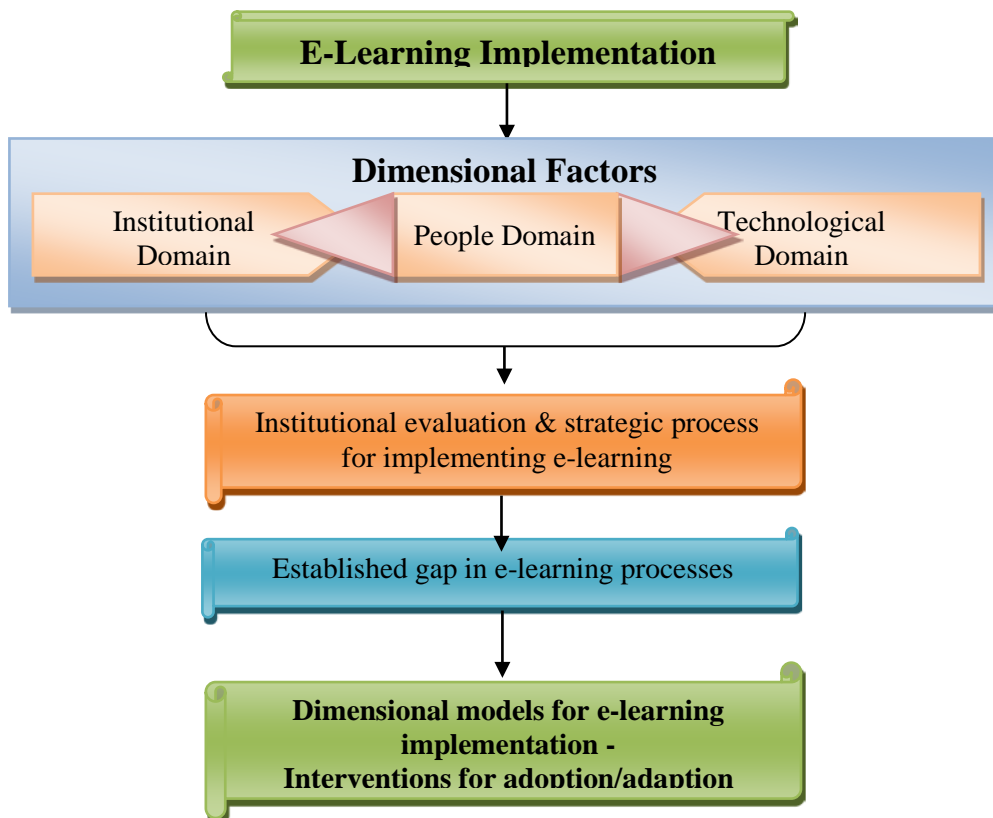


Figure 3.2 Conceptual Framework: Critical components and processes for e-learning implementation

In synthesising the critical issues from the literature, a conceptual framework has been developed to form a strong basis for this research. The primary components and their interrelationships to stimulate successful e-learning implementation are shown in Figure 3.2

The conceptual framework and interrelated processes are primarily drawn from Rogers' (2003) Diffusion of Innovation Adoption Model, Collis and Moonen's (2001) components for flexible learning and Khan's (2005) eight dimensions of e-learning implementation. Key components of the conceptual framework are discussed in the following sections.

A. E-Learning Implementation

Given that many e-learning initiatives in both developed and developing countries have failed because they were not robust and could not be sustained (Gatimu, 2009; Keegan et al., 2007) many researchers have proposed the need of using best practice experiences (Farrell & Isaacs, 2007; Keegan et al., 2007; McGrath, 2006). Designing a framework based on the experiences of institutions that have successfully implemented e-learning therefore, helps to put forward some best evidence examples to guide the research process. Thus, it can be used as a basis for evaluating the context of the UG, and proposing an implementation strategy.

B. Dimensional Factors

Central to the e-learning strategy and implementation process of universities reviewed is the emphasis on meeting the needs of lecturers and students, particularly with regard to the efficiency and effectiveness of the technology. A critical aspect of the observations made was that the driving force behind the success of e-learning implementation was the commitment demonstrated by management (Institutional). Equally critical were the human or individual primary users (People) and Technological factors, all of which form components of implementation (Cook et al., 2007; Hardaker & Singh, 2011; McPherson & Nunes, 2006; Nichols, 2008; Sherry, 1998). The components are not independent but interrelated as shown in Figure 3.3 and are described as strategic domains for e-learning implementation capacity.

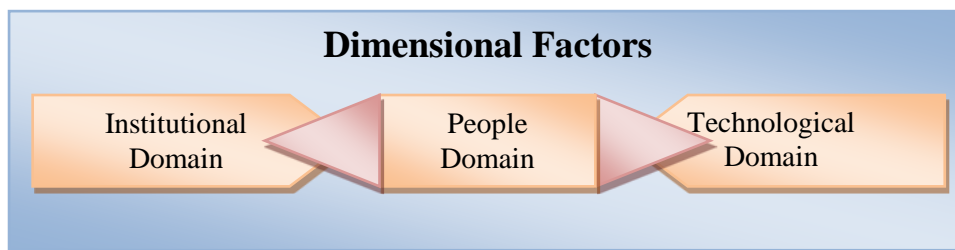


Figure 3.3 Relationship between domains of the dimensional factors

The best practice experiences of e-learning implementation processes described by various institutions were structured in phases depending upon the institutions' priorities. Such prioritised phases were dependent on institutional analysis to establish the gaps between current institutional technology use and the desired and expected operational performance of e-learning.

i) People Domain: The People Domain refers to the individual or human actions and influence that support e-learning initiatives to progress to acceptance, through integration and diffusion to all units within the university (Bentley, Selassie, & Parkin, 2012; Darby, 2003; Mital, 2010; Nichols, 2008). Lecturers' acceptance of e-learning will depend on the individual lecturer's intrinsic approach and institutional efforts in promoting users' adoption and perception of the technology. By the intrinsic approach, it means that lecturers go through a decision-making process, which begins with the relative advantage they place on the innovative technology (Ensminger et al., 2004; Hardaker & Singh, 2011; Zhu, 2010). The motivation to accept and adapt the use of the technology may be internal or external to the lecturer (Carlson, Downs, & Repman, 2002; Rhema & Miliszewska, 2010). Acceptance and adaption also depend on the extent to which lecturers perceive ownership of the innovative technology, and control over the environment in which they teach (Venkatesh et al., 2003). The social system or relationship among faculty members also has an influence on accepting management initiatives and technology use (Hardaker & Singh, 2011). Institutional efforts refers to the effectiveness of the communication that exists between management and faculty, and the perception of the relationship between management and lecturers. It also shows that training and professional development programmes organised by management have a direct influence on lecturers' acceptance, since they help determine their skills and competencies to use the innovative technologies. Technical support services provided are another key to lecturers' acceptance or rejection of the technologies (Nichols, 2008; Zuvic-Butorac et al., 2011). An additional key element of effective e-learning is the lecturers' pedagogical knowledge, content knowledge, control of instructional design, and above all training and support in pedagogical and technological knowledge (Convery, 2009; Govindasamy, 2004; E. M. Johnson, Cowie, Lange, & Fallon, 2011).

Students' acceptance and engagement in e-learning depends on both intrinsic and extrinsic motivational factors (Rhema & Miliszewska, 2010). The intrinsic factors depend on first, the relative advantage they perceive the innovative technology to have over the approach they consider comfortable, and second, the extent of their

involvement in the decision-making process to meet their learning needs. Students need some incentives to use innovative technologies, as the new learning environment forms a complete change from their current comfortable approach to learning (B. Collis & Moonen, 2001). Also, computer skills and competencies are relevant for students' effective engagement of innovative technologies for learning. Additionally, key to students' acceptance or rejection of the technologies are the system's flexibility, ease of use, and access to support and resources. Finally, a central factor in the effective engagement of the learning systems by students and lecturers, and support services by technical staff will be the institutional culture for teaching and learning (Newton & Ellis, 2005; Sutton, 2003).

The technical staff are considered as support 'livewires' of the technologies. Their skills and competencies in providing support services promptly and efficiently greatly influence acceptance and adaption to teaching or learning needs of users. However, their effectiveness also depends on institutional policy regarding infrastructure and support. The staff relationship with users and programmes of continuous training also has great influence on both intrinsic and extrinsic motivational factors, which influence successful e-learning implementation. Broadly, the People Domain examined the perspectives of lecturers, students and technical staff to establish the gap between the current state of the UG and best practice experiences.

ii) Institutional Domain: The Institutional Domain concerns management participation and decision-making processes that influence users' adoption of e-learning. The management role is seen as one that harnesses expertise, experience, leadership and commitment. Through management efforts, e-learning policies and implementation strategies are crafted, and resources are mobilised to ensure that the policies are implemented. Management provides direction to the institutional priorities regarding technology and teaching and learning. By their efforts, collaboration with faculty is promoted in formulating faculty policies and strategies that align with institutional goals and objectives. Such efforts are translated to support commitment, communication, management, and allocation of resources that will promote e-learning in the faculties.

Management commitment ensures that disruptive influences centred around time and user workloads are effectively resolved. Management, therefore, has the responsibility of ensuring that lecturers and students are comfortably engaged in the use of the resources, while technical staff are well motivated and committed to supporting users. Also, management is responsible for investing in the implementation through to

integration in all faculties of the university. In addition, they need to ensure that incentives and reward systems are in place as part of the external motivational factors. However, the extent to which management influences e-learning initiatives at both micro and macro levels of the institution are determined by its philosophy for teaching and learning. Finally, e-learning initiatives may arise from the micro or macro levels. However regardless of the source, effective integration will be influenced by management policy, leadership, commitment and support. The Institutional Domain is also greatly influenced by factors external to the universities, particularly government initiatives and provisions. Therefore, institutions must be aware of government provisions and support for higher education. Broadly, the Institutional Domain examined management's perceptions of the status of e-learning and technology innovation in the university. Perceptions of faculties, students and technical staff and expectations of management for successful e-learning implementation were also explained to establish the gap between the existing practices and best practice experiences.

iii) Technological Domain: The Technological Domain refers to the physical and technical infrastructure of the university to support e-learning. Equally relevant within this domain is the learning system, and the way the technologies are adapted for teaching and learning. The physical infrastructure refers to the capacity of the network operation centre (NOC) to support e-learning, including, network infrastructure, bandwidth, policy, and people involved with the infrastructure. It also refers to the extent to which the technology infrastructure (electronic hardware) supports the physical non-technology infrastructure (buildings and space). Further, technical infrastructure includes: hardware and software applications; learning/course management systems; library systems; management information systems; and e-mail services.

Within the Technology Domain institutional definitions of the technologies and innovative processes should be defined, while institutional support and technology objectives supported by policy should also be outlined. Initiatives and efforts to ensure reliability of the technology to build users' confidence are practically pursued through redundancy measures, while the relevance of the e-learning platform to the institution are clearly outlined. Learning platforms that are designed and developed in-house have documentation and structures in place to ensure efficient support and maintenance. For

enterprise products, support services are to be prompt, with sufficient funding to support continuous running and use of the learning system.

The technical capacity and control within the Technological Domain concerns ownership of the technology tools, which may be that of lecturers, technical staff, and educational technologist or subject matter experts. Regardless of who owns the tools, their skills and capacity to manage and control the use of the resources has an influence on users' acceptance. Also, users' expectations and ease of use of the technology has an influence on the implementation process at all levels. Broadly, within the Technology Domain the Researcher examined management's, lecturers', students' and technical staff's perspectives of technology infrastructure in the university and how they relate to best practice approaches. Examining the dimensional factors may bring out the emerging issues of e-learning implementation and factors that will motivate and stimulate acceptance and adoption in the UG.

C. Institutional Evaluation and Strategic Process

Institutional evaluation and strategic process refers to the functional process that the dimensional factors must undergo. Each domain may be evaluated to determine the purpose of e-learning by comparing the institution's conditions and capabilities with the environment's conditions and capabilities to support e-learning. The institution's conditions and capabilities are the primary concern and a SWOT analysis may be carried out to identify the institutional level of readiness for e-learning implementation. Clarity on the evaluation process will be provided by clear institutional objectives on e-learning, which will flow into faculty objectives supported by institutional policy. Operational activities may be defined and outlined, with timelines, while persons responsible for the various processes may be clearly identified. Various dimensions within the UG may be identified and used as a basis for redefining the implementation strategy for the university.

D. Successful E-learning Implementation

Successful e-learning implementation depends largely on acceptance and the extent of adaptation of the innovative technologies by elements within the People Domain. It means that users have confidence in the learning system to meet their teaching and learning needs. Lecturers find the system intuitive, user friendly, and one that supports delivery of authentic e-learning. Also, lecturers are able to control communities of learning within the electronic environment. Students also accept and adapt the

electronic innovation as an effective environment for learning, where lecturers are not the center of learning and they can construct knowledge on their own. Adequate support is also made available to all users, with technical staff having the skills and competencies to support users within the environment.

3.1.2 Processes of the conceptual framework

A review of some selected institutions showed evidence they had a statement of vision, plan of activities, goals, expected outcomes, operational activities, and a timeline with responsibility schedules (Darby, 2003; Deepwell & Beaty, 2005; ELAG, 2011; ELSG, 2011; Metros, 2003; Sheehy et al., 2006). The three structured Domains describe the resource and access dimensions that make up the e-learning capacity for successful e-learning implementation. Thus, a successful e-learning implementation will be made up of a combination of the strategic processes of the various domains (Institutional, People and Technological) that feed comprehensively into each other. An observation of a critical assumption underlying most of the implementation processes was voluntary adoption.

Experiences of technology acceptance at the UG over the years have shown that the assumptions of voluntary adoption of ICT resources were practically not workable, as they become impediments to the institutional goals and objectives. Intended users tend to rely on traditional approaches instead of the innovation being introduced. Hence, the assumption of voluntary adoption underlying the 4E Model, Rogers Diffusion of Innovation Adoption model, and the Concerns Based Adoption Model (CBAM) may not be workable within the context. It can therefore be argued that the principles are relevant when users are encouraged and motivated to use the e-learning resources, by comparing outputs of their performance with the interventions of e-learning (ICT innovative) practice. A mandatory approach with timeline, combined with persuasive initiatives may therefore be preferred.

The rationale for this argument is that, the implementation process may be frustrated, because people want to remain in their comfort zone where they feel confident. In an institution with a hierarchical structure that is embedded in culture, voluntary adoption may not work. A carefully planned timeline that demonstrates the state of practice, the state of intervention, and post intervention comparison stages is most likely to effectively impact on the adoption and diffusion of e-learning at the UG.

The conceptual framework suggests that an e-learning strategic plan must have an integrated plan of clear implementation processes that covers the three Domains. It requires a clear task (objective and action/activity), identified persons responsible and a timeline. This is because, although the institutions reviewed have elements of structured processes, the lack of categorisation into domains showing the components, exposes them to errors that can be avoided, if the structure is clearly defined.

The conceptual framework proposes that strategy at the institutional level defines what should be expected of management. Management make the critical decisions regarding e-learning, based on institutional mission, vision and goal, and should constitute a team or committee that will be responsible for the implementation, with direct involvement of the Chancellery of the university. The committee/team conducts interviews of all stakeholders involved in technology innovation in teaching and learning. This may be done by either out-sourcing the preliminary work to a consortium or setting-up a group of experts within the university to conduct the investigative analysis. Based on the gap identified between the expected and current situation, implementation strategies are crafted, with clearly identified actions, persons responsible and timeline.

The implementation plan for the People Domain includes components identified as critical dimensions of operational activities, which indicates for each dimension, the expectations, resources available, resources to be acquired to achieve the expected outcome, persons to be responsible and the timeline. Critical among the dimensions within the Technological Domain is the technical team's capacity and skill to ensure that the ICT infrastructure and technical infrastructure are well resourced, supported and managed properly.

On the basis of the conceptual framework, research instruments were developed using the component domains to investigate the UG approach to e-learning integration in teaching and learning. Findings at the UG were used to design an e-learning implementation strategy process that can be used by other institutions with similar characteristics. This Researcher argues from the theoretical and empirical information gathered, that institutions aiming to implement e-learning in ICT-challenged developing countries would identify with and find helpful a clearly defined implementation strategy that addresses issues in the dimensions contained within the three domains as previously outlined.

3.2 Rationale for the Components as an E-learning Capacity Framework

In exploring why up-scaling e-learning in higher education has become a challenge (as universities continue to identify the role of e-learning in improving access and quality while lowering costs) it is seen from this literature review that developing a framework from the component determinants can facilitate successful e-learning implementation. The literature review shows that the theories and models were mostly developed, tested and used in developed ICT-rich environments; however, lessons can be learnt and applied to ICT-challenged environments. For instance, Baraja and Gannaway (2007) described perspectives from a European context. In their peer reviewed study of eight European universities, Baraja and Gannaway (2007, pp. 112-113) focused on institutional strategies, intellectual property rights, library services, teacher training and support, student support, virtualisation of content and course design. In their key findings, Baraja and Gannaway (2007) identified: lack of clear policies and strategies for e-learning; lecturers' skill gaps in linking e-learning to teaching; technical staff lack of comprehensive understanding of support in an e-learning environment and effective communication; and lack of appropriate mechanisms to promote a culture of digital learning among students (pp. 114-115).

McPherson and Nunest (2006, p. 438) also argued that, institutional leadership, staffing issues, pedagogically sound delivery, and training for both students and lecturers are critical for any successful e-learning implementation and should not be trivialised. The views expressed suggest that, although institutions may have strategic plans and policies, trivialising the above factors results in challenges of implementing and up-scaling e-learning in the universities. Furthermore, Jones (2008, pp. 456-457), in drawing from Covington, Petherbridge, and Warren (2005) and other works categorised the barriers to effective uptake of e-learning into three broad areas; lack of professional development, institutional constraints and staff resistance. Hence, although these three broad areas may form the core of the barriers to successful implementation, they may also be limited within the context of their study. Thus, a more generalised exploration in the literature may provide a good basis in developing a conceptual framework.

Some institutional experiences have shown that over emphasis on some CSFs without consideration of other components forms the main reason why several universities in well-resourced ICT-rich environments have experienced disappointment at not meeting

the expectations they had for e-learning (Becker & Jokivirta, 2007; Kirkwood, 2009; Oblinger & Hawkins, 2005). Their disappointment resulted from the fact that e-learning offered low uptake, low user engagement and limited development of learning communities (Curran, 2004; Mital, 2010). Explaining why e-learning continues to remain a problem, Oblinger and Hawkins (2005, p. 14) posited that although most universities have no clear understanding of e-learning, they have high expectations which are not based on assessment. Their position suggests that first, the institutions have not been careful in understanding the experiences and expectations of students they enrol, and second have not provided the technology that makes the mechanism of learning more relevant to the students. By not counting the real cost of e-learning the institutions have tended to focus on the technology rather than on the learning (Oblinger & Hawkins, 2005). It means that the primary stakeholders (students and lecturers) focus on what they want to accomplish but not the technology, whereas the institutions focus on the technology. Therefore, the primary stakeholders show dissatisfaction in the use of the technology when their expectations are not met (Ely, 1999; Ensminger et al., 2004; Lameris et al., 2007)

Mital (2010, p. 24), in a recent study, also agreed with the position from an industrial perspective, positing that the effectiveness of e-learning will be dependent on the fulfilment of learner expectations, in terms of suitability to their task, applicability to their learning, incentives and motivation. The institutional factors notwithstanding, there are misconceptions of learning and assessment demands, beliefs and practices of both students and lecturers of what e-learning can offer, and how they can be supported within the e-learning environment (Engelbrecht, 2005; Kao & Tsai, 2009; Kirkwood, 2009; Oblinger & Hawkins, 2005). Kirkwood's (2009, p. 111) position confirms Zhou and Xu's (2007, p. 526) finding from a case study of a Canadian university, from which they concluded that, e-learning uptake may be achieved when lecturers are provided with "*the rationale of why computers should be used in the classroom*" (p. 526). These arguments suggest a lack of clear understanding of the potential of e-learning and the benefits both lecturers and students can derive from it. Reviewing evidence related to e-learning, Kirkwood (2009, p. 109) asserted that the problem can also be traced to institutional policies and strategies with no depth in research, hence, there is a lack of clear understanding of the complexities of the relationships that exist in e-learning.

The findings from case studies, conducted by some researchers and educational practitioners identified additional significant factors that have influenced successful

implementation and uptake of e-learning by lecturers. For example, Ebersole and Vordan (2003, p. 17) identified time constraints, resource constraints and questions about the effectiveness of e-learning. Hence, insufficient time and lack of resources, lack of leadership, lack of skills, and lack of knowledge about e-learning and its benefits to students and lecturers, can be considered critical barriers to successful implementation of technology in education. These confirm other findings that suggest user or stakeholder factors, technology and infrastructure are major issues that cause failure in e-learning uptake (Badge, Cann, & Scott, 2005; Kareal & Klema, 2006; Miller & Lu, 2002). This supports Lamas, Paraskakis, and Levy's (2007, p. 301) opinion that e-learning is likely to fail if the users of the resources are not familiar with the technology.

The findings outlined above suggest that effective and sustainable e-learning in higher education is not only dependent on fulfilment of lecturer and learner expectations. In addition, factors such as institutional policies and strategies, leadership, training, technical support for lecturers and students, library services and intellectual property rights, staffing, pedagogy, time, confidence and technologies all contribute to the challenges of implementing and up-scaling e-learning in higher education. Some categorisations of the challenges of e-learning implementation focus on individual or personalised factors as the most significant issues for adoption and diffusion, while other factors underscore (what may be described as) integrative factors. The integrative factors consider dimensions for which institutions may plan and strategies for successful e-learning implementation. Hence, the need to identify all the critical issues and clearly describe the approach of achieving their outcome forms the basis for the implementation framework.

3.3 Summary

Evidence from the literature confirms that universities are investing in technology integration in teaching and learning. However, for the technologies to achieve the institutions' objectives and improve teaching and learning they must be accepted and used by lecturers and students. The technologies must be seen as satisfying lecturers' and students' wants with adequate institutional support. It is evident from Chapter 2 that explaining successful e-learning implementation and identifying the factors that influence acceptance and adoption has been one of the most complex and difficult research areas in contemporary ICT integration in teaching and learning. This has

resulted in several theoretical and empirical models, with foundational roots in change and innovation theories, which explain individual acceptance or rejection of the technology innovation. Many universities implementing e-learning have therefore, been confronted with the decision to choose among the different models or to develop/construct one that suits their environmental context. When a choice is made in favour of a particular model the contributions from alternative models are usually ignored (Venkatesh et al., 2003, p. 426). Hence there is a need to review some of the frequently used models to identify common variables that influence successful implementation and thus to craft a framework that would be suitable for the UG and institutions that may have similar characteristics.

In order to propose an implementation framework, based on the components of e-learning capacity described above, literature was reviewed to verify the theories behind some of the most widely used or cited models. This was done to identify the significant variables that relate to e-learning implementation in higher education. The literature findings formed the basis for the research design and methodology.

The literature has shown that while researchers have established strong theoretical and conceptual bases for successful e-learning implementation in developed countries the empirical research literature for ICT-challenged environments like Ghana is weak and less developed. There is a dearth of empirical studies that have examined the acceptance, adoption and diffusion of e-learning. In particular, very few studies in developing countries have examined primary stakeholders' expectations and concerns, management commitment and technical support services. Similarly, the causal relationship between institutional management, primary users and technical staff has not been extensively explored. Hence, this Researcher argues from the literature that management policies and strategies have a direct influence on user acceptance and adoption of e-learning. Improvement in user acceptance and adoption is also evident in technical support services; however, the causal relationship is yet to be proven conclusively in the UG. This is difficult due to the complex variables involved. The literature has shown that successful e-learning implementation in any institution is affected by People, Institutional (management) and Technological Domains. Understanding each domain and applying appropriate strategies will result in successful e-learning implementation.

To prove the causal relationship, conclusively between the domain variables, further challenges may be introduced because of the complex multiple variables (social,

economic, political, technological, cultural, and ethical) that are within and outside the institutional context. Controlling all these interrelated variables will therefore be difficult to establish a conclusive relationship. Hence, considering the difficulty in controlling the variables to establish an extensive causal relationship, some relevant variables of interest were selected and explored. This was used as basis to establish how they affect or influence acceptance and adoption of e-learning.

The literature has also shown that many institutions have experienced disappointments in implementing e-learning. Hence, the Researcher's interest in investigating and understanding issues that contributes to the failure or success of e-learning implementation strategies. The understanding gained through a review of best practice examples will provide the basis for developing a framework for successful e-learning implementation in developing countries and, in particular, Ghana.

In Chapter 4, the research methodology is presented, including a description of research design, trustworthiness, and ethics as well as the limitations of the research.

CHAPTER 4

RESEARCH METHODOLOGY

4.0 Introduction

The preceding chapter described the conceptual framework in which the dimensional factors were categorised into People, Institutional and Technological domains, and were investigated to provide the basis for a strategic framework for e-learning implementation. This chapter describes the research design and methodology adopted. In Section 4.1 the rationale for the design emphasises a mixed-method approach using quantitative and qualitative instruments. Section 4.2 describes the population and sampling procedures adopted for this research and Section 4.3 highlights the research design methods used. This is followed by Sections 4.4 and 4.5, which describe the data collection and analysis process; Section 4.6 covers ethical considerations and Section 4.7 issues of validity, reliability, and trustworthiness. Finally, in Section 4.8 the research process in Ghana is described. Figure 4.1 below outlines the research process.

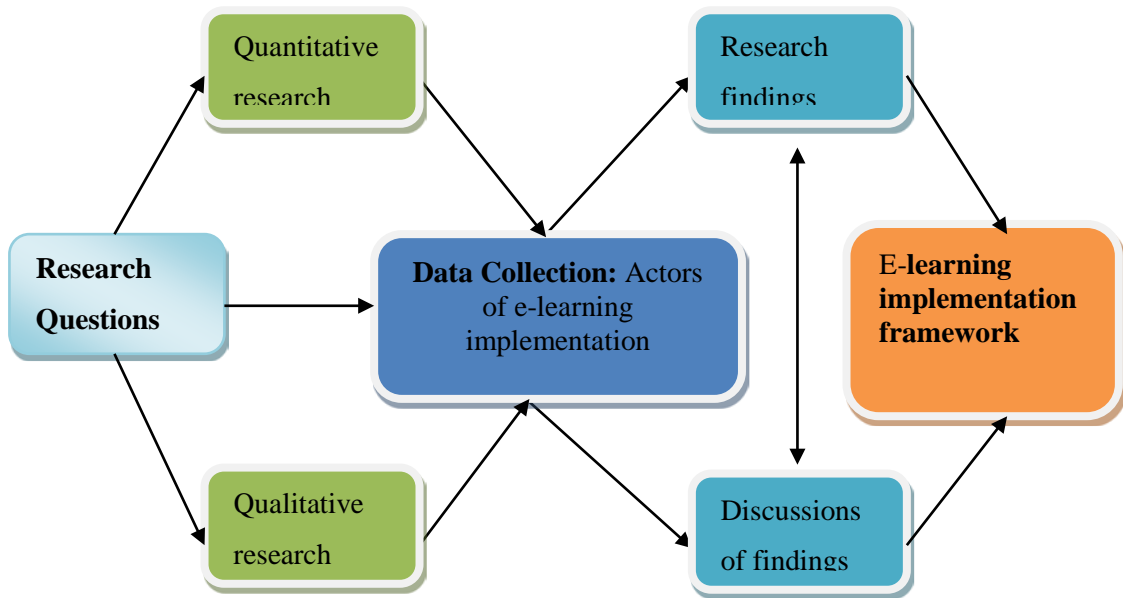


Figure 4.1 Research process

The Figure 4.1 shows that information gathered to answer the research questions was analysed to propose interventions that will facilitate successful e-learning implementation at the UG.

4.1 Rationale for Research Design

The research design was influenced by various ideological paradigms (Bryman, 2008; Creswell, 2009) which were used to consolidate the rationale behind the study. Such paradigms helped to indicate the procedure or technique used for data collection and analysis to justify the choice of approach to the research process. An important consideration was the trends in innovative technologies used by various institutions. Hence, the goal was to adopt an approach that helps to describe the beliefs and perceptions, which also dictate what should be studied, how the research should be conducted and how the results should be interpreted.

The literature reviewed showed two research paradigms (Quantitative and Qualitative) which fit this research design, although the positions argue against each other (Bryman, 2008; J. Collis & Hussey, 2003). Each approach offers a unique opportunity to understand the environmental context of the research, and can be used as a basis for generalisation (Bryman, 2008; J. Collis & Hussey, 2003; Creswell, 2009; Saunders, Lewis, & Thornhill, 2009), or as means of explaining the context of the UG. In the quantitative approach the variables can be measured and the numerical data analysed using statistical procedures to help the Researcher build in protection against bias. The qualitative approach involves explaining emerging questions and procedures as data is collected from the participants' setting. Hence, while the quantitative data lends itself to deductive interpretation, qualitative research leads to inductive interpretation of the phenomenon.

In a research project exploring implementation strategies for successful e-learning, a holistic approach is required to understand the perspectives of all stakeholders, in this instance, management, lecturers, students, technical staff, administrative staff and government. Thus, there is the need to employ both quantitative and qualitative research approaches. This is normally referred to as the mixed-method approach. By using both approaches, a better understanding of the situation and factors influencing the adoption and diffusion of e-learning can be achieved.

In addition, the mixed-method approach is suitable because examining the complexities of how e-learning is experienced, interpreted and understood in various contexts over time can better explain the variables influencing its adoption and diffusion. A further reason for adopting this approach is to examine the interactions of all stakeholders and their perceptions about the situation in order to achieve a holistic rather than a

reductionist understanding. In other words, the objective is to focus on extracting and interpreting the meaning of experiences by using the contrasted research paradigms of qualitative and quantitative research. The Researcher contends that the mixed-method approach provides the rich database necessary to address the purpose of this research. Mixed-method research design is also embedded in the philosophical assumptions and methods of inquiry that guide the direction of the collection and analysis of data. The mixed-method approach, therefore, fits well with the focus of this thesis because it can provide the depth that can better explain the rationale for e-learning, issues of policy, strategy and functional activities that enhance successful e-learning implementation.

4.2 Research Sampling Procedure

The sampling approaches used in this research aimed to determine the extent to which the findings could be generalised and applied to the results of the study (Sharp et al., 2012). They are categorised into probability and non-probability (purposive and convenience) procedures (Maxwell, 1997; Teddlie & Yu, 2007). Purposive sampling helps the Researcher to gain an in-depth understanding of its specific setting or phenomenon (Onwuegbuzie & Leech, 2007). Teddlie and Yu (2007, p. 80) stated that purposive sampling is used to obtain a representative phenomenon or comparability. Bryman (2008) has shown that, for institutions like the UG, convenience sampling is common and prominent where trust of the target population can be established to conduct a valid study. Hence, adopting a mixed-method approach, purposive and convenience sampling enables generalisation of the specific setting. The approach also helps obtain the most rich and reliable information about the UG and external factors that influence technology adoption.

Some research, have shown that purposive and convenience sampling approaches cannot achieve representativeness or comparability (Marshall, 1996). However, in contrast, research in the social sciences has shown that this is possible (Bryman, 2008; Teddlie & Yu 2007). In achieving representativeness or comparability (Teddlie & Yu (2007) described an extreme and deviate case approach as one way of achieving representativeness and comparability. In adopting that approach for this research, variables of interest were first determined through literature search. Distribution of cases of individuals and units were then identified by locating units within the university that will provide depth information necessary to answer the research question. After the type of information needed was determined and arranged in a table,

it was realised that only few category of the respondents could provide that information, hence, the adoption of purposive sampling techniques.

To obtain a representative phenomenon, the research focused on the limited number of respondents who had been selected because of their depth of knowledge and understanding of the issues. It is believed that the information they provide will give good insight into the issues of e-learning at the UG. For example, it was observed that management in decision making, associated with technology integration in teaching and learning, where the only ones who could provide information on institutional goals, objectives, and strategies for e-learning implementation. They meet the criteria of providing information that will be representative of the institutions position on such issues. Further, The HODs perception and opinion on issues in a department compared with responses from at most three (3) lecturers will provide a representative view of what pertains in the departments. Increasing the numbers will therefore be repetitive of the responses.

To enhance validity through convenience sampling, differences in the groups' responses that may undermine the overall validity of the results were further investigated through an arranged follow-up meeting, on emerging and contrasting opinions expressed.

E-learning implementation in higher education involves students and lecturers as the primary or key stakeholders who engage in the adoption and diffusion of innovative technologies, with management providing the resources and technical staff providing the support services. Taking into consideration the multifaceted faculties and departments at the UG, the target participants were selected through purposive and convenient sampling. Individuals involved with ICT and technology factors in the university were also identified, including external stakeholders who directly and indirectly influence e-learning adoption and diffusion in the UG. Some participants were also encouraged to recommend persons with much insight into the innovative technologies and who are involved in the change process inside and outside the UG. Hence, use of the snowball sampling strategy allowed the Researcher to gather information from individuals recommended by other respondents.

The criteria used in selecting the participants include:

- a. Participants in management and from faculty who are full-time recognised staff of the UG
- b. Participating students who have been enrolled in the UG for at least one academic semester
- c. Participating staff and students in the demonstration assessment of the LMS KEWL who have used the learning system for at least one semester
- d. Participants from government ministries and institutions outside the UG who are in senior level, decision-making positions and are involved with technology innovations in higher education.

The purposeful sampling procedure and snowball strategy adopted enabled the Researcher to sample relevant target respondents from all Colleges and Faculties of the UG with the exception of the medical school. Hence, the target population for this research included internal and external stakeholders for higher education in Ghana. As this study focused on the UG, the internal stakeholders were university management and Deans of Faculties, representing the institution; Heads of Department (HODs) and lecturers; students from most faculties; and ICT technical staff. External stakeholders included, the Ministry of Education, the National Accreditation Board, Association of African Universities, and the Rector of a private university (Telecom University), who is noted for his contribution to technology integration in teaching and learning.

4.2.1 Determination of the sample size

In order to determine the appropriate sample size, firstly, a literature review was done to identify institutional actors and stakeholders that influence e-learning implementation in higher education. The review identified the target population for the study. Some researchers indicated lecturers, students and support staff (Deepwell, 2007; Fisser, 2006; Hardaker & Singh, 2011), with others referring to or adding institution and government (Al-Yaseen, Hourani, & Al-Jaghoub, 2007; Deepwell, 2007; D. Jones, 2007) as actors in e-learning implementation. Fisser (2006) explored ICT implementation in education using Collis and Moonen's (2001) 4E-Model as a guide and put the actors into seven categories; board, higher management, middle management, faculty, students, support and external. The actors and their roles are summarised in Table 4.1.

Table 4.1

Actors of ICT in higher education (Adopted from Fisser, 2006, p. 9)

Category	Actors within the category	Role and activities
Board	Board members, Chancellor, President, Rector, Principal	Leadership, vision, strategy
Higher management	Vice-President, Vice-Chancellor, Pro-Vice Chancellor, Pro-Vost, Policy Advisor, Deans, ICT steering group, Registrar	Leadership, policy making, strategy, budget and resource allocation
Middle management	Middle managers, educational managers, Chair, Heads of Departments, Assist Registrars	Leadership, policy making, stimulating faculty
Faculty	Faculty, lecturers, instructors, teachers, demonstrators	Education and research
Students	Students	Education
Support	Members of Staff Development Unit, Pedagogical Support Unit, Infrastructure and Computing Unit, ICT Unit, Planning and Information Systems Unit, staff of the library	Supporting the implementation process
External	External institutions, Ministry of Education	External stimulus to change

Table 4.1 provides a clear overview of the various primary actors involved in innovative adoption of technology and the diffusion process within a university setting. It was observed that gathering valuable information from institutional management and external stakeholders will require interviewing of some critically selected members of higher management (see Table 4.1).

Secondly, secondary documents from the UG's annual basic statistics report from 2008-2011 were consulted to gain a good understanding of staff and student ratios. A summary of staff and student populations in the UG between 2008-2011 is shown in Table 4.2.

Table 4.2

Proportions of lecturers to students

Academic year	Academic staff	Students	Ratio
2007/2008	865	29,758	1:34
2008/2009	951	34,098	1:36
2009/2010	909	37,353	1:41
2010/2011	859	38,376	1:45

Source: University Basic Statistics, 2007-2011

It was noted that while the total population figures showed lower ratios, faculty and departmental ratios were high. For instance, lecturers in some departments lectured a

minimum of 600 students while in other course units they have over 1000 students (Daniel, 2007).

The Central Limit Theorem (CLT), a statistical procedure use in the determination of sample sizes (primarily in quantitative research) was used to determine the sample of students and lecturers to be selected. This was considered appropriate due to the large students' population and the academic staff (lecturer) numbers. The sample size was estimated by using the following formula; where 'n' is the sample and 'e' the margin of error:

$$n = \frac{(1.96)^2 \pi (1 - \pi)}{e^2}$$

With an estimated margin of error equal 0.090 a sample of 80 lecturers was also estimated for the survey. Using the statistical procedure for the determination of sample size, the number of students was estimated based on the 2009/2010 academic year figures and gender ratio. In the 2009/2010 academic year, the gender ratio in the UG was 52% male and 48% female. Thus, samples of 270 students and 80 lecturers were estimated for the survey. For management, it was estimated that at least three HODs and two lecturers from each of the faculties would be interviewed. Table 4.3 shows the matrix of the targeted sample and response rates of the participants. It shows the overall population sample was 415, with a response rate of 78.7%, which makes the sample representative of the target population.

Table 4.3

Matrix of the response rate

Target population	Population	Sample	Response	Response rate
Students	37,353	270	236	80%
Lecturers (Faculty)	909	80	36	45%
Management staff	189	40	32	80%
Technical support staff	86	21	16	76%
External representation	-	4	4	100%

The valid responses from the survey represented 80% of the student sample and 45% of the lecturer sample. The response rates were large enough to represent a reliable perspective of the target populations' views. The response rate is also consistent with the gender ratios in the UG. For management, where the emphasis was on the quality and depth of information, the response from staff met the requirement of in-depth information.

4.3 Research Design and Overview of Information Needed

The sample was largely drawn from undergraduate students of the UG with some input from post-graduate students who have been in the university for at least a year. The target population was identified and selected from ten institutional units within the UG. Institutional units in the Humanities included the faculties of Social Studies, Arts, and Law, Institute of Continuous and Distance Education, School of Performing Arts and The College of Business Administration. Institutional units in the Sciences included the faculties of Science and Engineering, College of Agriculture and Consumer Sciences and some students from the graduate school.

To clarify the information needed from participants to answer the research questions and to shed light on the problem being investigated, the Researcher used four information types; contextual, perceptual, demographic and theoretical, as a guide in designing the research instruments. The information types were described and used by Bloomberg and Volpe (2008, pp. 69-70) in qualitative studies. According to Bloomberg and Volpe (2008), contextual information refers to the context within which the participants reside or work, describing the culture and environment of the setting. The demographic information is the participants' profile, which describes the participants, their background, education and personal information. The perceptual information refers to participants' perceptions related to the particular subject of inquiry when interviews are used as the primary method of data collection. The theoretical information involves data and information gathered from literature and secondary sources to assess what is already known regarding the topic of enquiry.

These four types of information support the methodological approach and theories related to the research question. The methodology also provides support for the interpretation, analysis and synthesis of the conclusions. Since much emphasis is placed on qualitative information in this research, Bloomberg's (2008) approach was adopted to describe the kind of information needed. To understand the variables that inform successful e-learning implementation, the type of information needed to answer the research questions was determined according to the conceptual framework. Table 4.4 outlines the types of information used to answer the research questions.

Table 4.4
Literature guide for research design and analysis

Type of information	Required information	Method
Contextual	Institutional background, mission, vision, policy and strategy for e-learning; source of technology innovation initiative; strategy for implementation, management commitment to change and participation; strategy for professional development, training and pedagogical philosophy, culture of teaching and learning, leadership, infrastructure resources and technical support; strategy for sustainable diffusion and evaluation	Interview Documentary Review and Observation
Demographic	Descriptive information regarding participants, background, experience with technology, skills and competencies	Survey
Perceptual	Participants' descriptions and explanations of their experiences as relating to the phenomenon under study	Interview Survey
Theoretical	Diffusion of innovation, e-learning, implementation, strategy, pedagogy, students, lecturers, management, ICT, technology, integration, adoption, ICT-challenged environment	Document

On the basis of the literature review, research instruments were developed covering the three perspectives of Institutional, People and Technological domains. These domains are not mutually exclusive. Tables 4.5, 4.6 and 4.7 outline the broad areas of the questions covered in the research. Table 4.5 illustrates the focus of management investigation and source of information.

Table 4.5
Institutional domain

E-Learning capacity	Focus of interview
Institutional Domain (Management)	Source of technology innovation initiative; Institutional justification for e-learning and priorities; Vision, policy, objective and strategic plan; Strategy for implementation, management commitment to change and participation Strategy for professional development: training and pedagogy; Resources and technical support: technology and technical factors; Sustainability: approach to institutional diffusion of e-learning; Evaluation

Factors related to perspectives of students and lecturers that answer the research questions are described in Table 4.6. Factors of the information types covered both HODS and lecturers.

Table 4.6:
People domain

E-Learning capacity	Focus of interview	Focus of structured questionnaire
Lecturer	Faculty/heads of departments	Background
	Faculty/departments' priorities and perception of teaching and learning in 5 years	Skill and extent of usage of computer resources
	Analysis and planning for e-learning	ICT experience in professional work
	Relevance of e-learning	Availability and access to computer resources
	Faculty resources, conditions and capabilities for e-learning implementation	Professional development
	Internal and external factors for e-learning implementation	Pedagogy
	Lecturer frustration of ICT integration in teaching and learning	Perception of management commitment
	Faculty strategy for e-learning implementation	Participation in e-learning implementation
	Short, medium, long-term objectives and action plan for e-learning and evaluation process.	Computer skills and competencies
Students	Perception of infrastructure adequacy, reliability and support	Background
	Extent of participation in e-learning	Skill and usage of ICT resources
	Relevance to learning and satisfaction in e-learning	Extent of ICT application in learning approach
	Frustrations with ICT integration in teaching and learning	Technology acceptance and satisfaction
	Experience of change process	Motivation for using computer based resources for learning.
		Cultural influence in teaching and learning approach; Participation in innovative technology; Computer skills and competencies

In Table 4.7 factors concerning the Technological domain from the perspective of technical staff are outlined, showing the information types that were gathered to answer the research questions.

Table 4.7:
Technological domain

E-Learning capacity domain	Focus of interview	Focus of structured questionnaire
Technical Staff	Role and extent of support Most demanded support services from lecturers and students Adequacy of computers and web resources Reliability of current infrastructure Technology resources and reliability Frustrations and expectations Technical staff capacity: skill and competencies to support e-learning.	Background Institutional level ICT infrastructure Technology support for teaching and learning Capacity and support for teaching and learning Awareness and strategy for e-learning implementation

The questions covered in the research compared the critical components of the domains in the conceptual framework to the process of e-learning implementation in the UG in order to establish the innovative technology implementation gap.

This implementation strategy framework is one that suits the context of the UG, and may also be applicable to other institutions within a similar environment. The findings were used to design an implementation strategy framework for successful e-learning implementation showing a prototype of a strategy covering Institutional, Technological and People Domains.

4.3.1 Research design process

The literature was reviewed as a basis for designing the research to understand the experiences of institutions that had succeeded in implementing e-learning, and the contributions from researchers investigating e-learning and ICT integration in higher education. Google Scholar and databases of journals, published articles, books and contributions of institutions were used as resources in gathering information on e-learning strategy, e-learning implementation, and ICT integration in teaching and learning. The results were synthesised, comparisons made and the information was used to put the research problem in perspective, and a research proposal was written. The Researcher obtained approval to proceed with the study from the ECU's Human Research Ethics Committee. This ensured that all procedures and processes needed to satisfy issues of confidentiality and consent from participants were correct.

The Registrar of the UG was contacted by telephone and e-mail asking permission for the Researcher to approach management, faculty and students to participate in the survey. After approval from the Registrar, signed letters were sent to the Pro-Vice-Chancellor, who also chairs the ICT committee, all Deans of Faculty, selected HODs (by convenience) and lecturers, inviting them to participate in the research. Through the HODs some lecturers were asked to inform students about the study and encourage them to willingly participate in the survey. Heads of ICT, Information Management and the library were also contacted to participate in the research. The Head of ICT unit at the Ministry of Education, Head of the National Accreditation Board, Head of ICT unit – Association of African University (AAU) and Rector of Ghana Telecom University were all contacted by telephone and e-mail to participate in the research.

The research instruments were pre-tested and critiqued by expert researchers of ICT integration in education from ECU, and some students and lecturers in the UG. Information gathered from the feedback was used to refine the research instruments for all categories of participants. Four assistants were recruited to administer the survey questionnaire to lecturers and students, while the Researcher concentrated on administering the interviews. The research instruments were designed to collect the types of information in Table 4.5 and 4.7. Interviews for the external stakeholders were structured specifically to enquire about their contributions in establishing successful e-learning in higher education in Ghana (see Appendix C4). A semi-structured instrument was designed for student focus group discussion (FGD).

All the survey instruments for lecturers and students were structured with some open-ended questions for the respondents to express their personal views on the issues. Semi-structured in-depth interviews were conducted with higher management and the external stakeholders of the university. In each of the interviews conducted, critical issues raised by participants, which required further investigation or for triangulation purposes, were raised for the other participants.

All the survey and interview schedules for the 347 participants took place between February and November 2010. There was 100% transcription of all the recorded interview sessions.

The theoretical foundation for the research was based on four models. They include; the structural instructional design model ADDIE, Rogers' (2003) Diffusion of Innovation Adoption Model, Hall and Hord's (1987) Concerns Based Adoption Model (CBAM),

and Collis and Moonen's (2001) 4E-Model for technology acceptance and integration in education. Reference was also made to generic models emerging from these four models and their application to e-learning strategy implementation in higher education. The purpose for using these models was to gain a better understanding of what variable components contribute to successful e-learning implementation in an ICT-challenged environment. The focus on ICT-challenged environments was emphasised because institutions in ICT-rich environments with resources have been extensively researched, with current studies focusing on dealing with complexities of integrating multimedia and social network blogs and application in educational delivery. On the other hand, institutions in ICT-challenged environments are still struggling with getting the basics of successful implementation within unique governmental and environmental challenges. Hence the need to identify frameworks, that can be workable within ICT-challenged environments.

4.4 Data Collection Methods

The mixed-method approach provides for the use of between method triangulation to cancel or minimise biases, allowing researchers to be more confident about the results (Creswell, 2009; Denzin & Lincoln, 2003; R. B. Johnson & Onwuegbuzie, 2007; Sharp et al., 2012). Johnson and Onwuegbuzie (2007) defined the mixed-method approach as:

...the type of research which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (p. 123).

This definition is suitable for this study as it helps the Researcher to view the problem of e-learning implementation strategies from different perspectives to enrich the understanding of the issues. Hence, the information gathered provides a clear and comprehensive picture that can be used to compare, validate or triangulate the results (Bryman, 2008; Clark, 2010). Therefore, this study employed different data collection methods including survey, interview, focus group discussion, institutional documents, observation and follow-up on critical issues raised by respondents.

4.4.1 Research survey

The survey questions were largely closed with some open-ended questions that sought to tap into personal experiences and perceptions. Target participants who agreed to participate (lecturers and students) were contacted at the faculties and the library and given questionnaires to complete. As shown in Table 4.8, out of the 300 questionnaires given to students, 253 were returned out of which 236 were fully completed and analysed, making the return rate 78.7%. Although most lecturers indicated their preparedness to participate, a large proportion could not make the time to complete the survey; thus, out of 90 distributed questionnaires 47 were returned with 36 fully completed, making a response rate of 40%.

Table 4.8

Matrix of research respondents

Survey instrument	Distributed	Returned	Fully completed	Ratio of distributed
Students	300	253(84.3%)	236	78.7
Lecturers	90	47(52.2%)	36	40.0

Questionnaires completed by the lecturers were collected from their offices, while the students' surveys were handed directly to the research assistant or submitted to the secretaries at the offices for the research assistants to collect. A sample of the survey questions can be found in Appendices A (lecturers) and B (students). The face-to-face survey was adopted firstly, because it was easy to administer and to interact with participants and secondly, it enabled the Researcher to include a wide category of students at all levels of access to ICT and computer resources, and include the various activities for which students used computers. The attitudes of respondents were also observed, which prompted issues that were noted by the Researcher.

The relationship between the research questions and lecturers' survey questions are described in Table 4.9. Most of the responses were related to research questions 2 and 3, while responses to other questions were used to support survey responses.

Table 4.9:

Relationship between the research questions and lecturer survey questions

Survey questions	Research questions		
	RQ.1	RQ.2	RQ.3
Q.1-8	No	Yes	No
Q.9-11	Yes	Yes	Yes
Q.12	Yes	No	No
Q.13-16	Yes	Yes	Yes
Q.17-19	Yes	Yes	Yes
Q.20-26	Yes	Yes	Yes
Q.27	Yes	Yes	Yes
Q.28-30	Yes	Yes	Yes
Q.31	Yes	Yes	Yes

The relationship between the research questions and students' survey questions are shown in Table 4.10. Much of the students' information was used to support the interview and FGD responses in addressing all the research questions. The responses to questions 1 and 2 were used to answer the research question 1.

Table 4.10:

Relationship between the research questions and student survey questions

Survey questions	Research questions		
	RQ.1	RQ.2	RQ.3
Q.1-5	Yes	No	No
Q.6-10	Yes	No	No
Q.11	Yes	Yes	No
Q.12-	Yes	Yes	Yes
Q.13	Yes	Yes	Yes
Q.14	Yes	No	No
Q.15-18	Yes	No	Yes
Q.19	Yes	No	Yes

4.4.2 Research interview

The interviews were conducted using semi-structured open-ended research questions and administered personally by the Researcher. Each interview session was recorded using a Sony digital recorder. Although each interview was scheduled to take a maximum of 45 minutes and a minimum of 25 minutes, seven interviews extended beyond 60 minutes. Marczyk, DeMatteo, and Festinger (2005, p. 117) acknowledged

that while an interview may not be appropriate for extensive statistical analysis, it is a relatively inexpensive and efficient way to collect a wide variety of data that does not require formal testing. Combining interviews with other approaches enabled the Researcher to clarify issues or comments and to probe for additional information (Creswell, 2006; Denzin & Lincoln, 2000).

However, there were some difficult moments in the interviews, particularly with lecturers, as not all of them were equally cooperative, articulate and insightful. Some participants felt their time was limited and wanted to finish quickly and were unwilling to thoughtfully answer the questions. Others felt there was not going to be any significant benefit from the investigation, as they perceived the main problem to be that management was not prepared for any change. In some faculties, young lecturers were reluctant to participate, and requested the Researcher's assurances of confidentiality and secrecy, since they were scared of victimisation should they displease faculty management. Some lecturers poured out their frustrations with the system, in some cases deviating from the main questions. The Researcher used two approaches to redirect these respondents. Firstly, those who were deviating but giving information related to the research were allowed to speak freely. When they were finished, the question was rephrased to elicit responses that directly addressed the factor. However, the difficulty that resulted was that some interviewees wanted to end their sessions at the scheduled time, regardless of whether there were questions remaining. While some rescheduled the sessions, others rushed through the rest of the questions.

Another challenge was with lecturers who wanted the research questions prior to the interview session. For some respondents this would have been a good idea as other resource material could be referred to, and much detailed information given to the Researcher. However, in other cases the Researcher would have received responses that were not true reflections of lecturers' experiences due to their fear of falling out with management. For respondents who had more information to give, the Researcher scheduled additional appointments.

Interviews conducted with senior executive management included the Registrar and Pro-Vice-Chancellor (decision-making positions), Deans from three faculties, a Pro-Vost, a former Vice-Chancellor, Acting University Librarian, ICT Consultant for the UG and three Directors (Quality Assurance and Control, ICT Directorate, and Planning and MIS Directorate). The interviews were fully transcribed and themes coded,

generating data on factors that were discussed by all or the majority of the respondents. The emerging themes were categorised and discussed.

4.4.3 The research design and instrument development

The initial proposal was to recruit lecturers in at least three units to run three courses in e-learning for a semester using Moodle or KEWL, evaluate the programme and model a framework. However, this proved not to be feasible given the cost and time frame to complete the research, coupled with difficulties in institutional acceptance of the experiment. Because of these constraints, the focus of the research was directed towards investigating the process and procedures being adopted by the UG to implement and sustain e-learning within the context of its environment. Therefore, a prototype questionnaire was designed for management and lecturers that focused on the justification for e-learning; return on investment; financial commitment and support from the UG; ICT infrastructure and e-learning; computer skill and usage; content readiness; and implementation plan and readiness. The questionnaire on evaluation focused on: three aspects of e-learning effectiveness; pedagogical aspects; creation and maintenance of e-learning resources; support and operational management; evaluation and quality control through its lifecycle; and institutional planning and management. With feedback from reviewers and critical comments from the Director of the Centre for Schooling and Learning Technologies (CSaLT) in ECU the survey questions were developed. Computer competencies and skill instruments for lecturers and students were also adopted from a CSaLT research document. The instrument was considered suitable for this research and was not modified because it measured the actual competence of the user engaging in use of the computers.

During pre-testing of the research instrument for management and HODs, it was observed that though the research sought to address factors on strategy, the questions focused on the technology. The Director of the UG library and a lecturer in the University of Twente reviewed the instrument and provided feedback and their comments were incorporated to address issues of strategy and implementation. Table 4.11 show the matrices constructed to illustrate the relationship between the research questions and the interview questions developed for the UG management interview.

Table 4.11

Relationship between the research questions and management interview questions

Interview questions	Research questions		
	RQ.1	RQ.2	RQ.3
IQ.1-3	Yes	Yes	No
IQ.4	No	Yes	No
IQ.5-7	No	Yes	Yes
IQ.8-10	No	No	Yes
IQ.11-13	No	No	No

Emerging themes from the pilot survey and interview revolved around management commitment to e-learning, strategy, infrastructure, management priorities, access to computers, bandwidth, internet connectivity and stable electric power. These were incorporated in the final instrument by introducing more open-ended questions for respondents to share their experiences. The instruments and the changes are shown in Appendices A, B and C.

4.4.4 Focus group discussion (FGD)

Focus groups are techniques of research used to collect data through interaction of group members on topics determined by a researcher. The group interactions helps the researcher to gather impressions and concerns about the factor being investigated, which assists the researcher to explore and clarify participants' views in a way that would be less easily assessable in a one-to-one interview (Bryman, 2008; Creswell, 2009; Marczyk et al., 2005). They are normally structured groups of individuals brought together to discuss a topic or series of topics during a specific period of time.

The groups are normally composed of 6-10 participants and the researcher is the facilitator of the discussion (Marczyk, DeMatteo, & Festinger, 2005, p. 156). The effect of having a smaller group is the restricted diversity of opinions offered, as it's difficult for everyone to express themselves in a larger group setting (Bryman, 2008; Creswell, 2009; Marczyk et al., 2005). The common factor is that participants within the group share similar characteristics, interests and demographic features relevant to the subject of the research.

There were four focus groups with six participants in each group; two groups included students from the faculties of Science and Engineering, and two groups had students from the faculties of Social Studies and Art. To build trust and confidence among the participants' rules were established for the group discussion process. Primarily the rules

concerned issues of confidentiality of all information shared in the group, and the recording of sessions by the Researcher. Before the discussion commenced, participants were advised to respect each other's privacy; keep what they heard in the group confidential; take turns in expressing their views; and not to interrupt or criticise one another.

In designing the FGD questions care was taken to avoid using closed questions in order to ensure that the questions generated useful dialogue among participants. Marczyk, DeMatteo, and Festinger (2005, p. 156-158) advised against using 'why' questions due to the tendency of these questions to elicit socially appropriate rationalisation or best guesses about an individual's behaviour when the person is unsure or unaware of the true reasons. Instead, a different technique was used; participants were asked to explain their responses where a 'why' question was inevitable.

The average time for the four focus group discussions was 45 minutes. The maximum time spent with a group was 63 minutes. The FGD provided an open and unrestricted forum for individuals to discuss ideas and to clarify each other's impressions and opinions. The matrix of the relationship between the FGD questions and the research questions is shown in Table 4.12.

Table 4.12:

Relationship between FGD questions and research questions

FGD questions	Research questions		
	RQ.1	RQ.2	RQ.3
IQ.1	Yes	No	No
IQ.2	Yes	Yes	No
IQ.3	Yes	Yes	No
IQ.4	No	No	Yes
IQ.5	Yes	No	Yes
IQ.6	Yes	No	Yes
IQ.7	No	No	Yes
IQ.8	No	No	Yes

4.5 Methods of Data Analysis

The process of data analysis involves preparing the data, analysing it and interpreting it. Different multimedia resources and applications were used to organise the data, clean and summarise it for analysis. The survey data, which was mainly qualitative, was

captured using EPI-Data Software (EpiData Association, 2010) by defining the value and variable labels and doing manual data entry. This application was considered suitable for data entry as it allowed the Researcher to set skip patterns, and move automatically to the next field after an entry was made. It was considered as fast and time saving compared to Microsoft Excel or using direct entry in SPSS. Assigning numeric codes to all the responses preceded data capture. The open-ended responses were captured, as expressed by the respondents, to generate a table of the various responses. The captured and cleaned-up data was transferred into SPSS for analysis of the variables. After exploring the survey and interview datasets, non-parametric statistics was considered appropriate for analysing the data. Descriptive statistics, which allowed for the generation of frequency tables, and cross tabulations to establish the relationship between some of the variables, was used as described in Sub-Section 4.3 in Tables 4.4-4.7. In some cases, a chi-square test was done to explain the relationship between the variables. From the open-ended questions in the survey a long list of all the responses was generated; these were categorised and coded. The coded themes were represented in a table, while some of the phrases that clearly expressed respondents' views and supported arguments were quoted in the findings of the research.

The recorded interview sessions were transcribed using 'Express Scribe' (NCH Software, 2010), which was downloaded from the internet. The application was suitable for 100% transcription as it allowed the Researcher to control the speed limit and replay sentences. However, the challenge was making logical sense of the large amount of data, reducing the volume of information, identifying significant themes, and constructing a framework. Also, during the data collection, field notes were kept summarising observations and activities related to the research. This helped keep the Researcher focused on critical issues that may not have been captured in any of the other approaches being used for data collection. Assigning alphanumeric codes to the respondents and themes that emerged from the responses preceded analysis of the transcribed data. These themes are presented in summarised tables that indicate the frequency of respondents' highlighting specific issues. Initially, many factors were identified, forming large tables; however, these were truncated and summarised by using themes that categorised the responses. Thus, categorisation of the responses into themes separated the interview responses into fragments, which were synthesised by looking at each detail and pulling the fragments together to construct a holistic explanation. The synthesised information was organised as shown in Tables 4.11-4.12.

The initial approach to reporting the results was to summarise the findings and identify the main themes without using tables that informed and themes that explained the factors. Following this the tables were generated with a more formal structure, by re-categorising the themes and using the summaries as sub-headings for discussion within the sessions. The narratives from the interviews and focus group discussions were helpful in explaining the survey findings and vice versa. The narratives were helpful as a secondary analysis, and useful in crosschecking the analysed data. For a cross-case analysis the coded data was compared with the frequencies generated from each of the findings using the numerically coded profile of participants.

It became evident during the analysis that, despite having been asked to specifically list factors that were considered critical for e-learning delivery success, from time to time, respondents digressed into other areas of the conceptual framework. Thus, themes emerged around these additional factors. Occasionally, by rearranging words with a different emphasis, an interviewee referred to a CSF more than once in their response. Hence, the process of clustering the responses was not a quantitative one, but was based on a thematic qualitative coding approach.

In summary, threads and patterns within the interview categories were examined and compared with connecting patterns across the survey, FGD and observations. Interlocking the analysis from the various approaches of data collection, the findings were reiterated, compared and synthesised with literature to put the research in perspective, to answer the research questions. At the end of the process, the conclusions drawn by the Researcher helped in developing an implementation strategy framework, and practical recommendations that can be applied in ICT-challenged environments.

4.6 Ethical Considerations

Ethical precautions that protect respondents and their viewpoints, expressed in a survey, interview, FGD or any approach to collecting data, are of primary concern in research (Berg, 2004; Bryman, 2008; Creswell, 2009; Silverman, 2004). Following the ethical protocol, invitation letters for participation that clearly outlined the purpose of the research and the right of participants to withdraw at any stage of the research process were presented to the ECU Human Research Ethics Committee for approval. Interview respondents were requested to sign consent forms, and students were required to indicate their willingness to participate in the survey before proceeding to answer the

research questions. Three students and seven lecturers declined to participate in the study, as well as those who agreed to participate but failed to return their questionnaire.

To avoid third party access to participants' responses, the database and completed questionnaires were secured in an ECU facility only accessible to the Researcher. Copies of the database of all responses (interview, survey, FGD, observation, institutional documents) were backed-up on external hard drive, on the Researcher's laptop and ECU's server. Through this procedure, the protection and rights of participants, and the integrity of the database were safe guarded.

Finally, when analysing and reporting the findings, participants were treated with optimum integrity, avoiding any references or phases that might identify individuals. Instead, to protect the identity of the respondents each individual was assigned an alphanumeric code. Only the Researcher and supervisors have access to the identity of the respondents.

4.7 Issues of Validity, Reliability and Trustworthiness

Issues of reliability and validity are relevant for any research process because of the objectivity and credibility they build in the research (Silverman, 2004). The quality and credibility for any research process is largely determined by the extent to which biases are controlled and findings can be verified as a true reflection of the researched situation. In quantitative research, the degree to which the determined variables measure what they are purported to measure, and the consistency with which they are measured, are referred to as validity and reliability respectively (Marshall & Rossman, 2011; Silverman, 2004). In qualitative research, the consistent efforts of the researcher to satisfy the conditions of validity and reliability are referred to as trustworthiness.

Research designs, including approaches to data collection and analysis have their foundations in a particular research paradigm. The findings can be subjected to empirical testing. The criteria of rigour for quantitative and qualitative research approaches continue to be hotly debated, although the different terminologies describing the approaches of quality assessment have provided some clarity to assessment and the quality of the research process. Guba and Lincoln (1998) used four terms to describe various means by which the trustworthiness of a qualitative research approach can be assessed (credibility, dependability, confirmability and transferability); that is, a credible means by which the quality for acceptance can be established. They argued that the trustworthiness of qualitative research should be separated from quantitative

research in their assessment of quality (Guba & Lincoln, 1998). Using a mixed-method approach, therefore, requires the researcher to establish a means by which potential biases, that may question the credibility of the research process, are scientifically dealt with.

4.7.1 Validity and reliability

Validity is related to research methodology because its primary purpose is to increase the accuracy and usefulness of findings by eliminating or controlling as many confounding variables as possible. Validity involves the researcher ensuring that the questions in the research instrument observation, measurement process and assessment, actually measure that which they are intended to measure (Guba & Lincoln, 1998; Silverman, 2004). All participants must have a clear understanding of the research. Also the questions participants are asked must be clearly stated without ambiguities or differences in interpretation of the issues. This is based on the assumption about the separation between what Perakyla (2004, p. 289) described as the raw observation and the issues that the observation stands for.

Issues of validity may be internal or external. Internal validity concerns the legitimacy of the research findings and is based on the sampling procedures, data collection and analysis, suggesting that the research design has an effect on the findings, hence the need for validity. Perakyla (2004, p. 294) argued that the central issue of validity is the grounds which the researcher has for claiming the focus of the research is connected to the same conceptual framework. External validity involves the extent of generalisation of the results; exploring whether the findings are transferable to another setting or group; and enquiring about the validity of the data analysis and the basis of its interpretation. However, validity may not necessarily guarantee reliability of the findings, though it involves the interrelationship between the components of the research design.

To achieve validity the research instruments were sent to peers and e-learning experts to critique the adequacy, flow and content of the questions. The reviewers noted the interview questions were inadequate and skewed towards technology rather than strategy and implementation. Also, the survey instrument was repetitive and more focused on technology. The feedback was used to update and restructure the instruments. The refined instruments were finally reviewed by the Director of CSaLT in ECU, a lecturer and senior researcher from the University of Twente and the

Librarian of the UG. The feedback informed the quality and rigor with which the Researcher interpreted and analysed the data in relation to the research design.

Data sources and methods of collecting the data were triangulated by the Researcher to enhance the validity of the research methods. This method promoted a clear and in-depth understanding of the investigation process. This was preceded by mapping out the process of interpretation through a literature review and a conceptual framework, and the assumptions underlying the research, using the research questions as a guide. One-on-one interviews and FGDs were used as participatory and collaborative approaches, in addition to the peer review and literature evidence. Thus, the Researcher looked for various ways of understanding the critical issues involved in implementing and sustaining e-learning, and sought instances that might challenge the expectations of this research and findings. Findings were adequately reviewed, including presenting a conference paper on some of the initial findings. There were also discussions with supervisors to ensure the realities of participants' views were captured and that they were consistent with the findings.

4.7.2 Trustworthiness

Presenting arguments on reliability in qualitative research, Guba and Lincoln (1998) indicated there is a need to focus on the consistency and dependability with which the data is collected, since some of the activities cannot be repeated in the manner of quantitative research. To achieve this, research diary memos were kept as records of field notes that detailed the unfolding research process, data collection and analysis. Therefore, the research procedures were documented consistently in a research diary, while the transcriptions of the interviews were coded and consistently maintained through the entire research process. Themes showing threads emerging from the responses were summarised in tables and displayed in graphs. These were used as a basis for inference and suggestions of respondents' viewpoints, although they were not directly quoted. This was done to meet the dependability and confirmability standards as argued by Guba and Lincoln (1998).

In relation to transferability of the research findings, it was primarily assumed that, although the institutional experience might be different, universities in environments with similar characteristics of the UG could choose examples that will enhance e-learning implementation in their organisation. Furthermore, by establishing a foundation based on different approaches to e-learning in generic theories and models of

innovative technology diffusion and adoption, successful and sustainable e-learning in such ICT-challenged environments can be achieved. The Researcher assumed that by adopting strategies that allow proactive and preventive approaches to potential biases, transferability of the interpretation and findings may be enhanced. Hence, the Researcher used the in-depth description of the participants and the context as the basis of meeting the standards of transferability.

4.8 Research Process in Ghana and Characteristics of Participants

The data collection process began with students and lecturers in February 2010 and ended in October. Students and lecturers were sometimes inaccessible which presented difficult situations for data collection. Table 4.13 describes the research participants, instruments and time-line for the data collection.

Table 4.13

Research participants and period of data collection (Time-line)

Participants	Sample	Instrument	Period - 2010
Students - Science & Engineering	12	2 Focus Groups	March/August
Social Studies & Arts	12	2 Focus Groups	
Survey	236	Questionnaire	
Lecturers	36	Questionnaire	March/August
Heads of Departments and Lecturers	18	Interview	March/September
Deans of Faculty	6	Interview	May/September
Management - Central Administration	2	Interview	May/September
ICT Heads	5	Interview	
Support Unit Directors	6	Interview	
Technical staff	12	Interview	May/August
Stakeholders			
Association of African Universities			
Ghana Telecom University	4	Interview	June/September
ICT Co-coordinator Ministry of Education			
Executive Secretary: National Accreditation Board			

The complete data collection process covered eight months of contact with students, lecturers, technical staff, management, and external key stakeholders. In total the students surveyed covered eighteen departments from six faculties in the UG.

4.9 Summary

In Chapter 4 the research process was discussed using the mixed method approach, grounded in the constructivist paradigm, as a guide for the design process. Rationale for the research design and sampling procedures were described in detail. Reviewing the “actors” involved in ICT for higher education determined the research participants and the sample size. Information gathered covered the institutional environment, the subject of the research, demographic information, and the perceptions of participants., both theoretical concepts and models support this. Following this, the data collection and analysis processes were further discussed in detail. Chapter 5 describes the research findings based on the conceptual framework and perceptions presented by respondents.

CHAPTER 5

RESEARCH FINDINGS

5.0 Introduction

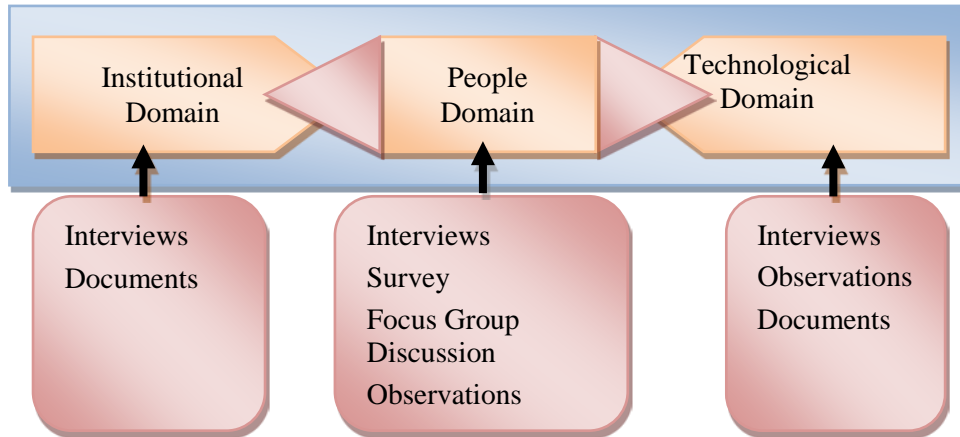


Figure 5.1 Structure of research findings and analysis

In the preceding Chapter the methods of data collection and analysis were described. This Chapter describes the findings in the three domains illustrated in Figure 5.1 below. They form the over-arching structure of this Chapter, which outlines the findings from interviews with management, lecturers, students, and technical staff at the University of Ghana (UG). Lecturers, students, and technical staff were also surveyed to triangulate the interview responses and documentary evidence. Focus Group Discussions (FGDs) with students were organised to gather a deep understanding of their perspectives.

The findings are reported in three sections: the institutional (Section 5.1), people (Section 5.2) and technological (Section 5.3) domains. This allows the researcher to give a clear picture of the current status of e-learning at the UG and thereby to suggest a new e-learning implementation strategy.

5.1 Institutional Domain

The results presented in this section were drawn from interviews granted by management at the UG. Respondents included the Registrar (the administrative head of the university), and the Pro-Vice Chancellor (the academic head of the university and chair for ICT meetings) as the primary administrative managers with relevant experience in university management and ICT in higher education. Interviews were also held with Deans and these were aimed at providing understanding of faculty

readiness and strategies being adopted to integrate e-learning. Emerging themes also came from follow-up questions.

Ideas emerging from the responses were first grouped broadly then summarised and further grouped. Issues mentioned fewer than five times overall were not considered critical for the categories. Four broad themes emerged: ICT and e-learning at UG, understanding/relevance of e-learning, policy and strategic plan, and readiness and workable options for e-learning implementation. Table 5.1 shows the emergent themes and how many of the 19 respondents mentioned each theme.

Table 5.1

Keys Themes emerging from the interviews

Key themes	Number of respondents (N=19)
ICT and e-learning at UG	-
<i>Priorities and E-learning</i>	6
Understanding and relevance of e-learning	8
Policy and strategic plan	10
Readiness and workable options	19
<i>Conditions and capabilities</i>	10
<i>External influence</i>	10
<i>Limitations/frustrations</i>	9

5.1.1 ICT and E-learning at the UG

In this Section interview responses regarding management efforts and ICT in teaching and learning, strategic priorities for teaching and learning, previous experience with e-learning, perceptions of teaching and learning and sceptical reservations for e-learning are discussed.

5.1.1.1 Management efforts and ICT in teaching and learning

All the management interviewees indicated the primacy of traditional face-to-face interaction as the accepted approach to teaching and learning. However, their comments indicated that management had recognised the effectiveness of ICT to support teaching and learning and to this extent they had made e-learning a priority:

Well these days one cannot really separate the use of ICT from even F2F learning because lecturers are encouraged to use the ICT facilities in the lecture room in terms of projecting what they have on the computer and so on. (SMCA1; 20/05/2010)

This was further evident from comments made by a Provost of one of the colleges:

I am trying to encourage the staff currently to try and use as much technology in the delivery of lectures as possible. Try to use PowerPoint, try to put their lecture notes online and make them accessible to the students. And some of them are doing those things. (MDFA3; 12/05/10)

Interview data also showed that there were many small efforts across the UG to establish faculty e-libraries with resources that could be accessed by students. This suggests there was no coordinated effort or plan at the UG to integrate ICT into teaching. One of the factors driving the implementation of e-learning was management's belief that it would lead to a decrease in class sizes (which is a serious problem at the university):

... but obviously with the rapid increase in student numbers one has to think of distance mode of teaching and learning and that is why the university has expanded its distance education. (SMCA2; 11/05/2010)

Management had suggested using ICT resources as tools to effectively support distance education and had made structural changes in rebranding their Institute of Adult Education (IAE) to an Institute of Continuous and Distance Education (ICDE). One interviewee remarked, "... and we have changed the [name of] former Institute of Adult Education to an Institute of Continuous and Distance learning, ... so it does those two things [continuous and distance learning]" (SMCA2; 11:05:2010). In addition to the rebranding, existing sandwich programs during long vacations were promoted by management. All the management interviewees spoke of management's efforts in building a Network Operating Centre (NOC) with the aim of using the technologies to support distance learning. The researcher's observation revealed that most mandatory use of ICT resources leaned towards administrative support services rather than academic support. The use in teaching and learning was therefore dependent on the individual student or lecturer.

5.1.1.2 Strategic priorities for teaching and learning

Six management interviewees indicated that efforts in providing ICT infrastructure to facilitate academic work were consistent with the primary purpose of setting up the university. That is to ensure a conducive environment for teaching and learning. Building the ICT infrastructure was considered a priority - a means of reaching out to all students who otherwise may not have had access to higher education. Management claimed that the primary goal for ICT investment at the UG was to support on-campus teaching and learning, and distance education.

Providing orientation on effective methods of teaching and training, including using PowerPoint presentations for newly recruited lecturers, was considered by four management interviewees as a medium term preparation towards operating in electronic mode. This was based on a Quality Assurance survey report, which revealed that some lecturers were competent at research but not teaching, while others were good at teaching but not research. They found that most lecturers at the UG had no formal training in teaching. One Director of Quality Assurance remarked:

... so far what the unit has been doing is to give some training on teaching methodology to newly recruited lecturers. In the past we have taken it for granted that once you have a PhD then you can be a good lecturer. (MDCA1; 15/05/10)

While the Dean argued that there was a need for the training programs to be extended to all lecturers in the faculties, one senior manager indicated the focus was on newly recruited lecturers only, not existing lecturers. An intention to rollout the training sessions to all departments in turn, to ensure that all faculties were covered in the future was expressed. However, it was observed that these intentions were not communicated to HODs.

Three management respondents argued that the university's priorities were not right because key units to support teaching and learning were not well resourced while there was much emphasis on non-academic structures. One Director remarked:

... a decision to start the QA unit started in 2005, ... but it took the university two years to discuss in detail what form it should take and finally the unit was born in 2007. Problem is they have still not resourced the unit to operate effectively. They are rather building Hostels (MDCA1; 15/05/10)

The priority expressed by this Director did not appear to show serious planning of activities for developing an e-learning environment. The comments did not suggest any structured priorities for teaching and learning.

5.1.1.3 Management's previous experience with e-learning

The interviewee responses were further categorised into two broad areas - previous experience with learning systems, and acceptance and use of the learning systems.

i) Previous experience with learning systems: In relation to institutional experiences with learning systems, most (13) management respondents referred to ICT support for administrative services, provision of computers to faculties and computer laboratories for student access. However, three interviewees cited the African Virtual University (AVU) program in which the UG had been involved. They indicated that the learning

platform did not influence the UG curriculum, citing lack of adequate infrastructure as the reason for its failure: "... we have used the AVU structure to bring about some use of ICT for distance learning but not on the scale that has much influence on the university curriculum" (MDCA4; 14/09/10). The data show that while senior administrative managers were familiar and aware of the AVU program, the Deans of Faculties were not. The extent of management commitment to the AVU program was therefore not clear.

The open-source LMS was also mentioned by seven management interviewees. They explained efforts being made to encourage lecturers through a training program. However, the assumption that the training programs will inspire lecturers to accept and adopt the resources shows a lack of policy and strategy to integrate the ICT in teaching and learning: "The University has been experimenting with a lot of things; they have been encouraging lecturers to use this KEWL type of delivery of lectures; PowerPoint using the Internet to give assignments to students to put lecture notes on the Intranet." (MDFA2; 19/03/10)

ii) Acceptance and use of e-learning resources at the UG: Lecturer apathy towards the use of KEWL and ICT resources was expressed by seven (7) management respondents, with some Deans attributing their inability to use PowerPoint presentations to large class sizes and inadequate physical infrastructure:

... but most lecturers are uncomfortable using that module [KEWL]. It is there but people are not using it, if anything very, very few people are using it. ... and again they are encouraging people to use PowerPoint, and again very few lecturers are using that. I for one I am not using it for the bigger classes because the classes are so large, the classrooms are so big. (MDFA2; 03/03/10)

Five management interviewees explained that although training workshops were organised, these had not affected lecturers' attitudes towards use of the resources. Implications were that participants' needs were not met at the workshops, and participants would therefore not accept use of KEWL simply because they attended a training workshop.

iii) Reasons for lecturer indifference: The lecturers' lack of interest in using ICT resources was explained from two different management perspectives. Technically inclined interviewees (4) argued that it was new within the context of the university while the Deans (6) attributed the lack of interest to absence of institutional policy and strategy to drive a successful implementation:

The current status is that it's [use of e-learning] at its infancy stage. A lot of work has been done to promote e-learning in the use of an open-source package – KEWL. At the institutional level we have not had policy to actually promote it [e-learning]. At the institutional level there is no drive per se to really promote it. ... It's only recently that we completed our ICT policy and it's yet to be implemented. (MDFA2; 03/03/10)

Contrary to the efforts related to training, expressed by some management interviewees, there were expressions of a lack of awareness about the learning resources and their potential to support teaching. The four Deans suggested a lack of effective communication and a problem with the approach management had taken to implement the learning resources.

5.1.1.4 Perceptions of teaching and learning

In short and medium term plans, management was implementing a visitation panel report that recommended reducing class sizes from 1200 students to a maximum of 300 students. The objective was to make teaching and learning more effective. Some interviewees (6) expressed optimism that if the policy was adopted and enforced, teaching and learning in the short to medium term would be effective, especially if driven by technology.

Arguments for more technology in the medium term were based on knowledge of a revamped Network Operations Centre (NOC) by the UG, and a perceived increase in users' understanding of computer usage. It was perceived that more students were actively involved in the use of ICT resources and that the cost of computers would continue to fall:

The delivery of lectures is being more technologically based than [before] – people have moved from chalk to making presentations and delivering lectures by PowerPoint. So gradually I can see that with the enhancement in technology and the availability of support, I can envisage that there would be more use of technologies, which would ensure that delivery of lectures is made easy and more understandable to the students. (MDFA3: 12/05/10)

The eight million \$US Chinese Project is going to improve facilities for learning. In fact, it's going to help to acquire the e-learning system, which will support distance education in terms of off-campus and on-campus learning. So there is an exciting future for ICT in teaching and learning. (TSIT1: 20/08/10)

The suggestion that technology would drive teaching and learning, causing a reduction in class size, and on that basis lecturers and students would adopt and use the ICT resources, shows an inadequate understanding of the complexities involved in adopting e-learning.

A few of the management interviewees revealed that the university aimed to acquire an e-learning platform different from the LMS KEWL in the short term to support both on-campus and distance education. The data showed that distance education was the main focus of attempts by the university to adopt e-learning, with emphasis on blended learning as the preferred approach.

It's certainly going to be a blended learning approach, ... we also have a distance learning project which is on board, which we hope in the next few years to come will transform into electronic teaching and learning covering the various regions [10 regions of Ghana]. Currently it is in the traditional mode, so the electronic distance learning is not on board ... it's one of the projects that we have upcoming and the current Chinese project which is going to transform the electronic infrastructure is certainly going to be the major resource for the university in this regard. (SMCA1; 20:05:2010)

Expectations of management were that, on completion of the project, the current paper-based models would be transformed into an e-learning format.

Concerns about short, medium and long-term objectives

In contrast to the optimism expressed, five management interviewees expressed concerns about lecturers' acceptance and adoption of the innovative technology platform, prompting the ICT Director to remark "... when the Chinese project is completed we are going to have that platform and you find out that it's not only getting the software but getting people to use it." Corroborating the concerns, the Pro-VC remarked:

... I also expect a good number of our scholars to gradually accept this electronic mode particularly since they have been used to the traditional means of teaching and for a long time, since the university started, and it's not been easy getting ourselves to overnight learn to use the electronic mode of teaching and learning and communication [sic]. (SMCA1; 20:05:2010)

These expressions of concern and expectations further suggest a lack of both institutional policy and a properly structured program to implement e-learning.

5.1.1.5 Sceptical reservations for e-Learning

There were contrasting views and doubts expressed about the success of e-learning by some management interviewees (6), who suggested the UG could not cease face-to-face sessions with students. In their view e-learning can be achieved within the medium to long term for distance education. Corroborating these views, one Provost expressed

doubt about the university's capacity to implement e-learning considering the cost involved in acquiring the resources:

... one of the challenges is that technological base deliveries are quite capital intensive. If you want to give out the best using the modern technologies and those things, the university has not been able to resource itself or position itself with such technology to be able to facilitate the day-to-day utilization of such methods of delivery of lectures. But by and large it is in the wisdom of the university to do so if it has the capabilities to support it. (MDFA3: 12/05/10)

It was evident from the response that having the infrastructure was not enough: the ability to facilitate day-to-day utilization of the resources and the financial support for maintaining the resources were also critical for successful e-learning implementation.

5.1.2 Institutional Understanding and Relevance of E-Learning

The need to explore management's perception of e-learning and its relevance to the UG emerged after 2 interviews with management respondents, which revealed some differences in opinions about e-learning. To gain an in-depth understanding about the perception of e-learning at the UG, management were asked to describe the institutional perception of e-learning and whether they considered it relevant.

5.1.2.1 Understanding of e-learning

Eight Management interviewees described e-learning in terms of students using electronic resources like the Internet, Intranet, computers and online resources to access learning resources; lecturers uploading the learning resources for students to access; and projection of lecture notes:

E-learning is learning through the net, learning through the net and that is teaching and learning through electronic resources ... internet or intranet where students have contact with their lecturers on the net. ... Assignments are given on the net, lecturer notes are given on the net, the responses are given on the net and replies are given on the net... [all this happens] without the intervention, F2F contact with the lecturer or the student. (Dean, MDFA2; 03/03/10)

... my understanding of e-learning is having information available on the net ... I think that it's in different stages, I suppose for example I as a lecturer can prepare all my lectures and load them on the net. (MDFA3: 12/05/10)

The descriptions given underline both synchronous and asynchronous learning; however, the data show that the LMS network was used primarily as a repository for learning resources. The general understanding for the preferred type of e-learning was blended learning.

5.1.2.2 Relevance of e-learning

The management interviewees indicated various reasons for the UG to pursue e-learning. Firstly, it was seen as a means of solving the UG's problems of increasing student numbers without a corresponding increase in infrastructure:

... when you see the numbers in the university they are simply overwhelming, they are frightening, you see about how many, what is the lecturer student ratio. I mean very huge numbers. (MDCA2: 10/06/10)

It is very relevant particularly with our numbers soaring so high and particularly with the Distance education that the university is currently embarking on. (MDFA3: 12/05/10)

One manager commented that students were reported to walk in and out of lecture sessions and were not being diligent. This resulted in diminishing student contact sessions with lecturers and lecturers losing control of the students in large lecture theatres (halls). It appeared this had an effect on effective teaching and learning.

Secondly, e-learning was seen as a way to improve the lecturer/student ratios and expand distance education to remote locations in the country. They perceived that one good lecturer could serve as the resource person to several students from different faculties and disciplines:

One, the HR [Human Resource] is not there, the faculty is dwindling and two, student numbers are increasing. Yes we cannot physically accommodate them on campus. Lecture rooms are over flowing so the e-learning concept will be very, very helpful (MDFA2: 03/03/10)

In support of the above comment, Table 5.2H in Appendix E1 shows that between 1990 and 2010, student enrolment in the UG increased steeply with a decline in lecturer numbers so lecturer: student ratio increased substantially. It was also observed that the ratios varied widely between faculties.

In corroborating the benefit of reaching students in remote locations, one Deputy Dean remarked that "... if we have virtual lecture rooms and teleconference... video conference can all be used to reduce the contacts. The large numbers and the few faculties can handle them..." (MDFA2; 03/03/10)

Thirdly, the UG may enter into partnership with other well-resourced universities to share well-researched and developed content. Three management interviewees cited examples of partnerships already established with Harvard University and MIT to access both learning resources and content. An investigation into the extent to which

these resources were being used revealed that none of the surveyed faculties were using the resources effectively. This could be explained by the lack of effective electronic resources and leadership to adapt resources.

Fourthly, the managers indicated that by incorporating e-learning into the UG's curriculum, students' understanding of the content would be enhanced, since they would have access to learning resources and could prepare before attending lectures:

E-learning in that context is relevant because you are talking about improvement in the quality of learning. So when you talk about relevance there is no question about the relevance, you are talking about quality. E-learning means quality, so that is what I will say. (MDFA2; 03/03/10)

The managers' high expectation of e-learning to improve the quality of education indicates an 'optimism of panacea' for the challenges the university faces.

Fifthly, students would have unlimited access to learning resources:

The student accesses the material, reads it, and gets prepared. The students have access to digital resources both within the Internet and within the Intranet. Just by the course mode or face to face is limited, but then opening the gate of e-learning online, students have access to so many resources on a given topic. (MDFA2; 03/03/10)

The data shows strong arguments for e-learning at the UG. However, though management were familiar with the relevance of e-learning, it was not clear whether they were well informed about the trends and how e-learning was impacting higher education. Some of the arguments reflected ideal situations, which would require careful policy, strategy, leadership and management commitment.

Seven of the management interviewees, in supporting the relevance of e-learning to the UG, cautioned on challenges to be overcome and the level of commitment required from management to make e-learning successful:

If we have the facilities to be doing e-learning, that would be super. But you know it means the infrastructure also has to be set up by the government. (MDFA3; 12/05/10.).

The network and internet systems and ICT facilities across the country would have to be very, very efficient, if you have to actually do e-learning and make it more effective. (MDFA1: 09/08/10)

5.1.2.3 Challenging the relevance of e-Learning

Contrary to the logical reasons advanced for e-learning implementation at the UG two management interviewees challenged the relevance and need for e-learning. One Dean

remarked: “Why are we making so much ... out of e-learning? I mean, that is the question we need to ask, we need to interrogate that.” (MDFA1:09/08/10) A preference for contact sessions with students over e-learning was indicated. They argued that effective communication and instruction through face-to-face interaction enables the lecturer to analyse students’ ability, and was a means of assessment for the lecturer personally. Hence, these interviewees considered that the traditional mode of instruction was the more effective way of teaching and learning.

Concerns were also expressed about how the emerging technologies would benefit users, considering the dynamic nature of the technologies and their extent of penetration into the market:

... the world has a very nice way of swinging onto new fads and riding away on the fad and then they get to a point and say well you know, yeah we are tired of this one, let’s move onto another platform, we need to interrogate that. ... the question is how do we ensure that students develop the skills they need to have by the time they finish a certain program? (MDFA1: 09/08/10)

It appeared from these concerns that the UG needs to focus on the skills and competencies gained by students by the end of their learning. Two management interviewees questioned the difference between giving handouts to students and uploading notes online, and making them download materials when access to computers was limited:

... if what I am going to put on KEWL, ... is something that I can also make in a handout and give to students what is the difference or if all I am doing is putting the thing on the site – is that e-learning? (MDFA3: 12/05/10)

Some opinions showed that e-learning does not provide an easy way of marking assignments written in essay form, and that the classrooms were not technology-friendly enough to project lecture materials to large numbers of students.

5.1.3 Policy and Strategic Plan for E-Learning

Policy and strategy issues that were raised in the interviews were grouped into sub-themes of awareness and familiarity with government provisions; corporate strategic planning and e-learning; institutional structured processes for e-learning; management policies and strategic plans for e-learning; and the gap between e-learning and policy.

5.1.3.1 Awareness and familiarity with government ICT provisions

With regards to government provision of ICT resources, management interviewees (5) were divided on two issues: first, institutional awareness and familiarity with government ICT policy and second, the provisions for higher education, as the driver or basis of management initiatives and activities. One manager remarked: “I know there is some government ICT policy somewhere, but I guess the Pro VC can tell you [more] about that.” (SMCA2; 11:05:2010) While contributing to initiatives that the UG had made with government the Pro-VC did not give specific details about the government’s ICT strategic plan for higher education. However, the ICT Director indicated that efforts were consistent with government policy for higher education:

... we are taking advantage of the government strategic plan for ICT in tertiary institutions, that is how come we are in partnership with the Ministries of Education and Finance, with government support to secure the Chinese loan for the project to upgrade our infrastructure to a world-class standard (MDFA2; 03/03/10)

The researcher observed that management depended on the ICT Directorate to lead and provide information on which government provisions the UG could take advantage of. All four Deans responding to the question, however, appeared to be unconcerned about the government policies or strategies available but expressed concern about the university’s goals and objectives for e-learning. One Dean remarked, “we are waiting for the university to provide the resources, and the policy for e-learning. The lecturers will not use KEWL when they are not well-resourced.” (MDFA2; 03/03/10) It was obvious from the comments that the faculties had no clear policy or goals to effectively integrate e-learning in teaching and learning, but expected management to give direction.

5.1.3.2 Corporate strategic plan and e-learning

All management respondents showed clear knowledge and understanding of the university’s corporate strategic plan, which identified ICT as a tool in achieving its goals, and the need to develop infrastructure to support administrative and academic processes:

... in the year 2000 the university developed a strategic plan which ran for 10 years; 2000-2010. One of the key thrusts of the strategic plan was that the university would pursue the use of ICT to drive all its initiatives (MDFA.C3)

Contrary to the provisions in the strategic plan, there was no evidence of emerging policies and strategies for e-learning. Respondents explained that although e-learning was not prominently captured in the strategic plan the improvement in infrastructure implied its integration in teaching and learning:

Technology integration in teaching and learning is not prominently captured but if they say improvement of technology it pre-supposes that all those other facilities which would be linked to that technology would be enhanced once you do the technology improvement. MDFA3: 12/05/10.

There were a number of objectives listed in the UG's strategic plan aimed at improving technology, but not necessarily teaching and learning. The corporate strategic plan revealed that the UG's mission was to provide a congenial learning environment, accessible especially to the people of Ghana and Africa. The goal was to develop world-class human resources and capabilities through quality teaching, research and knowledge dissemination. Although e-learning was not mentioned, technology was cited as critical in analysing the UG's strengths, weaknesses, opportunities and threats. Current ICT infrastructure was cited as an institutional weakness. Hence, it was recommended that it be changed into a strength to achieve its listed objectives. The document was clear that the focus of technology was to build a robust ICT infrastructure, integrating teaching and learning as a by-product of adequate infrastructure. The document identified the ICT Director as the primary respondent to the development of ICT infrastructure and other members of management as secondary respondents.

The lack of institutional policy and strategy for e-learning may be explained by the fact that the role of e-learning was not clearly defined, though the benefits were acknowledged. The ICT directorate had crafted an ICT strategic plan, but it had not been accepted and approved by the academic board at the time of this research. The plan has been the directorate's guide to pro-active initiatives consistent with its mandate in the strategic plan.

5.1.3.3 Institutional structured process for e-Learning and challenges

All the management interviewees indicated there was no structured plan currently in place for e-learning implementation, but expressed what they considered workable processes. The processes discussed below were the issues most mentioned by the respondents.

Firstly, enthusiastic users should be identified, encouraged and motivated to develop e-learning content. In expanding the comment, the ICT Director remarked "... the strategy is that we would identify some lecturers who are passionate about it [e-learning], and encourage them, motivate them in one way or the other to create content, or in other words e-courses, using the new e-learning platform." (MDCA2: 10/06/10) In a follow-up e-mail to explain the process of identification and motivation the ICT Director was asked two questions:

1. How do you intend to identify the lecturers who are passionate?
"Their Deans/Heads will nominate them based on a criterion to help them. The criteria include: Proficiency in ICT, familiarity with e-learning tools, etc"
2. How are they going to be motivated to develop the content?
"These will include: Promotion, honorarium or some allowance"

The content development process was structured to gather information from all categories of lecturers to develop e-learning content: "... such people who would not have the time to sit down and use the e-learning software to create a web-based, or e-course ... we have that central team, or core team that would just get the input and create the content for the e-learning." (MDFA2; 03/03/10)

Secondly, it was not enough to have e-learning content developers only; the commitment of lecturers to use the resources with adequate technical support was also needed. Providing technical support was aimed at boosting user confidence:

Apart from the software that you need and the kind of technical assistance that you need, a core of technical staff that readily would come to the aid of lecturers in need by the press of a button ...a help desk all over the campus where you can be very easily helped. (SMCA1; 20:05:2010)

Thirdly, the effective process would ensure a stable power supply, and the installation of a robust electronic system and infrastructure that would "... stand a test of time and not those that typically break down after every lightning."(SMCA1; 20:05:2010)

Fourthly, there were concerns about institutional support for technical staff and leadership to facilitate ICT adoption at the UG by the ICT technical support unit:

The ICT policy was approved by the academic board recently. The strategic plan is in its draft form, just to be approved, but what has been happening is that pending that formal approval, we have been working with the draft, so that is to say there is some kind of road map. (MDFA2; 03/03/10)

Some management interviewees denied knowledge of the document, suggesting it did not exist.

Fifthly, all management respondents identified training as a necessary part of the structured process for successful e-learning implementation. They believed that student competencies were often higher than those of the lecturers, and therefore recommended continued training of lecturers to acquire skills and competencies that were abreast with emerging technologies for teaching and learning: “The irony is that many students appear to be ahead of staff, out of curiosity they are more adept in the use of electronic gadgets” (SMACA1: 20/05/10)

This suggests that there were still issues with encouraging lecturers to engage in using ICT resources for teaching and learning. Students were considered more competent than the academic staff (who were considered to have a phobia for e-learning). While newly recruited lecturers were considered technology-friendly, concerns were raised about established lecturers who had the biggest resistance to using ICT resources for teaching. Lecturers’ willingness to use e-resources and computer literacy was linked to age and their background training before the university recruited them. In contrast to the observation made by five of the management respondents, a study done in Australia (ACSA, 2008) show that the best users of ICT resources were the experienced lecturers, who usually bring more than technical knowledge to teaching.

5.1.3.4 Management policy and strategic plan for e-learning

Nine of the management interviewees were divided on the question of why there were no policies and strategic plans for e-learning, although the UG did have some basic infrastructure and the political will to implement e-learning. Some (6) of the interviewees believed that though most lecturers have computers, policies can only be started when all staff (lecturers) have a computer in their office and have received adequate training: “A policy means that you have provided all the necessary ingredients. You don’t roll out a policy when you are not ready with the equipment on the ground. So we need to consider all these before we start...” (SMCA1; 20:05:2010)

The management interviewees said that the number of PCs, training sessions and electronic books were critical issues to be considered before having policies and strategies for e-learning. The Pro-VC estimated the current computer to student ratio as 1:34, which he thought could be improved to 1:10 or 1:15. Although most lecturers had

a computer, it was common to see students waiting in queues for at least 20 minutes to access a computer in the computer laboratory. Each student was allowed two hours of access to a computer and Internet services in a day. Interviewees also stated that although the university has an electronic library, the available bandwidth was inadequate for accessing most of the electronic books. This was expanded by the Pro-VC: "... I think we can, as for the teaching and learning within the confines of our own campus, forgetting even about the bandwidth you need for e-libraries and so on, we can start in a modest way." (SMCA1; 20:05:2010)

Management's approach was to resource all departments and provide training before crafting an e-learning policy with the hope that once all lecturers have the opportunity to use the system effectively there will be no excuse for not using it. The argument was that it was inappropriate to develop a policy that would compel lecturers to use ICT resources when they were not well resourced. Although student access to computers and Internet services was a concern, most lecturers were unwilling to use the resources for teaching, partly because they did not know how to use them. One Director remarked: "... as far as our context is concerned – access by the students is an issue. For the lecturers or teachers we only have [a] few people expressing interest, or using it..." (MDFA2; 03/03/10). For some managers, students' access was linked to lecturers' interest for adoption.

A few (3) management interviewees considered the manner in which resources were provided as an institutional culture of how things are achieved at the UG. Citing an example of when the ICT policy document was first presented to the university academic board in 2005, its acceptance in 2009, and that it still had not been adopted, an ICT Director remarked:

... when you talk about the UG, it is a reflection of how things get done, slow; things are conventional so people need to meet, committees. It has to do with the university's context of doing things. Things tend to be slow, the bureaucratic process. So [it] is not like the university does not buy into it [policy and strategic plan]. You know the processes are there, they are going by them. (MDFA2; 03/03/10)

In attributing the current problem to change management issues, the ICT managers argued that the current ICT policy will provide impetus for faculties to adopt ICT resources for teaching.

5.1.3.5 Establishing the gap in e-learning and policy

Four management respondents indicated that five years after launching the open-source LMS KEWL, much has still not been achieved. The managers attributed the lack of adoption to the fact that no prior institutional policy or consultation with faculties was done to establish the needs of lecturers and students. This lack of policy meant the LMS KEWL was not widely used by either lecturers or students. According to one Director of ICT, “the open-source LMS, KEWL was launched in 2004, requesting all faculties to use the LMS for teaching and learning. They are not using it. Maybe because it is voluntary...” (MDCA2: 10/06/10). Corroborating this a Dean of a Faculty added:

... e-learning in general has to be a university policy. The university policy is not very concrete on e-learning whatsoever. So the departments are waiting to fit [their plans] into it... you know we cannot go alone ... The policy framework is not concretised, it's not firm. So it is left to individuals who have the skill to try and do this and put materials on the net for students to access (MDFA2; 03/03/10)

The issue of limited ICT infrastructure was cited as one of the significant challenges that the UG must contend with for successful e-learning implementation: “We must be careful [about] the extent to which you ask people to use the application. We must not forget that, access is slow and the bandwidth subscribed for university-wide engagement is very small.” (MDCA4: 14/09/10)

5.1.4 Institutional Readiness and Workable Options for E-Learning

Responses from management interviewees on university and faculty readiness for e-learning were various and prompted the question “what options can be considered workable?” Issues and themes relating to readiness, structure and design of courses suitable for e-learning were collated. Attempts were made to tease out responses that suggested e-learning will aim at meeting some of the strategic needs of users and will be embraced as a new culture of teaching and learning. This section describes management's perception of institutional readiness and workable options for e-learning.

5.1.4.1 Readiness to adopt/implement e-learning

All management respondents cited initiatives, completion of infrastructure projects, and upgrading the ICT infrastructure as signs of management commitment and readiness towards e-learning. This section describes management responses on institutional

conditions and capabilities, as well as workable options for e-learning implementation in the UG.

i) Conditions and Capabilities for E-Learning: Institutional conditions and capabilities highlighted by the management interviewees that suggested readiness for e-learning are summarised in Table 5.2. The responses show internal conditions that are capable of promoting and enhancing successful e-learning implementation. Management believes, by identifying the conditions, value adding initiatives may emerge to support the implementation process. Coded responses were categorised into strengths, weaknesses, opportunities, and threats.

Table 5.2

Summary of institutional conditions and capabilities for e-Learning

Conditions and Capabilities for E-Learning (n = 13)			
Strengths	Weaknesses	Opportunities	Threats
Intensified training for staff – PowerPoint presentation (6)	Lack of formal training in teaching methods (pedagogy) (3)	Collaboration and partnership with well-resourced universities already exist (5)	Inability to resource or position for e-learning (6)
Orientation for new staff on teaching methodologies (3)	Lack of e-learning policy, and plan (6)	Access to global resources (6)	Lecturer apathy towards ICT and fear of change (4)
Recruiting younger lecturers with computer skills, enthusiastic about ICT (6)	Optional use of ICT resources (4)	ICT in revised SHS curriculum (4)	Inadequate support services (13)
More students were engaged in using ICT resources than lecturers (4)	Few lecturers were enthusiastic and engaged in using ICT resources (5)	Students contribution (fees) towards ICT equipment (6)	Resistance and phobia for electronic mode of communication (5)
Automated Library Services (3)	Lack of adequate support staff (13)	Part of a consortium of libraries to access e-materials (4)	Poor culture of maintenance and monitoring (13)
Political will to roll out e-learning (2)	Inadequate technical skill and competence (13)		
Students assessment and evaluation of courses (5)	Lecturer apathy towards using ICT resources (4)		

(*) Numbers in brackets represent the number of interviewees who responded to each category.

Issues categorised as strengths include; all the efforts made to promote e-learning, resources that give the UG an advantage over other universities, teaching and learning activities that make the university different from other universities in the promotion of e-learning, and anything considered strength in promoting e-learning. The weaknesses described activities in which the university was not performing well, including issues that did not promote successful e-learning implementation. Examples of weakness were issues restricting faculties from effective and efficient use of ICT resources to improve teaching, learning and research.

The following issues were considered opportunities for the UG: 1) issues related to relationships and partnerships with other universities that will promote and enhance e-learning; 2) prospects that will promote quality teaching and learning, above other universities, or make e-learning very attractive to applicants; 3) attracting the best students from high school to the UG; 4) necessary internal structures that could be restructured; 5) available competencies and capabilities that were not being used, and 6) Resources that could be gathered to promote e-learning.

Issues with the potential to negatively influence successful e-learning implementation were considered threats. These threats, both internal and external, included rates of staff turn-over, financial challenges and problems that posed challenges to any successful e-learning implementation. From management's perspective, financial challenges were the main issues to be considered, a situation supported by one Provost who said: "We don't have sufficient internal resources [funding] to support any initiative for e-learning." (MDFA3: 12/05/10)

The data show that although strengths, weaknesses, opportunities and threats were discussed, the main emphasis in the responses was on infrastructure. There were almost no direct comments on the philosophy and culture of teaching and learning, leadership and management, finances or on technical support readiness. The

Researcher concluded that readiness for e-learning spans beyond the technological infrastructure.

ii) Workable Strategic Options: There were four common threads running through responses from management in terms of workable options for successful e-learning implementation. Firstly, management respondents stated that there needs to be a focus on issues that will enhance the capacity of faculty members to engage in e-learning,

given that all available resources and technical support would be provided. They believe this will help lecturers use PowerPoint presentations effectively, and that they will only be required to update their lecture notes periodically: "... so, if we have adequate infrastructure, available resources, good supporting services, then we move on to enhancing the capacity of the faculty members and the technical staff, then we can roll out this thing [e-learning]." (MDFA3: 12/05/10)

Secondly, management respondents requested seminars to explain what the university hopes to achieve, training and re-training of lecturers, and ensuring that everything essential will already be installed.

...you need to train people. Introduce them to the system so they know what the system is... train a core of people who will be operating the system, then the users must also be trained. Once they get into rhythm into what benefits they can derive from the system they will use the system. (MDFA2; 03/03/10)

Comments from all the respondents show that management's focus was on training lecturers and not technical staff and students. They indicated that though training was important it was not enough by itself and that management initiatives alone cannot lead to successful e-learning. Generic training would not satisfy specific individual and faculty needs. An ICT consultant for the university remarked: "They [management] may have the overall view but the specific needs of the various faculties would have to be articulated from the faculties." (MDCA4: 14/09/10)

Thirdly, in recommending a phase-by-phase approach to implementation, management linked the workable options to institutional policy based on assessment, and indicated a need for feasibility studies to establish the university's infrastructure and human resource strengths and weaknesses: "... so once we know what we have and what we lack then we quickly have to put those things in place, put the infrastructure in place." (MDFA2; 03/03/10) and

... we would just bring the expertise together into a committee to really evaluate our position. Actually, do feasibility to be sure; we know what we have; what is available, what we need. Because we need to do systems audit to be sure what you have, whether you have adequate resources, if not what do we need. (MDFA1; 09/08/10)

Fourthly, the need for a cultural change in maintenance and monitoring were described by respondents as being essential, because these two aspects had been the most common factors in destroying systems and the sustainability of resources over the years:

... constant monitoring and evaluation is very, very important. We put things in place and just go. We don't monitor their use, how they are being used, whether they are maintained. Maintenance should also be up there, always servicing the system. MDFA2; 03/03/10)

There were calls for changes in the attitudes towards maintenance and support, as servicing of machines was not done consistently and periodically. Respondents indicated that technical support services did not respond promptly to requests for help and attributed the delays to the poor culture of maintenance, lack of adequate staff to support the system, and a lack of knowledge and skills to solve the problems. Further, the strategic options expressed by the Deans varied between faculties. For instance, Deans from Arts based programs had concerns about e-learning, indicating their preference for contact sessions with students. Deans from the Social Sciences recommended a holistic approach to implementation, involving both management and faculties, and indicated practical options to deploy e-learning. Moreover, although none of the faculties had an e-learning strategic plan, some had long-term faculty strategic plans but these still lacked emphasis on e-learning.

5.1.4.2 Limitation/challenges to workable options

Contrary to the administrative managers' optimism, the Deans of Faculties sounded caution on issues they considered critical for successful e-learning implementation. They indicated that, firstly, the low number of lecturers in the faculties who took the option to use ICT resources was disturbing. They argued that having policies on use of ICT resources would guide users and promote effective integration of e-learning. Secondly, lecturers were apathetic and lacked individual initiative and effort to acquire competencies and skills to use the resources. One Dean remarked: "...the people themselves would have to educate themselves about this new technology, so that at least we would minimise frustrations in the application of that technology". (MDFA3; 12/05/10). Thirdly, the time needed to learn how to use resources and move away from the "comfortable" traditional approach to teaching was an issue as lecturers had little spare time and the system was slow:

... we don't have that much time, we are used to a certain way of delivering lectures, now you want to make a new introduction and I sit behind the net and it takes me 30 min just to key in; is a big frustration and disincentive, so if you want people to apply themselves ...this is a new technology. (MDFA3: 12/05/10)

Fourthly, there was a lack of technical support and competence to effectively manage the available resources indicating that the challenges in adopting e-learning were more

human than technological. The technology-dependent issues require a proper setting and periodic evaluation and maintenance, while the human-dependent issues focus on enhancing the process through support services. A failure of either one has both direct and indirect effects on the operation of the entire system: “we have the technologically-dependent programs to start, to protect the system and make them work and then we have the human based approach also to protect the system to make it work, we look at ethics, the laws, education and orientation and then efficiency of management.” (MDFA2; 03/03/10)

If people were not diligent in ensuring that systems were securely protected and updated periodically, then the system would not be sustainable. The broad range of issues cited by management respondents included ethical standards in using e-learning resources, legal issues, continuous professional training and development, efficiency of management in harnessing use of the resources, and management efforts and leadership.

5.1.5 Summary of Institutional Domain

Findings from management response show that face-to-face contact sessions with students were the most practised form of instruction. However, management identifies e-learning as the future of teaching and learning. Efforts were made by management to promote the use of computers and computer resources for teaching. Resources that were recognised to be used at the UG were PowerPoint presentation, and the Learning Management System (LMS) KEWL. As part of efforts to promote e-learning some units at the UG were restructured, a staff resource centre was built to train staff, a NOC was revamped, and more infrastructures were acquired. Periodic workshops and seminars were organised to encourage lecturers to adopt the resources for teaching. Management projection in the medium term was to use e-learning to enhance teaching and learning. Management has further demonstrated good rationale for the need to adopt e-learning as the university’s alternative mode of instruction. However, there was lack of clear understanding of e-learning, the complexities involved in motivating users to adopt e-learning and the process of implementation. Though the UG was part of the AVU initiative, and has moved on to launch the KEWL, the experiences did not impact on the curricula of the university.

In the Table 5.3a and 5.3b are summaries of management factors identified as limitations to successful e-learning implementation at the UG.

Table 5.3a
Institutional domain factors

Best e-learning practice (Literature)	UG practices	Established gap
Clear e-learning mission and vision statement	Corporate mission and vision statement	Lack of mission and vision statements
Well defined policies and objectives	No known policies and objectives	Lack of policy and objectives
Strategic and implementation plan	Drafted ICT strategic plan	Lack of a completed strategic and implementation plan
Management leadership and commitment	ICT management committee; staff resource centre; computer laboratories; seminars; workshops; support services	Inadequate
National e-learning policy and infrastructure support	Good knowledge and awareness of national policy and provisions	Inadequate unreliable
Feasibility/Cost benefit analysis	Unstructured uncoordinated approach	Approaches not informed by any institutional study to assess user needs
Well define incentives and reward system	Incentives not seen as needed	Lack of incentives
Well define plan for faculty roll-out	No faculty or curriculum plan for e-learning	Lack of target programs for e-learning
Structured training and continuous staff development plan	Orientation on teaching methods; PowerPoint presentation training; use of KEWL Next-Gen	Not aligned to teaching and learning culture
Quality assurance structures and monitoring plan	Related to lecturers annual assessment of students	Lack of quality assurance
E-learning aligned to institutional culture of teaching and learning	Ad-hoc practice	Not consistently related to culture of teaching and learning
Well-developed social systems and support	Negative influence of social system	Poor social system for e-learning
Change management plan	No known plan	Lack of change management plan
Stakeholder consultation in decision making process	Management decision	Lack of consultation with stakeholders

Table 5.3b

Institutional domain factors

Best e-learning practice (Literature)	UG practices	Established gap
Well defined institutional philosophy for teaching and learning	Norm of traditional contact with students	Undefined institutional philosophy for teaching and learning
Defined communication channels	Staff meetings; circulars; e-mails	Poor, inadequate and uncoordinated
Clear understanding of e-learning	Unrealistic expectations of e-learning	Lack of clear understanding of e-learning potentials
Well defined rationale for e-learning (research based) – based on institutional needs	Good rationale for long-term tangible benefits (not based on research)	Good rationale
Clarity to improve valuable learning experiences	Not informed	Lack of clarity
Institutional restructuring to facilitate e-learning adoption	Restructuring of institutional structures to facilitate e-learning	Inadequate resourcing of restructured units to facilitate e-learning adoption
Adequate network infrastructure; high bandwidth, good Internet connection, user access	Restructuring and laying of fibre optic cables to improve network access; Access to bandwidth, revamped NOC, computer laboratories and printers, and standby generators as backups for electricity outage; Access to LMS KEWL; Developing an in-house LMS platform	Poor network infrastructure; Low bandwidth; Poor Internet connectivity; Poor users access to computers and Internet resources; Unreliable generators to support outage for a long period; KEWL described as unintuitive
Adoption strategy for lecturers and students	Management expect user initiative to develop skill and competence to adopt e-learning; Lecturers are expected to adopt e-learning after participating in a workshop	Poor user self-confidence to adopt e-learning; Lack of personal orientation towards trying out new ways to carry out learning related tasks

The UG's strength for e-learning can be established in its: 1) good rationale for e-learning adoption; 2) provision and upgrading of technology infrastructure to support e-learning; 3) Orientation on teaching methods and introduction to the LMS KEWL for newly recruited staff; 4) Automated library that can support e-learning; 5) Pro-active initiative in promoting PowerPoint presentation among lecturers. Management believe that users will be motivated to accept and adopt e-learning if they are provided with: 1) adequate resources and technical support; 2) seminars to address their needs; 3) adequate training for user and technical support staff; 4) an institutional policy for e-

learning; 5) an institution-wide implementation strategy; 6) an understanding of the benefits to be derived from e-learning; 7) a positive cultural change in maintenance, evaluation and replacement policies.

5.2 People Domain

The people domain is divided into three sections. In Section 5.2.1, lecturers' perspective of technology use in the UG is described. Section 5.2.2 describes the students' perspectives of technology in teaching and learning, while technology and support for e-learning by technical staff is described in Section 5.2.3.

5.2.1 Lecturer Dimensions

This section describes HOD and lecturer perceptions of current teaching and learning at the UG. The section aims to reveal how available technological resources were used to support teaching and learning efforts, lecturers' motivation, and e-learning implementation. The survey data (n1=35) were synthesized with interview responses from the nine lecturers and nine HODs. The distribution of respondents by data source is shown in Table 5.4 below.

Table 5.4
Distribution of lecturer respondents

Faculty	Survey		Interviews	
	n1=35	%(n1)	n2=18	%(n2)
Social Studies	14	40.0	7	38.9
Arts and ICEDL*	4	11.4	2	11.1
Business College	6	17.1	4	22.2
Science and Engineering	11	31.4	5	27.8

*Institute of Continuous Education and Distance Learning (ICEDL)

The issues covered in this section are the lecturers' characteristics, the current situation of teaching and learning, the lecturers' understanding of the relevance of e-learning, the lecturers' pedagogical experience and use of ICT in e-learning, motivation for e-learning in the UG' perceptions of conditions and capabilities for e-learning, workable strategies for e-learning, and barriers to successful e-learning implementation.

5.2.1.1 Lecturer characteristics

The survey respondents were comprised of 22.9% senior lecturers, 60% lecturers and 17.1% assistant lecturers/tutors, with a range of years worked in the university between 2 years and 28 years. Each lecturer teaches between 2 and 9 course subjects during an academic year with a student attendance of 100 to 800 per session in each course subject. Most lecturers (89%) also teach courses across faculties. The overall institutional average of attendance per course subject was estimated at 250 students per subject per semester. The UG Basic Statistics (UBS) (2009-10) revealed that at lower academic year levels where students do general courses, the numbers are higher and range between 350-1860 students per course subject. Class sizes fall to between 100-450 students per class at higher year levels. Some lecturers (28.8%) were involved in part-time consultancy services as well as their full-time teaching and learning activities, but the majority indicated they were involved in only teaching and research. In response to whether they had had any formal training in pedagogy, 31.4% said they were trained teachers prior to joining the UG, while 8.6% indicated they acquired the skills as part of an orientation program organised by the UG.

5.2.1.2 Current situation: teaching and learning at the UG

Issues discussed in this section highlight the situation at the time of the research. The teaching and learning at the UG is discussed in terms of the faculties' awareness of institutional policy on learning and lecturers use of ICT resources.

i) Faculties' awareness of institutional policy on teaching and learning: All nine HODs and some six lecturers indicated knowledge of the university's strategic plan on teaching and learning. They were also familiar with expectations of departments but were unaware of any ICT or e-learning policy mandating lecturers to use ICT resources as part of their teaching. One HOD suggested "... where can we find that [e-learning policy], in the statutes? I am not sure." (HODA2: 18/02/10). Corroborating the HOD's comment a lecturer remarked: "... as at now, I am not aware [of any policy]. I have been using my PowerPoint presentation and it is not every department that have the projector and screen for presentation. This department is thinking about acquiring one." (LAC2: 22/02/10). Another HOD remarked:

I will say that, honestly, in the area of policy the university is not very, very clear. If you ask me as someone who has taught in this university for years, the emphasis should be on the students. ... to focus on the individual student and

produce a student who would be very functional for the rest of society. (HODA3: 01/03/10)

The survey data support these views, with 97.1% of respondents indicating they were unaware of any institutional or faculty policy on teaching and learning; 94.3% were unaware of any strategic plan for ICT integration in teaching and learning; and 91.4% were unaware of any clear set objectives for e-learning implementation.

There were also doubts about a clear e-learning vision stating what the university hoped to achieve with ICT resources, in light of current student numbers and the increase in tertiary universities in the country. Most respondents (74.3%) indicated that lecturers decide on convenient approaches for their teaching, citing face-to-face contact sessions with students in classrooms as the accepted practice at the UG.

ii) Lecturer access and use of ICT resources: A large proportion (80.6%) of lecturers had a personal laptop, desktop computer (77.4%) and private broadband internet connection (64.5%). It was revealed from the survey that 40% of lecturers had never used a computer or ICT resources to teach; 27% used computers to teach sometimes; 18% always used a computer while 9% used a computer often to teach. Of the respondents indicating they used ICT resources to teach, 62.9% cited using PowerPoint presentations during lecture sessions, which implies that most lecturers do not use computers or computer resources to facilitate teaching and learning. They indicated that the lecture rooms have no enhanced ICT resources (Internet connection points) to support teaching and learning, though there were power points in the lecture rooms.

5.2.1.3 Understanding and relevance of e-learning

This section discusses lecturers and HODs' understanding and perceived relevance of e-learning, to help understand issues that informed their acceptance and adoption of ICT. Views expressed here are derived from interview responses.

i) Lecturers' understanding of e-learning: The understanding of e-learning among lecturers varied, with the data showing that none of the respondents had prior hands-on experience with an e-learning system, though some (5) indicated knowledge and familiarity with the e-learning system.

Firstly, seven lecturers and four HODs expressed understanding of e-learning in terms of distance education, reaching students in remote locations and communicating with them via the Internet. The comments suggest that e-learning resources were considered communication tools and platforms for learning repositories for students to access:

Distance Learning, using ICT to reach students at remote locations. Lecturers can send learning materials to students to access through the internet. (HODA8: 12/03/10)

By e-learning, we are also talking about distance learning. The distance learning is not like the Rapid Results College or even the old time. ... it is now done online and you have to be linked-up to other universities. (HODA4: 15/02/10)

Is a system whereby lecturers and students are separated from each other and are using electronic gadgets to interact for teaching and learning or using electronic gadgets for teaching and learning processes (LAC4: 03/03/10)

Secondly, two senior lecturers described e-learning in terms of digitization of learning resources and classrooms. One lecturer remarked: “ the e-learning means the materials that we are using should be digital, our classrooms too should be digital.” (LAC1: 13/04/10) E-learning was limited to on-campus learning with electronic resources as tools for learning.

Thirdly, e-learning was described as being beyond distance education, with the explanation that the experience may also be used in an on-campus environment:

e-learning basically has to do with a virtual platform where a lecturer or a teacher and the student or the students interact so it is a facility or platform where lecturers or teachers can provide materials for their students and the students would intend to either respond in the form of assignments and again you have feedback also coming from the teachers (HODA5: 06/04/10).

... the use of e-technology. i.e. ICT and ICT resources for the teaching and learning process. It covers network computers, to communicate to students through the internet so that teachers and researchers are able to search materials on the internet in e-format, not to the exclusion of the print material but in support; in addition to the e-material so that students can communicate with their colleagues through modern methods socially as well as intellectually, sharing ideas. (HODA4: 15/02/10)

The varied nature of these descriptions implies that there was no institutional definition of e-learning communicated to all stakeholders at the UG.

ii) *Relevance of e-Learning:* All HODs and seven lecturers described e-learning as the future of educational delivery explaining that the university will be left behind if advantage was not taken of current technologies to transform teaching and learning. They indicated that electronic information could be distributed and accessed in any form and format, thereby facilitating easy access to information and data immediately. It will also serve as a good basis for management decisions related to students and lecturers. A lecturer remarked:

It is relevant because we all live in the global world which has become a village and a system whereby various institutions are using this system to facilitate teaching and learning (LAC4: 03/03/10)

Corroborating the comment, the following HODs added:

we can't over-emphasise its importance [e-learning], whether we like it or not, within the information society something happens here today and within minutes it's known all over the world because of e-technology, radio, TV and Internet. (HODA4: 15/02/10)

... but if you go to my office right now you would see that we have photocopied huge loads of them [learning materials]. We should be able to use ICT facilities to promote and make learning easy for the students. ... scan and post to them; and putting them on site so they don't come to worry you about this is not available again.... we need to move forward. (HODA3: 01/03/10)

The interviewees' comments highlight that lecturers would feel less stressed about dictating notes to students and photocopying hand-outs for students to photocopy would be minimised, making it possible to reach out to students more easily. All HODs and lecturers indicated that e-learning would facilitate flexible learning for people who were busy but wished to study, and facilitate a move from passive instruction to one of active participation in the learning process:

It is very, very relevant in the sense that everybody is so busy and that gone are the days where people would sit in front of a lecture, and then you would just try to upload for them to download but because of modernization there are many people out there who want to work and at the same time study. e-learning is a nice opportunity for people to program their own time for studies. ... they can decide when it suits their own convenience. ... it is a relevant idea that would support learning. (HODA8: 12/03/10)

In their view, e-learning will make learning more effective and would provide a more efficient way of doing things. They explained that student numbers have increased significantly and that has affected interaction with lecturers to the point where lecturers were unable to meet with their students (one-on-one) to support and address individual learning needs. Potentially good students who may be denied access to higher education due to limited resources may be able to enrol with the advent of e-learning:

... there are a lot of students who want to get access to the [UG], but they cannot get access because of the limited space and infrastructure, residential facilities and all that, but with the e-learning, they can stay wherever they are in the comfort of their homes, their offices, and then have the teaching and learning experience. By so doing we can reach out to more students and a wide access of the UG programs, and people all over the country and abroad (LAC4: 03/03/10)

E-learning was further considered the means by which individual lecturers and the university can link-up with other universities through video-conferencing to share resources that would facilitate research, teaching, and student learning.

iii) Perceptions and expectations of e-learning: All HODs and three lecturers reiterated the management policy on reducing class sizes and emphasised expanding distance

learning. However, they also expressed concern about the appropriateness of the infrastructure and sharing resources with other universities. Frustrations were further expressed about the lack of uninterrupted access to the Internet, meaning students could not use the resources to enhance their learning.

Seven HODs and four lecturers expressed concerns about the negative attitude of students towards working collaboratively with lecturers. The students' focus was on obtaining high grades through rote learning. They were also concerned about the failure of some lecturers to upgrade their lecture notes and interact with students. One HOD remarked:

... so this is where again the course lecturer has certain responsibilities, the student also has certain responsibilities. The approach is to use a technology to our benefit so whatever we can do, we can design a course and I don't like the ideas of just throwing text into some folder or some server somewhere for students to access. I don't consider that to be e-learning. (HODA2: 18/02/10)

The respondents indicated that though students have to be trained to communicate online, they must also be motivated to engage with online tasks.

iii) Concerns and reservations about e-learning: The majority of the HODs and lecturers (91.4%) who participated in the survey believed that e-learning was workable at the UG but expressed some concerns as shown in Table 5.5.

Table 5.5
Lecturers' perceptions about the relevance of e-learning (n=35)

Perceptions	SA	A	N	D	SD
	%	%	%	%	%
I have concerns about students' attitude towards e-learning (Comfortable with Face-to-Face)	42.9	25.7	25.7	0	5.7
E-learning will not work within this environment	2.9	2.9	2.9	40.0	51.4
There are other approaches that might work better than e-learning	2.9	8.6	48.6	20.0	14.3
I am concerned about having enough time to organise myself each day with e-learning activities	17.1	37.1	11.4	20.0	8.6
I would be interested in the effect of e-learning on my professional development	48.6	37.1	5.7	5.7	2.9
I have concerns about using e-learning	8.6	25.7	20.0	17.1	22.9

1-Strongly Agree; 2-Agree; 3-Neutral; 4-Disagree; 5-Strongly Disagree

One third (34.3%) of the respondents had concerns about e-learning with 8.7% suggesting it was not workable at the UG (see Table 5.5). The data further showed that 68.6% had concerns about students' attitudes towards e-learning, since the only

approach to teaching and learning they knew was contact sessions with lecturers. Most lecturers (64.2%) also expressed concerns about how they could organise themselves and make enough time for e-learning activities each day. They (85.7%) were uncertain about how e-learning was going to affect their professional development, particularly promotion, research and publication.

Two HODs and one lecturer expressed doubt about the effectiveness of e-learning arguing that most lecturers were not computer literate. Corroborating this one HOD remarked “How effective can it be knowing that about 80% of the lecturers are not so much computer literates” (HODA7: 07/04/10). They argued that, although the concept of e-learning sounded good, the UG does not have the resources and capacity to implement e-learning, citing infrastructure and human capacity as critical issues to be resolved in the short and medium term.

5.2.1.4 Lecturers pedagogical experience and e-learning

From the HODs and lecturers interviewed and from survey responses themes emerged that were structured into lecturer pedagogical experience, lecturers’ approach to teaching, and lecturers’ approach to student learning.

i) Lecturer pedagogical experience: Six HODs and four lecturers said they had not received any institutional training in teaching and learning methodologies since they were recruited by the UG. However, three lecturers recruited within a period of two years said they had received some orientation in effective teaching methods when they were employed but not since then. One HOD and two lecturers said they were professionally trained teachers before joining the university and therefore did have some prior training in pedagogy. One HOD remarked:

I was a trained teacher for many years before going to the university. That is where I first learnt about teaching methods. ...I apply the various techniques of teaching to help my students learn better. I don’t remember having any training in methods of teaching since I joined the university 20 years ago. (HODA10: 26/04/10)

The survey responses in Table 5.6 below confirm lecturers’ experience with pedagogy, which showed that 85.7% have indeed not benefitted from any institutional training in pedagogy. The data also show that a third of the respondents were trained teachers.

Table 5.6

Lecturer training in pedagogy

Pedagogical Experience	N	Percentage (%)
No training in pedagogy	9	25.7
Yes, I am a trained teacher	11	31.4
No, learnt on the job	10	28.6
Other, please specify	3	8.6
Total	33	94.3
No-response	2	5.7
Total	35	100

Four HODs queried why teachers in secondary schools should need training in teaching methodologies but that lecturers at the university did not. They were of the opinion that every lecturer should have some training in pedagogy:

... at the Secondary Schools, at the basic schools, ...people who ... teach have some training in teaching, whereas at the university level you can find people with no training in teaching... They went to graduate school, the only qualification they have is masters at least. They may not have had any courses in education (HODA2: 18/02/10)

Contrary to opinions expressed by the HODs about the need for lecturer pedagogical knowledge, four senior lecturers said there was no need for lecturer pedagogical knowledge because they are subject matter experts. They argued that being an expert in content was sufficient for lecturing at the UG. Corroborating the view, a senior lecturer remarked: "... we are supposed to be lecturing and not teaching as in the secondary schools. ... we lecture and the students are expected to research on the information we provide to them. We are supposed to stimulate student learning" (LACA9: 18/02/10). This can be explained by the fact that lecturers were mostly recruited right after graduation based on their academic performance. Hence, they adopt approaches familiar to them, and do not develop their own standards or strategic approaches.

ii) Lecturers' approach to teaching: Almost all the HODs and lecturers (97.0%) in the survey reiterated that lecturers prefer contact sessions with students as their pedagogy (Table 5.7). A follow-up question, for those interviewees who indicated e-learning and blended learning, revealed that none had received support for content development.

Table 5.7
Lecturers' approach to teaching

Approach	Respondents (N=33)	Percentage of cases (%)
Face-to-face	32	97.0%
E-learning	6	18.2%
Blended learning	3	9.1%

Seven of the nine (77.8%) respondents in this group said they prepare their own PowerPoint presentations, while two said they use the KEWL environment as a repository for lecture notes, and were not involved in content development for e-learning. A senior lecturer remarked: "I upload the lecture materials for the students to download. I sometimes organise quizzes for them but since we do not have enough computers in the faculty, they go to the ICT Directorate in batches to take the quiz there" (MDCA4; 14/09/10). In verifying the relationship between preferred pedagogies and approaches adopted, it was observed that lecturers indicating blended learning tended to use PowerPoint presentations most.

iii) Lecturer approach to students learning: When presented with eight approaches to teaching that could stimulate student learning, the majority of the lecturers (85.7%) said they used 'students working in groups' as a preferred teaching method (Table 5.8).

Table 5.8
Pedagogies for learning

Learning activities used with students	Respondents N=35	Percentage of cases (%)
Working in groups	30	85.7%
Developing collaborative learning skills	9	25.7%
Negotiating activities	4	11.4%
Working on self-paced activities	6	17.1%
Presenting work to the class	23	65.7%
Tackling real-life problems	18	51.4%
Understanding their own learning	12	34.3%
Focusing on higher learning skills	8	22.9%
Analysing Information	24	68.6%

They also used approaches aimed at helping students to analyse information (68.6%) and present of work to the class (65.7%). Tackling real-life problems (51.4%) and helping students understand their learning (34.3%) were other preferred approaches used by the lecturers. The least used pedagogies for learning included negotiating

activities (11.4%) and working on self-paced activities (17.1%) as shown in Table 5.8. It was further observed that trained teachers focused on students working in groups as the most appropriate pedagogy for learning, with less emphasis on other forms. Lecturers who learnt on the job adopted varied approaches to stimulate student learning with an emphasis on working in groups, presentations to the class and tackling real-life problems.

5.2.1.5 Lecturer expectation and pedagogical concerns for e-learning

Exploring lecturer expectations and concerns for e-learning revealed the following issues: interactive pedagogy; culture of learning and competencies for e-learning; provision of pedagogical support for lecturers; change in lecturers' attitude towards teaching; structural change; and secretarial support for pedagogy.

i) Interactive system: Five HODs and six lecturers said that if management were committed to providing adequate support and resources, an interactive pedagogy approach would be considered an appropriate teaching approach. This would mean a move away from the active lecturer and passive student approach to teaching and learning. The approach would support effective student learning either in synchronous or asynchronous setting or in any type of e-learning. However, they argued that such a learning system must be one that would allow peers to have a good level of interaction, inbuilt assessment facilities, and to recognise the large number of students to be assessed:

It is about interaction; it should be such that the system enhances or provides a high level of interaction, lecturer to students and the students among themselves. It should be such that lecturers and students will interact at their convenience... So if we have a system where students can answer objective questions and instantly the system generates the results for them, if it is an essay they can turn it in on line or submit it online and all that, then that kind of facility within an e-learning system will be great for us. (LAC4: 03/03/10)

Issues from the comments highlight interactions between students and lecturers and among the students themselves, and having an objective form of questions for assessing students.

ii) Culture of learning and competencies for e-learning: All the HODs and lecturers expressed concerns about adopting appropriate pedagogies that would be suitable for both students and lecturers. In their view, effective teaching and learning was greatly influenced by the lecturers' teaching skills and the students' culture of learning. The

basis of their argument was that e-learning was a new experience for both lecturers and students. Its effectiveness would require knowledge of ICT use at basic school through government policy as part of the basic school curriculum. One lecturer remarked: “Now because the approach to teaching and learning at the lower level is totally different they are taught to read and write independent of electronic resources. That has to be managed else the students would be disadvantaged.” (LAC1: 13/04/10). They indicated that a national policy was required to address issues of links between technology used in learning at the basic and secondary school levels to prepare the students before admission to the university. They argued that the government would need programs that will gradually introduce students to using e-resources for learning, and a structural change to teaching and learning at both basic and secondary levels of education. Training and provision of adequate infrastructure for all stakeholders was recommended as the first step to effective e-learning adoption:

... the personnel and the training; Sometimes some people put the personnel [staff] first [before equipment] but I think they are all equally important and the technical personnel would manage those ... and these people need to be trained and the training needs to be upgraded... (HODA4: 15/02/10).

Concerns were expressed about identifying lecturers with deficiencies in pedagogy to be trained. In their opinion, internal links between faculties and inter-university's co-operation within the sub-region would help the sharing of pedagogical ideas that would facilitate student learning. This means feasibility studies would be needed to identify the pedagogical gap among lecturers, in order to develop appropriate training for them.

iii) Providing pedagogical support for lecturers: The need for pedagogical support for electronic teaching was expressed by six HODs and five lecturers. They said information regarding where appropriate resources could be obtained for both lecturers and students should be well communicated, citing teaching materials aside from textbooks and journals, and support in developing content:

In terms of PowerPoint presentations we would require some support. For instance, I was trying to do some diagrams on the PowerPoint – if it is just the typing of words, sort of, there is no problem. But I think sometimes you need to illustrate with pictures and what have you and that would make learning easier – so you know, it is one thing that we would need, how you would present the [content] and students would not doze offto understand the thing simply because the design, the presentation and everything would keep them awake so that is something that we would also need. (HODA8: 12/03/10)

This means lecturers currently improvise and use electronic resources and approaches best known to them. Frustrations were expressed about their difficulties in using images for illustration, and problems with shaping disorganised images, (when there were better ways of presentation) which demonstrated lack of confidence and frustration in attempts to adopt and use the available ICT resources.

iv) *Change in lecturers' attitude towards teaching:* Concerns were also expressed about the content presented to students, and argued that some lecturers' attitudes towards ICT resources must change. In what was described as a disincentive to effective teaching, all eight HODs and three lecturers indicated how some lecturers recycle lecture notes without upgrading them. This attitude, they argue, may promote absentee students and lecturers. One HOD remarked: "First the attitude; that is everybody must [upgrade] the content and you know some people are fond of using old lecture notes and just go and dictate to the students – that must be reviewed." (HODA7: 07/0410) In expressing frustration and doubt about some common lecturer comments, "we are here to lecture and not to teach" and what may be described as a contradiction to the common statement, One HOD remarked:

How can you be a teacher without training in methods of teaching and learning? ... which is why I was amazed to find out that in some places notes are being dictated as the lecture. It was very shocking to me but then again if you cast your mind back, this person went to graduate school, probably has a masters or PhD. There was no educational element in that training, they were taught to be experts at something, some narrow area that did not include the dissemination of information to others at a certain level. (HODA2: 18/02/10)

Fears were expressed about lecturers "dumping" lecture notes in an e-learning environment, without updating them. Emphases were on the need for management to be seen as effectively supporting e-learning instead of building student accommodation. They argued that having e-resources was not enough and that incorporating aspects of teaching in an electronic mode and having students participate in using the resources to learn were equally important. There were suggestions that some lecturers do not have an interest in teaching but were there because it was a job, hence the need for a structural change to motivate teaching.

v) *Structural change and secretarial support for pedagogy:* Six HODs and five lecturers indicated that having an appropriate pedagogy for e-learning will require structural change: one that has resources and support available for lecturers to develop content, leaving them with no excuse for non-adoption:

You have limited time to even spend on the computer to upload your materials electronically ... ok but if we have that structural change where there would be a secretarial support with the appropriate level of expertise, all the lecturers need to do is to package your material nicely, present to the secretariat, they develop it, you have that interaction with them until the material is properly done and then he [lecturer] would have to do that presentation. So I think there must be structural changes to support technology [sic] (LAC1: 13/04/10).

They argued that lecturers have a work overload, which spans setting examination questions, marking papers and submitting grades to central administration, which leaves them with no time to develop content. Because of the time taken to upload course materials, they believe a secretariat with appropriate expertise may provide the needed support, which would allow lecturers to concentrate on content development.

vi) Pedagogies and student attitudes towards learning: Concerns were also expressed about student attitudes towards learning. They said students preferred dictation of lecture notes rather than lecturers' presentation with illustrations, from which they could construct knowledge. Four of the HODs and three lecturers responded that in some cases, students do not seem to appreciate PowerPoint presentations, which highlight key points the lecturers wish to emphasise, but instead demand detailed lecture notes:

They [students] don't attend lectures. They look for the lecturers' notes and handouts and they think they are ok but the extra comments of the lecturers' illustration that comes with the explanation, that the lecturer would give that adds flesh to the PowerPoint to help you illustrate what you want to write and so that has been the problem with the PowerPoint. (LAC2: 22/02/10).

The problems were largely attributed to large student numbers and a lack of appropriate orientation for the students about learning at a university. This confirms the fears that e-learning may promote absentee students and lecturers (who feel they have done their job by putting their lectures online). It also means that training of students for e-learning spans beyond computer literacy, to effective independent learning that centres on the student with lecturers as mentors.

The Researcher asserts that, although the problem of students preferring lecture notes was evident, the inherent problem may be found in the scarcity of books and other resources cited by the lecturers available at the university.

5.2.1.6 Motivation for e-learning at the UG

The HODs' and lecturers' responses to issues concerning the motivation to adopt e-learning were categorised into four themes: lecturer skill and competency; attitude and

professional development; support for teaching and learning; and lecturer expectations of management.

i) Lecturer skill and competency (Individual Initiatives): The competence and skill of lecturers were assessed in two different ways. Firstly, by asking how often they use computers to perform tasks and how they perceived themselves as computer users. Secondly, through a computer literacy scale adopted from the International Society for Technology in Education (ISTE). Lecturers were asked to describe their computer literacy levels by using basic computer applications to perform tasks. The responses were then coded as “Novice”, “Beginner”, “Intermediate” and “Expert or Advanced”.

Data revealed that 91.4% of respondents used computers always, while 8.6% indicated sometimes. In terms of computer literacy, 51.4% considered themselves advanced users, while 54.7% considered themselves intermediate users. Contrary to the individual perceptions of themselves, computer literacy estimated from performance revealed that most lecturers (56.2%) can at best, be described as beginners. However, for word processing and e-mails, 51.4% and 57.1% respectively could be described as advanced and intermediate users. The details are shown in Appendix E, Table 5E.1.

ii) Lecturer attitude and professional development: In response to how often they participated in professional development programs, 42.9% of the respondents said they participated in academic development programs, which were not related to computer training while 20% indicated participation in computer-based training. Orientation programs for newly recruited lecturers were cited by 6 out of 14 lecturers who described them as professional development programs they had participated in. The issues covered during the orientation included; effective teaching methods, use of KEWL Next-Gen, use of MS PowerPoint presentations, online-publishing and use of an Integrated Tertiary Software (ITS) (a student information management system). Some lecturers (57.1%) said they had not participated in any institutionally organised computer-based training program. This means it is important to establish the training needs for e-learning adoption in the UG.

Three HODs responses attributed the problem to lecturers’ attitudes, an unclear management policy for e-learning and a discriminatory approach to training programs which were only available to newly recruited lecturers. It was evident in their comments that, for some lecturers, the absence of immediate value in terms of financial

reward and incentives for promotion made e-learning unattractive, particularly for those without prior experience of using the ICT resources and large classes:

There has been a series of seminars; I have not been able to attend any of their workshops but what they are doing which in my opinion is not correct is that they concentrate on the young lecturers, that is the reason why I have not ... they concentrate on the newly recruited lecturers, the assumption being that those who are already in the system are aware, but it does not follow. ... in my opinion this is a short coming (HODA3: 01/03/10).

Unfortunately it's true. I have had people who have asked if you call a meeting and they go ... is there a sitting allowance? For your professional development, if you go for a meeting/join a professional association. Why should you be paid a sitting allowance – for your own professional development? But we do have colleagues who think in this way (HODA2: 18/02/10).

Evidence from the data is a need to motivate lecturers to change from doing the bare minimum of work with ICT resources and to expand participation in training programs beyond newly recruited lecturers to existing staff. The Researcher asserts that management's approach to providing training to newly recruited staff was a long-term strategic plan for building capacity for e-learning.

iii) Lecturer support for teaching and learning: The survey on technical support revealed that 51.4% of the lecturers received various forms of technical assistance. The type of assistance cited included: institutional provision of computers (22.9%); use of projectors for PowerPoint presentations (17.1%); anti-virus and software applications upgrades (4.2%); training at the staff resource centre (2.9%); troubleshooting (2.9%); Internet connectivity (28.6%); and video-conferencing (2.9%). A few staff (2.9%) received very little support. Summaries of the services received show, aside from the provision of computers, Internet connection was the most cited support service. It was evident from the list that activities directly related to teaching, like course design and delivery, were not mentioned. In reiterating the need for an efficient and effective help desk, six HODs and four lecturers highlighted the potential for a help desk to motivate lecturers to embrace e-learning:

... but there are some colleagues who really do need technical support in this [use of ICT] to be able to develop the content. There are others who can provide content but its incredible amount of time and ... commitment. If there is technical support to help us delegate some of the duties, if I have come up with all the concepts, the ideas are there, if it's a matter of putting it together and making sure it's feasible ... some technical support would help very much so that I don't spend all my time doing it. (HODA2: 18/02/10)

The survey data, however, showed that most lecturers (61.1%) were not satisfied with the support services they received while some (27.8%) indicated satisfaction citing installation of anti-virus applications and training in PowerPoint presentations. In rating the general support services between fair and excellent, 50% rated them as average, 22% rated them fair, while 16.7% rated them as above average. The rating confirms that HODs and lecturers were not satisfied with the support services they received, and therefore did not have confidence in the current services supporting e-learning.

iv) Lecturers' expectations of management: HODs and lecturers' expectations of management are categorised into themes of institutional policy for e-learning; resourcing technical support services; and stimulating training for lecturer competencies.

1. Clear institutional policy:

The primary expectation of all HODs and lecturers was for management to provide direction and guidelines for faculties to adopt e-learning. Emphases were on crafting a workable institutional policy for e-learning and providing guidelines about the expectations of lecturers. In terms of the expectations, they explained that, without a policy, strategy, and clear objectives of what the UG wishes to achieve, individual lecturers would continue to use the available resources differently and without proper coordination.

They [management] have incorporated that technology [KEWL] into it, [teaching and learning] therefore I expect management to sit down and come out with a clear policy to indicate the direction, the expectation that they are ... expecting lecturers to give the students etc. Come out with clear policies of these so that we all incorporate them along the line (LAC1: 13/04/10)

... first let's have some policies in place; where are we going with this e-learning? If a lecturer decides to go full scale e-learning with all their courses, would we get the support needed; help with registration; if the students knew it was a policy they had to do, they might do it. (HODA2: 18/02/10)

There was an emphasis on clear achievable objectives, which need to be linked to proactive management initiatives through consultation with experts in e-learning, and clear implementation options the UG can benefit from. The lecturers' comments may be explained by the difficulties in enforcing policies at the UG, the political influence of faculties in accepting change and the culture of respect for authority in facilitating an adoption process.

2. Resourcing technical support

All the HODs and lecturers indicated that their motivation for e-learning was linked to management's commitment to providing technology and technical support. They said management must ensure that the technical support was available and that staff were well equipped and skilled to support e-learning:

... if we really were serious about this [e-learning] it is best to have a dedicated office to support the lecturers who are interested in developing course materials. And then this issue of access ... If all faculties decide to adopt this [e-learning] then I would think that each faculty would have a way of getting their students to access what even is there. (HODA2: 18/02/10)

Researcher observation from the College of Business Administration at the UG revealed that most lecturers were involved in using the Colleges' Intranet services and PowerPoint presentations because there was strong collaboration between the technical staff and lecturers. All the resources were organised for the lecturer, who would walk into the lecture room to present the slides to the students. Only the slide content was developed by the lecturer, so in this way the lecturer was not hampered by the technical aspects.

3. Stimulating training

The need for training for lecturers was mentioned by all interviewees, with an emphasis on in-service training, while seven respondents indicated the need to also extend the training to students and technical staff:

... with some technical training, there could be some minor things that you don't need some external support, so if you can be given some training, especially minor ones that any ...individual of average intelligence should be able to fix it yeah, so if we can be taken through such things that would be ok instead of always calling somebody when that thing could be done on your own (HODA8: 12/03/10).

The HODs comment showed both the interest and frustration involved in using the ICT resources and the challenges of relying on technical assistance that was not always available. Another HOD remarked:

I talked about training but training also for faculty is very crucial and in every implementation you need to train and educate the people who will be using this new technology. If they are not trained they resist such changes then it would be difficult to achieve the desired results; training for faculty and the need to let them know that e-learning is the way to go (HODA6: 06/04/10).

The comments were linked to policy, workable training programs, available infrastructure and computer resources for all users. They believed training would minimise the lecturer's reliance on technical staff, as was currently being experienced

by most lecturers. Lack of training, they asserted, may result in resistance to change and adoption of e-learning.

5.2.1.7 Lecturers' perceptions of conditions and capabilities

The HODs and lecturers spoke about conditions and capabilities at the UG that have direct influences on the successful implementation of e-learning. These conditions and capabilities emerging from the data are summarised into themes of institutional policy initiative, management commitment to funding e-learning, misplaced management priorities for e-learning, lecturers' time and workload, and lecturer training and support for e-learning

i) Institutional policy initiative: All the HODs and lecturers interviewed said that an e-learning policy and the communication of that policy was an important approach to effective e-learning implementation. They described internal politics as being a setback.

... without a policy you are like walking in darkness, when there is a policy then you get the right guideline and the right approach to doing things; and you can also hold someone responsible, somebody accountable to what you are supposed to do or what they are supposed to do for you by the policy which they are not doing. (HODA4: 15/02/10)

... you see, the internal politics, we must not try to make any political gains out of this online learning. Though individual lecturers may have the passion of using ICT while others may have issues, it's only a policy that can ensure that e-learning is being implemented. The policy is the key though it might take some time, if there is a policy in place this might break through any form of internal politics. (TSIT5: 01/03/10)

These views were supported in the survey as well. The HODs and lecturers explained that institutional policy initiatives were important in providing guidelines for e-learning adoption, and that the initiatives would also empower implementers in ensuring that individual units and departments were held accountable. The survey respondents (97.1%) rated the need for university-wide and faculty based policies for e-learning as very important. They (94.1%) also cited management inaction and poor communication of what the UG wished to achieve as a setback to successful e-learning implementation. They argued that management's overemphasis on technology without a corresponding plan or road map to integrate the technologies in teaching and learning should be a thing of the past. Management must be seen as leading the way in e-learning implementation through policy:

... I will prefer the university having a strategy, an educational strategy and coming out with a clear policy that this is where we want to get to. Every lecturer must be at this stage by this time; every student must be at this stage at this time etc... policy to do those things, and I think that is what is lacking now. (LAC1: 13/04/10)

This means that lecturers expect the condition where institutional policy is available to provide backing to efforts that would be made at the faculty and department levels.

ii) *Management commitment to funding e-learning:* About two-thirds (62.8%) of the HODs and lecturers said there was inadequate financial support to develop e-learning in the faculties. Most of the 62.8% (65.7%) cited a lack of funding to support lecturers initiatives to adopt e-learning. Corroborating the survey findings, one HOD remarked: “Basically, financing is a huge challenge. So for me the support of management in terms of financing and training will really go a long way. Financing and training must be the major areas that management should be heavily involved in.” (HODA6: 06/04/10) They argued that management must be seen to be committed by setting and creating an atmosphere where various courses could be offered with minimum frustration, and enforcing use of ICT resources through adequate financial support. One senior lecturer described the expectations of management: “...management must be seen to be committed, by providing all the systems and training. If inwardly they don’t believe in it, it’s not their philosophy, then it would not work. Set the rules, obey the rules and everyone will follow.” (LAC4: 03/03/10). This comment implies that management must believe in e-learning to support it.

iii) *Misplaced management priorities for e-learning:* In terms of the UG’s priorities for e-learning, three HODs and five lecturers linked the role of management and initiatives to institutional priorities. They said management was not supporting e-learning well, and suggested the need to use technology fees (paid by students) to develop and promote e-learning. These interviewees argued that departments could list their needs and requirements for e-learning, which could be funded through the technology fee budgets. Management was called to invest in technology and resources that can support teaching and learning, instead of building hostels without a corresponding increase in academic infrastructure. This means that the university’s priorities for developing e-learning were not clearly outlined.

First of all we must set our priorities right and realise that we cannot buy time and bypass the e-aspect of learning and think we can progress anywhere. ...what is the focus, providing students accommodation or resources for training good high quality students? (HODA4: 15/02/10)

We are charging the students quite a bit of money, it's not enough. ... I think the time has come for somebody in management to take a bold and decisive decision that, look, a substantial proportion of the money that we collect from students is now going to promote e-learning at the departmental and university level. In other words at local and global level, we must prioritise this if we want to move along with the rest of the world. (HODA3: 01/03/10)

In acknowledging the heavy financial burden the university faces because of dwindling government funding for running the university, the interviewees indicated that substantial proportions (25%) of the budget may be set aside for developing e-learning, and upgrading existing ICT facilities and replacing obsolete computers. The respondents commented that management has some immediate source of funding through ICT levies collected annually from students. However, lecturers were uncertain about how such resources were being used and would like more funds for program that support teaching and learning.

iv) Lecturer time and workload: Lecturers' time and workloads where a minimum of four course subjects were taught in an academic year were considered by three HODs as potential threats to adoption of e-learning. They argued that lecturers have limited time to develop e-learning content and teach. One HOD remarked:

... it has to do with freeing time for lecturers or providing support for lecturers to deliver, to develop e-learning materials, content and also for access; students access. ... the problem is that if you are busy developing 4-5 courses when do you find the time to develop the course content well enough? (HODA2: 18/02/10)

v) Lecturer training and support for e-learning: In reiterating management's efforts in establishing a staff resource centre as an institutional strength, three HODs and seven lecturers indicated that training programs organised by the staff resources centre were poorly structured and not well coordinated. One lecturer added:

... I expect to see that every semester break lecturers are going for training, they are doing this.this is what we want to get to. We must restructure our classrooms and even everything to move ahead; incorporating the technology ... at the appropriate level, not just come and dump the technology and expect everybody to use it and therefore move along ... no, it does not work. It is not a good strategy. (LAC1: 13/04/10)

An emphasis on user training was considered a priority by most interviewees. However, in their opinion management did not appear to have taken training (as an essential part of a successful e-learning implementation) seriously. Hence, the lack of training is considered a weakness, or threat, to a successful e-learning implementation. It was evident from the comments that programs taught during the orientation of newly

recruited lecturers were equally relevant for existing lecturers, even though they were not available to the existing lecturers. Many of the existing lecturers had been in the UG for a considerable time but had not been offered professional training programs.

5.2.1.8 Workable strategies for e-learning

This section describes HODs and lecturers' perceptions about issues they considered workable to facilitate successful e-learning implementation. The responses were structured into themes of a workable policy and strategic plan, motivation (incentives and support), and leadership for e-learning.

i) Workable policy and strategic plan: All HODs and lecturers interviewed reiterated the importance of a well-structured strategic plan supported by a policy to roll-out e-learning. They expressed concerns about the HODs' inability to enforce policies, explaining that some lecturers' attitudes had become ingrained and difficult to change:

...so we need the direction. We need some kind of orientation; the ones coming in and those of us already here. Those of us who have become 'MBAs' (m'mi baha atse) [been in the university long before you] in the department, we all need to be told what the university stands for if we did not already know. Where are we going, what is acceptable and what is not. It is difficult in the university environment because of the idea of collegiality. We are equals working so you cannot enforce your viewpoint on another person, especially where it is not in black and white for them. ... But at the same time some things are obviously not acceptable, we should not be afraid to say it (HODA2: 18/02/10)

The comments regarding clear policies and strategies were linked to time-bound goals, which they suggested must begin with government and private sector support, investing part of their resources in e-learning.

In recommending workable approaches, four HODs and three lecturers suggested a combination of bottom-up and top-down approaches to e-learning implementation. They explained that situations where management acquired resources without consultation with stakeholders were now inappropriate. Suggestions were made that management needed to learn and observe what lecturers were doing and promote it. Management should also find ways of communicating rules and regulations on new technology activities more effectively.

ii) Motivation for e-learning: The respondents showed that incentives for lecturers and support services were important. Just over one half (54.3%) of the respondents considered rewarding lecturers, if they used ICT resources for teaching, as an important

activity of management, but 20% of the respondents said it was unimportant. Explaining why they considered it unimportant one HOD remarked: “The idea is to make life comfortable for you and your students, so why should you be paid? Of course the university is incurring costs for providing this facility so why should you be given incentives for using the facility?” (HODA5: 06/04/10) The researcher observed that the notion of incentives was limited for some respondents to monetary benefits, rather than rewards like formal recognition or contribution to promotion. Relevant issues emerging from the survey response are shown in Table 5.9 below. The table shows four types of expectations for support. These were management, administrative, technical staff, and peer-to-peer support services.

Table 5.9

Lecturers’ views on activities that would facilitate successful e-learning (n=35)

Activities	VI	I	N	UI	VUI
	%	%	%	%	%
Rewarding lecturers for the use of computer-based ICT resources	31.4	22.9	22.9	14.3	5.7
Supporting and recognising individual lecturers’ ICT initiatives for teaching would motivate usage	57.1	25.7	5.7	5.7	2.9
Peer-to-peer support in the use of computer based resources	42.9	42.9	5.7	0	2.9
Management and administrative support	82.9	11.4	0	0	0
Adequate technical support for e-learning users	82.9	11.4	0	0	0
Adequate administrative support for e-learning	80	14.3	0	0	0
Continuous training of academic staff on the use of ICT resources	74.3	22.9	0	0	0
Special task-force responsible for the implementation process	51.4	20	20	5.7	0
Continuous evaluation of the process by task-force	57.1	20	17.1	2.9	0

Scale: VI-Very Important; I-Important; N-Neutral; UI-Unimportant; VUI-Very Unimportant

1) Incentives as workable motivation for lecturers

The majority (82.8%) of the respondents believed that supporting and recognising lecturers’ initiatives for using computer-based ICT resources for teaching was an important activity that could facilitate their acceptance and adoption of e-learning (Table 5.9). Six HODs and five lecturers expressed concerns about the lack of faculty support and lecturer lack of interest as a limiting factor to effective adoption, while

recommending persistence and peer support. There were calls for lecturers making initiatives to strive and never to give up due to frustrations they face.

Lecturers say that initiatives like that [use of technology] are not supported in the university. They initiate something and even their own colleagues do not see the need to participate or even experiment. Sometimes faculty itself does not recognise it. Well you know it is these same lecturers who form faculty ... these are problems that they should be able to solve. ... all human institutions are like that, envy and jealousy, and things like that but if it is an initiative that is worthy of a second look then the person who initiated it should strive (HODA4: 15/02/10)

Consultation ... we advise each other informally in our offices if a colleague has difficulty we help the person and, I know people who have gotten encouraged by seeing another colleague do a PowerPoint presentation for instance. The person said can you help me do it, Ok, so these are some of the ways by which we can help each other. By the peer support, so if you have a colleague for instance giving their students assignments on their e-learning platform, he or she can also direct or encourage you to do same. And I think some people respond positively to these things; so that is one way we can encourage them. (HODA5: 06/04/10)

The same respondents believed that difficulty recognizing initiatives was human, and required appropriate strategies that promote peer-support, institutional goals and ideals. In the view of two HODs and five lecturers, incentives for lecturers could take different forms:

Another thing is motivation, when it comes in the form of promotion. When you really spend time doing this would it be counted in your promotion or not, if so to what extent? Motivation not in terms of physical cash but other forms of motivation; if you can give an award for the best e-course that would also help. That would encourage some people. (HODA2: 18/02/10)

This suggests that lecturers would be motivated if they could gain some benefits from the adoption of the resources in the form of promotion or awards.

2) Lecturer support and encouragement for successful e-learning:

Management, technical and administrative support for e-learning implementation were rated as 'very important', while continuous academic staff training and peer-to-peer support training were rated as 'important' (see Table 5.9). Such peer-to-peer support, they argued, would boost lecturer confidence and motivate colleagues with reservations about using ICT resources for teaching.

One monitored observation during data collection confirmed the views indicated by the lecturers. For example, a lecturer of statistics designed a website with a database where lecture material and notes were uploaded for students. The information provided on the page included the syllabus, course calendar, course objectives, lecture materials and

assignments. According to the senior lecturer, initial efforts were made to get the department to accept and use the resources without reference to his personal domain name. The objective was to gradually promote the concept at the faculty level if the initiative was successful at the departmental level. The simple concept was motivated by the notion that some lecturers rejected KEWL and complained that the system was not intuitive. However, colleagues and the faculty also showed apathy towards the product and rejected it. Appeals to the HOD, the Dean and the registrar to promote the use of the resources, which could be done on a departmental basis, were not supported. Hence, the current use of the application remained an individual initiative to support teaching and learning. It was observed that most of the decisions to reject KEWL by lecturers were influenced by colleagues in their faculties and outside their faculties, some of whom had not tried the system but acted based on what other colleagues had said. This trend indicated there was a strong social system at the UG.

Encouraging lecturers and students to use resources at a basic level by sending e-mails and providing necessary feedback within the electronic environment, was expressed by the interviewees as a first step in motivating engagement. The eight HODs and seven lecturers argued that collegial support and encouragement would have great potential to promoting early adoption and would be more effective than organised workshops and seminars:

I am encouraging my faculty members to make use of the facilities; I'm encouraging them to come out ...to say their problems...by the end of the year I want to replace all those out-dated machines. I am also encouraging graduate students to start contacting their lecturers online. ... once you finish your chapter just e-mail it as an attachment to him [supervisor] and let him respond. (HODA3: 01/03/10)

ii) Leadership for e-learning implementation: The survey responses suggest that faculties expected management to establish a special task force (71.4%) which would be responsible for ensuring successful e-learning implementation, and that there would be continuous evaluation of e-learning processes (77.1%). They indicated that such a task-force would be responsible for ensuring best practice procedures were adopted and that lecturers would be satisfied about adopting and using e-learning:

I think there are real challenges ... challenges in the sense that there are many faculty members out there who are not very effective in the use of modern technology so for e-learning to be very effective you will need faculty which is on top as with regards to the use of computers. If they are not there and you have the

secretariat which can handle all the issues I think that will do well for everybody (HODA8: 12/03/10).

5.2.1.9 Lecturers' perceptions of barriers to e-learning implementation

To understand what lecturers' perceived as barriers to successful e-learning, two sets of questions scaled from 'strongly agree' to 'strongly disagree'; were asked (see Table 5.1.3E, Appendix E1). The first set described what lecturers would consider as concerns while the second set described the barriers. The findings were synthesised with interview responses about why e-learning has not been successful at the UG though there has been some initiatives to use KEWL.

i) Concerns about e-learning implementation: Initial frequencies computed from the survey data revealed that most lecturers (91.4%) believed that e-learning was workable at the UG, but many (68.6%) also expressed concerns about students' attitudes towards e-learning, suggesting that integrating technology into teaching and learning was new at the university and may disadvantage many students. The respondents (54.2%) further expressed concerns about having enough time to organise e-learning activities, and how e-learning would impact on their (85.7%) professional development. About a third (34.3%) of respondents suggested there were other approaches to teaching and learning that might work better than e-learning. Concerns were further expressed about management belief that because resources were provided lecturers must use them to support teaching and learning. One lecturer remarked;

But I think the suggestion that – oh because the technology is there why are you not using the Internet ... oh because you don't want change, is neither here nor there... it should not be so. Policy must come so that we all follow. (LAC1: 13/04/10).

The comment confirms that lecturers were voluntarily expected to accept and adopt the technology resources available. However, they did not like the suggestion that lecturers were not using the resources because they did not want change. The majority (96.9%) further indicated a lack of adequate information and awareness about ICT resources that could be accessed to support teaching and research.

ii) Barriers to e-learning: Potential threats to e-learning were identified as: inadequate financial support to develop computer-based learning (62.8%); a lack of adequate technical support (60%); inadequate computer training for lecturers (57.2%); the lack of a reward system and not recognising staff already using ICT resources for teaching (42.8%); and inadequate support from central administrators (60%) (Appendix E1).

Other issues considered threatening to successful e-learning included computer training programs organised at inconvenient times (42.9%); unreliable computers and unreliable Internet connection (48.6%); scarcity of computers and access to them (48.6%); lack of standards (examples) for teaching with computers (45.7%); and lecturers' lack of basic skills in using computers (48.5%). The interviewees' response supported the survey response:

... you see, some of our colleagues tend to rely on IT support for everything; they will not check the cables to see if they are properly connected/linked to the computer or the power is on. Sometimes some of the basic things that they could do for themselves, they want to call someone from ICT. We need to make the effort and not rely on their support all the time. That is why they bluff us when we call them. (LAC1: 13/04/10)

This comment illustrates that although technical support was not readily available, most lecturers over rely on technical support staff for assistance. It suggests lack of lecturer confidence in using the ICT resources. In touching on inadequate support and other frustrations lecturers go through in attempts to use KEWL one HOD remarked:

... the time that Engineering went for the workshop on KEWL, there was a lot of excitement. I wanted to do it, but I was teaching 6 courses. I had no time and there was no support and if I wanted to delegate some of the duties, who would I even speak to. I was basically required to do this on my own, and just one course takes just an incredible amount of time if you want to do it well. So I got frustrated and gave up (HODA2: 18/02/10).

In addition to lecturer over-reliance on technical staff, and lack of adequate technical support frustrating them, the HODs and lecturers indicated urgent challenges affecting successful e-learning. These challenges were:

1) Users inadequate computer skill and competencies

Three HODs argued that most lecturers did not know much about computers, and lacked necessary skills and competencies. This was demonstrated by their lack of enthusiasm to adopt ICT resources to teach.

I think there are real challenges ... challenges in the sense that there are many faculty members out there who are not very effective in the use of the modern technology so for e-learning to be very effective you will need faculty which is on top as with regards to the use of computers. If they are not there and you have the secretariat which can handle all the issues I think that will do well for everybody but the challenge over there too is that how will a small secretariat deal with all the various courses that we handle in the university so for e-learning to be very effective I think you will need a faculty which is also very good in terms of the use of modern technology. (HODA8: 12/03/10)

Six HODs and five lecturers said it was not just lecturers who were deficient in computer skills but also students who could not use the resources.

2) Doubts about the usefulness of e-learning in the humanities

Two HODs and four lecturers expressed doubt about the relevance and usefulness of e-learning in the humanities, suggesting it would be relevant only in the sciences. One HOD (a Deputy Dean) remarked:

...if you take a course like linguistics which I teach, or philosophy, I am just wondering how e-learning can improve on what I do currently or improves on students learning, in building some skills in the discipline. It may be applicable in the sciences but not within the context the liberal arts. This is my personal view... (MDFA1: 09/08/10)

3) Inadequate access to computer resources

All HODs and lecturers mentioned inadequate access to computer resources as a major barrier to e-learning. One HOD remarked:

... there are complaints from students about the access.so even if you went through all the trouble to develop the course and they could not access it what would you have gained. ...the issue is mainly with the large class sizes. If you have a very large class first of all you have to register them unto the KEWL. This alone is a major responsibility. (HODA2: 18/02/10)

4) Evidence of e-learning education effectiveness

The data revealed that management and HODs' decision whether or not to implement e-learning was not dependent on their understanding of the impact of e-learning on student learning (77.1%). That is they were planning to implement e-learning in any circumstance, contrary to the lecturers position that it must be relevant to the students learning. Respondents (40%) agreed that lecturers do not have sufficient time to engage in e-learning (most of them were indifferent). They were indifferent about generic computer training and the fact that the current curriculum did not allow enough time to integrate computer use in teaching.

5) Lack of funding

Lack of funding for technology and physical infrastructure were described as major threats for successful e-learning implementation because of the unstable foreign exchange rates. Respondents argued that to remain competitive in global educational delivery, there was need for a heavy investment in infrastructure. However, any

intended project could not be sustained if funding was heavily dependent on government support:

As far as we are concern, and so long as we buy with foreign exchange, then we have a problem there. ... if you can't afford it then you would not be able to be part of the information society. ... so it is essential that even if it's expensive we can borrow and invest and they would surely reap very, very good dividend from it. (HODA4: 15/02/10)

There are serious financial constraints because we are heavily dependent on government for financing and to tell you the truth, government does not do anything more than paying salaries and that is the problem. You need to invest in ICT and you don't invest in ICT if you are simply collecting salaries from government. ... I think we should share cost in such a way that it would enable us to do many of these things, and to promote e-learning we cannot depend on government entirely and be able to achieve all these things. (HODA3: 01/03/10)

6) UG repositioning for higher educational delivery

One HOD and two lecturers described the proliferation of foreign universities offering distance learning courses in the country as competitors, which would reduce the potential of successful e-learning implementation. A repositioning of the university was suggested:

Now we have all kinds of schools from outside having representations here. We are really becoming global. At least if you look at the universities being represented here, most of them offer e-facilities, distance education and you cannot by-pass the e-aspect of it. So we must invest well in e-learning if we want to do it properly and achieve its maximum benefit. (HODA4: 15/02/10)

7) Resistance to change

Finally, lecturers' attitudes towards the use of modern technology resources were described by three HODs and a lecturer as 'not welcoming'. This was because lecturers were attached to their old ways of teaching and because some had reservations about computers or they were aware of being computer illiterate. Respondents argued that this requires change, which must first begin with management crafting and enforcing policies and strategies that must be adopted by the lecturers:

... the university still has the veterans around, so to speak, and most people are still used to doing sameteaching with their manual notes ...they feel comfortable with that....so the changeover would be quite taxing and challenging. (HODA5: 06/04/10)

... not all of my colleagues are computer literates unfortunately. ... sorry to say this but some actually do have resistance. I told you in Engineering, the standard now is to use PowerPoint presentation, but there are some colleagues who are using the whiteboard and have not yet decided. (HODA2: 18/02/10)

... we have no clear policy, no known policy. It is time that management started tapping on expertise of best practice, and moved away from engaging academics with little experience in technology for teaching and learning. (HODA8: 12/03/10)

Respondents' perceived that management has not done much to promote e-learning. There was an inadequate infrastructure and support service; management had not educated users enough and had not built the capacity needed to promote e-learning. One HOD described partiality within the university; that is, responsibilities of leading projects were given to colleagues and not necessarily to experts. In the view of the lecturers, lacking the personnel to lead implementation without consultation of people with expertise in the project was an issue for effective and efficient e-learning implementation process. The lecturers opined that management should set aside the over-reliance on people with academic qualifications and engage some staff with technical or hands-on expertise in e-learning to guide implementation initiatives.

5.2.2 Students' Dimension

This section combines interviews, survey responses, the focus group discussions (FGDs) and Researcher observations to discuss the students' ICT skills, current use of ICT resources, and their challenges and motivation to use e-learning. The interviews were conducted with students in the Faculties of Social Studies, Arts, Science and Engineering. The questions were semi-structured and covered students' impressions about teaching and learning, assessment and feedback processes. There were two (2) sets of surveys. The target of the first survey was all students, while the second survey focused on students whose lecturers agreed to experiment with using LMS KEWL during the period of the survey. The second survey was conducted online using an online survey instrument, Qualtrics. The FGDs examined opinions expressed by students in the survey and interviews in more depth. Questions for the FGDs focused on students' views and impressions about teaching and learning, use of ICT for learning, and their expectations of e-learning. This section therefore explains the preliminary investigation conducted to understand student learning processes that could inform a successful e-learning implementation process.

5.2.2.1 Background of respondents

There were 236 student participants from 16 different departments and six faculties, all from undergraduate and postgraduate programs. 38.6% were from science (engineering, science and agriculture), and 61.4% from the humanities (arts and social

sciences). The Faculty of Social Studies, with the largest student population, was represented by 39.8% of respondents and the Faculty of Science by 22.5% (Table 5.2.1E, Appendix E1). For the FGDs there were seventeen participants in all, seven students from Social Studies referred to below as Humanities and five sets of students from the faculties of Science and Engineering, mainly from year one to year four.

Although all academic levels were covered, 41.5% respondents were represented by the second years (Level 200). Comparing student enrolment figures from the UG's 2010 annual Basic Statistics with the sample sizes used in this research, the proportions reflect the true representation of student distribution within Faculties at the UG. Views expressed are therefore likely to reflect students' perspectives of the situation of teaching, learning, and technology used in the university at the time of the research.

There were 53.8% male and 46.2% female respondents, mirroring the actual gender distribution of students. Current ratios stand at 58.8% male and 42.2% female (UG Basic Statistics, 2010). The survey data show that 94.1% of respondents were full-time students while 5.9% were part-time students. University statistics showed that part-time students constitute 9.5% of the total students' population in 2010.

Students understanding of e-learning: The FGD responses revealed that students' understanding and familiarity with e-learning varied between faculties. Students in the humanities described e-learning simply as 'electronic learning' with emphasis on PowerPoint presentations, while students from the sciences described e-learning as: "E-learning has to do with using computers and internet connectivity to learn and in essence get notes and materials and be able to do assignments and get feedback from lecturers" (FGD Student SG1S1); while another described it as: "I think e-learning is also about lecturers putting their lecture notes on the internet for students to access, and students to submit assignments to the internet" (FGD Student SG1S2). It was observed that while most science students were exposed to the learning management system KEWL at levels 100 and 200, students in the humanities had no such exposure. There was evidence of some students and lecturers' use of KEWL in the faculties of sciences and engineering but there was no evidence of use in the Faculties of Art and Social Studies.

5.2.2.2 Students computer skills and competencies

In terms of familiarity and extent of computer use the survey data revealed that 60.2% of the students were familiar with computers for both personal and academic work. 34.7% indicated they sometimes use computers for personal work. 3.8% said they rarely used computers and 1.3% said they never used computers for any work. On the self-rated computer literacy skills, 72.5% indicated they were intermediate, 16.9% beginners, and 10.2% considered themselves advance users. Contrary to the self-rating, performance on task (Table 5.10) revealed that 28.9% cannot do much with computers, 37.3% can be described as beginners, 17.1% intermediate, and 16.1% advanced users. This data implies that most students at the university were generally inexperienced users of computers.

Table 5.10
Students' computer competencies on task (n=236)

Competencies in task performance	Not much	Beginner	Intermediate	Advanced
	%	%	%	%
Word processor	11.0	25.8	20.8	28.4
Spread-sheets	19.9	46.2	9.3	8.1
Databases	33.5	33.5	8.5	4.2
Slideshow software	25.0	26.3	14.8	14.0
Email	7.6	28.4	30.5	17.4
Computer file management	12.7	37.3	17.8	16.1
The Internet	8.9	34.7	22.0	19.5
Web page authoring	43.6	24.2	3.8	5.5
Digital photography	27.1	28.8	11.9	14.4
Image editing	30.5	28.8	10.6	11.9
Video photography and editing	41.1	22.9	9.3	5.9

The survey data summarised in Table 5.10 shows that although most of the students could be described as either beginners (37.3%) or novices (28.9%), they had good task competencies in e-mail (76.3%), Internet usage (76.2%), word processing (75%), computer file management (71.2%) and spread-sheets (63.6%). This large proportion of inexperienced users means that students may need to develop their skills further.

5.2.2.3 Students' experiences of using ICT resources for learning

The survey data showed that students' use of computers for personal or academic work was not influenced by their academic year level or the faculties they belonged to (see Table 5.2.2E; Appendix E).

Students with computer literacy skills prior to enrolment used computers for personal and academic work more frequently than students who acquired literacy skills after enrolment (Chi-square = 0.005). It was also found that students who owned computers were more engaged in using them for personal and academic work than those who did not own one. On ownership of computers, the majority of students (57.8%) indicated they had desktop computers or laptops or both, while 42.2% said they did not own any form of computer. Student ownership of computers was not influenced by year levels ($p=0.175$).

Many students (78.4%) acquired their computer skills prior to enrolment in the university, and 13.6% acquired their skills after enrolment through the university's Computer Licence Training Program (CLTP). During a follow-up enquiry, the head of CLTP remarked: "...you see, most of these students register because of the certificates that we give them at the end of the course. Some of them just come to write the exams for the certificate." (LAC4: 03/03/10). After the academic registrar and Pro-VC requested an end to the award of certificates by the Directorate, student enrolments dropped sharply from 4000 students per semester to about 1000-1200 per semester. This implies that most students acquired computer literacy before enrolment in the university; the focus of the CLTP may need to be revised to meet learning needs, rather than competencies in using common applications.

i) Students' use of computers: Some students (41.4%) indicated that they used computers most frequently for entertainment and social networking, and 38.2% indicated academic work was their most frequent use (see Table 5.11). However, in the overall ranking, academic activities were higher. These activities included typing of assignments, research, checking exams and assignment grades online, course registration, and reading.

Table 5.11

Activities performed by students using computers

Most frequently performed activities	Responses	
	N	Percentage
Academic activity	315	38.2
Entertainment/games	205	24.9
Browsing/social networking	136	16.5
Checking mails	62	7.5
News and general information	21	2.5
Storage/printing/downloading/copying	18	2.2
Use of applications (design, MS Office, Dbase etc)	30	3.6
Others (administrative etc)	37	4.5

Each student spent an average of 4.08 man-hours per day on entertainment, 2.48 hours on academic work, 2.04 hours on social network activities and 1.09 hours in checking and reading e-mails (Table 5.12).

Table 5.12

Man-hours spent by students in using computers

Activities	N	Minimum	Maximum	Mean (Minutes)	Std. Deviation
Academic time	195	20	840	148.59	102.219
Social network time	119	10	480	122.23	92.16
Entertainment games time	119	20	1320	244.92	212.729
E-mail time	59	10	300	65.59	56.501

Researcher observation revealed that students were generally not tasked to engage in activities that would require them to use computers for direct learning activities or academic work, except for typing of assignments and individual research efforts. It was not clear when and where assignments were uploaded for students to access as claimed by management, except for students introduced to KEWL in the sciences who were using it. Students were required to check their university provided e-mail accounts regularly, check examination grades online, register for courses online, and add or drop courses using the Integrated Tertiary System (ITS). All other activities on their computers were mainly individual initiatives by students. It was further observed that the ITS system had an enterprise e-learning module, which the university had not acquired a licence to use.

5.2.2.4 Perceptions of teaching and learning at the UG

Students' learning was greatly influenced by their early exposure to teaching and learning during basic and secondary education. In Ghana, students depend on lecturers for learning, and learn only materials given to them. The FGDs explored students' perceptions of teaching and learning at the UG. Their responses were categorised into themes of teaching, learning assessment, feedback, programs and infrastructure.

The students indicated that teaching in the university was predominantly face-to-face, and that their lecturers attempted to cover all items in their syllabus before the end of semester. Electronic resources used during delivery include PowerPoint presentations and not KEWL. One level 400 science student remarked:

Right now in level 400 most lecturers do not use it [KEWL] so they would rather come to class and then copy the slides for you on a pen drive or something. That is what we normally do ... we find that to be more convenient. (FGD SG1S1)

Respondents revealed that apart from the PowerPoint presentations, which were normally copied for students, lecturers did not use any known ICT resources for teaching. The situation in the sciences was no different from the humanities, as some lecturers expected students to memorise learning materials given out to them. Students were therefore experiencing confidence-challenging situations:

Teaching and learning is a problem because the lecturers have to improve upon how they help us as in they always put food in our mouths instead of us thinking and being creative ... this is what we have met so there is nothing we can do about it. ... But on the whole the lecturers they teach what they are supposed to teach and they end their syllabus as it's expected of them. (FGD Student HS6)

It was evident from the comments that students were not satisfied with the teaching approaches adopted by lecturers, and preferred approaches embedded in critical thinking and creativity to construct knowledge. Their perceptions of helplessness have been attributed to lecturers' attitude of maintaining the status quo, creating an institutional ethos.

Students at level 100 were introduced to KEWL, where lecturers upload relevant course materials for the students to access, but some students had difficulties, because not all of them have access to the Internet. This situation resulted in students relying on their peers for the learning resources. Comments also highlighted that students were introduced to KEWL at the early academic levels, but at higher levels, more emphasis was placed on contact sessions as the mode of instruction. Users largely attributed the problem to poor Internet access.

5.2.2.5 Students' perceptions of lecturers using KEWL

Participants in the science FGDs revealed that although some lecturers used KEWL at lower levels as a repository for lecture notes and assignments, and used PowerPoint presentations during lecture sessions, assignments were hand written and submitted physically in hard copy. The students cited the only chemistry lecturer who used KEWL environment to organise quizzes periodically. Due to a lack of computers in the faculty, 130 computer workstations in the ICT directorate were reserved for the students to take the quizzes in batches and marks were available immediately. The coordinator of KEWL corroborated this:

We have two faculty members, from Chemistry and Physics who put course content online. That is where a student can go and be reading online their course documents ... where you use the system as a course document repository. Lecture notes where every week slides are dumped for students to download or print (TSIT3: 12/04/10)

The coordinator explained that there were two lecturers who used the LMS for both course content and as a repository for learning resources, and they conducted interim assessments. However, the difficulty was that most students were unable to access the information. Confirming the frustration in accessing learning resources, one student remarked: "...having to go to the café all the time is tiring and waste of time for me, so I personally, I collect the information from my friends." FGD Student SG1S3. According to the students, their problem with KEWL was access to information when outside the university's network environment. They needed to spend a considerable amount of money and time accessing information from KEWL.

i) Interest and extent of satisfaction with KEWL: In response to whether they felt well supported using KEWL, students in the FGDs indicated they preferred contact sessions with lecturers, and argued that contact sessions supported and best suited their learning needs.

I think having a physical contact with a lecturer is very important, ...from the way the lecturer is going to explain and from her facial expression, you can get to understand better, and you can get to know what he expects from you the student ... but if its online and you don't get to see his expression and how he wanted you to go about the thing... (FGD Student SG1S3)

However, five students from the sciences, who had laptops and private Internet connection, indicated a preference for a combination of both contact sessions and KEWL or online learning. The preferred format for e-learning was that the system be used as a repository, to give and receive assignments and feedback online. Reasons for

their preferences were attributed to lack of access to computers and Internet. One participant from the humanities remarked:

Lack of accessibility even to the network is a problem because the whole campus is not wired with Internet for students. Most students have laptops, which they can be in their room and use. If this e-learning is in progress it could be very effective but since the whole university concentrates at the ICT, I think the ICT can't accommodate every student who wants to come for e-learning here. When they introduce such a course I think that the ICT would be full to the capacity that every day here would be full and people would be queuing and would not be nice.
FGD Student HS2

Table 5.13 below shows respondents' reasons for rejecting e-learning as an option for learning in the Humanities (H) and Sciences (S). The question was 'would you be happy to take some online courses? Real-time or delayed time?'

Table 5.13

Rationale for rejecting e-learning

Rationale	H	S
Face-to-face is effective and more interactive with lecturer than online learning	5	7
Lack of access to computers and internet services. Difficulty in accessing computer remotely	4	5
Inadequate support for students	2	4
Lack of space	2	0
Inadequate computers leading to long queues – students waiting for their turn to access the computers	4	6
Not easy to understand in online learning environment	0	6
Unstable power supply	0	8
Would prefer delayed time	1	6
Would prefer a combination of face-to-face and e-learning	3	5

It was evident that students would reject e-learning because they considered contact sessions were more effective and interactive than online learning. In their view, it was difficult to understand courses taught online. The students' responses and observations made in the ICT directorate showed that it was a common sight to see students in queues waiting for their turn to access a computer. The electricity supply was unstable and unreliable, making the Internet connection unreliable for students with their own laptops and not all students had private Internet access

My main problem, it all has to do with the infrastructure. If the infrastructure is there then of course it's possible to do that, because e.g. it is not everyone on campus that has Internet access. So if internet access is everywhere on campus then it will be feasible because it would be easiest thing to do rather than walking

all the way to the library or somethingyou probably go online, go to KEWL and then download lecture notes. (FGD Student SG1S2).

... I will not mind using it but my problem with it is that, I don't like reading things from computers. I will like to have a print out and then read and printing also cost, though when you access it you could print it out, it's quite a burden printing it out. Because when the handouts or printing materials are given out on papers photocopying them is cheaper than printing from a PC so I would not mind using it but then I am not too enthused about it. FGD SG2S3

It was evident that not all students liked reading from computers and some preferred print. Corroborating the students' reports, the head of KEWL indicated that the unit was always forced to open the directorate during the weekend so that students could do interim-assessments. This was because the bigger laboratories that could take a maximum of 100 students were only available during the weekends.

Contrary to some views expressed, science students were excited about online learning and indicated their readiness to use it in all courses:

Yes, it makes studies easier. You may not have to be in physical contact with your lecturer to have access to information and so it makes your learning experience easier. But then one problem is that it's not every lecturer who uses the facility. FGD SG2S2

This shows that issues motivating e-learning adoption are critical.

ii) Effects of ICT resources on students' academic efforts: Enquiry about the extent to which available ICT resources have impacted on academic efforts revealed that they had little-to-no effect on most of the students' access to library resources (48.3%) and on class assignments and examination (45.7%) as shown in Table 5.14. General impressions of submission and assignment feedback showed that the ICT resources did not provide sufficient support to students. However, in relation to access to course registration, the students indicated it has had a very large effect on their academic activities.

Table 5.14

Students' views of technology effects on academic activities

Extent of ICT support/effect on students' academic activities	No effect	Very little	Little	Some	Much	Very much
	%	%	%	%	%	%
Access to course registration	6.8	5.5	8.5	9.3	28.4	41.1
Learning Efforts	4.7	10.2	20.3	28.8	22.0	13.1
Access to your information	3.4	6.8	13.1	32.6	25.0	18.6
Access to library resources	11.9	14.8	21.6	26.3	14.8	9.3
Class Assessment (assignments and exams)	9.7	14.8	21.2	25.0	18.2	8.9
Submission of assignments	37.3	19.5	19.5	11.9	5.1	4.7
Feedback on assignments	45.8	20.3	16.9	7.6	2.5	4.7

iii) Extent of students' engagement with ICT resources: In exploring the extent to which students individually engaged with the available ICT resources for learning activities, most students indicated they did not engage (Table 5.15). Few of the students indicated using ICT resources for their academic work. A good proportion of students indicated occasionally using the resources for assignments, having good technical support, and the time to use computers for learning.

Table 5.15

Students' engagement in use of ICT resources

Activities	Often	Sometimes	Never
	%	%	%
I have access to computers in the faculty or department.	16.1	49.6	34.3
Courses I take in the university have on-line components	16.9	53.8	26.7
Lecturers use computer resources to teach (eg. PowerPoint)	25.4	66.1	5.9
Assignments are given on-line (downloaded by students)	1.7	33.1	64.0
Feedback to my assignments is given on-line	0.8	20.3	76.3
My course learning materials are posted on the internet	2.1	36.4	60.2
My lecturers ask students to use ICT and internet resources for their assignment	15.7	66.1	16.5
I have good technical ICT support for learning	20.3	68.2	9.3
I have time to use computers for learning	20.3	68.2	9.3
I am given specific guidelines for the use of computer-based resources	10.2	49.2	37.7
The existing technology supports student to student interaction	14.8	48.3	35.2
The existing technology supports student to lecturer interaction	7.2	44.1	45.8

iv) Motivation for e-learning: Humanities students, unlike those in Science, showed no interest in e-learning, indicating they were generally not motivated to take courses in e-learning because they believed it was not effective and was unreliable. For some in the humanities, there was a fear of the unknown and the prospect of engaging in a learning environment they were not familiar with and not confident in. This was a risk they were not prepared to take before graduation:

For now we are not confident in the e-learning. For now if I should be confident we should have full access to the network and stable internet connection. (FGD Student HS1 & HS4).

I share a similar opinion with him because the system is not so effective so my confidence level is still minimal. I can't trust the system, but then if the system is such a way that its very, very effective I have no problem with that because it would definitely increase my knowledge base and also in terms of accessibility (FGD Student HS2)

These comments suggest that although the students have reservations, they believed e-learning had the potential to increase their knowledge and they would be motivated if they had access to resources and computers with stable Internet connection (Table 5.16). All the students emphasised institutional upgrading of existing ICT infrastructure as a motivating condition for adoption, indicating preference for an environment in which they could access the Internet and learning resources at anytime and place. Below are students' responses from the Humanities (H) and Sciences (S).

Table 5.16
Students' motivation for e-learning

Motivation to take online courses	H	S
The whole university should be networked	4	6
Students should have access to the Internet anytime and anywhere	3	5
Adequate facilities and resources to support students at all times even remotely	2	8
Having discussions with lecturers online	1	4
Effectiveness of the system	1	3
Not waiting long in queue for a turn to browse	4	7

Of significance was the comment that students would be motivated if they did not need to wait a long time in queues to access computers and the Internet access.

The students expressed doubts about appropriate support for teaching and learning indicating that they have only two hours each day in which to use university provided computers and Internet resources. This limitation made learning more difficult. Students wishing to copy or print materials can only do that through a laboratory

assistant tasked with the responsibility, because students cannot use pen-drives or storage devices:

... Another problem is that you cannot use storage devices like pen-drives, when you go to the ICTD. If you want to do so you have to draw attention to the person who is in charge of the place, and then if you want to copy something on your storage device he does it at his desk. (FGD SG2S3)

The students asserted that leadership and management were the main problem for effective deployment of e-learning in the university, because in their opinion, the technology fees they paid meant that management had the capacity and resources to generate sufficient funding to support e-learning. In their view, students thought that e-learning was workable if management was able to provide the necessary infrastructure and adequate support for both students and lecturers:

... so I think that before the e-learning thing can be introduced the whole school should be networked so that the student can be in the comfort of his room and he can search for the lecture notes and even if any discussion you can have it with the lecturer at his own comfort. Leadership and management, if these things can be resolved thenso it comes to leadership. Who is taking the lead to sustain the process and would not tie our hands because of frustration and support – we need people who are supportive. FGD Student HS2 & 4

It was clear the students consider that management support for teaching and learning is critical for successful e-learning. With the emphasis on infrastructure, the students wanted to sit in their rooms or at other sites within the university campus to access and browse the Internet, and any resources made available to them by their lecturers.

5.2.3 Technical Staff Dimension

This section outlines findings from interviews with five senior ICT managers and seven assistant support staff at the UG. Reference was also made to comments made by the university's finance officer in response to budgeting issues raised. The interview responses were synthesised together with survey responses from twelve (12) ICT technical support and services staff comprising both senior managers and technical assistants. The senior ICT staff members included heads of the university library technical sections, ICT directorate, Planning and Management Information Systems Directorate (PMISD), ICT head of the UG Business College, and the head of Student Support Services, who was also the operational head of KEWL.

To explore technical support and service staff perceptions of e-learning, the survey had four sections: the state of ICT infrastructure at the UG; familiarity with institutional

policy and plan for ICT integration in teaching and learning; perception of infrastructure performance and how they influence teaching and learning; and staff competencies and capacity to support teaching and learning.

Managers of ICT interviewed raised several critical themes. These included policy and strategy, ad-hoc measures in operations activities, improper budgets and planning, capacity building and motivation, poor staffing and documentation, and lack of coordination and quality assurance. The unstructured interview covered the current role of ICT units at the UG, familiarity with policy and strategies for e-learning, current support services, capacity and competencies for e-learning, frustrations and perceptions' of strengths, weaknesses, opportunities and threats for sustainable e-learning implementation.

5.2.3.1 Role of ICT support units in the UG

The ICT heads confirmed the structure of three ICT directorates at the UG and indicated current efforts by management to merge operations of all three units. A single Director would head them, although the operational functions of the units would remain unchanged. Operational activities of the PMISD were to manage software applications, students and administrative information (academic, human resources and finance) and all related databases. The ICT Directorate managed ICT infrastructure and support services with additional responsibility of identifying needed and appropriate ICT resources to be integrated in all operational activities of the university. Their role further includes technical support services of the infrastructure, managing and maintaining the infrastructure as a whole, organising computer literacy training for students and managing their use of resources. The library technical section identifies and advises on technology needs for the library and provides support services for them.

Technical staff emphasised their role centered on the provision of ICT infrastructure and support, the development of lecturers' capacity for e-learning, and enabling the sharing of resources. They also indicated the importance of building infrastructure that would be on par with other leading universities. The ICT staff interviewees described the operational support provided for faculties as technical, administrative and academic services.

5.2.3.2 Knowledge of policy and strategic plan for e-learning

All three ICT Directors and a approximately third of the technical staff (36.4%) were aware and familiar with the national ICT policy and the government's strategic plan for higher education. However, at the institutional level there were no policies or strategies for ICT integration in teaching and learning, although a corporate strategic plan and a completed ICT strategy yet to be implemented existed. The focus of the ICT directorate was to use the draft ICT strategic plan to revamp existing infrastructure like the NOC and provide support for the UG's distance education program (further discussed in Section 5.3). However, two ICT heads indicated that having a strategic plan, systems, and applications were not enough. Getting people to use such systems and applications was also required. One director remarked: "Strategy is getting people to build content and getting people to use it [system] actually." (MDCA2: 10/06/10) The opinions suggest that although the ICT heads had no direct policies and strategies for e-learning they were conscious and familiar with the expectations of their roles.

Two ICT directors mentioned efforts made in collaboration with a Chinese company to develop an e-learning platform as part of an infrastructure development project motivated by the draft ICT strategic plan. One director remarked: "... we looked at quite a number of e-learning applications, just to make sure that we get and integrate that right kind of synergy for the learning system" (MDFA2; 03/03/10). They revealed that the ICT directorate was assisting the ICDE to convert all manual modules of teaching to an online or e-format as part of the strategy, however, the required technical experience to convert the modules effectively remains a challenge. This means a lack of adequate skill and competency to support migration of manual resources to an e-learning environment. The researcher observed that there was no organised team responsible for e-learning to coordinate the migration process. Concerns were expressed about lecturers' resistance to change and the need for management to examine the processes of lecturer adoption.

All three ICT heads mentioned that efforts made to promote ICT deployment and adoption were done on an ad-hoc basis and added that active systems running at the UG were not grounded in structured strategic management processes:

... there is no coordinated or systematic activity to say that we are targeting this department or that this academic year to make sure that this is done. So far it's a bit of an ad-hoc thing. (TSIT2: 12/04/10)

Corroborating the comment a senior ICT head remarked: “.... none of the systems running had gone through a thorough systems approach to implementation.” (TSTI5: 01/03/10) The heads explained that management approaches to the acceptance and use of installed applications were done as means to meet needs without active end-user involvement. Their approach has affected user acceptance, the smooth running of the system and a structured process of maintenance. They expressed caution about the effect of the approaches being adopted. A deputy director remarked: “... if the university does not come out with a clear policy on e-learning, it would be very difficult to have any meaningful [e-learning] implementation” (TSIT2: 15/07/10).

They explained that the ICT unit occasionally organises workshops to create awareness of KEWL and of existing resources in the faculties. Their aim was to encourage and provide support to individual lecturers who express interest in using KEWL. The heads expressed optimism that by using the workshop approach enthusiastic lecturers would adopt and promote the system in their departments. It was evident from the perceptions that there was no structured plan for deployment of the ICT resources and support. The assumptions suggest lack of depth in the understanding of the complexities involved in e-learning adoption by individual users. It means that views of lecturers’ resistance to change lacked context in which they were expressed. This suggests lack of good understanding of the challenges lecturers face.

5.2.3.3 Technical staff expectations of management

Technical staff expectations of management were focused on the provision of resources to support e-learning. Seven issues were identified:

1) Inadequate expert consultation on technology issues

Three ICT managers expressed concerns about management over reliance on academics (with little or no background in ICT) for ICT professional advice rather than consulting with ICT experts on ICT decisions. Suggestions were made to recognise and respect technical staff input in forming policy decisions. This will help to prevent backlashes on decisions made. Allowing professional decisions will be an advantage to the university:

... you see one thing is that, for example, here in the UG, ...it is the academics that matter but in the rest of the world every professional also matters. With IT is not like that. I respect Doctor’s and Professors. ... but we must let professions work. So in infrastructure development we must ask people who know. You can be the head but let the people who know the thing do the work ... but make sure professional decisions are taken and you go with the professionals advice. (TSIT2: 15/07/10)

2) Establishing proper structures to support effective e-learning

The four unit heads and three support staff believe management was not up to date with technological trends, and were therefore not moving with changes in technology support for educational delivery. All three managers also mentioned the need for management to ensure that proper structures were in place to promote inter-faculty and institutional co-operation. This may lead to developing technical support and local capacity across the university. One manager remarked: "... to avoid duplication and make use of the limited resources effectively, management must facilitate the co-ordination of resources on campus." (TSITL3: 17/07/10). The managers summarised the situation as un-coordinated and suggested inter-university coordination of resources and activities:

If you look at our structure now there is not much proper co-ordination of the resources. For instance if you go to the US and UK they have different ideas towards the development of e-learning – there are structures that link institutions within the university together and inter-university co-ordination. (TSIT5: 01/03/10)

Expectations were that management would make decisions that were directed by policy and enforced through strategies that would be adopted. Such processes may cover monitoring, evaluation, technical support, cultural factors and institutional politics.

3) Initiating and promoting national and regional cooperation to share resources

Fourthly, two managers opined that it was necessary for management to initiate and promote e-learning across the universities in the country through the committee of Vice Chancellors. The benefit will be to acquire resources at a cheaper cost:

Coming from the committee of vice chancellors ... then it brings some kind of uniformity in the acquisition and use of the resources. ... consortium of the university libraries buys an online database for the libraries. Currently the public universities have a common database, which is acquired at a cheaper rate, and accessed by all member institutions. (TSIT5: 01/03/10)

Opinions expressed suggest that a consortium of universities means acquiring resources, ensuring uniformity in infrastructure deployment and resource allocation within the universities at a cheaper rate. Such cooperation may be achieved through the promotion of a National Research and Educational Network (NRENs) of universities in Ghana. They described the formation of the NREN a future strategic strength for the university. The research observed that a NREN and a regional REN were being promoted by the AAU. Such research networks have the potential of supporting sharing of resources, building capacity for network infrastructure, security of shared resources, creating backup policy systems, and redundancy in the network.

4) Crafting and enforcing e-learning policies

All three ICT managers and two unit head indicated the need for an institutional policy for e-learning. They agreed that such policies would minimise internal politics of lecturers' acceptance of e-learning, and would educate them on the benefits of e-learning. One unit head said that: "...once there is policy it would not be difficult for implementation, just that it might take some time for it to come on" (TSIT5: 01/03/10). One manager added; "...most lecturers are comfortable with the traditional system of teaching and learning, but not too much with the young ones coming up. If it becomes policy they will be forced to conform." (TSIT2: 15/07/10). These arguments imply that most lecturers were not using the resources because they were not supported by policy.

They believe most students were embracing and catching up with the technology in various forms, so it would not be difficult for them to change over to an electronic learning environment. Suggestions were made for management to build lecturer confidence. All three managers further expressed concerns about the lack of clear documented policies and procedures on maintenance and replacement of computers and ICT resources:

There is no documentation on the network cables laid in most of the faculties. Anytime there is a problem we have to disconnect the entire section where the problem is identified, until the problem is resolved. You see this is not a good practice but under the circumstance we have to do that. (TSLTech2: 05/08/10).

They emphasised the need for management to ensure proper documentation of cables that were being laid university wide to avoid maintenance problems that may occur in the future. There were further calls for management to support the recruitment of qualified technical support staff as that would help ensure the necessary quality of support was available. The comments suggested no policy existed on proper logging of operational activities.

5) Approving adequate budgets to support ICT operations

One ICT manager and three unit heads argued that management approval of ICT budgets was not adequate to support operational activities of the units. In response the Finance Officers (FO) explained why ICT unit budgets were cut annually. The FO said: "...the poor budgets prepared by the ICT directorate cannot support and promote the ICT integration in the university system as it is desired. The budgets must be properly justified." (MDCA6: 21/07/10) The conflict of perception was attributed to lack of appropriate skills in budget preparation.

6) Proper coordination of resources to avoid duplication of efforts

All the technical staff concerns further suggest the need for management to facilitate coordination of resources on campus to avoid duplication. Suggestions were made about the adoption of appropriate means to create awareness among users, discounting the mass workshops targeted at faculties and departments. Training programs were described as inadequate and unstructured to benefit lecturers. Peer-to-peer support was preferred to the approach of inviting all lecturers to workshops with no follow-ups and after training support:

... the strategy may be such that, 3 to 4 people from a department may be identified and trained as support resource persons for the departments or faculty. Such people may be identified as resource persons from the faculties who understand the systems operation inside out. ... once this is done, creating user group discussion forums, where people can post questions and those who are on top of it can help. All these we have not done, so when somebody gets stuck they give up.... (TSIT2: 12/04/10)

It was suggested that lecturers' participation in the training programs was low because they were unaware of the training sessions. However, comments made by the respondents suggest that lecturers who show interest and gave up did so out of frustration for lack of support when they got stuck with using the resources.

7) Poor communication and information flow

Finally, laboratory assistants expressed concerns about poor information flow between supervisors and lab assistants, calling on management to ensure clear communication flow on decisions made for effective support services for both students and lecturers:

... so when it comes to the registration too, sometimes you will sit here and a student would come to you and say; 'I have heard this registration is going on', if you are not careful and you tell the student no such registration is going on, you would suddenly realise that you have made a joke of yourself, because the moment you go and check you would realise that true to what the student has said such registration has started and is ongoing. So sometimes this creates a problem for us. Lab Assistant.

This means there were poor internal communication structures about operational decisions that were made.

5.2.3.4 Technical staff capacity to implement e-learning

On staff competencies and capacity for e-learning, four unit heads said the ICT units have well qualified staff with skill and competencies to support any e-learning initiative, but these were discounted by a deputy head. He explained that although there were

well-qualified staff, the university lacked qualified educational technologists and content developers to support lecturers in producing electronic curricula and learning content for students. The problem was attributed to the HR decision to freeze recruitment of technical staff to match corresponding increase in resource support and operational activities:

... University management may have to decide at a point to recruit high quality professionals or provide adequate training for existing staff to build the needed skill and capacity to manage and maintain the available resources, especially with the new infrastructure that is currently built (TSIT2: 15/07/10).

Opinions expressed by technical staff confirmed views expressed by the head above. The survey summary in the Table 5.17 shows that respondents' believe the ICT unit does not have sufficient staff to support both faculty and students. They believe the ICT directorate does not have the capacity and staff to implement and support e-learning. In their view the technical staff need adequate training to implement e-learning. They were however indifferent to the suggestion that the ICT unit has the capacity and resources to develop an e-learning system.

Table 5.17

Competency and skill for e-Learning (n=11)

Technical Staff Opinion on Capacity for E-learning	SA	A	N	D	SD
	%	%	%	%	%
The ICT unit has sufficient staff that can support both faculty and staff	0	0	9.1	45.5	45.5
The ICT department has the capacity and staff to implement and support e-learning	0	27.3	9.1	27.3	36.4
The ICT staff needs training to implement e-learning related technology.	27.3	72.7	0	0	0
The ICT Unit has the capacity and resources to develop an e-learning system	9.1	27.3	18.2	27.3	9.1

1=Strongly Agree; 2=Agree; 3=Neutral/Indifferent; 4=Disagree; 5=Strongly Disagree

Technical assistants corroborated the comment that recruitment of more qualified staff would complement support services provided by existing staff. However, as part of measures to solve the staffing problems, students with good backgrounds in ICT and computer literacy were recruited on casual basis to assist with the students support services. All these were done as part of efforts to bridge the staff gap.

5.2.3.5 Perceptions of issues to be avoided for successful implementation

In describing issues that must be avoided when designing an implementation strategy all three ICT managers and four unit heads cited: 1) management unwillingness to recruit technical staff with expertise to support e-learning. Such a policy they explained will continue to negatively affect operational services. 2) No proper coordination of ICT resources on campus. This resulted in conflicts between lecturers and technical staff. 3) Improper documentation of resources deployed in faculties and departments. Examples were cited of network cables laid at various blocks at the UG, which were not properly done, because there was no reference document on the network design used.

In addition to the above, poor budgeting and inadequate funding to support the operational activities were mentioned. The three managers confirmed that budgets and budgetary allocations have been ad-hoc over the years. Monies were released as and when requests were made for the purchase or replacement of some devices. A deputy director revealed that annual budgets do not reflect or cover major issues on maintenance and repairs, which is the basis for the ad-hoc measures. The deputy director remarked that: “Sad to say but the budgets we submit are not well covered for the entire directorate needs.” (TSIT2: 15/07/10). The deputy director confirmed management cuts-down on budgets submitted by the directorate of operational functions. Some unit heads have resolved to work only when resources are available to support their operations.

For now, when the request is made ... when the money is released I will work. I am now moving at my own pace to do what I can do. Those using the system [KEWL] now, anytime there is a need for assistance, I intend to give it priority first, almost immediately. So that is the only way to keep the system running (TSIT3: 12/04/10)

It was evident that staff have adopted non-concerned attitudes towards support services due to lack of adequate resources and were prepared to only do what was within their means.

Inadequate logistics including transport to move technicians around campus was cited as a problem that affects quick response to queries raised by lecturers for assistance. The three managers and two unit heads explained that moving between faculties to service computers (with the limited staff strength) requires transport, which was mostly not available. Some Directors said they used their private cars to drive staff around for support services without compensation. One deputy director said: “...we are trying to

let the administrative authority, those who take decisions understand what needs to be in place. ... Colleagues in the section sometimes use their own cars and they don't buy them fuel, and there is no support for maintenance.” (TSIT2: 15/07/10). The effect has been that technicians respond to calls at their own convenience, as and when logistics were available for them to solve the problem. Some faculties therefore recruit not so qualified maintenance staff to support their day to day operations with calls for out-sourcing ICT support operations in the UG. One unit head remarked:

Faculty has some support staff that supports day-to-day operations but not qualified maintenance staff. With time agitation is made for out-sourcing, but there are serious problems with out-sourcing in institutions like the UG where control and systems securities are relaxed. (TSIT2: 15/07/10)

There were concerns about the security of the system and control of learning resources when they are outsourced. Highlighting the staffing situation, a manager revealed there were only two well qualified maintenance staff supporting the entire UG community.

Another issue to be avoided was that of compromising systems. Two managers suggested the development of regulations for using available ICT resources. The managers and technical assistants said there was poor coordination of resources hence different faculties and departments adopt varied approaches in using ICT resources. A unit head remarked: “...the situation now is such that there is no inter-university collaboration to share the resources. All the public universities are pursuing different projects independent of each other. So costs of the resources are very high” (TSIT2: 12/04/10)

5.2.3.6 Issues enhancing and limiting effective support services

The emerging issues were categorised into external and internal factors described as strengths and opportunities that will enhance e-learning, and weaknesses and threats that can adversely affect the technical staff support services.

i) Internal and external strength and opportunities: The ICT managers and technical staff described the following factors as strengths and opportunities for effective e-learning implementation:

First, the UG's investment in infrastructure development, aimed at expanding the existing network and upgrading ICT resources. They believe on completion students may be able to access learning resources from remote locations. Two managers revealed the deployment of ADSL+ in the halls of residence, faculties and departments,

with the goal of improving access to Internet connectivity. One manager remarked: "... for the first time, I am insisting on comprehensive drawings of all the cables being laid, and documentation of the network infrastructure." (TSIT2: 15/07/10) He further described efforts being made to lay a solid foundation for distance education by acquiring high capacity servers (storage capacity to support large amounts of learning resources). Another manager remarked: "The network is scalable; with capacity to expand. The internal bandwidth is currently unlimited, ... it has the capacity to run an effective video conference." (MDFA2; 03/03/10)

Secondly, they were optimistic cost of bandwidth in the country would reduce to enable faster access considering the proliferation of Internet Services Providers (ISPs) and access to a nationwide fibre optic cable being laid. They believe the situation will improve Internet access at the UG and in remote locations. The available bandwidths were limited and had direct effect on access.

Thirdly, they indicated that periodically, technical staff were sponsored to take courses where needs were identified. They cited the staff resources centre with resources capable of supporting all lecturer-training needs at the UG.

ii) *Internal and external weaknesses and threats:* The issues categorised as weaknesses and threats for effective e-learning implementation as described by the technical staff include the following:

All the ICT managers indicated that universities in Ghana were gradually building ICT infrastructure at various levels to support teaching and learning. Their growth and expansion at various levels was gradually building competition among the universities. However, the building of a robust ICT infrastructure strategically positions the UG to potentially share technical competencies with other universities. Touching on threats a manager remarked:

Though the university is building up robust infrastructure to support teaching and learning, 24 hours reliable access at remote locations is still an issue that has to be dealt with. This is due to our low bandwidth situation. We are making efforts to increase the bandwidth. (MDFA2; 03/03/10)

Management attitude towards ICT and e-resources were perceived by the three manager and two units heads as a problem that may continue to affect effective support services if nothing was done. They explained that management attitude was influenced by the extent of exposure they have had with learning technologies over the years, and if care

was not taken some lecturers may hide behind the e-learning platform and not teach thereby making all efforts worthless. One manager remarked: "... our leaders learnt by rote and traditional teaching methods which is different from our technological age. ... the fact is that UG is not engineering focus" (TSIT2: 15/07/10).

Fears were expressed that lecturers' attitudes may undermine efforts. A manager remarked: "It is easier for people to just dump lecture notes on this platform and say everything is there and in our part these are some of the dangers." (TSIT2: 12/04/10) According to the managers, information uploaded or posted for students to access must always match or be consistent with PowerPoint slides presented to the students in lecture sessions.

Electric power (which was periodically rationed), was mentioned by all three managers and technical staff, as inconsistent and unreliable. The researcher observed on May 12, 2009 how power supply from the national grid went off four times without any warning. On each occasion, it took an average of 45 minutes for power to be restored. It was further observed that most standby generators at key locations were rarely started when there was power outage. It was explained that the generators had run out of fuel. A deputy director attributed the problem to budgetary allocations for fuel required for running the generators.

Lack of adequate security for the protection of available infrastructure and e-resources were raised as major concerns by three unit heads who indicated periodic theft of routers, and computer accessories from the laboratories and the problem of non-documentation of occurrences by staff. A technical assistant remarked: "Gadgets and accessories are removed from the system without proper documentation. Logging of operational activities is a problem. It is just poor." (TSTIT4: 15/07/10).

Lack of funding, poor culture of maintenance, inaction towards inefficient staff, and lack of planning to stock relevant components and resources, were described as threats by four technical assistants. A deputy Director expressed difficulty in accessing institutional funds for the replacement of obsolete machines. He remarked: "... though lack of adequate funding is an issue, there is lack of planning to stock relevant components of e-resources, couple with poor budgeting. Budgets prepared lack in-depth planning and direction, hence some rejection from the budgetary committee." (TSIT2: 15/07/10).

Three managers cited lack of quality assurance as a potential threat to quality technical services and lecturer-designed learning resources within the learning environment. The lack of standards to support lecturers, which allows them to use techniques that suit them, were said to be worrying. A unit head opined that learning materials presented to students may have to be reviewed to ensure they were at par with standard disciplines in well-resourced universities. One manager expressed concerns about lecturers not updating their lecture notes. From the manager's experience of working with the lecturers in the KEWL environment, there was no evidence of faculty vetting of learning resources before uploading them online. One unit head remarked: "The faculties should take personal interest, special interest, to make sure that whatever goes in there is not just a dumping of lecture notes." (TSIT2: 12/04/10). The need for vetting and peer-review of online resources to ensure quality before they were uploaded was expressed by two technical staff and a unit head:

... the danger is where the faculty members decide on their own to roll the complete e-learning anytime ... just telling the students that the lecture notes are available and they don't get to do the Face-to-Face. So maybe the faculties should take personal interest; ...whatever goes in there on the platform, they should make sure that the university's standards concerning teaching and learning are not compromised. (TSIT2: 15/07/10)

Quality assurance was relevant because management would be able to determine the quality of resources and performance, and the effectiveness at which resources and competences were combined to give best outcomes. This will help management to measure institutional outcomes based on set objectives and the philosophy of teaching and learning set by the UG.

5.2.3.7 Perceptions of workable strategies

All ICT managers and unit heads cited institutional policy decisions covering technical support as appropriate strategies for an effective e-learning implementation. Such policies will help define the role of technical support services. There was emphasis expressed for management support to ensure adequate training before migration onto any electronic learning environment, adding that capacity training programs were biased towards administrative and students support services. The technical staff further cited improvements of the infrastructure to ensure smooth running of the Internet and extranet. They explained that the local area network (LAN) should be well structured:

... make sure the infrastructure is right, ...make sure anytime someone wants to hit the system its available. ... they [management] have to create the awareness

that such a system exists. ... the policy to help us to gradually move towards this direction. The policy should inform strategy. (TSIT2: 12/04/10)

In drawing from the comments it was observed that reliance on a strategic plan would help to ensure lecturers continued to use electronic resources. This means there was need for a structured process for e-learning implementation.

5.2.4 Summary of People Domain

The people domain is described in three Sub-Sections: the lecturer and HOD, student, and technical staff's perspectives of ICT and e-learning at the UG. The findings showed that lecturers taught large class sizes, several course units, and were faced with academic and economic pressures (consultancy, research and teaching) from time and workload. Teaching and learning was by contact session with students, who depend on what the lecturer considers appropriate for students learning. The majority of lecturers had UG provided computers, personal desktop and laptop computers. Most lecturers demonstrated limited capacity with computers to perform tasks.

Lecturers and HODs: Lecturer expectations of what management must do to facilitate e-learning adoption at the UG include: 1) provide appropriate infrastructure to support how lecturers teach and share resources; 2) provide stable and uninterrupted Internet access; 3) provide adequate resources to enhance students learning, such that none was disadvantage; 4) provide adequate training for students to communicate effectively online; 5) provide adequate motivation for users to engage with online tasks; 6) provide a secretariat with appropriate expertise in content development to provide support services. The support services expressed by the lecturers and HODs were in four categories; 1) faculty; 2) social systems (peer-to-peer); 3) technical and; 4) management or administrative support services. Lecturers and HODs motivation for e-learning were linked to institutional policy and strategy, adequate training and available infrastructure. The findings show lecturers motivation for e-learning depended on: 1) lecturers skill and competencies; 2) a structured program for continuous professional development; 3) adequate ICT facilities and resources to facilitate e-learning; 4) meeting lecturers expectation for e-learning adoption; and 5) adequate resourcing of technical staff to support e-learning.

Finally, identified factors that require strategic attention are the: 1) culture of teaching and learning which limits authentic (e)-learning; 2) inadequate technical and pedagogical support for lecturers; 3) poor lecturer attitude towards e-learning; 4)

inadequate time and heavy lecturer workload; 5) inadequate pedagogical skills and competencies; 6) unclear management policy, strategy and objectives for e-learning; and 7) lack of incentives for e-learning. The lecturers and HODs believed e-learning would be successful if appropriate policies and strategies were in place, and management was committed to funding appropriate resources to support lecturers.

Students Perspective: The students' perspective was described in themes of students ICT skills and competencies, experience and use of ICT resources for learning, challenges and motivation for using ICT resources to support learning and their perception of lecturers support for learning. Responses were gathered from students in the humanities and sciences at all academic year levels.

Students concerns and frustrations identified as limiting factors for e-learning include: 1) slow, limited and unreliable Internet access; 2) difficulty with, and limited access to, computers and ICT resources; 3) active lecturer - passive student culture 4) difficulty understanding resources presented online and; 5) unstable power supply. The students' motivation for e-learning was related to management ability to provide solutions to their expectations and the challenges they face. Overall however, the students believe e-learning could increase their knowledge base and be motivated if they had: 1) adequate unlimited access to computers, ICT and Internet resources; 2) stable Internet connection and power supply; 3) upgrade of infrastructure to facilitate access to information anytime and anywhere; and 4) not waiting long in queues to browse due to time-restrictions on the UG provided computers.

Technical staff perspective: The roles of ICT units at the UG, knowledge of policy and strategic plan for e-learning, technical staff expectations of management and staff capacity for e-learning were described. In addition, perceptions of barriers to e-learning and workable options were described. The technical staff confirmed management investment in both technical and technological infrastructure to expand the existing network and upgrade ICT resources with state-of-the-art infrastructure. Although the bandwidth was small and costly, there were plans to increase the size with reduction in price. The technical staff confirmed an ICT strategic plan existed in a draft form with focus on ICT infrastructure development. There was no strategic plan, which outlines expectations on technical staff and their role for e-learning implementation. Emerging issues raised by the technical staff, which were originally not considered in the survey and interviews were: 1) lack of policy and strategy to drive e-learning; 2) the ad-hoc

measures in operational activities; 3) improper budgeting and planning; 4) inadequate motivation and capacity building processes; 5) poor staffing and documentation of operations; 6) lack of coordination and quality assurance. In Table 5.18a and 18b are summaries of the People domain factors surrounding e-learning implementation at the UG.

Table 5.18a
People domain factors in the UG

Best e-learning practice	Current UG Practice	Established gap
Clear efficacy gain doing routine task	Knowledge about some benefits of e-learning; good perception for e-learning rationale	Lack of clear efficacy gains; unrealistic user expectations of management and e-learning infrastructure; unclear understanding of e-learning benefits
Clarity to inform valuable learning experience and improve communication	Annual students assessment of lecturers not related to e-learning	Lack clarity to inform valuable experiences and improved communication; lack of educational research; poor communication
Clarity to improve individual aspects of learning experience	Voluntary ownership of computers and Internet resources	Lack of clarity to improve individual capacity and motivation for personal engagement with e-learning
Motivated by incentives and rewards – workload and time management	Individual lecturer initiative required	Lack of incentive package or reward system; heavy workload and inadequate control over time
Capacity to stimulate e-learning	Organised workshops and seminars for interested lecturers (Voluntary)	Lack capacity to stimulate students e-learning; unable to relate training to teaching practice; over-emphasis on PowerPoint usage
Leadership commitment to e-learning	ICT committee; encourage use of PowerPoint presentation; expectations of management to provide guide	Inadequate leadership; lack of faculty plan to implement e-learning; lack of goals, objectives and policy for e-learning
Computer skills and competencies	Staff resource centre; structured students literacy driving school	Inadequate user skill and competencies to adopt e-learning; computer training programs were not related to e-learning
Capacity and competencies for e-learning adoption	Unstructured technical staff development programs; training for lecturers and students; limited infrastructure	Lack of capacity and inadequate competencies for e-learning
Strong social system	Unstructured unorganised	Negative influence not based on personal experience of LMS

Table 5.18b

People domain factors in the UG

Best e-learning practice	Current UG Practice	Established gap
Valuable support for existing curriculum	No e-learning curriculum; ICT unit dedicated for e-learning support	Lack of e-learning curriculum; poor and inadequate support for enthusiastic users
Readiness for e-learning	Supplied computers for users; available Internet and intranet resources; wide network coverage; LMS KEWL available; technical support services	Users sceptic due to limited resources; inadequate resources; limited support services
Faculty leadership and commitment	Encourage lecturers to use PowerPoint	Inadequate leadership; lack e-learning capacity to facilitate acceptance and adoption
Strong figure with experience in the use of technology in teaching to lead e-learning adoption	Enthusiastic users with no previous experience in LMS	Lack of faculty members that are familiar with and have adequate competencies in e-learning
Effective communication between and among stakeholders	Written circulars to HODS; e-mails and by word of month	Inadequate information for e-learning that is concrete and meaningful to lecturers
Adequate technical support services	Limited technical staff; unit dedicated for e-learning	Lack of adequate technical staff to provide effective support service; inadequate technical support for users
Clear and concrete faculty targets for e-learning adoption	Not known	Lack of concrete target for adoption and integration faculty-wide
Training and professional development	New staff orientation of teaching methodologies; voluntary workshops organised for lecturers interested in using the KEWL; sponsored training programs for technical staff; established unit to support LMS	Poor lecturer participation in organised workshops; unstructured staff development program for e-learning; lack of technical support for content development and management; lack of competencies in e-learning pedagogies; lecturers were unable to relate what they learnt with how they taught

5.3 Technological Domain

The results presented in this section were drawn from interviews granted by management, lecturers, students and technical staff and are supported by the survey data collected from lecturers and students. The findings are presented in three sections: respondents' perspectives of the technological (physical) infrastructure are presented in Section 5.3.1; perspectives on technical infrastructure are described in Section 5.3.2; and experiences of the LMS KEWL are described in Section 5.3.3.

5.3.1 Perspectives of the Technological Infrastructure

This part of the Chapter is structured in five main sub-sections, which describe the state of the technological infrastructure (Sub-Section 5.3.1.1), the infrastructure support for teaching and learning (Sub-Section 5.3.1.2), and the approach to resources, faculties and departments (Sub-Section 5.3.1.3). In Sub-Section 5.3.1.4, the infrastructure strategy used to achieve UG's objectives is described while reasons for ICT infrastructure failure are described in Sub-Section 5.3.1.5.

5.3.1.1 State of the technological infrastructure

1) Adequacy of the infrastructure to support e-learning: Two ICT managers and three unit heads believed the available resources were completely inadequate for effective e-learning, describing the operational resources as poor. Corroborating comments from technical staff, the Pro-VC expressed optimism that: "...the current Chinese Project which is going to transform the electronic infrastructure is certainly going to be a major resource for the university". On completion of the Chinese project, the existing infrastructure would be revamped and performance improved. At the time of this research, the poor state of the infrastructure was attributed to large student numbers, inadequate bandwidth, poor Internet connection and access, insufficient computers and lack of proper coordination of the resources. Survey responses from the technical staff showed that 63.6% believed the general level of performance of the physical infrastructure was low. Internet access and speed were described by the majority of respondents (81.8%) as poor, although many of them (63.3%) said there was a good intranet supporting both academic and administrative communication. They revealed that the university had its own server and Internet resources with a bandwidth size of 25 mbps (12.5 mbps upload and 12.5 download), which supported library and student information systems, and did not depend on private service providers for data storage.

The survey data in Table 5.19 show that the university has its own server and does not depend on private service providers (54.5%). Nearly all the respondents (81.8%) were aware that there was computer-based training available for all students.

Table 5.19

Technical staff awareness of infrastructure (n=12)

Awareness of infrastructure	Yes (%)	No (%)	No Sure (%)
The University has its own server and does not depend on private Service Providers	54.5	18.2	27.3
The ICT unit provides computer-based training for all students	81.8	18.2	0.0

On the extent of infrastructure deployment on campus, respondents were indifferent with some (45.5%) indicating that use of ICT resources on campus did not cover the entire campus. Further probing of this response revealed some extreme agreements and disagreements, which influenced the overall impression as shown in Table 5.3.1E (Appendix E1). In terms of the network stability on campus, 54.6% disagreed that the system was stable.

Perceptions expressed by the technical staff confirmed students' views that the infrastructure support had not impacted on their learning, as described in Section 5.2.2. Students generally used resources to check results through the university's ITS system online, read university news on the UG's portal, and receive general information through their UG provided e-mail addresses. They also had some access to computers in the faculties and departments, access to online library resources, assessment materials and research resources. Comments from the Pro-VC corroborated views expressed by the students: "...but in spite of these phobias currently, admissions are electronic, applications are electronic." One Dean also added: "...currently entering of marks is electronic and it makes the whole thing enjoyable" (MDFA2: 03/03/10). Management perspectives were that online resources to support teaching and learning had improved significantly and could be linked to any learning system for successful e-learning.

The survey data summarised in Table 5.20 below show that lecturers believed that using ICT resources had not supported their teaching activities, although efforts had been made to use the resources. Available video conferencing resources were not used for teaching purposes (mean = 1.21); however, lecturers did have access to web resources for teaching (mean = 3.85) as most of them had personal computers.

Table 5.20

Lecturers' use of ICT resources to support teaching

Lecturer use of technology for teaching	N	Mean	Std. Deviation
Computer workstations in the classroom	33	2.15	1.523
Computers in the Library	33	2.09	1.444
Computers at home	31	3.68	1.536
E-mail services	35	3.63	1.437
Web resources	34	3.85	1.351
Wireless resources	32	2.47	1.646
Intranet resources	30	2.87	1.592
Video conferencing	33	1.21	0.781

Scale: 1=Not at all; 2=Very little; 3=little; 4=Much; 5=Very much; 6=Don't know

The practice of lecturers themselves deciding which technologies to deploy, independent of any standard practice, normally led to conflicts that made support services less effective. One ICT head remarked: "There is not much co-ordination of the resources. No co-ordination at this point as different departments and faculties adopt various approaches in the use of the resources" (TSIT5: 01/03/10). Their comments emphasised that implementation of any learning system should be linked to the structures already available at the UG and should be well coordinated.

2) *Experience and objective of infrastructure development initiatives:* Expanding on the state of infrastructure, management and ICT managers indicated that the focus of the infrastructure development project was to: 1) refurbish and modernise the existing NOC with resources to support, transport data and improve communication; 2) upgrade the network infrastructure and students' access to computers. The Researcher observed routers, a firewall, virtual private network devices (VPN), switches, wireless access points, cabling and termination devices; 3) provide computers, e-learning applications, and software applications through cooperative partnership development processes with local staff. One project report revealed that 512 computers and 15 laptops were distributed to various halls of residence, units, departments, and the ICT students' laboratory; 4) modernise the Intercom Telephone System; 5) support the distance education program, by equipping a new computer laboratory with 24 PCs, 60KVA UPS and a printer. Video conferencing facilities made up of a multi-media system, furniture, data and power wiring, and a projector and screen were also set up, and finally; 6) create awareness and understanding of the new network installations and equipment in the

operating centre, for training and capacity building. The training sessions were in Beijing or on-site at the UG.

The training program associated with the Chinese partnership project, targeted planners, administrators and faculty staff who will plan and administer distance education courses in the UG. According to four ICT participants, hardware and networking personnel were trained to set up the hardware and provide technical support. The e-learning training was targeted at personnel with a web-based or basic programming background and faculty personnel who were already conversant with e-learning. The aim was to evaluate the e-learning software under development by the developers and to teach trainees to set up and provide technical support for the e-learning platform. Some selected programmers/webmasters, enthusiastic lecturers and directors were exposed to the learning system.

A second part targeted end-users such as teachers/lecturers, IT training personnel, course writers, and coordinators. This second group learnt to create and run online courses and content for e-learning. The major and most significant challenge faced by participants in the training sessions was language and the mode of communication. The trainers were not fluent in English and interpreters sometimes had challenges translating into English. Hands-on sessions were introduced to compensate, but respondents reported that they were not sufficiently helpful.

5.3.1.2 Infrastructure for teaching and learning

In terms of the infrastructure available for teaching and learning, two administrators and one Dean explained that in the previous few years the university had introduced measures to facilitate teaching and learning, although the contact sessions were dominant. They asserted that the UG had used audio-visual facilities in several classrooms (to facilitate the process of projection) for some time, but had not been able to cover most of the classrooms, particularly large and relatively new ones. There was also an institutional plan to cover the entire spectrum of classrooms, largely with public address (PA) *systems*. "... we have now decided that all new classrooms built, should have or be prewired for that purpose so that they are not newly imposed [on the wall with new cables] on the buildings that exist." (SMCA1; 20:05:2010) The Researcher observed that large lecture rooms had a PA system, but that some (eight classrooms) required tuning to improve the sound quality. The respondents explained that the

lecture rooms were not technologically friendly. One student from a FGD in the humanities remarked:

... from Level 100 up to now (I am now in Level 200) you go there and the lecturer is speaking and you hardly hear the lecturer, nothing is done about it. ... There are times that you strain your eyes to see to the extent that you can't see whatever the lecturer is writing on the board, is not as if it's the fault of the lecturer but the quality of markers they are using are just not the best, so I think we need something better than what we are already experiencing now in the class.
FGD-SH3

It was observed that eight of the ten lecture rooms visited by the Researcher had no fixed projectors to allow PowerPoint presentations. It confirmed comments made by some HODs that the lecture rooms were not ICT compliant and would require refurbishing.

The managers explained that although the staff resource centre was not frequently used, optimism was expressed for its future use. They revealed proposals to start a series of seminars and workshops aimed at informing them about how to use the available resources for teaching and connecting with students. The Pro-VC remarked: "...teleconference resources would be upgraded to facilitate communication with lecturers in the period of 5 to 10 years." The LMS KEWL was mentioned, though most lecturers indicated they were not aware of the system.

5.3.1.3 Approach to resource allocation to faculties and departments

Four management interviewees expressed concerns and frustration about genuine efforts by some faculties to plan and resource departments with adequate and efficiently working ICT resources. The approaches were ad-hoc, lacked adequate planning for acquiring and maintaining the resources, and were poorly budgeted. Management therefore adopted government policy that enforced procurement procedures, an approach that was helping the university to streamline purchasing processes for hardware and software applications. There were still challenges, however:

It is a problem with planning owing to the procurement system that the university is fully complying with. There is no longer haphazard taking of money here and there ... we need departments to plan and budget well ahead of time and that is what many of us have not been used to. We are used to haphazard modes of doing things. (SMCA1; 20:05:2010)

Instances were cited of staff from departments with no budget for ICT resources going straight to the Finance Director and requesting money to replace broken equipment. This practice created situations where the UG had signed contracts with several

maintenance and supply agents without coordination, a situation described by the management as worrying. By relating the purchase of equipment to effective e-learning, two management interviewees revealed that equipment purchased by faculties and departments was of inferior quality which resulted in the frequent breakdowns:

... [this] is a general problem that we have ... let's buy robust equipment. This is a 60 year old university – you don't just say anything goes. Any cheap thing, cheap equipment – it breaks down and the next week you expect money to be given to you on the spur of the moment to give to the person [who supplied it] ... it's not done. (SMCA1; 20:05:2010)

It was clear from this comment that some officers were careless about the quality of equipment bought, resulting in frequent breakdowns. Such situations normally resulted in financial demands outside the annual budget of the university.

5.3.1.4 Infrastructure strategy to achieve university objectives

All management interviewees said basic physical and electronic infrastructure was needed to achieve successful e-learning, and they recommended the Chinese project as a strategic option to build an adequate infrastructure. The goal of installing a wireless communication infrastructure was to provide Internet access to students and lecturers, and full electronic mode teaching within eight to ten years. That involved increasing the number of workstations clustered on campus. The interviewees were confident that the strategic partnership for building the e-learning infrastructure would provide the required ICT resources to meet the university's objectives.

i) Infrastructure and usage strategy: Three administrators and two ICT heads confirmed that the process must begin with a policy on the infrastructure and usage. Such a policy would then enhance the adoption process.

Five management and three ICT unit heads suggested strategies that may promote effective e-learning and expressed concerns about student access. One Director of ICT asserted that effective e-learning integration would be possible only when all users have uninterrupted access:

... because you recognise that our labs are not adequate, about 1000 computers dropped in the ocean of about 30,000 students. So the strategy then is that we would address the access issue. That access issue is to simply increase the number of computers, but more importantly the WiFi network... (MDCA2: 10/06/10)

In the managers' view, providing WiFi on campus would mean that students can access Internet resources from any location on campus and lecturers can reach students at anytime/anywhere with learning resources. They were optimistic that with the wireless

infrastructure students would be encouraged to own personal laptops and the computer: student ratio on campus would be improved. Caution was expressed about some proposals for the UG to initiate laptop ownership through a structured ownership scheme with laptop manufacturers. Three Deans and one ICT Director were hesitant and suggested that students may be exploited. Describing the strategy in types, content and access were considered primary factors to be considered.

...just create the enabling environment. Students would go and grab their laptops ... so I think that just create the enabling environment where students can access the network from their halls. It is prime because once the lecturers have created the content and they are well conversant with how to use it ... they would be motivated to adopt it. (MDCA2: 10/06/10)

There was also emphasis on regular training to use the infrastructure and multimedia resources, describing it as a means of providing lecturers with the opportunity to learn how to use multimedia resources to link images and videos in teaching. They further argued that an institutional e-learning platform would enhance successful e-learning. Citing the revamped NOC as an appropriate policy step one manager remarked:

... the Chinese project is out ...a suitable e-learning platform and we have gone the way of having our own e-learning platform, we could have gone to get Moodle or any of these packages, but we choose to have our own e-learning platform. (MDCA2: 10/06/10)

They explained that acquiring good e-learning software and getting a good infrastructure were the most important issues to be pursued. As part of the infrastructure preparedness, the ICT heads indicated that the institution would acquire a generating plant to supply power 24 hours a day, 7 days a week. The generator would be triggered automatically if there was a power outage adding that: “your services should be running throughout without any hindrance due to power failure”. (MDCA2:10/06/10)

5.3.1.5 Reasons for ICT infrastructure failure to support teaching and learning

All management and ICT technical staff interviewees attributed failure of the ICT infrastructure to enhance teaching and learning to what they described as multiplicity of factors. They indicated that 1) the institutional goals for acquiring ICT resources were not aimed at enhancing educational delivery; 2) management was unclear about the benefits the UG stands to gain from its adoption. In their view, a good understanding of the benefits may motivate people to use the resources:

... once you have a good understanding of the opportunities that ICT holds, provides, then that becomes a motivation or a motivating force and you can see that lecturers who do appreciate the use of IT are really doing a lot and you can really see their delivery. (MDCA2: 10/06/10)*

3) the network infrastructure was poor, so that while some departments had access to computers and Internet resources, others did not; 4) all respondents cited the unstable power supply as a significant challenge; 5) the three ICT managers and one unit head expressed concerns about institutional politics, which had affected infrastructure distribution to faculties; and finally, 6) the bandwidth was too small to support the increasing demand. They said it required a political will to invest in the resources. There were suggestions for government to subsidise bandwidths for the universities. Such support may reduce bandwidth prices and help the UG progress to having unlimited access to the Internet.

In support of the political will needed for successful ICT integration in the teaching and learning process, one Rector said that universities in Ghana were not pursuing the acquisition of ICT resources as learning objects to be shared. The Rector remarked: “We ourselves are not properly organised. And once again the culture, you see the culture of lack of sharing is always there, affecting us.” (ESEL4: 16/09/10) He said the universities were pursuing their individual interests, adding that “if a particular university takes the leadership, it is seen as a threat or each university is looking at the other suspiciously.” Leadership was feared and construed as an attempt to monopolise the resources. The culture of not sharing meant that the reality was more about competing against each other, rather than sharing for the benefit of all.

5.3.2 Perspectives of Technical Infrastructure

Perspectives of the technical infrastructure are described in three sub-sections. In Sub-Section 5.3.2.1, the availability, access and confidence in the applications are described; in Sub-Section 5.3.2.2, the infrastructure support for teaching and learning are described; and the strategy for technical infrastructure is described in Sub-Section 5.3.2.3.

5.3.2.1 Availability, access and confidence in infrastructure

The lecturer survey revealed that basic ICT resources were sometimes available when needed by lecturers, as shown in Table 5.21

Table 5.21

Lecturer perception of availability of ICT resources (n=35)

Availability of resources when needed for teaching	Percentage
Never	31.4
Sometimes	45.7
Often	22.9
Total	100.0

Both students and technical staff reiterated views expressed above. The technical staff were, however, divided on the suggestion that using ICT resources was regulated and widely available on campus. They disagreed that the network system was stable (54.6%), and that the technology infrastructure was widely available (54.6%). The majority (91.0%) of staff further disagreed that the ICT unit has the capacity and staff to implement and support both lecturers and students in an e-learning environment. Some 63.6% were also of the view that the staff could not develop an in-house LMS. In describing the current function of ICT facilities and resources some technical staff (45.5%) rated the functional performance as good and 27.3% rated it as poor..

It was evident from the response that ICT resources were not widely available at the UG, and with under-staffed units the technical services were unable to support an e-learning environment. The ratings further showed that most technical staff members were not confident in the operational performance of the resources.

5.3.2.2 Infrastructure support for teaching and learning

The impressions of the available resources and how they supported teaching and learning were varied amongst the technical staff. The most cited uses included e-mails (72.7%), Microsoft applications (72.8%), web resources (63.6%), and unlicensed individual software applications like SPSS and the LMS KEWL (27.3%). Multimedia and videoconference facilities were not adequately used as most technical staff respondents said they did not support such facilities. Other resources not adequately used and supported by the technical staff included applications for content development, wireless resources and available courses or modules accessible through the web.

i) Primary technical support provided by staff: To understand the extent of support provided, the number of faculties and departments supported and the types of support provided were explored. Most technical staff respondents said they could not say the total number of faculties and departments they supported. Two managers indicated that

all departments and faculties were supported. However, some technical staff discounted this view and one ICT head said some faculties and department had recruited private technical support services. All the ICT heads said that Internet services were provided and supported by the ICT directorate. Although the faculties and departments had their own technical staff, there were efforts to streamline activities and if possible centralise the operations.

Support services that were not available included unlimited access to basic IT network services. Some technical staff (36.4%) indicated that unlimited services were available to lecturers, while 27.3% responded that they only provide access to standard software and services. Two technical staff managers revealed that the only licensed applications supported by the UG were an “Anti-virus” Sofos, which protects the university’s server, and the Integrated Tertiary Software (ITS) application. It was evident that the technical support services provided at the UG primarily include e-mail, and Internet services to students, lecturers and administration.

ii) *Technical conflict and effects on e-learning:* The Researcher observed conflict and some power struggles amongst the three technical directorates. Although the roles were clearly defined, decisions on managing the infrastructure and communication to optimise use of the resources were fraught with reservations. On two occasions, leaders were observed questioning why they had not been consulted before decisions were made on particular operational activities. It was necessary to note the observation because effective e-learning requires harmony amongst all the directorates, particularly as the library system and student information system were also important parts of e-learning.

5.3.2.3 Strategy for technical infrastructure

Four management interviewees emphasised that training to support users was an important strategic effort to build technical capacity, as was acquiring software and the skills needed to maintain it. They further indicated the need for a help desk in all faculties, saying: “... apart from the software that you need and the kind of technical assistance that you need; a core of technical staff that readily would come to the aid of lecturers in need by a press of a button is important” (SMCA1; 20:05:2010).

In addition to the support services, the interviewees also mentioned efforts to ensure a stable electricity supply and the installation of a robust electronic system to protect other applications; one that would not break down when there was lightning. In

describing efforts that could enhance effective infrastructure integration, the ICT heads expressed concerns about the network infrastructure, system security and the redundancy plan. They said inadequate infrastructure discouraged many lecturers from using the systems:

The first will be the network infrastructure, the security of the system; allowing only authorised users to have access, redundancy or network redistribution policy, so that when there is failure somewhere they would be able to recover within the shortest possible time without interrupting users. It is important to create some redundancy in the network. (TSIT5: 01/03/10)

The strategy further includes maintaining an adequate technical staff with competencies to support e-learning. Three unit heads said management and technical staff had not reassure lecturers enough to persuade them to embrace and use the electronic resources available. A good platform and well-supported network to run a learning system application was suggested. They explained that with smooth technology, people would be confident with the network or delivery method and it would be easier to get all users engaged:

Once they know that we have a network or good platform to work on... Users complain that their network has been down for 2-3days. It takes 24 hours or 48 hours to get a response from the ICT directorate then it becomes difficult for the person to come on board, but if they know that we have all these structures then through administration and library we can move forward. (TSIT5: 01/03/10)

It was evident that users were not confident with the current support services as it could take several days for problems to be resolved. Four ICT heads cited lack of motivation, lack of co-ordination and budgetary issues as problems hindering the smooth running of the technical infrastructure. Concerns were further expressed about maintenance and monitoring of the infrastructure by three Deans who emphasised the need for periodic and consistent monitoring and maintenance of the systems:

... we put things in place and just go; we don't monitor their use, how they are being used, whether they are maintained regularly; because systems are slow, systems down, computer viruses and anti-viruses on the server not updated. When you switch on the computer it tells you immediately the anti-virus is expired. (MDFA2: 03/03/10)

They explained that a culture of maintenance was absent, the risks were high and with no visible measures in place, they cautioned that efforts for e-learning may not materialise. Two ICT unit heads and one support staff member mentioned challenges relating to technical infrastructure that required attention, such as the university's website, which had not been authenticated, leading to frequent crashing of the site, and

hackers interfering with access. Three technical assistants recalled occasions when access to the university's web address was re-directed to other websites by hackers.

5.3.3 Perspectives of the Learning Systems Strategy

Policy and strategy issues for learning systems were raised as concerns by some management respondents. This Section describes the expected strategic efforts for e-learning, the UG's experience, goals and rationale for adopting KEWL, users' perceptions of KEWL and perceptions of practical steps for implementation.

5.3.3.1 Expected strategic efforts for e-learning

Five Deans and two administrative managers mentioned that no policy existed for an e-learning platform. Such a policy would aim at building the infrastructure to an appropriate level before developing a policy on e-learning, which would include the platform most suitable for teaching and learning. Three of the respondents deemed that an effective learning system would require that the UG was well-resourced with workstations for users, electronic books, training to use electronic databases, a possible electronic library and good bandwidth size. One manager indicated that an "... e-library is available, all over, but we don't have the bandwidth even to access those electronic books." (MDCA5: 07/07/10) The managers asserted that successful e-learning was dependent on a robust system, an instructional policy and a clear strategy.

5.3.3.2 UG experience and goal for adopting the LMS (KEWL)

Three ICT managers and one unit head indicated that until the year 2005, the student: computer ratio was in the range of 234:1 and it was therefore difficult for lecturers to do any form of blended learning in which students could be asked to download course information. With the introduction of the ICT unit in 2005, a central computer laboratory was introduced to provide students with access to computers, to support their learning and research efforts. One ICT unit head remarked: "... so prior to that few lecturers used the system. ... the idea has been to cut across all the faculties.." (TSIT2: 12/04/10)

Initiatives for the LMS started with a Dean of Science, who was first attracted to the open-source product at a conference, and who then encouraged the university to embrace it. The initial intention was to promote Internet services at the UG, so several workshops were organised to attract members of the community. Training sessions were also organised for technical staff led by a lead developer of KEWL. Although an

individual initiated the adoption of KEWL, the university through Carnegie funding, supported it, by sponsoring the training and workshops. In describing what should have been done, one unit head remarked:

... the university knew that such a system existed but there was no policy ...it is an e-learning system so everybody should gradually move to it. For example, they could have set it for all graduate programs, to have an e-learning component. (TSIT2: 12/04/10)

It was revealed that though the university accepted and supported the system, policies have not been crafted to support further development and use. There was no rollout plan for course components that could be adopted online and there was no corporate initiative to integrate the system into the mainstream university curriculum. Investigating reasons for the inadequate corporate initiative to facilitate e-learning implementation, four ICT heads revealed that the goal of the UG was to use the infrastructure to support distance education. This goal formed the basis for the project to revamp the infrastructure. They commented that since lecturers on the main campus also teach the distance education program they would see the benefits of using the LMS and adapt it to suit them. Responding to how the e-learning agenda was going to be pursued without a policy, one unit head indicated that the Director of ICT was passionate about developing the ICT policy and added; "... am sure the process can be reviewed so that e-learning is mentioned in the ICT policy, but it should stand out more. ... what is lacking now is a clear policy of what the university wants to do with the LMS" (MDCA2: 10/06/10).

5.3.3.3 Rationale for KEWL

The ICT heads gave three reasons as to why the university decided on the open-source LMS and not a robust enterprise product. Firstly, the cost involved in acquiring the learning system and set-up was high. Secondly, the initiative was to build an application that would most suit the context of African universities, and finally, there were capacity building opportunities that the system offered to all participating community members:

At the time when this was introduced – imagine if the first software came with a cost the university would have kicked against it. Finance is a major issue in the university. Affordability – the fact that it was at a zero cost and the fact that this platform presented an interesting challenge because any institution that sets it up there was an invitation to join in the development. So we saw it as joining a community, building a community which is the African Virtual Open Source initiative (AVOA) based at the University of Western Cape. It presented the

opportunity to collaborate with other universities in Africa to develop a home-made e-learning platform. In the process to develop capacity as far as software development is concern in this university. (TSIT2: 12/04/10)

They explained that once the system was deployed properly and was running, there would be no cost to the UG apart from the infrastructure on which it ran. This confirms why an enterprise product was not considered suitable for the UG.

... so cost has been the issue. Blackboard, though attractive ... with time licensing became an issue because they could not afford it, ...so we didn't want to give any reason at all for this thing to fail. When it comes to capacity building there have been a lot of opportunities for us in collaborating with other universities. (TSIT2: 12/04/10).

The manager explained that universities in Africa that initially accepted Blackboard as their platform for e-learning had to revert to open-source LMSs because with time the licensing fees became an issue. The enterprise products were very attractive and well developed but the cost associated with maintaining and supporting them was a problem for most universities. Another ICT unit head indicated that benefits through collaboration in capacity building included coding to improve on the open-source LMS performance, being able to develop course content, and electronic support for lecturers and other users.

In explaining the rationale for deciding on the LMS, three administrative managers and three ICT managers commented from three different perspectives. Firstly, they were of the view that traditional face-to-face teaching was not effective because of the large student numbers, hence a drive for an alternative solution. One manager remarked: "... so the university has no choice but to find solutions to the fact that student population has increased and e-learning is a way to go" (TSIT2: 15/07/10). It was aimed at promoting and supporting reinstatement of interim student assessments, which form 30% of their final grade.

2) The university was spending considerable sums of money in expanding its network infrastructure on all the campuses. The only way to use this significant investment in infrastructure was to ensure that local content was available on the learning platform. It was therefore seen as means of increasing student numbers and making good use of the investment in infrastructure. The managers explained that though funding was an issue, and there was not much awareness, the motivation to implement came from the benefits the university would gain by introducing e-learning. Justifying the need for accepting the system, the unit Head added:

Where we have bigger classes if we manage to get them to write interim assessments because of the numbers so imagine we manage to get them to do this. Immediately you submit it's marked automatically then you grade. So those were some of the things that were considered. There are challenges but that is the way to go so we have started with that. (TSIT2: 12/04/10)

Technology support for the interim assessment of large classes and grading students online were key factors, as the university was faced with the challenges of large student numbers.

5.3.3.4 Technical infrastructure - perceptions about KEWL

All ICT managers and unit heads indicated that KEWL had not been an integral part of teaching and learning due to a lack of testing to establish its feasibility and suitability for the lecturers' approach to teaching. One head remarked: "No feasibility – the person went to this workshop and it was talked about and he just brought it, so probably as time goes on this thing would be streamlined." (TSIT5: 01/03/10) They also indicated a lack of funding to promote its use on campus. One ICT unit head remarked:

Before the e-learning project was started, there was no feasibility study done to determine students' affordability, sources of funding and support to the system. There was no such thing. It was a clear case of need, where an individual saw the need and the system as the way to go. Even though at the time this thing was being introduced there was not much awareness of ICT. (TSIT2: 12/04/10)

The emphasis in this comment was on the fact that no feasibility study was conducted and no immediate future plans were outlined for adoption.

5.3.3.5 Practical steps for infrastructural support of teaching and learning

Two ICT unit heads indicated that practical steps that could be used to improve the adoption and use of the LMS were to ensure the available infrastructure was appropriate and available, awareness of the resources were created, and an e-learning infrastructure policy crafted and communicated to all users. They asserted that a policy will guide migration of the resources to the new learning environment. Re-structuring of the existing network infrastructure was recommended. One head remarked:

The first is the ICT infrastructure; Intranet and extranet. The Local Area network (LAN) should be well structured to be useful, and getting local content for the Intranet. The university should come out with a policy for e-learning and its implementation, the training of students and repacking of their course material. (TSIT5: 01/03/10).

These unit heads were of the view that if the backbone was strong enough and users could access the e-resources, acceptance would be easy. In searching for a robust

infrastructure and appropriate software to support teaching and learning at the UG, they revealed that several open-source LMSs were examined, both to inform appropriateness and to fit with the existing student information system (ITS). They emphasised specific requirements that would suit the UG and as one unit head commented "... we want to ensure it's something that we can support, customise within our own peculiar need." They linked successful e-learning to an effective e-learning system.

The respondents expressed optimism that partnership in building the ICT infrastructure would promote collaboration between faculties and IT technical staff and would promote service delivery. Documentary evidence revealed that technical staff would co-develop a learning management system platform to replace KEWL. Technical staff explained that by co-developing an e-learning system, staff would be trained further and would acquire skills and competencies in educational technology and quality control.

The Researcher observed that though the government's white paper on educational reforms (GES, 2004) advocated its commitment to integrating ICT in higher education the major setback has been funding and infrastructure. The local partnership with the Ministry of Education (MOE) and the Ministry of Finance and Economic Planning (MOFEP) has therefore yielded dividends by committing government to support the project (GNA, 2008). It was deemed that on completion of the initiatives, the UG would have formed strong collaboration with other universities that have similar academic status relating to e-learning.

5.3.4 Infrastructure Readiness to Adopt/Implement E-Learning

In enquiring about the readiness of a learning platform to upscale e-learning in the faculties, seven management interviewees cited initiatives to upgrade the ICT infrastructure and combined efforts to develop a new e-learning platform. They mentioned management commitment in promoting the partnership to develop the learning system, and expressed optimism that on completion, all colleges, faculties, halls of residence, fibre optic cables would connect the central administration and units. Once this was completed they believed that successful e-learning implementation would be achieved, but the current challenges needed to be overcome. Reiterating optimism on completion of the project, one unit head deemed that the university would have an 80% to 90% fibre optic network capability laid through the university with reliable links to the satellite centres in the regions. They believed the UG would then have the capacity to support all the satellite institutions.

One Dean of faculty remarked:

It depends on how we embark on tackling them and if we do that then gradually we would move into a time where we would have all these facilities, adequate infrastructure and efficient running systems. Then we can easily say we want to do e-learning, and it would be effective but at the moment, the challenges on the ground – the terrain is not that smooth to be able to roll out e-learning efficiently. We don't have sufficient internal resources to support any initiative for e-learning. (MDFA3: 12/05/10)

In some of the science lectures practical demonstrations were conducted but students observing from the rear of the class could not see much of what was happening and were therefore disadvantaged. The Deans indicated that the current situation did not encourage engagement of every student, because students at that stage were naturally not very conscious of, and not very serious about, what they were doing. Current efforts were not aimed at promoting student consciousness to motivate e-learning acceptance. Frustrations were expressed about using ICT resources and problems with communication. Concerns were expressed that though internal (telephone) communication lines existed they were dysfunctional and unreliable, so administrative and academic staff relied heavily on their cell phones as a means of communication on campus. One Dean remarked:

... if you want to adopt e-learning as one of the tools in our lectures then it must be something which has been well supported to roll it out. I mean as I sit here my Internet and intercom does not go beyond this building. My Internet, I don't know whether it works, I am hooked on a private service provider. So how do I communicate with the people? Communicating with the people in the next building is a big challenge. How do we go on e-learning, how are the students going to access the information? Assuming even if we are able to put it there, how are the students going to access the information? We don't have enough computers even for the students, we don't have enough space. (MDFA3: 12/05/10)

This means that for successful e-learning the technological, technical and learning platform in particular must be well supported. Electronic resources supporting the process must function properly to achieve the institution's goals. Communication, access to resources and support were identified as being central to all efforts to implement e-learning.

5.3.4 Summary of Technological Domain

The technological domain was described in three ways; the physical (technological) infrastructure, technical infrastructure and UG's experience with the LMS KEWL. The technological infrastructure discussion focused on the state of the ICT infrastructure,

support for teaching and learning, approach to resourcing faculties and departments, the vision and plan for e-learning, infrastructure strategies to achieve UG's objectives, and reasons for the ICT's failure to support teaching and learning.

The technical perspectives that described the completeness, accuracy and reliability of the technological infrastructure, which relies on the technical capacity of the resources available, were categorised into three groups; 1) availability, access and confidence in the infrastructure, 2) technical infrastructure support for teaching and learning, and 3) strategies of the technical infrastructure to support e-learning. The findings showed that basic ICT resources were available. However, technical staff members were not confident about the capacity of the resources to support e-learning. They attributed the problem to the unstable network systems, the infrastructure not being widely available, and the lack of capacity and staff to implement and support e-learning. Performances of the technical infrastructure were generally rated as good by the ICT managers and technical staff, but were considered inadequate to support effective services. The available resources were not used directly to support teaching and learning. In addition, applications for content development and online modules were not available. Wireless resources were piloted for use on campus and efforts were made by the ICT units to provide essential support services to all faculties and departments, although most faculties engaged private technical support services. In Table 5.22 the summary of the technological domain factors surrounding e-learning implementation at the UG are presented.

Results of the findings have shown that the failure of the technological infrastructure to support teaching and learning was attributed to: 1) poor procedures and unclear goals about acquiring the ICT infrastructure. Some participants asserted that acquiring the resources was not aimed at enhancing teaching and learning but was to support administrative processes; 2) management being unclear about the benefits of adopting e-learning in the short or medium terms; 3) most lecturers not adopting KEWL because they were unsure about the benefits of e-learning; 4) lecturers being unaware of technical resources that could support their efforts; 5) the poor infrastructure, access to computers and Internet services, an unstable power supply and low bandwidth size; and 6) the institutional politics which resulted in a poor distribution of resources.

Table 5.22a
Technological domain factor in the UG

Best e-learning practice	Current UG Practice	Established gap
Adequate staff to manage and support technical and technological infrastructure	Established ICT unit to provide support services for KEWL	Inadequate capacity for e-learning
Infrastructure adequacy and fit for e-learning	Engage in partnership with a Chinese institution to develop an e-learning platform (LMS)	Inadequate infrastructure resources not customised to fit with the culture and style of teaching and learning
Continuous professional development for infrastructure support	Orientation to newly recruited staff; staff resource centre; literacy training for students	Lack of incentives and support for e-learning; no structured plan for training lecturers
Adequate infrastructure to support e-learning	Available e-learning platform (KEWL Next-Gen) for interested faculty members	Lack of user confidence; limited access; inadequate skill to manage and use learning content; inadequate resources for users;
Adequate bandwidth, effective Internet connection	Limited bandwidth, Internet resources available; piloting wireless system	poor network infrastructure and inadequate bandwidth size
Adequate technical support for content development	Unit dedicated to support KEWL users	Lack of educational technologist and support for content development
Financial commitment and support	Technology fees; government support; Carnegie Corporation; AAU support; purchasing computers; sponsor training session	Poor budgeting to invest in continual upgrades of the internal network, replacement of obsolete machines and operational devices
Infrastructure policy and objective for e-learning	Not available	Lack of infrastructure policy and objective for e-learning
Infrastructure strategy for e-learning	Crafted ICT strategic plan	Lack of e-learning strategy and implementation plan
Management commitment to infrastructure development	Invested in the NOC, increased the stock of computers at UG and faculty levels; invest in the upgrades of the Internal network, servers and bandwidth	Unstructured operational activities
Infrastructure feasibility for e-learning	Individual initiatives	No feasibility study to evaluate and select a learning system that meets users needs
Easy user access to infrastructure and learning resources	Students have two hours each day to access UG provided computers and Internet access	Inadequate computers for students access; irregular upgrade of software tools
Redundancy plan for infrastructure support	Not available	Lack of infrastructure redundancy plan for e-learning adoption

In summary, the UG had built an ICT network infrastructure linking the faculties and departments with a central computer laboratory. Some faculties and departments had computer laboratories for both student and lecturer use. However, the challenges faced by the UG were the unstable power supplies, poor Internet connectivity, and a lack of computers. Due to the high cost of bandwidths, subscriptions to bandwidths were low with poor connection speed. The most common use of the Internet by both students and lecturers centred around browsing the web and checking e-mails. Computers in the laboratories were used for word processing. Even though the need for technology use was well captured in the university's strategic plan, there were no clear policies and strategies to integrate the resources into teaching and learning.

It is therefore argued that, while this findings agrees with Umwin et.al (2010) observation of the challenges that universities in Africa face, the UG experience show that, the argument of lack of interest of educators in e-learning cannot be sustained. With the good ICT infrastructure and management efforts to implement e-learning, the interest was evident. However, the knowhow of combining resources of the primary stakeholders can be described as the issue that must be confronted.

CHAPTER 6

DISCUSSION: STRATEGIC MODELS FOR E-LEARNING IMPLEMENTATION

6.0 Introduction

In Chapter 5 findings regarding ICT and the e-learning situation at the UG between 2009 and 2011 were presented. By comparing current practice at the UG and good successful practice as described in literature, “gaps” were identified. These findings form the basis of discussion and a response to the research questions. In this Chapter 6 the synthesised views expressed in Chapter 5 is discussed in response to the research questions. The research question one and two is discussed in Sub-Sections 6.1 and 6.2 respectively. A model for assessing the status of e-learning implementation at the UG is then introduced in Sub-Section 6.3. The research question three is discussed in Sub-Section 6.4.

6.1 Question 1: Factors surrounding e-learning implementation

What are the factors surrounding e-learning implementation in an ICT-challenged environment?

In this Section 6.1 perception of management, lecturers, technical staff and students were synthesised in order to discuss the implications of factors relating to e-learning implementation at UG. Institutional practices and e-learning models from the literature that describe factors likely to influence the implementation of e-learning are used as a guide to verify the likelihood of success. Findings from the research domains on factors surrounding e-learning implementation (Chapter 5; Sections 5.1.5, 5.2.4, 5.3.4) are compared with components of some best institutional practices.

6.1.1 Institutional domain issues

Evidence showed there were generally poor perceptions about acceptance and adoption of e-learning and a poor understanding of technology integration in teaching and learning (Section 5.1.4). Although assumptions underlying the 4E model suggest voluntary user adoption of e-learning, such assumptions when applied to a university wide adoption were not workable. Particularly, considering the cultural context where mandatory directives with adequate support from management were workable.

Experience at the UG showed that providing computers and organising workshops do not result in user acceptance and adoption of e-learning. “Gaps” established from the UG practices as discussed below confirm the need to understand complexities involved in e-learning implementation.

1) ***Lack of vision and objectives for e-learning implementation:*** A major finding was the lack of a clearly stated vision and set objectives for e-learning and processes of implementation, although management had stated a good rationale for e-learning adoption. The “gap” was inconsistent with best practice experiences (B. Collis & Moonen, 2001; Khan, 2005; Zuvic-Butorac et al., 2011) that demonstrated the usefulness of policies and objectives for e-learning. Experiences of failure in the UG’s efforts to adopt e-learning demonstrate that it was not enough to have good rationale for e-learning adoption. Failures associated with lack of vision and objectives suggest lack of purpose and proper explanation for the reasons for e-learning adoption. Implications were that in the medium to the long-term management might not be able to indicate clearly what ICT integration in teaching and learning at the UG may be like. Hence, the desired level of performance and expectations of achievement were not be attained. A strategic implication for the ICT management committee at the UG was to develop an e-learning vision, stating its mission for educational delivery with sets of objectives to be achieved in the short, medium and long-terms.

2) ***Lack of policy to provide direction for the implementation of e-learning:*** There was lack of policy to provide direction for implementation. Other research has shown that policies are relevant to the success of e-learning implementation (Czerniewicz & Brown, 2009; Deepwell & Beaty, 2005; Zuvic-Butorac et al., 2011). Effects of this “gap” were the lack of interest demonstrated by lecturers in their approach to using the resources in ways best known to them without standards. They were neither compelled nor persuaded to adopt e-learning, because they were not aware of any institutional policies that assured them of the direction the UG was pursuing and the support services available for them. An e-learning policy was needed to provide purpose of progression from building ICT infrastructure to lecturer adoption of e-learning. Policies required must address such factors as training and capacity building for e-learning, support services, infrastructure usage, and deployment of the policies based on a definite timeline. Implications were, poor management commitment and support due to lack of purpose and direction. Management’s argument that policies were appropriate only when resources are adequate available for all users (Section 5.1.3.4) cannot be sustained

because absolute ICT maturity cannot be achieved at any time. Furthermore, having the political will was not enough, since policy provides both direction and the power to enforce implementation. Strategically policy as an environmental factor must be clearly defined as it has both direct and indirect effects on the vectors of ease of use, educational effectiveness, and engagement.

3) ***Lack of strategic plan for e-learning implementation***: Evidence showed there was no e-learning strategy or plan for implementation, a practice that was inconsistent with successful practices demonstrated by other universities (Cukusic, Alfirevic, Granic, & Garaca, 2010; Graham, Woodfield, & Harrison, 2012; Konting, 2012; Zuvic-Butorac et al., 2011). Evidence of possible approaches used to implement e-learning was poor (Section 5.1.3.2). Although the corporate strategic plan emphasised building good infrastructure and competencies in emerging disciplines, promoting innovation in relevant and cutting-edge technologies, and enhancing delivery of value to students, no e-learning plan has been developed. The corporate strategic plan provided a good basis for the crafted ICT strategic plan by the ICT directorate but it was short of an e-learning plan. Implications for an e-learning policy and strategic plan will imply identifying ICT as a tool to enhance quality education so as to achieve its goal as a leading university in the world. Lack of a strategic plan also means lack of direction to how the UG's goal of e-learning may be achieved. Implications for management and faculties are to develop institutional and faculty level e-learning strategic plans that are profound and provide direction for change in how the UG organises, finance and manages teaching and learning to achieve its goals. The lack of both a policy and strategic plan suggests a lack of clear understanding of the complexities involved in e-learning implementation. These things would help the UG to estimate the real cost of e-learning adoption.

4) ***Inadequate leadership and commitment to e-learning***: The management and faculty approach to facilitating e-learning implementation shows inadequate leadership and commitment to the implementation processes used (Section 5.1.2; 5.2.1.7). Such factors as lack of co-ordination and limited collaboration between the ICT units which normally resulted in occasional conflict situations; the lack of quality assurance measures in technology deployment; uncoordinated support services; and absence of a structured plan to integrate ICT in the university curriculum, all confirms the lack of e-learning leadership (Section 5.1.4; 5.2.1; 5.2.3). Best practice examples confirm leadership and coordination of resources as tools for successful e-learning implementation (B. Collis &

Moonen, 2001; Deepwell, 2007; Hardaker & Singh, 2011). Poor coordination of resources implies duplication of efforts, which leads to waste of resources.

Furthermore, lecturers, students and management appear to have no clear priorities for e-learning adoption and diffusion at the UG. Management commitment to expanding residential facilities without a corresponding increase in infrastructure support for effective student learning raises questions about priority and commitment to promoting e-learning. It also raises questions about improvement in the quality of teaching and learning. Strategic implications of shared leadership and commitment to well defined priorities will result in the promotion of not just e-learning adoption but also encourage lecturers to utilise e-learning approaches that are authentic and constructively aligned with teaching approaches that suit their context. While leadership would harmonise use and coordination of resources, the commitment will ensure adequate budget allocation that will enhance adoption. Leadership in quality assurance will ensure there are the proper standards in place for e-learning.

5) *Inadequate consultation of experts in decision making processes:* Perspectives gathered from senior and lower level technical staff show that technical expertise was not widely consulted by management in initiating and deciding on technologies to be adopted (Section 5.2.3.6). Management consulted and engaged academics with little or no experience in technology innovations to lead in ICT adoption decision-making processes (Section 5.2.1.6). Scarcity of literature on the relationship between institutional technology appointed leaders and ICT technical experts in universities makes this a unique experience at the UG. However, other institutions' experiences demonstrate the need for mutual consultation and understanding between technical staff, management and faculty (B. Collis & Moonen, 2001; Deepwell, 2007; Hardaker & Singh, 2011; Khan, 2005). The outcome of these experiences was that academic leaders own the projects, which normally resulted in conflicts and apathetic attitude from some technical staff because their best practice advice was ignored. With the pertaining situation, expected standards may not be achieved. Strategically, management need to consult with technical professionals in decision-making processes, particularly ICT and e-learning being critical for successful implementation.

6) *Poor national infrastructure to support e-learning:* The UG could not rely on electricity supplied on the national grid for effective e-learning because it was unstable and unreliable, particularly when power was rationed. The frequency of power outage without warning means the UG had to rely on generators and other power sources to

support any meaningful e-learning. Furthermore, the national Network infrastructure to enhance Internet access was poor and unreliable. These problems pose challenges to flexibility in course delivery and access to Internet services, particularly in remote locations. Strategic implications are that e-learning must be centred around delayed and blended learning (asynchronous) and not real-time (synchronous). Strategic alternatives are necessary because, inadequate support and funding from government increases the pressure on management to depend on other sources like the AAU, Carnegie Corporation, DANIDA, USAID, NUFFIC and other multinational institutions for support.

7) ***Lack of cost-benefit analysis***: A major finding around the issue of educational effectiveness revealed that there was no short, medium and long-term assessment of educational outcomes during and after launching the KEWL (Section 5.3.3). Although some benefits for the institution were listed, they were perceptions (Section 5.1.2.2) and not based on any thorough assessment. Best practice examples (B. Collis & Moonen, 2001; Khan, 2005) show that such assessments are necessary to address tangible and intangible factors and benefits to users and the institution as a whole. The adoption was beneficial if the educational gains were far above the cost of adopting the e-learning process. Strategically, internal and external evaluation of the capabilities at the UG to adopt e-learning were needed to provide concrete and meaningful reasons that will persuade and give meaning to users acceptance of e-learning. Experiences from the UG showed management efforts made to launch the KEWL, and the ICT Directorates efforts in organising workshops, however, the lecturers were unable to relate the e-learning procedures to their practices. Strategic implications are that, assessing the tangible and intangible value of adopting e-learning may help the UG measure the real-cost of e-learning in relation to the objectives it hopes to achieve. Performing a cost benefit analysis will inform management commitment and support for e-learning, particularly with regard to how faculties may benefit from e-learning adoption.

8) ***Lack of concrete target for adoption and integration faculty-wide***: There was no UG plan regarding how faculties and departments would roll-out e-learning (Section 5.1.3.5). The absence of a plan showing the target programmes or courses confirms why lecturers use the resources the best way known to them (Section 5.2.1.5). Best practice examples (B. Collis & Moonen, 2001; Fisser, 2006; Khan, 2005; Rosenberg, 2001) show that a gradual process beginning with some pilot programmes were required to ensure that success or failure of such targets could be assessed and measured.

Implications are that there would be no mechanism of stimulate progress and adequately plan for resources that would be required by students and lecturers. A strategic approach may be through the identification of target courses or programs that can be run effectively online, by first piloting, evaluating and integrating into the university curriculum.

9) ***Inadequate staff development initiatives:*** Capacity development programmes were focused more on administrative support services and not structured towards the support of e-learning or content development (Section 5.2.3). Best practice experiences (B. Collis & Moonen, 2001; Khan, 2005) have shown that effective e-learning requires broad expertise, not limited to educational technologists, content developers, graphic designers, subject matter experts, instructional designers, project managers and programmers. Implications are that the academic support unit needs strengthening through training, recruitment of expert technical staff and restructuring of operational activities that focus on e-learning.

10) ***Lack of quality assurance to facilitate standards for best practice:*** The poor resourcing of quality assurance and its focus on assessment of lecturers at the UG (Section 5.1.1.2; 5.2.3; 5.2.3.6) has a direct effect on the quality of e-learning delivery, resources used in the environment and the infrastructure. The experience of other institutions has shown that quality assurance has technical and technological implications that directly affect users and pedagogies for e-learning (B. Collis & Moonen, 2001; Deepwell, 2007). This means that e-learning courses must be comparable with well-designed and developed courses that build capacity in learning, meeting high educational standards. Such quality may ensure that learning systems selected are reliable; sustainable, scalable and can enhance the performance of students learning. Strategically, the UG may ensure that quality assurance was well developed covering technical and technological resources, meeting users' needs, pedagogies and content development, and the selection and use of the LMS. It should not be limited to the assessment of lecturers at the end of each academic year.

11) ***Aligning e-learning with the culture of teaching and learning:*** The wide spread concerns by students about their sources and learning online, the emphasis on PowerPoint presentations and lecturers alignment of training received with their teaching approaches limits the effectiveness of e-learning. Institutional experiences have shown that technology must not drive the learning process but be used to enhance the teaching and learning process (B. Collis & Moonen, 2001; Deepwell, 2007; Hardaker &

Singh, 2011; Sheehy et al., 2006). The implications were evident as lecturers continue to avoid seminars and workshops that are aimed at facilitating the acceptance and adoption of e-learning (Section 5.2.3.1). Strategically, assessment of user needs and matching training to suit their needs is required. With appropriate support services this will help facilitate and enhance e-learning adoption.

12) ***Other factors***: The findings have shown there are other factors that affect the institutional environment directly for successful e-learning implementation. However, these factors are also related to the people and technological domains and are discussed further later in this chapter. They can be directly related to educational effectiveness, ease of use and user engagement, which require strategic attention to ensure successful implementation. Some of these factors include:

a) Poor user perception of e-learning meaning it is not accepted voluntarily (Section 5.1.4). Voluntary e-learning adoption as perceived by management was not workable and would not facilitate successful e-learning adoption in the UG.

b) The students were generally not satisfied with approaches to teaching and learning, and expressed reservations about some activities of the contact sessions that may be transferred to e-learning (Section 5.2.2.4 (5); 5.2.3.4). All of which affect both policy and strategy. Strategic implications are that students will continue to have ‘confidence-challenging’ feelings. A solution could be in designing learning contents that will facilitate and enhance critical thinking and creativity skills for knowledge construction and not being totally dependent on what the lecturers provide.

c) Additionally, there was limited and poorly managed institutional capacity for e-learning. The approaches were not centred on pedagogy, and lack technology and technical staff plan for e-learning (Section 5.2.3.3).

d) Further, there was lack of institutional philosophy on teaching and learning; poor lecturer pedagogical experience and lack of pedagogical knowledge about e-learning (Section 5.2.1.4(5)). The outcomes are lack of strategic means of ensuring efficiency in delivery.

e) Evidence from the findings showed that lecturers were neither aware nor familiar with any institutional policy and document that outlines UG’s philosophy on teaching and learning, which can be applied in an e-learning environment (Section 5.2.1.2).

f) It was also found that most lecturers had no formal training in pedagogy except those who were professional teachers before joining the university (Section 5.2.1.4).

In summary, the Institutional domain factors mentioned and discussed above, show that the UG had no well-defined purpose and direction for e-learning implementation and was therefore likely to fail in efforts to implement and sustain it. Although broad institutional needs were identified in the corporate strategic plan, they were not related to needs of users, or to inform both policy and strategic approaches to be adopted. Strategic interventions are therefore required based on the “gaps” established between the UG’s current practice and good practice as illustrated by the literature and other institutions. A summary of the “gaps” established and the implications of the “gaps” are presented in Table 6.1a and Table 6.1b.

Table 6.1a

Implications of results from the Institutional domain

Established gap	Critical implications
Lack of vision and objectives for e-learning implementation	Unclear purpose for e-learning implementation, educational goals; poor understanding and relevance of e-learning; lack plan for bridging educational delivery gap; unclear user understanding of desired expectation
Lack of policy to provide direction for e-learning	Lack control over inappropriate actions; Poor coordination of task; poor decision making and standardization of procedures; inconsistent operational patterns; unclear guide on decision made; lack empowerment for change management; Outdated culture of teaching and learning; poor competitiveness in higher education
Lack of strategy for e-learning implementation	Poor and unclear process of adoption; lack real cost of e-learning adoption; poor budgeting for resources; inadequate funding and expenditure; poor training techniques to facilitate adoption
Inadequate leadership and commitment to e-learning (Management and faculties)	Lack of policy and plan for implementation; ineffective coordination of decisions; poor budgeting and funding; poor resource coordination; lack technical and infrastructure support
Inadequate consultation of experts on ICT decision making processes	Lack real user needs for adoption; poor selection of learning resources; poor appropriateness of infrastructure; poor technical support for resources; lack quality assurance
Poor national infrastructure to support e-learning	Poor vision, policy and strategy; poor economic, social, cultural and technical inference; poor Internet connectivity; poor reliability of network; high cost of technology resources; lack sustainability of e-learning adoption
Lack of cost benefit analysis to establish short and long-term educational pay-off	Lack real cost of e-learning adoption; poor conditions and institutional capabilities for e-learning, poor policy and strategy deductions; poor selection of learning system and resources; poor adequacy of resources

Table 6.1b

Implications of results from the Institutional domain - (Cont.)

Established gap	Critical implications
Lack concrete target for faculty level e-learning adoption	Poor procedures for acceptance and adaptation of e-learning; unclear pedagogical approaches; poor coordination of implementation process; poor resource allocation
Inadequate staff development initiative; unstructured staff development program	Poor institutional priorities; lack policy and strategy; poor training and professional development; poor quality assurance; lack authentic e-learning; poor pedagogical skills
Lack of e-learning quality assurance to facilitate standard practices	Poor technical and technological infrastructure; lack users' needs and expectations; poor pedagogy; Inadequate skill for content development; poor professional development; poor selection and use of LMS
Experiences with learning applications not aligned and customised to fit with the culture of teaching and learning	Poor policy and strategy; ineffectiveness of e-learning; lack motivation, acceptance

6.1.2 People domain factors

1) *Unclear efficiency gains, doing routine task associated with learning more quickly:*

Evidence from the findings was that both lecturers and students were unsure of the benefits they would gain by doing routine tasks associated with learning more quickly (Section 5.1.2.3). Concerns were expressed by some Deans, particularly in the humanities, regarding the skills and competencies students were going to gain through e-learning. Also of concern was the lack of a compelling rationale for practices described as e-learning. Research and institutional experiences demonstrated that users were more likely to adopt innovative technologies if they will gain from doing routine tasks associated with their work more quickly (B. Collis & Moonen, 2001; Ensminger et al., 2004; Rogers, 2003). The outcomes were evident in the questions asked by lecturers about how e-learning was going to improve students' learning and their career development processes. A practical and appropriate strategic process would be one of a parallel demonstration of experience, through comparing e-learning experiences with the traditional approach, before, during and after the adoption process.

2) *Lack of clarity to inform valuable learning experiences, and improved communication:*

There was no evidence of evaluation reports or scientific processes used in measuring the impact of innovations on students learning and assessment of the quality of teaching. Hence, there was lack of concrete and meaningful information about e-learning that was helpful to motivate both lecturer and student acceptance. The

outcomes of this were evident in lecturers concerns regarding poor communication from management and therefore they were unaware of technology resources they could use to enhance their work (Section 5.2.1.7; 5.2.3; 5.3.1). This demonstrated a gap in communication and poor leadership in promoting the e-learning adoption process. Best practice approaches suggest proper communication and understanding of how the resources would enhance user adoption of the innovative technology (Hardaker & Singh, 2011; Lin et al., 2011; Rogers, 2003). The continuous effect of this gap may result in lecturers' apathetic attitude towards e-learning. Users may not be fully aware of institutional policies or strategic plans for e-learning, which may frustrate the implementation process.

3) ***Lack of clarity on how to improve the capacity of individualised aspects of the learning experience:*** The HOD's and lecturers expressed doubts about e-learning's effectiveness to enhance their teaching and student learning. Although they believe e-learning was workable at the UG (Section 5.1.1.5; 5.2.1.8), it could not be sustained because there were internal and external factors management had not resolved (Section 5.2.1.3(8)). Some early e-learning research in Africa attributed both internal and external difficulties the universities face to lack of policies and strategies that would provide direction for successful implementation (Farrell & Isaacs, 2007; LaRocque & Latham, 2003). The HOD's concerns however, suggest there were user needs that have not been met, the implications of which may result in continuous lecturer boycott of e-learning if individual benefits or benefits for student learning efforts were not assured. The appropriate strategy requires performing a thorough needs assessment to identify the areas that would require interventions. Such assessment will make management's rationale for e-learning strong enough to motivate user adoption.

4) ***There was a lack of incentive or reward systems relating to the use of e-learning resources:*** The findings show lack of incentives or reward systems to motivate user adoption. Lecturers expressed concerns about how e-learning was going to enhance their research and promotion as academics (Section 2.5.1.6(8)). This situation was inconsistent with best practice approaches that demonstrated incentives and reward systems as appropriate tools for successful e-learning implementation (Deepwell, 2007; Hardaker & Singh, 2011). Rogers (2003) demonstrated that adopters of an innovation would relate the present and future situation of the innovation to their work in deciding on acceptance or rejection of the innovation. Implications are that incentives and reward systems build lecturer confidence and motivate the adoption of e-learning. In the

particular case of the UG where management, Deans and HODs were divided on the reward system for lecturers gives relevance to the framework proposed later in this Chapter. Incentives may be in the form of sponsorship to conferences, contribution to their promotion, leave for developing learning content, and other means by which they would feel motivated. Experience in the UG had shown that students showed much interest to train in ICT literacy and use the resources when certificates were awarded, but withdrew when the certificates were suspended (Section 5.2.2.3). This suggests that a plan for incentives is required to motivate and sustain user engagement in the use of e-learning effectively.

5) ***Inadequate capacity to stimulate e-learning:*** Another major finding was that lecturers did not have the capacity and competencies to stimulate students' engagement in authentic e-learning (Section 5.2.2.3). This was evident in 1) the lecturers' inability to engage students to use the available resources for research and to support their learning; and 2) students rating of four most important activities they use computers and Internet resources for in a day (Section 5.2.3.5). The findings further show that most lecturers in the UG had no formal training in pedagogy. Strategically, lecturers will need training in both traditional and e-learning pedagogies. Professional development programmes for lecturers may be structured to develop ICT skills, competencies in online course development and appropriate pedagogies for e-learning.

6) ***Inadequate leadership and coordination of resources:*** The data indicated that there was a struggle for control over roles played by the three ICT units in the university (Section 5.3.2 (2)). While one unit played the role of power and dominance in ICT decision and initiative processes, the other units were suspicious and careful to be involved. This means that visionary directions were not well coordinated and lacked adequate consultation between directors, there was duplication of efforts, poor documentation and suspicion among leaders. Laudable as the UG's efforts in establishing a position that will coordinate activities of all three ICT units may be, successful e-learning requires proper coordination of resources between the units because they are not mutually exclusive. Trust between the heads is critical as e-learning platforms may be linked to a number of university systems. The implications are that technical staff recruited by the faculties and the university as a whole should be responsible to one person who will in turn be responsible for harnessing the optimum use of the resources through the unit heads

7) ***Culture of teaching and learning***: Evidence from the lecturers showed that they had concerns regarding student attitudes towards e-learning and how the e-learning environment would improve their learning (Section 5.2.1.5). Traditionally, students were not familiar with e-learning because of the culture of learning from basic education. Strategically this means that the UG must provide adequate training for students. Rogers (2003) asserted that adopters of an innovation will consider the innovative effect on others, and how it will affect their output. Implications are that because the students are direct clients of the lecturers, optimal and effective use of e-learning was of importance to them.

8) ***Lack of personal orientation towards e-learning***: Initiatives and efforts to develop lecturer competencies for e-learning through workshops, seminars, and conferences have not had any effect on e-learning acceptance and adoption (Section 5.2.1.3(6)). The orientation and training programmes were not focussed on pedagogy and e-learning competencies. This suggests that internal motivation for e-learning does not depend just on training, but also how the training can be related to their work and the perceived gains to be achieved. Clear policy directions and a plan for e-learning professional development were needed to address factors that would boost the individual user orientation towards acceptance and subsequent adoption and integration. Planned and organised activities of learning experiences designed to enhance appropriate and effective ways of using e-learning to provide authentic learning were required. This implies moving away from an active lecturer and passive student approach to teaching and learning to a student centred learning model. Training objectives should focus on improving lecturers' professional and personal performance to enhance teaching with e-learning. It is important that the UG accept responsibility for lecturers training rather than expecting staff to up skill themselves.

9) ***Strong influence of social system (peers)***: There were negative perceptions about the KEWL, which were communicated by colleagues who did not have any experience in using the KEWL. It was observed that some decisions to reject the KEWL were informed by comments that the LMS was not intuitive and lacked technical support (Section 5.2.1.8). The findings had many parallels with the studies by Hardaker & Singh (2011) who found that lecturers' adoption of e-learning was greatly influenced by the social system they were in. The outcome of the negative influence of the social system in the UG was evident in lecturers' difficulty in becoming familiar with the KEWL (Section 5.1.1). An appropriate strategy would be to make the social system an

integrated part of the planning and implementation process through parallel demonstrations of e-learning and the traditional approach. This may involve identifying some key (enthusiastic) lecturers to promote the learning system accepted by the UG. They may participate in the evaluation of the system through demonstrations, and designing interventions to address the needs that were relevant to the users.

10) ***Inadequate user skill and competencies for e-learning:*** Evaluating user performance on tasks revealed poor and often inadequate user skill and competencies to adopt e-learning (Section 5.2.1; 5.2.2). This contradicts their perceptions of their own skills and competencies as revealed through the interviews. Other institutions experiences show that user skill and competencies were necessary and must be appropriate for successful e-learning (B. Collis & Moonen, 2001; Khan, 2005; Lin et al., 2011). The UG experience revealed that competencies and skills in computer literacy were dependent on abilities of the users to actually perform tasks and not on their perceptions of what they can do. Strategically, standards were needed to guide competency training for e-learning. The limited understanding of e-learning among staff, which was mainly associated with PowerPoint presentations demonstrate the level of exposure and strategies that must be adopted to develop appropriate skills for e-learning. Levels of training must be structured to meet not just teaching and learning needs but also for research and collaboration.

11) ***Inadequate training in pedagogy and the danger of absentee lecturers:*** Lecturers in the university identify with three primary pedagogical approaches to engage student learning (Sub-section 5.2.1(4)). When the emphasis was on the traditional mode of instruction students were either placed in group-work, given assignments, made presentations in class or analysed information provided by the lecturer. A pedagogic strategic plan requires careful integration of the best of the existing pedagogies into the e-learning environment. This structured pedagogical training for e-learning may emphasise the approaches that are engaging and match students' needs, interest and ability, reflect students feedback about how they learn best and have a focus on enhancing individual learner's development. Experiences from some other universities implementing e-learning supported this approach (Goolink, 2006; MacBeath & Dempster, 2009). Implications of effective lecturer training for e-learning will be that, lecturers will move away from recycling lecture notes without upgrading them. Such training may prevent or minimise the situation where some students absent from lecture sessions and focus on learning materials presented by the lecturers to pass their semester

examinations. However, there was danger of producing absentee lecturers who may simply upload lecture notes and learning resources on the server for students to download, when the training was ineffective and there was no monitoring. Strategically, a faculty or department committee responsible for content development and evaluation of standards is needed.

Effective pedagogical training may minimise dictation of lecture notes and focus more on engaging students in authentic discussion of content. Lecturer absence from lecture sessions because learning resources were uploaded without proper guidance to students learning may cease. Having an appropriate pedagogy for authentic e-learning will require structural change in some standard norms related to teaching and learning in the university. Although lecturers complain of students' preference for dictated lecture notes, attributed mainly to large classes and poor infrastructure, this situation was not confirmed by the Researcher. However, the situation can be explained by lack of pedagogical training. Hence, strategies for pedagogical competencies may cover such factors as planning, preparation, and delivery of content to students.

12) *Inadequate staff development initiatives:* The findings show that critical factors influencing inadequate institutional initiatives and efforts to adapt e-learning were leadership commitment; lack of clear policy initiatives for e-learning and lack of e-learning strategic approaches (Section 5.1.4). Equally important were issues of e-learning vision, and goals and management experience with innovative technology adoption for e-learning. In relation to professional development, efforts at improving lecturer competencies to enhance teaching and learning through workshops, seminars and conferences had not had any effects on lecturers' approach to teaching or students' approach to learning (Section 5.2.1(3,6)). Strategically, the programs may be focused on pedagogy and e-learning in order to achieve the institutional objectives. This aligned with Collis and Moonen's (2001) engagement strategies, which were demonstrated to present a workable approach that would promote continuous professional development among lectures. Such workable strategies may be planned and organised activities around learning experiences designed to enhance appropriate and effective ways of using e-learning and research to provide authentic learning. It should not encourage a pedagogy based on an active lectures and passive student approach to teaching and learning. The objective may focus on improving lecturers' professional and personal performance to enhance teaching in an electronic environment. Management and

faculty's perception that continuous professional development depends on the efforts of the individual (and not the institution) has been shown be unworkable at the UG.

12) ***Other people factors***: These factors are largely linked to the Institutional and Technological domains. Their effects are related to the educational effectiveness of e-learning and ease of use of the resources. The findings showed that:

a) There was poor communication regarding the resources, which affected knowledge and awareness of resources available for lecturers to use (Section 5.1.3). Though information through peers and faculty meetings are good, they are not an adequate means of communication that can facilitate e-learning. Literature on best practices supports communication as an important factor in any successful implementation of e-learning (B. Collis & Moonen, 2001; Hardaker & Singh, 2011; Lin et al., 2011; Rogers, 2003). Strategic implications relate to well defined communication channels.

b) Inadequate understanding of the benefits of e-learning. This was evident in attitudes demonstrated by some lecturers and students towards use of the resources.

c) There were issues of poor user self-confidence to adopt e-learning including expressing a lack of interest in the LMS KEWL (Section 6.2(8)).

d) Poor lecturer participation in organised workshops (Section 6.1) because there was poor course alignment to e-learning.

e) Inadequate technical and infrastructure support for users (Section 6.1.3) to motivate e-learning adoption. These were largely attributed to the lack of adequate technical skills to support e-learning.

f) Inadequate resources and time for students to adopt and use resources to enhance their learning efforts.

g) No feasibility study was carried out to assess both user and institutional needs for e-learning before the LMS KEWL was selected. This was contrary to good institutional practices of analysing and establishing user and institutional needs and requirements for e-learning (Rosenberg, 2001; Collis & Moonen; 2001; Hardaker & Singh, 2011). This means the real cost and benefit for e-learning has not been established.

Concerns of management over emphasis on ICT infrastructure, with less attention on pedagogy and appropriate strategies for managing e-learning resources, are an issue of management commitment to e-learning. Other institutions' experiences show that such a focus was a major problem (B. Collis & Moonen, 2001; Freitas & Bandeira-de-Mello,

2012). Strategically, management must ensure that resources are adequately used to support teaching and learning.

In conclusion, it was clear from comparison of the best practices and the UG's current practices that the gaps have implications on the educational effectiveness of e-learning, how easily resources can be used and user acceptance of the resources. The above discussion showed that successful e-learning implementation strategies require careful evaluation of the factors and their implications to serve as a guide, particularly on matters of policy. The recommended approaches align with Attwell (2004) who asserted that policy makers and policy influencers need greater awareness of the implications of particular e-learning strategies and models to make informed decision on e-learning policy and funding. Verification of the factors and their implications gives direction to management to ensure a successful e-learning implementation is achieved. In Table 6.2a and Table 6.2b below summaries of people domain factors that affect e-learning implementation at the UG are presented.

Table 6.2

Implications of results for the People domain

Established gap	Critical implications
Unclear efficiency gains doing routine task associated with learning more quickly	Lack confidence and motivation for e-learning adoption; negative influence of social system; poor training and professional development
Lack of clarity to inform valuable learning experiences, and improved communication,	Poor Institutional goal; poor relevance of e-learning; Unclear information for acceptance and adoption; poor policy and strategy; poor use of resources; poor resource allocation
Lack of clarity to improved capacity of individualise aspects of the learning experience, valuable support to the existing curriculum	Lack training and professional development; poor finance and budgeting; lack technical support services
Lack of reward and incentive system for lecturers adopting e-learning	Poor policy and strategy; lack confidence and motivation; negative influence of social systems; indifferent to acceptance and adoption
Inadequate capacity to stimulate e-learning	Unclear relevance; lack authentic e-learning; poor students use of resources; poor standards of teaching and learning;
Inadequate leadership and commitment to e-learning	Lack policy and strategy; poor resource allocation; poor technical support services; poor budgeting and finance
Entrenched culture of teaching and learning	Ineffectiveness of e-learning; lack students acceptance and adoption; poor quality of teaching and learning; poor availability and access to resources; lack pedagogies for e-learning
Lack of personal orientation towards trying out new ways to carry out learning related task	Poor budget and training: unclear determination of appropriate focus and training initiatives required; poor policy and strategy; poor institutional goal for e-learning

Table 6.2b

Implications of results for the People domain

Established gap	Critical implications
Strong influence of social system	Lack users confidence and interest in e-learning; poor training and professional development; lack management commitment and leadership; poor policy and strategy
Inadequate user skill and competencies for e-learning	Ineffectiveness of e-learning in comparison with objectives for teaching and learning; poor policy and strategy; lack training; technical support
Inadequate training in pedagogy; competencies in e-learning pedagogy	Lack skill and competencies; lack training; poor policy, objective and strategy; lack quality assurance; poor authentic e-learning; standards
Inadequate staff development initiative; unstructured staff development program	Poor institutional priorities; lack policy and strategy; lack training and professional development; lack quality assurance; lack authentic e-learning; lack competencies.
Poor communication of resources	Indifferent to acceptance and adoption; lack strategy
Inadequate understanding of benefits the UG will gain from e-learning	Lack objective, policy and strategy; training; acceptance and adoption
Poor user self-confidence to adopt e-learning; lack of interest in LMS	Indifferent to acceptance and adoption; lack policy and strategy; lack training; lack technical support services
Poor lecturer participation in organised workshops	Poor communication; lack policy and strategy; unclear implementation processes; lack institutional goals for e-learning
Inadequate support for users	Indifferent to acceptance and adoption; lack institutional goal for e-learning
Inadequate resources and time for students to use available resources for e-learning	Lack policy and strategy for e-learning adoption

6.1.3 Technological domain factors

1) ***Inadequate capacity to support e-learning:*** A major finding was that there were inadequate numbers of appropriately skilled technical staff. This was evident in the delays and poor responses to user requests for assistance, which normally resulted in periodic conflicts between the academic technical support units and users (Section 5.1.3.1; 5.2.1.6(9)). Additionally, there were no educational technologists, course designers, and, expert content developers who could provide support for lecturers and students. This was inconsistent with effective institutional practices, which emphasised efficient and effective technical support services (Hardaker & Singh, 2011; Khan, 2005; Lin et al., 2011; Msalela, 2011). The problem at the UG was amplified due to poor policy enforcement in recruiting technical staff. The duplication and conflicting roles of technical staff further confirms poor structures for support services. It is clearly critical that the UG provide adequate technical support for e-learning. Strategic implications

include reviewing the recruitment policy and setting up a help-desk to support the needs of all users. Important for e-learning are the help desk personnel, network managers and the design assistants.

2) ***Inadequate technological and technical infrastructure***: The findings show that although all lecturers had computers, students had poor access to computers and Internet services. Students had two hours of access to computers and Internet resources each day, which caused frustration among the students. The findings further showed that the Internet connection was poor, bandwidth size was small, the network infrastructure could not be relied upon, and the generators were unreliable in supporting power outages (Section 5.1.4.2; 5.2.1.9). Many software applications used by lecturers were not supported. Best practice (B. Collis & Moonen, 2001; Deepwell, 2007; Khan, 2005) would involve the technological and technical infrastructure being critical hubs for successful e-learning. These resources must be easily accessible to all users. Among the effects of the poor technological infrastructure was the unwillingness of lecturers to adopt the learning system. They believe some students will be disadvantaged because of poor access. Hence, effective e-learning may be achieved on small scale, where resources may be focused on few selected courses. Partnerships with well-resourced institutions have the potential of enhancing the infrastructure.

3) ***Lack of incentive and support for technology ownership***: There were no institutional subsidies for lecturers wanting to use Internet resources from home to support teaching and learning. The outcome was that most lecturers subscribing to private Internet services use the resources for research and consultancy services, and not for teaching and learning (Section 5.2.1). The UG also had no subsidies from government to acquire bandwidth at cheaper cost. Hence, there was pressure on the university to consider alternative sources of funding to support ICT infrastructure at the UG. Immediate effects could be seen in the technology fees charged to students annually (Section 5.2.2.5). In terms of subsidies for Internet connection outside the university's Internet coverage area, the experiences of other institutions have shown that incentives for lecturers promoted e-learning adoption (B. Collis & Moonen, 2001; Deepwell & Beaty, 2005; Deepwell & Syson, 1999) implication of a lack of Internet subsidies was the lecturers' reluctance to use their personal resources to support teaching and learning. Strategically the UG may position itself in partnership with government and private institutions to provide incentives needed for lecturers to use the resources at all times.

4) *Poor user confidence in institutional infrastructure and provisions for e-learning:*

Practices at the UG and concerns expressed demonstrated lack of user confidence in management to provide effective and efficient e-learning, citing a lack of adequate resources and support services (Section 5.1.1.5; 5.1.2.3; 5.2.1.3). User access to computers and computer resources was generally described as poor. Generators used to support power during an outage were unreliable. The students' preference for contact sessions with their lecturers confirms this is a gap that requires attention (Section 5.2.2.5). Implications from the concerns suggest that innovative technology acceptance goes beyond familiarity, awareness, and comparative advantage of the system as argued by Rogers (2003). It means the likelihood of e-learning acceptance by users will directly depend on the individual perception and experience of access to computers, Internet connection, speed of browsing, and support available. Implications of the factors raised are that synchronous online learning was not possible and for asynchronous learning the infrastructure and support services must be adequately available.

5) *Poor bandwidth, Internet connectivity, and network infrastructure:* The network infrastructure at the time of this research was available across the whole university, with a low total bandwidth of 25Mbps for up and down loads. The effects of this are expressed in Section 6.1.3 (4) above.

6) *Poor budgeting for technical and technological resources:* Budgets for technical and technological resources were generally described as poor. Institutional experiences have shown that adequate funding is required for successful e-learning. Proper budgeting is required at the UG and this may minimise the ad-hoc purchase of resources and maintenance equipment.

In summary, it can be seen that both management and people factors have significant effects on technology and technical infrastructure. Hence, the capacity for support services, adequate infrastructure, and incentives needed to facilitate e-learning adoption must be well supported. A summary of the Technological domain factors is shown in Table 6.3 below.

Table 6.3

Implications for the Technological domain

Established gap	Critical implications
Inadequate capacity for e-learning support; technical skill and competencies to support e-learning	Lack leadership and commitment; lack training and professional development; lack technical support for authentic e-learning; lack skill and capacity to manage infrastructure
Inadequate technological and technical infrastructure	Lack confidence and motivation for e-learning; lack policy and strategy; indifferent to acceptance and adoption
Lack of incentive and support for individual technology ownership	Poor user decision for acceptance and adoption;
Poor user confidence in institutional infrastructure	Indifferent to acceptance and adoption; lack policy and strategy; poor leadership and commitment; lack e-learning pedagogies; lack technical support services; poor management priorities
Poor network infrastructure, Internet connectivity and low bandwidth	Lack institutional capacity to adopt and implement e-learning; poor finance and budgeting; poor speed of access to Internet; poor quality of authentic e-learning; poor user decision to acceptance and adoption of e-learning
Lack of educational technologies and staff with competencies in e-learning	Ineffectiveness of e-learning; poor institutional competitiveness
Poor budgeting to invest in continual upgrades of internal network, replacement of obsolete machines and operational devices	Inefficiency of technical support services; lack e-learning competitiveness; poor finance and expenditure allocation; poor allocation of resources; poor culture of infrastructure replacement; poor technical support services

6.2 Question 2: Factors motivating the effective use of e-learning.

Which of these factors motivate effective use of e-learning resources in an ICT-challenged environment?

This Section 6.2 describes factors that are likely to motivate lecturers and students to accept and adopt e-learning. These factors also play a role in the technical staff's commitment to provide adequate support services. Experience at the UG had confirmed that intrinsic and extrinsic motivational factors influenced both lecturers and students decisions to engage in the use of ICT resources. Individual perceptions of e-learning influenced their level of engagement, expectations of management on provision of adequate resources and what they considered workable options available for successful e-learning implementation. It confirms Venkatesh' (2003) assertion that motivations for

the adoption of innovative technologies are influenced by both internal and external factors to the individual user. In this Section 6.2, discussions of the motivational factors, involves management (institutional) (Section 6.2.1), lecturers (Section 6.2.2), students (6.2.3), and technical staff (6.2.4).

6.2.1 Management motivation for e-learning

Findings showed that although there was no feasibility study to assess the merits of e-learning in the UG, management perceive e-learning as means of solving the problem of increasing student numbers and also as a means to facilitate distance learning (Section 5.1.2.2). Management awareness and familiarity with the potential of ICT to enhance teaching and learning was the driver in developing the current infrastructure. Although the infrastructure development was supported by the corporate strategic plan, integrating the resources in teaching and learning was implied. To go beyond motivation by the infrastructure and achieving successful e-learning will require leadership and action involving all users (Hardaker & Singh, 2011; Lin et al., 2011).

Furthermore, management's commitment to blended learning illustrates the type of e-learning approach the UG preferred to adopt. Considering the available ICT resources, as tools for providing alternative support for learning means management would not use technology to drive the teaching and learning process. If management have a clear understanding of the relevance of e-learning and its benefits this is likely to motivate the adoption process. Building on stakeholders' knowledge of the benefits of e-learning, and developing a gradual engagement plan of hands-on demonstration to compare use of e-learning before, during and after adoption has strategic implications for success.

A sound infrastructure for professional development (staff resource centre), with the potential of effectively supporting e-learning (Section 5.3.1.2; 5.2.1.6) would, if strategically deployed, boost confidence for acceptance and adoption. Management's belief that users will be motivated by the resources and adopt e-learning naturally cannot be sustained. The implications of the current perceptions are that capacity building and staff development programs to achieve successful e-learning may not be seriously pursued and achieved (Donnelly & O'Farrell, 2006; Goolink, 2006; Jobring & Svensson, 2010). It can be concluded that management level motivations for e-learning must be seen in terms of leadership priorities and commitment to policy decisions, crafting strategies, funding and facilitating the implementation process.

6.2.2 Lecturer Motivational Factors

Lecturer factors that were likely to motivate e-learning adoption were broadly categorised into four areas: expectations of management; relative advantage of e-learning; reward systems; and perceptions of existing conditions and capabilities of the UG resources to support e-learning.

1) Expectations of management: The faculties and departments believe they would be better motivated to accept e-learning if management was perceived to be leading by providing direction and guidelines for e-learning implementation (Section 5.1.3.1; 5.2.1.6). Hence, institutional policy and strategic plans, with clear objectives on what the UG wish to achieve can be considered an important motivational factor. These expectations align with strategy implementation principles described in Section 2.3. It can be concluded that users feel motivated to use e-learning resources when their expectations properly aligns with management objectives to meet their needs. Although some management staff attributed the expectations to lack of initiative from the faculties and departments, this can be explained within the cultural context and authority structure, which makes initiatives from the bottom-up difficult to be accepted. A strong management accent, policy to enforce and timeline were critical to compel acceptance and adoption of e-learning university wide, depending on the UG's objectives (Section 5.2.1.8). Some evidence was the unwillingness of lecturers to accept and adopt the LMS KEWL and multimedia resources until policies, strategic plan and support resources were provided.

Experiences from the College of Business Administration demonstrated that lecturers were ready and willing to adopt e-learning if they were consulted together with technical experts on e-learning planning and the decision making processes (Section 5.2.1.6). They wanted to be part of the decision process to have their concerns addressed, and not be receivers of decisions they were not part-of. This means, effective communication between management and lecturers would enhance the adoption process, which is in keeping with what some other institutions have found (Hardaker & Singh, 2011; Lin et al., 2011).

Furthermore, lecturers expression of dissatisfaction with management's voluntary e-learning adoption principle, when computer and Internet resources, technical support services and training were inadequate, show what lecturers need to motivate them. It can be concluded from the concerns that lecturers will feel motivated to accept and

adopt e-learning if: the resources are available and reliable; and management was committed to e-learning with clearly defined priorities. Lack of interest attributed to the above may negatively influence the e-learning implementation process, particularly, because the lecturers believe that technology fees charged by management were adequate to support ICT integration in teaching and learning.

2) *Relative advantage and reward systems:* Lecturers were willing to accept and adopt e-learning if the system was going to enhance student learning and minimise their workload (Section 5.2.1.6). Some institutional experiences show that lecturers will adopt e-learning if they believe the system will enhance lecture preparation, the teaching process, and students' learning experiences (B. Collis & Moonen, 2001; Hardaker & Singh, 2011; Rogers, 2003). Contrary to some HODs concerns about why lecturers should be rewarded for using e-learning, the majority of lecturers were willing to use and adopt e-learning if the time spent in developing content were credited to their workload (Section 5.2.1.8). Best practice models show that successful e-learning is greatly enhanced by reward systems to motivate adoption of online learning (Deepwell, 2005; 2007; Hardaker, 2011). Strategic implications are that management must ensure there are clear policies on incentives that would motivate acceptance and adoption especially considering that the concept of e-learning environment is relatively new to the lecturers. It can be argued that the lack of proactive initiatives from lecturers who could use the e-learning resources but were not, can be explained by the lack of incentives and assurance of relative advantage. Significantly, different scenarios from the UG's experiences showed that, when HODs were involved in initiative processes they were easily acknowledged and accepted when support was inadequate. Such influence was embedded more in the culture of respect for leadership. Hence, the strategic approach requires direct HODs' involvement and commitment to acceptance at the departmental levels.

3) *Institutional conditions and capabilities:* Perceptions of management's overemphasis on technology to address administrative problems, with less reference to teaching and learning were noted by the lecturers as lack of management commitment to e-learning. They were happy to use the e-learning resources if the classrooms were ICT enabled for easy Internet access. Enthusiasm of young and newly recruited lecturers to use PowerPoint presentations and the expression of desire to experiment with the use of new technologies demonstrate a willingness to accept e-learning

technologies (Section 5.1.3.3). This willingness was largely attributed to the orientation the particular lecturers received on recruitment.

The UG approach to developing its ICT infrastructure may be described as one to attain ICT maturity for effective deployment of e-learning. However, the initiatives for teaching and learning were affected by inadequate structures for professional development (Section 5.2.1.6). Best practice examples demonstrate that ICT in teaching and learning goes beyond building the physical infrastructure to motivating user acceptance and adoption (B. Collis & Moonen, 2001; Rogers, 2003; Venkatesh et al., 2003). It can be concluded that the adequacy of technical skills and competencies to ensure resources were easy to use and accessed by all users may motivate e-learning adoption. Implications are that, motivation for e-learning acceptance and adoption will be high if the UG's provision of services is adequate for the limited infrastructure and suits lecturers' needs and expectations (Hardaker & Singh, 2011; Sheehy et al., 2006).

6.2.3 Pedagogy Motivational Factors

The data has shown that the lecturers were willing to participate in training programs aimed at developing competencies in teaching methodologies and particularly e-learning. This was evident from the call on management by the HODs to extend training in teaching methods from newly recruited staff to all lecturers in the UG (Section 5.1.1.2). The views suggest training in e-learning pedagogies has the potential to motivate lecturers toward different approaches to authentic teaching and learning. Lecturers were willing to accept and use the available ICT resources to develop interactive pedagogical content when given adequate support and resources (Section 5.2.1.5). Having a pedagogical approach for e-learning requires knowledge of the process within the learning environment that students can identify with. Implications are that lecturer pedagogical level strategies will require developing competencies in pedagogical knowledge, pedagogies for e-learning, content development and developing students' capacity for e-learning. The findings show that lecturers were interested in adopting e-learning pedagogies through collaboration and linkages with faculties and institutions with good experience in e-learning within and outside the UG (Section 5.2.1.8(9)).

6.2.3 Student Motivational Factors

Students in the UG were mostly interested in using ICT and Internet resources for entertainment and social networking activities than for conventional academic activities (Section 5.2.2.3). The intrinsic interest of using the resources suggests that given the right motivation and clear objectives the students will use the resources to support their learning efforts. Implications for management were to explore future options of using social networking environments and appropriate pedagogical approaches to support teaching and learning. It was evident that students were prepared to use the available ICT resources to support their learning efforts when tasked to use the resources to do so. However, when not given direction students use the resources in a way best known and suitable for them. That student's use the resources for enrolment and course registration, confirm the readiness of students to use the resources for learning when given the appropriate instruction. The students' experiences show that successful e-learning for them is related to reliability of resources, convenience of access to computers, Internet access, and multimedia resources.

The large number of student participation in computer literacy programs demonstrated that students were more interested in accepting and using ICT resources when provided with incentives to use it (Section 5.2.2.3). Although there were problems with access to computers and the number of hours allocated for use, they were motivated by the award of certificates to participate in the training. A drop in the number of participants in these courses was attributed to the fact that most students had computer literacy skills before enrolment in the university. This further confirms the effect of incentives on acceptance and use of ICT resources.

Student expressions of dissatisfaction with the ICT infrastructure as ineffective in providing adequate and reliable support services to enhance their learning (Section 5.2.2.4) means their expectation of the infrastructure were not met. Although they acknowledge the potential of e-learning, they were sceptical about migrating to a learning environment they were not familiar with. The two hours time allocation for using computers with Internet resources in a day were described as discouraging to effective e-learning. It was evident in the students' reasoning that effective e-learning could not be done in such environment. Strategically effective e-learning cannot be achieved within the allocated times and will therefore require unlimited access to computers and internet resources. An appropriate strategy to address this problem may

require supporting students and ensuring access anywhere and at any time. With such flexibility there is a high likelihood that students will be motivated to embrace e-learning.

6.2.4 Technical Staff Motivational Factors

Concerns raised by users regarding technical staff services (poor attitude towards support services, poor support services) were related to inadequate technical staff, inadequate resources, and a lack of quality assurance based on best practice. On that basis, factors likely to motivate technical staff to provide effective services are categorised under the following headings: pressure from inadequate staffing; inadequate support resources; and poor documentation of structures and support services.

1) Pressure from inadequate staffing: Technical staff were unwilling to push their boundaries of commitment to services they provided because management was unwilling to recruit adequate skilled technical staff to complement their heavy workload (Section 5.2.3.6(7)). Security compromises at faculty levels were explained by a lack of expertise and proper coordination of resources. The frequency of conflict between lecturers demand for support services and response from technical staff were all clear evidence of the challenging staffing situation, which frustrated technical staff and prevented them from providing services adequately. Strategically, the UG should undertake a manpower audit, which may result in easing pressure on the technical staff allowing them to provide effective support services. Additionally, the technical (software related) roles may be separated from the technological (hardware related) support roles for e-learning.

2) Inadequate support resources: The lack of adequate resources to provide support services, such as there placement of obsolete parts and funding to stock common devices that require periodic replacements (Section 5.2.3.(6)), discouraged technical staff from giving their best. This was evidenced by inadequate logistics to move staff around, which affected the operational performance of staff. The outcome of this was delays in replacing obsolete and broken parts, and unplanned expenditure, a situation that affected technical staff performance. However, synthesizing the perceptions from both management and technical staff, it was clear that poor budgeting and a reduced allocation of funds to this area had affected the replacement of obsolete machines, repairs and general operations. Strategically, the staff would be more motivated

knowing that there is effective planning by management regarding the resources for support services.

3) *Poor documentation of structures and support services:* Technical staff were often frustrated when they were unable to solve a problem that could be easily resolved if provided with appropriate logs and maps of the infrastructure (Section 5.2.3(8)). Troubling shooting that required knowledge of previous works normally took much time resulting in conflict situations between technical staff and users. The frustrations became more apparent when they were unable to resolve simple problems due to this lack of historical documents. Hence, technical staff motivation is linked to the proper logging and documentation of operations.

In conclusion, motivations for effective e-learning are influenced by management, lecturers, pedagogy, students and technical staff. Management perception of innovative technology gains and provision of infrastructure were not enough to motivate users acceptance and adoption of e-learning. A well-developed understanding of the complexities of e-learning adoption and implementation has a high likelihood of motivating user acceptance and adoption of e-learning. Understanding of the complexities must be related to the environment of e-learning, the educational effectiveness of the learning system, ease of access and use, and user commitment to engagement strategies. Motivation of technical staff to provide effective and efficient support services depends largely on adequacy of staffing, the availability of support resources, and the documentation of structures and operational activities. It was seen that proper training, budgeting and funding of technical and technological activities also has the high likelihood of enhancing user adoption of e-learning. Lecturers and students motivational factors are directly related and not mutually exclusive. It was seen that although adequate resources and support services were much emphasised, the relative advantage of e-learning and reward systems were very critical for user acceptance and effective adoption. Appropriate institutional conditions, capabilities, and structures for pedagogical training also have a high likelihood of promoting e-learning.

6.3 Towards a Model for Implementing E-learning

In this Section 6.3 the researcher is attempting to create a series of e-learning related dimensions, which may be used to position the UG with regard to its e-learning implementation. From factors identified in Chapter 5 with summaries in Table 5.23-5.25, gap and general implications were established and motivational factors discussed (Section 6.1-6.2). A tool has been created to show where the UG can be positioned on a line. The reader should understand that, although lines are used, the dimensions are not necessarily linear scales, and the positioning of the university is an approximation based on the data presented in Chapter 5. The positioning of the UG on the following dimensions is necessarily an approximation because the dimensions have *emerged* from the data analysis. That is, the original instruments were not created to measure these dimensions. The positioning on the dimensional line also shows the approximate gap between a poor performance state and a desired performance state as shown in Figure 6.1 below. Furthermore, although the dimensions are not necessarily mutually exclusive, it is the Researcher's belief that each should be considered independently by the UG.

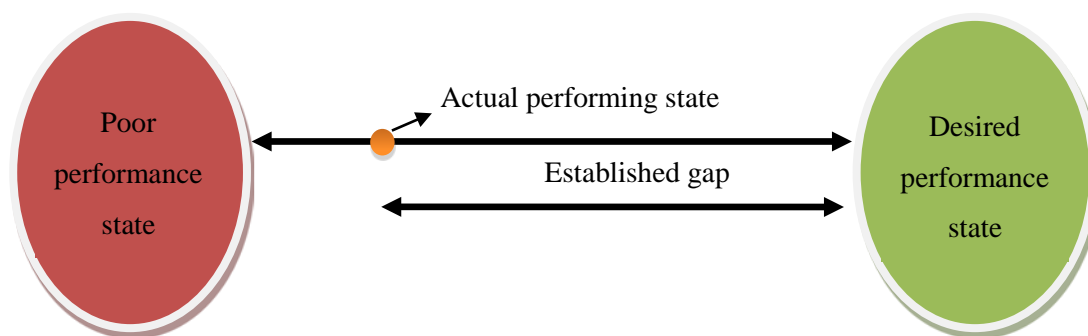
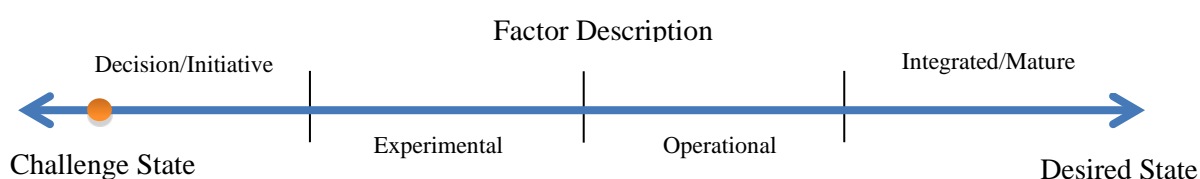


Figure 6.1 Dimensions representing state of the university.

By examining the “gap”, strategies to improve performance may be developed. Although several dimensional areas were identified in this discussion, emphases were laid on factors considered critical to enhance e-learning implementation at the UG. It was noted that the gaps established between the UG's practices and desired good practices were directly related to management (Institutional domain); lecturers, pedagogy, students and technical staff (People domain); and technical and technological infrastructure (Technology domain). Identifying and separating the dimensional areas form a clearer picture on where the UG's strategic process should focus. The six dimensional areas (management, lecturers, pedagogy, students, technical staff, and technology infrastructure) are illustrated in Section 6.3.1-6.3.6.

In considering the factors (domain issues and motivational factors) surrounding e-learning adoption, it can be concluded that each of the identified factors involves four main processes to achieve successful implementation. These are the decision and initiative process, experimenting and piloting process, operational action or implementation process and the integrated or matured stage. These processes are related to the argument that a process of change in adopting e-learning involves decisions to adopt emerging technologies (ICT in education), the implementation process (Fisser, 2006; Rogers 2005)) and the life cycle of the process of change (Collis & Moonen 2001; Fullan 2006). Hence, for ICT challenged environments four quadrants may be assumed, as point of reference for the imaginary position where an institution may be positioned as illustrated below.



In determination of the position of the UG on the line spectrum, perceptions expressed by respondents were synthesised. Each critical domain or motivational factor was then assessed, in terms of operational action in the university. The emerging factors and issues synthesised and considered to be in the formative stages or where nothing was being done were positioned in the decision/initiative quadrant. The imaginary positioning depends on the researcher's judgement and project team's field observation of evidence on what has been done either by management, lecturers or technical staff.

Information that has been synthesised and considered as significant effort in trying out or exploring opinions were positioned within the processes of experimenting use of some resources, or piloting technologies that has been agreed upon to support teaching and learning. Information gathered which suggested that an learning system has been implemented and efforts were made to institutionalise the process were positioned at operational phase. The imaginary integrated or matured stage relates to information suggesting that e-learning has been institutionalised, and has become the integrated part of the institutions educational delivery. In positioning the institution the synthesised information are compared with the researchers' field observation of evidence available. Hence, the intervention or solution will depend on the position determined.

6.3.1 Management dimensions

The key management dimensions were developed from managements' perceptions, efforts, and users expectations of management role and support. Each dimensional level as in Figures 6.2a and 6.2b shows management focus and questions that must be asked, and where the UG can be positioned after formative evaluation.

Institutional Domain (Management)

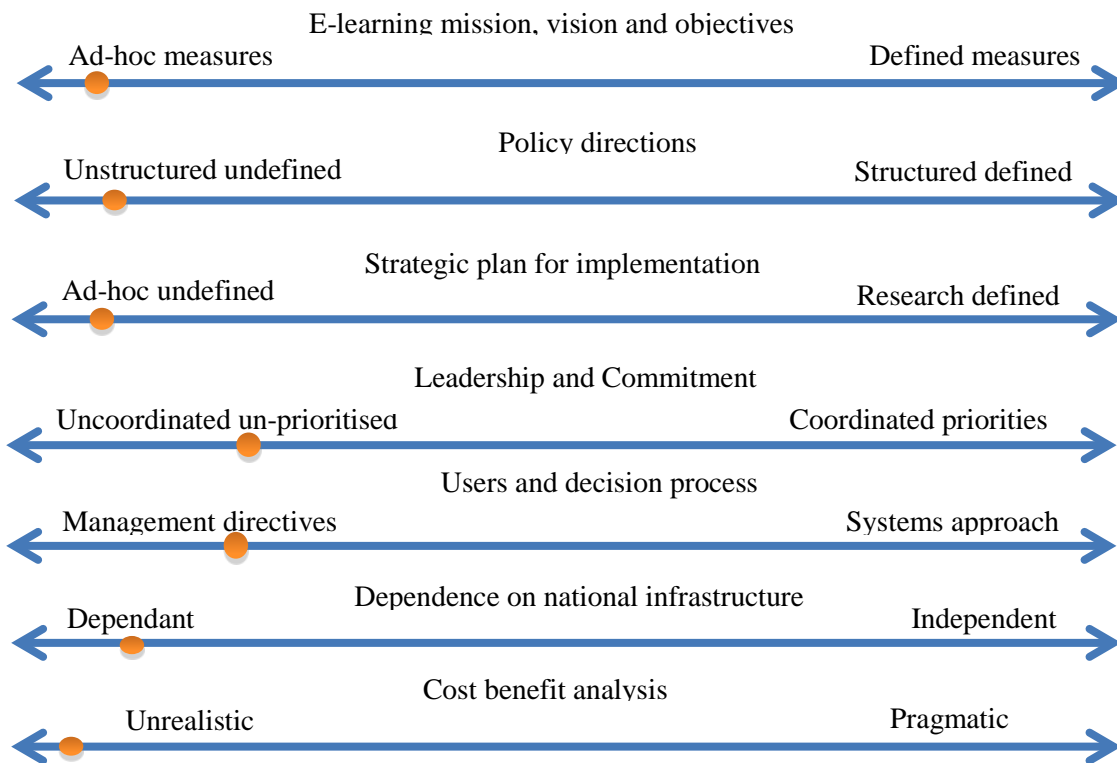


Figure 6.2a Institution/management dimensions

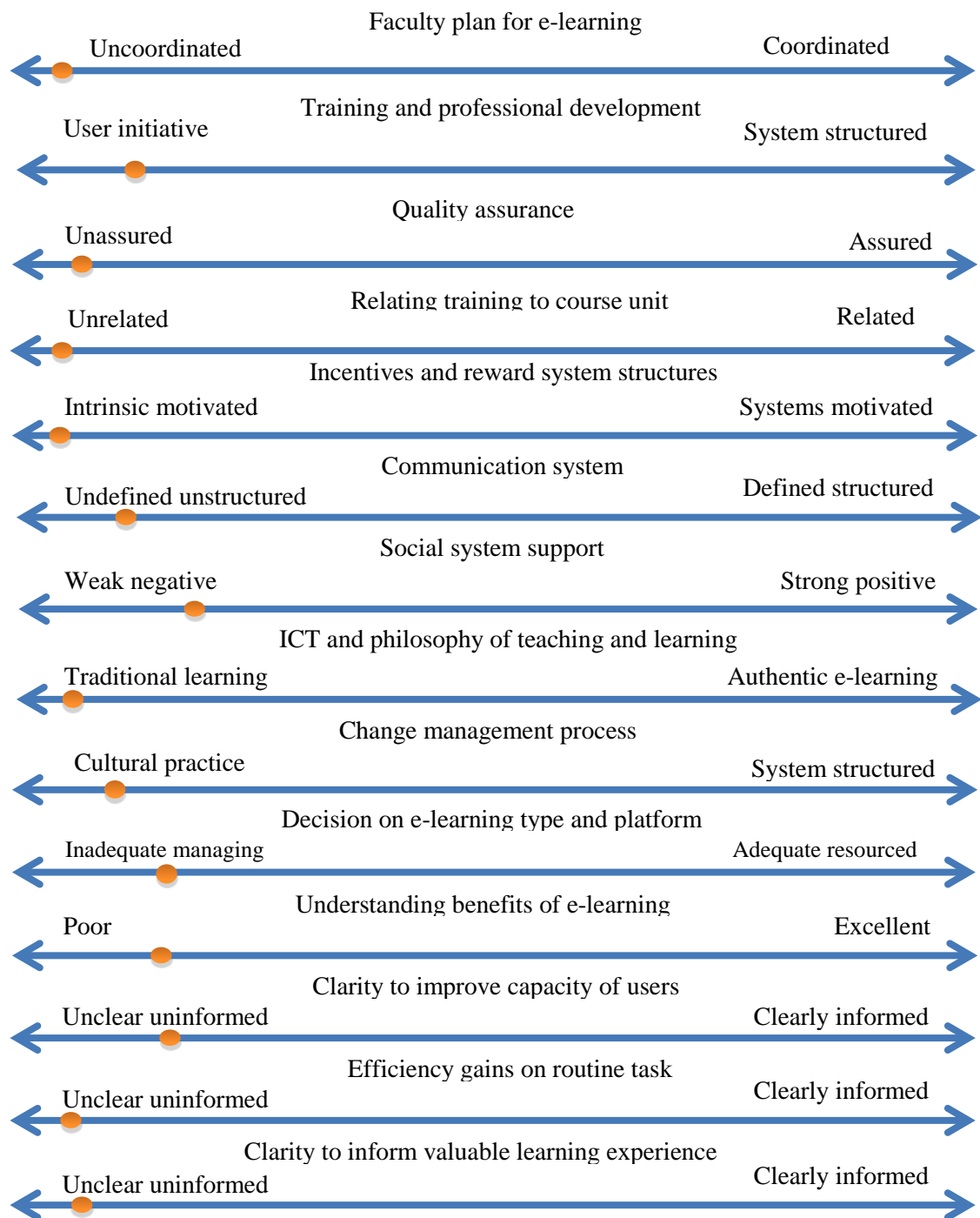


Figure 6.2b Institution/management dimensions

6.3.2 Lecturer Dimensions

Lecturers' capacity to effectively use computers and computer resources was critical because it served as a pivotal agent in the drive to transform a passive teaching and learning approach to a student centred one. The following dimensions were based on perceptions, motivations, and preparedness of lecturers to adopt and use e-learning. In Figure 6.3 the lecturer and pedagogical dimensions which require attention to achieve successful e-learning are presented.

People Domain: Lecturers

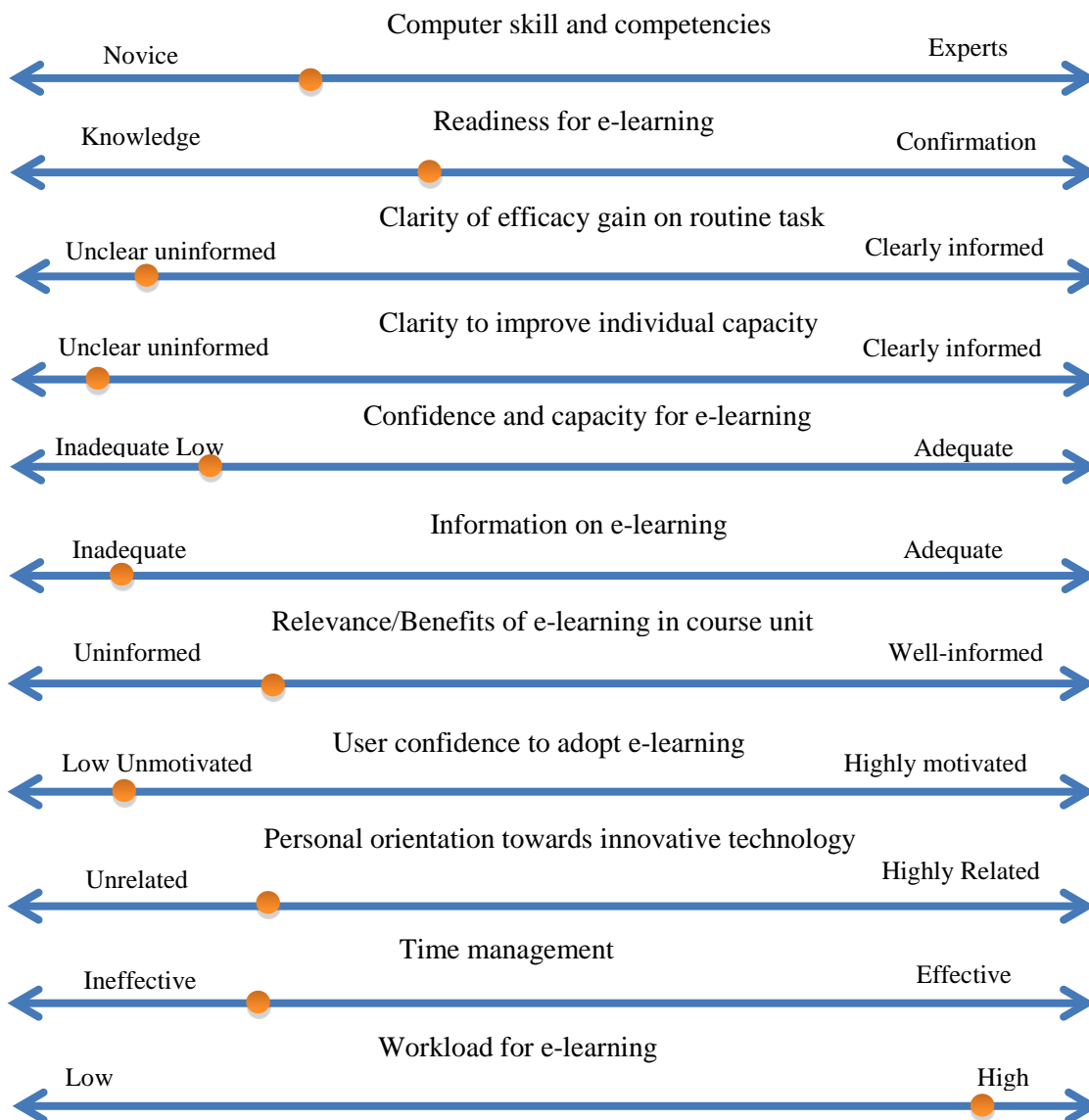


Figure 6.3 Lecturer dimensions for e-learning

6.3.3 Pedagogical dimensions

The pedagogical dimensions for e-learning were categorised into pedagogical knowledge and pedagogical integration in e-learning. These were drawn from the literature as well as experiences of good e-learning implementation practices and compared with practices in the UG. Positioning of the UG as shown in the Figure 6.4 was informed by the fact that there was no clear pedagogical philosophy for teaching and learning, although a norm of traditional contact with students was established.

People Domain: Pedagogy

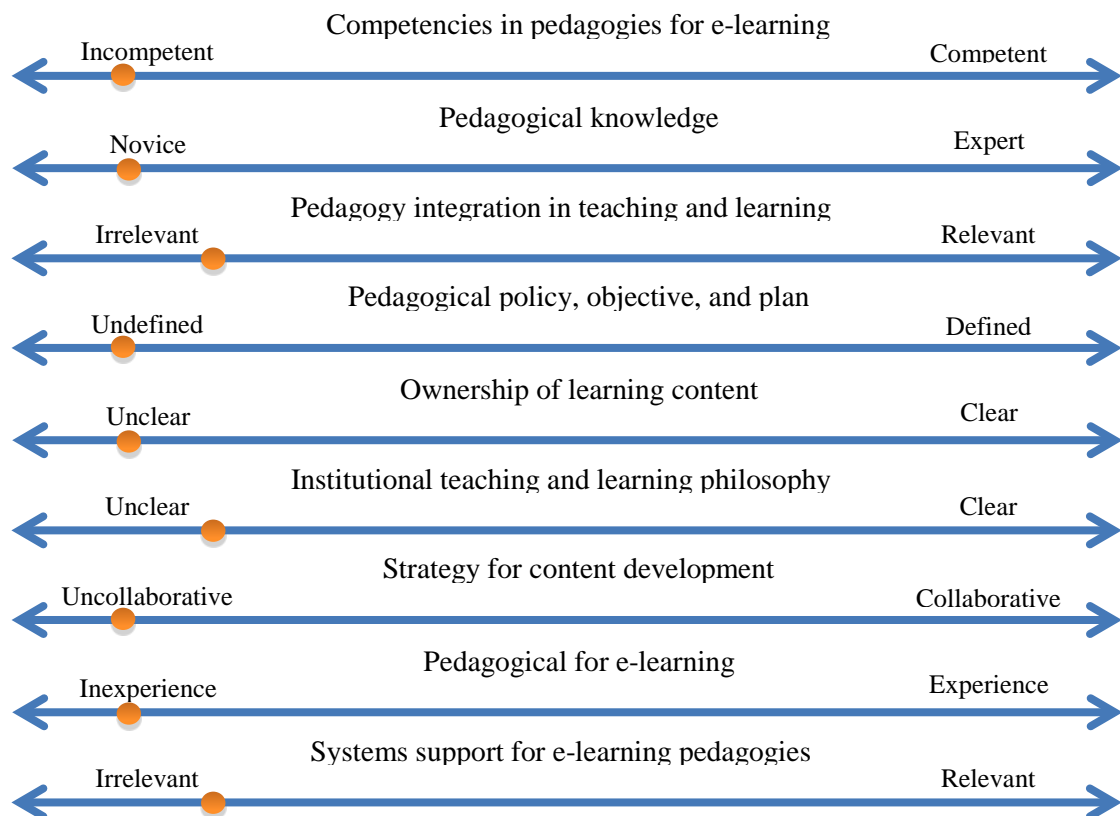


Figure 6.4 Lecturer pedagogical dimensions for e-learning

6.3.4 Student dimensions

The student dimensions for e-learning adoption were considered from three broad categories of: computer skills and competencies; teaching, learning and assessment; and motivation for e-learning. Figure 6.5 below shows areas that will require strategic attention from management and implementers.

People Domain (Students)

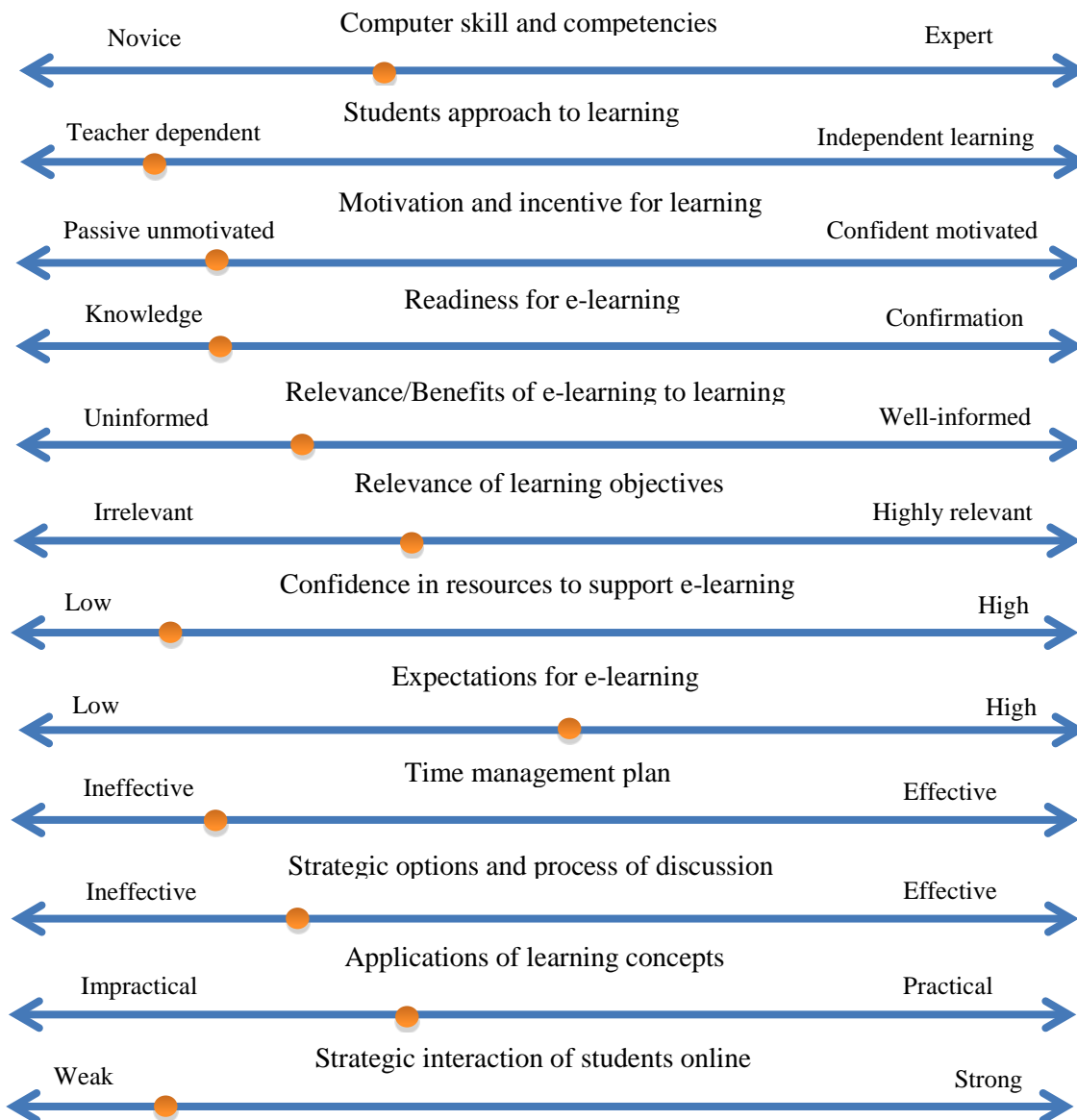


Figure 6.5 Student dimensions for e-learning

6.3.5 Technical Staff Dimensions

The technical staff established gap sand their implications were informed by their skill and competencies, staffing situation, their role and support resources for e-learning implementation. These are shown in the dimensions in Figure 6.6. They represent some critical areas that management may focus on among other factors.

People Domain (Technical staff)

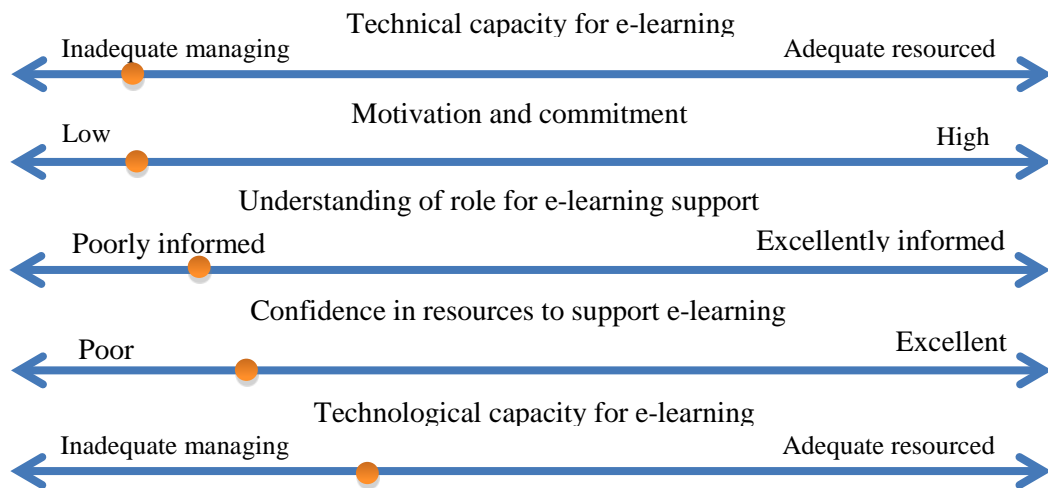


Figure 6.6 Technical staff dimensions

6.3.6 Technological dimensions for e-learning

The technological dimensions for successful e-learning implementation were drawn from three broad areas; infrastructure positioning for teaching and learning; infrastructure policy for e-learning, and the physical and technical infrastructure readiness for e-learning. Figure 6.7 shows the dimensions that management may focus to ensure effective and efficient support for e-learning.

Technological Domain (Technical and technology infrastructure)

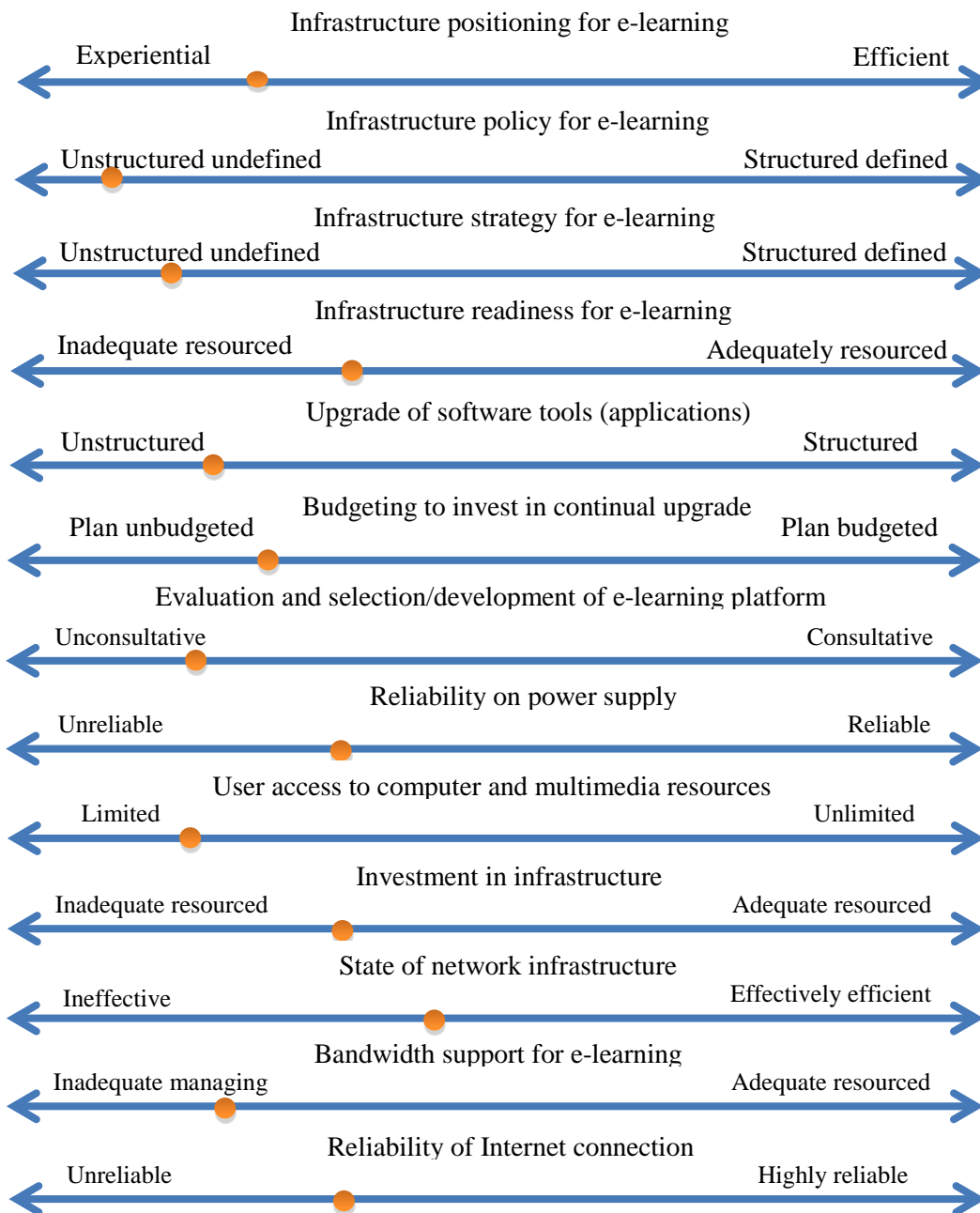


Figure 6.7 Technical and technological dimensions

6.4 Question 3: Emerging strategies for successful e-learning implementation

What implementation strategies are likely to be successful in an ICT-challenged environment?

The established “gaps” and general implications as shown in Tables 6.1-6.4 provide indications of factors that must be considered for implementing e-learning at the UG.

Developing the dimensional lines in Section 6.3 helps to position the UG's actual state of practices compared with desired best practice, to answer the research question. It is hoped that this research will direct management focus on issues that may be considered critical for the context and help to assess readiness to effectively plan an e-learning implementation process.

The implications outlined in Sections 6.1; 6.2 and the dimensions created in 6.3 clearly showed that pre-implementation planning was equally important as the stage-by-stage strategic processes of implementation. E-learning pre-implementation planning involves outlining the UG's; 1) mission and vision for e-learning and 2) the policy and objectives that are directly aligned with the UG's corporate policy and strategic plan. The Figure 6.8 illustrates the entire strategic level process cycle, with arrows showing focus of strategic areas to be considered, and the evaluation processes.

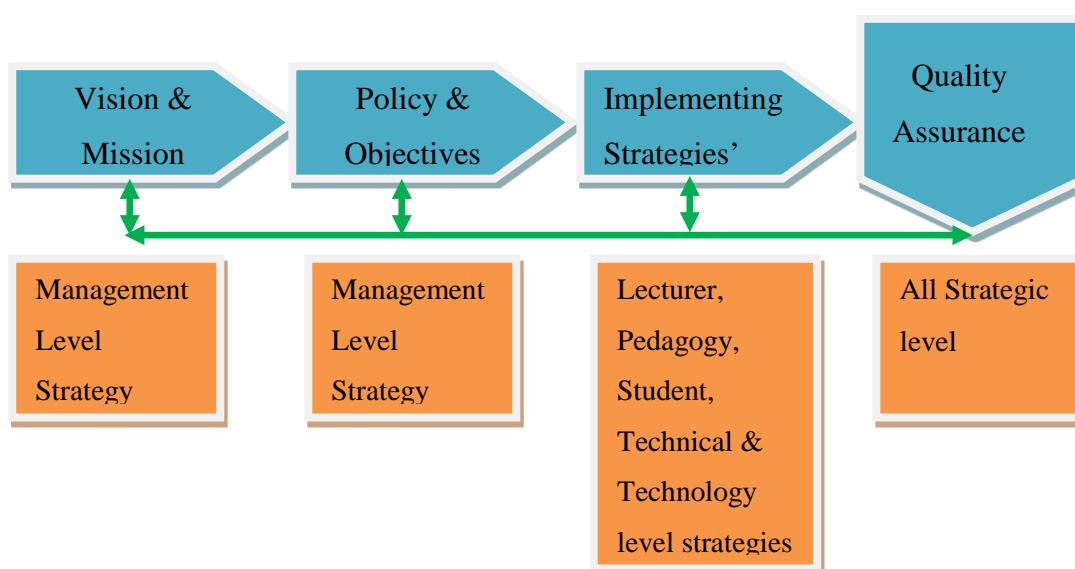


Figure 6.8 Emerging strategic plan process cycle for the UG

The emerging process involved six strategic areas that must be guided by the vision, mission, policy, and objectives for e-learning implementation at the UG. The implementation strategies involve clearly defined objectives, timelines, and persons to ensure goals set are achieved within the timelines. It is argued that having a holistic strategic plan without well-defined strategic levels allows for gaps that may be avoided. Hence, the strategic area based on the dimensions from the strategic domains in Chapter 5 (used as basis of the analysis) helps to identify and minimise critical gaps that may be overlooked. To achieve successful e-learning means each of the strategic areas must be

considered. It was evident that achieving an institution wide success largely depends on management strategic areas, used as the hub for all decision processes. Below are the management strategic level checklists for critical factors that must be considered to achieve successful e-learning at the UG.

6.4.1 Management level strategies

The dimensional factors discussed in Section 6.3 confirm management's role as decision makers and drivers of the UG wide e-learning implementation processes. Critical among the processes were clarity of the rationale for e-learning and cost benefit analysis. Major steps in the strategic process involve; developing an e-learning mission and vision, a policy, and well-defined objectives, through a project team made up of key stakeholders. The practices of voluntary adoption may be structured with clearly defined strategic processes including objectives, timelines, and people in positions of responsibility.

The restructuring of the existing system with a greater focus on e-learning and building infrastructure based on defined goals and needs of users are crucial management roles. Practices in the UG have shown that management has the responsibility of ensuring that fibre optic cables were widely expanded to enhance network and Internet connection. This was confirmed by the fact that the uncoordinated efforts of faculties and colleges failed to use the infrastructure to enhance e-learning.

The activities of management as described above have to be evaluated to ensure that the e-learning initiatives are aligned to the UG objectives for e-learning adoption. Feedback from the project team may lead to a revision of the policies and the processes initially outlined. Although developing an in-house Learning Management System (LMS) in partnership with another institution was one strategy, evaluating the KEWL and exploring other learning products may be carefully considered. Management must have periodic feedback on pilot implementations to inform direction of e-learning decisions. Piloting will provide the implementation team valuable information for scaling up the integration process UG wide. A guided checklist relevant for the UG is shown in Table 6.5.

The strategic role of the project team involves ensuring the system's security, effective support services, adequate digital library and multimedia resources that would enhance students learning.

Table 6.5

Management level strategy - checklist

External management level consideration

External consideration

Government support for infrastructure – Electricity and bandwidth

Evaluation of e-learning trends – local and international

Awareness of government policy and strategy for e-learning

Partnership initiatives and positions to be explored to achieve success

Identified major sources of technology funding

Internal consideration

Clarity of mission, vision and objective statement for e-learning

Clarity of policy and strategic plan for e-learning

Clarity of leadership, commitment and demonstration of same

Adequate consultation of users in decision making processes

Clarity on incentives and reward system structures

Clarity of structures for stakeholder training and participation outlined

Clarity of professional development – improve user capacity

Clarity and roles of social systems in promoting e-learning

Clarity of change management approach for e-learning integration

Clarity of quality assurances processes for e-learning

Clarity on institutional philosophy for teaching and learning

Clarity of cost benefit analysis done

Clarity of efficiency gains on routine task

Clarity of processes to inform valuable learning experiences

Clarity of channels of communication

Clarity of benefits and rationale for e-learning adoption

Clarity of short, medium and long-term goals

Consensus with stakeholders workable e-learning options at the UG

Clarity on procedures of evaluating and measuring e-learning outcomes

Clarity on sources of funding and support for e-learning

The poor state of support services means setting-up an e-learning service help-desk, independent of the technology helpdesk to direct the focus of services. The checklist (Table 6.5) above provides a guide for external and internal strategic factors that must be considered. It represents critical management strategic questions to be answered to ensure a successful e-learning implementation. Although unique to the UG, the table helps to understand e-learning implementation gaps and implications that may be relevant to other institutions with similar characteristics.

6.4.2 Lecturer Level Strategy

Lecturer level strategies that are workable to achieve successful e-learning at the UG involve a combination of top-down and bottom-up approaches that would include the perspectives of both management and users. However, considering the context, a strong management influence would be required to make the implementation successful due to the authority structure at the UG. Good as the combined strategic approaches may appear, operating in an environment that upholds hierarchical structures, which are embedded in both institutional and national cultures, any workable strategy will need to lean towards a top-down approach. Management approaches in securing ICT resources without consultation and consensus with stakeholders appear to have affected the likelihood of acceptance, leading to rejection in teaching and learning. However, it was clear that in ICT support for administrative services policy statements from management has greatly influenced compliance to adoption. This means management lead policy and strategy were also relevant for e-learning. Lecturers' dissatisfaction and rejection of e-learning were observed largely because management made the adoption processes optional. Strategically, an adoption policy was required, while the workable options may begin with observing what lecturers do and promoting it with appropriate e-learning resources.

The emerging gaps and implications suggest that communicating the UG's rationale for e-learning and objectives for adoption were critical strategic processes. This may be described as the preparatory stage. With regard to the process, target courses and enthusiastic users may be identified to pilot the implementation process during orientation of the UG policy for e-learning. Critical factors to resolve before and during the pilot process involve configuring and customising the ICT infrastructure to meet lecturer and students' needs. Providing training and data migration may also occur during this period. Support from educational technologists and designers may booster user confidence. Further, there must be a clear motivational system for the lecturers in terms of a well-defined incentive and reward package.

The strong argument by lecturers that management priorities must be ordered correctly by investing in technologies that support user needs, means a shift from the focus on student accommodation problems to teaching and learning technologies. The implications are that when adopted properly, capacity for developing high quality competencies for learners would be employed to booster user skills. However,

achieving that requires lecturers' commitment to developing authentic tasks and to use appropriate pedagogies to support the student learning processes. Hence, training in content development and pedagogies are key strategic processes to develop the expected competencies in students. The training approach must be consistent with best practice efforts outlined by both researchers and university experiences (B. Collis & Moonen, 2001; Deepwell, 2007; Deepwell & Syson, 1999; Sheehy et al., 2006). Negative individual attitudes towards innovative technologies that have developed into institutional norms may be tackled through effective communication, policy enforcement, and motivation for adoption. Enforcement of policies should be one of depersonalising factors (institutional politics, individual perceptions and differences of e-learning acceptance) of principle, with full backing from management as protection for the HODs.

The lack of adequate government subvention to support innovative technologies in the UG has both medium and long-term effects on the success of e-learning. However, a good feasibility study may help identify workable options that would ensure that resources were adequately used without continuous dependence on government. A good strategy may be one of exploring public-private partnership arrangements. Strong positive collegial support may be developed by identifying and supporting key department members who possess qualities that can promote and enhance e-learning. This may encourage early lecturer adoption of online course design and delivery rather than organising general workshops and seminars, which tend not to address specific lecturer needs. Nevertheless, collegial support combined with workshops and seminars in a well-designed strategic plan has the potential of achieving good results. The emerging factors show that clearly defining communication channels, enforcing rules and regulations covering e-learning activities, and management commitment at every stage of the implementation process are critical lecturer strategies for implementation. A structured plan of change management must be considered critical for successful e-learning at the UG. The checklist shown in Table 6.6 illustrates some key lecturer strategies that the UG should consider and focus on.

Table 6.6

*Lecturer level strategy – checklist***Lecturer level considerations**

Clarity of computer skills and competencies for e-learning - capacity
Clarity of lecturer readiness for e-learning
Clarity of efficacy gain on routine tasks
Clarity of professional development programs – individual capacity
Confidence in institutional resources to implement & support e-learning
Clarity of information and awareness of e-learning
Clarity of e-learning relevance/benefit to course unit
Confidence in adopting and adapting e-learning in course units
Clarity of motivation to adapt e-learning (Orientation towards e-learning)
Personal orientation towards innovative technologies
Clarity on targeted course units to run e-learning
Confidence in students to effectively learn with e-learning
Clarity of time management skill
Clarity of workload, incentives and support

6.4.3 Pedagogy Level Strategy

Management, HODs and lecturers preferred a blended e-learning approach to complete online learning (Section 6.4.3). Considering that most lecturers preferred approaches that promote students working in groups, analysing information, and presentation of individual work in class (Section 5.2.1.4), the strategy may be aimed at making such approaches relevant online. In drawing from the findings, strategies for content development were classified into three main categories; 1) developing the learning content in collaboration with instructional designers, 2) developing the content for lecturers based on resources provided by the lecturers, and 3) providing training for lecturers to develop the content as experts. However, each of the above categories requires an institutional policy on ownership of the learning content to be developed. In the first and third categories the lecturers wanted to have control over the content they develop and not the instructional designers or the technical staff supporting them. They believe they are experts in their subject areas and having control will make them develop the content appropriate to their teaching and learning needs. In the second category, lecturers were interested in saving time for other professional academic activities since content development may be time consuming, and could increase the existing workload without corresponding incentives from management.

The emerging factors show that appropriate pedagogical strategies may focus on establishing and communicating the UG's philosophy on teaching and learning, supported by policy. Fulfilment of the UG's philosophical position and objectives for teaching and learning could be achieved by establishing a unit that would solely be responsible for developing and improving teaching and learning through research. The implementation strategy may focus on such factors as pedagogies for e-learning, content development, assessment, evaluation, and the improvement of teaching and learning approaches. Pedagogical factors considered critical include; assessment of available pedagogical resources (infrastructure supporting content development and delivery); training and continuous training in pedagogies suitable for authentic learning; and e-learning pedagogies for discipline specific authentic learning. The strategies may also focus on institutional collaboration and partnerships with well-resourced institutions with experience in e-learning.

Teaching requires mastery of academic content of the lecturers' field of subject, but the interview responses and survey data showed that lecturing must go beyond that. For e-learning to enhance student learning the lecturers pedagogical skills are important. Effective lecturing requires identifying students' needs with clearly defined objectives that are measurable to achieve the goals of students' learning. It requires sound training in pedagogy. Implications are that lecturers should be conscious about strategies appropriate for authentic learning, which would help them structure their experiences and intuitive knowledge into a systematic approach to help students learning. Hence, a good background in pedagogy in order to design an effective e-learning curriculum was needed. This supports Morrison's (2007) argument that effective adoption of e-learning in higher education must have the imperative prerequisite of new pedagogical perspective and methods. It can therefore be concluded that lecturers' experienced in appropriate pedagogies can make learning effective and engaging for students. A good pedagogical approach may help meet students' needs; interest and ability to reflect on feedback about how they learn best (MacBeath & Dempster, 2009). If lecturers are deciding on appropriate pedagogies that suits student learning, a feasibility study on pedagogies for faculty level programs is crucial to identify factors that influence pedagogical choices for e-learning. The checklist for pedagogical factors in Table 6.7 shows some pedagogical areas that require attention at the UG.

Table 6.7

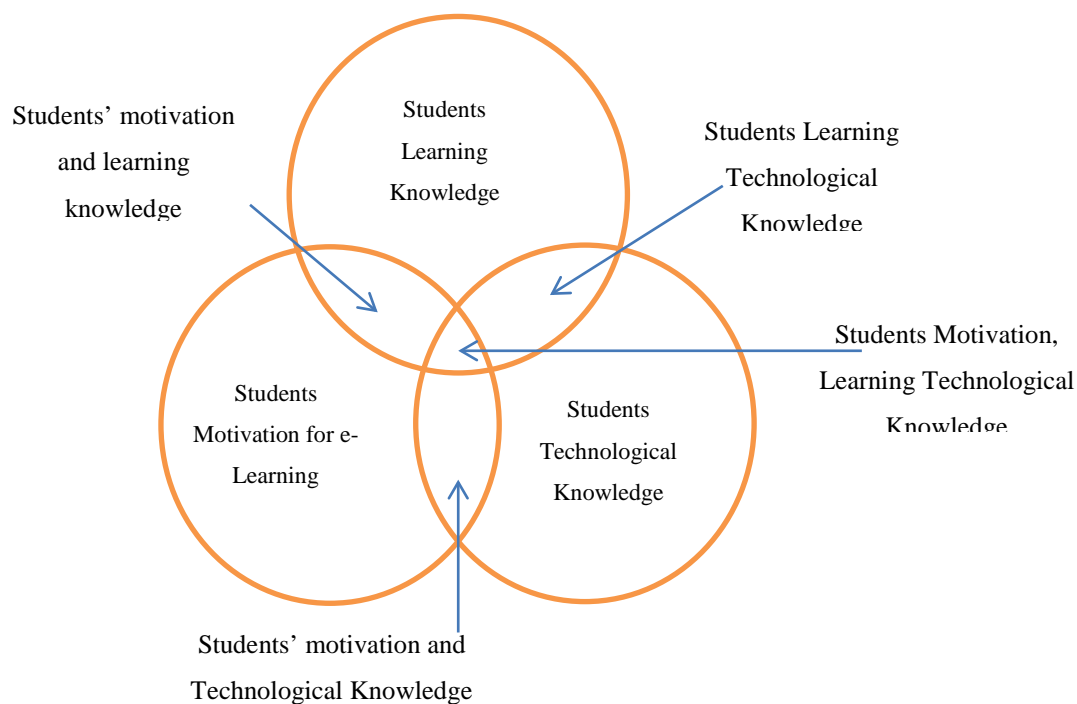
Pedagogical level strategy checklist

Pedagogical level considerations
Clarity of pedagogical competencies for e-learning
Clarity of lecturer pedagogical knowledge
Clarity of pedagogy integration in teaching and learning
Clarity of pedagogical policy, objectives and plans for e-learning
Clarity on ownership of learning content developed
Clarity of the teaching and learning philosophy in the UG
Clarity of pedagogy for technology(pedagogical technology) experience
Clarity of systems support for e-learning
Adequacy of lecturer pedagogical knowledge
Clarity on sources and support for content development
Systems support for teaching and learning culture/enhanced delivery
Clarity of support for content management
Clarity in measuring pedagogical outcomes of authentic learning
Clarity of structured role of social system for e-learning support
Clarity of appropriate course unit strategies for authentic e-learning

6.4.4 Students Level Strategy

The student level strategies at the UG focus on three emerging areas: 1) computer skills and competencies directed toward knowledge construction, 2) building student level confidence that e-learning will enhance their learning efforts and 3) structures to build intrinsic motivation for e-learning. It was concluded that student motivation for e-learning depended on three factors as shown in Figure 6.9. The goal is to achieve an intersection of all three identified factors (given that access to resources was easy and convenient). These are the: student's learning knowledge; student's motivation for e-learning; and student's technological knowledge. Authentic students learning may be achieved through convergence of all three areas

For the students to receive the full benefits of e-learning the culture of learning by rote should be carefully evaluated, to develop competencies for independent student learning. Hence, training in students learning in the first year is recommended. Particularly, where using electronic resources to support teaching has not been part of the learning culture. With most students now developing interest in technologies and the use of multimedia resources, they are positioned (with good strategy) to benefit from e-learning.



*Figure 6.9*Point of convergence for authentic student learning with LMS

Hence, as illustrated in Figure 6.9, a strong technological knowledge combined with learning skills developed through training is required. It was evident from the UG's experience that student learning knowledge alone was not enough for e-learning, where students can develop authentic skill and competencies ready for the working world. Particularly in an environment where learning was done by rote, with lecturers dictating notes, selling learning resources with minimum attention to students' independent construction of knowledge (through authentic pedagogies for learning). This means that in some faculties, strategies were necessary and needed. The students' knowledge of learning was dependent on what the lecturers provided. Students were therefore critically limited with inadequate capacity to solve problems. Hence, the technological knowledge for learning and intrinsic motivation for e-learning is required.

Students' motivation and confidence for e-learning must be developed. The technological knowledge is evident in their computer literacy skills, however, authentic e-learning require skills beyond the literacy demonstrated by the students. They will require skills to research and use the tools as resources in solving problems. Although the students may have the technological skills and knowledge of learning, the two factors are not sufficient for effective students learning. They will also need the motivation for learning in the electronic environment.

The student experiences show that their motivation for e-learning is dependent on the extent of incentives, convenience and access to the available resources, and computer literacy skill and competencies. E-learning in any form requires both intrinsic and extrinsic motivation to make optimum use of the resources to achieve the learning goal. Though the student may have the technological knowledge, without the motivation to use the resources to learn, or the skills to learn within the environment, the objectives may not be achieved. On the other hand, students may be motivated to use the resources but lack of appropriate learning approaches and technological skill to use the resources constructively and this may result in a lack of success. Hence, sound instructional design to develop authentic and user friendly content with a relative advantage over the traditional approach to learning has the high likelihood of motivating students' acceptance and engagement in e-learning.

Though the student strategies include providing training on how to navigate around the course or learning system, the focus of the strategies should be on using the resources for authentic learning. Additionally, public-private partnership initiatives may be explored in efforts to promote student ownership of computers. The checklist in Table 6.8 shows areas that require management's attention.

Table 6.8

Students level strategy

Students level considerations

Clarity of student skills and competencies to adopt e-learning (ICT competencies)

Clarity of student learning competencies (approach to learning)

Student motivation to adopt e-learning to enhance learning efforts

Clarity of incentives and support for e-learning

Clarity on relevance of e-learning objectives

Clarity of expectations of online discussions

Clarity of effective time management plan

Clarity of strategic options and processes for online discussion

Motivation to be responsible for their own learning

Clarity of change management approach to learning culture

Clarity of students role in e-learning environment

Confidence in institutional capacity to implement and support e-learning

Clarity of practical application of e-learning content/concepts

Clarity of strategic interaction of students

6.4.5 Technical Staff Level Strategy

The technical staff level strategies were informed by responses on staff ICT roles, their capacity to support e-learning, expectations on management to enhance operational performance, and resources for support services. It can be concluded from the discussion that the ICT units within the university need restructuring along with strong leadership to manage and effectively coordinate the available resources. Although the support services have moved from the stage of “managing with the resources” to “building capacity” (with efforts of taking control and leadership), management commitment, and continuous training of staff was required.

The technical staff problems may be resolved through policy decisions, funding and management support. The implications are that thoroughly defined and structured processes policies will provide direction to the operational processes. Such policies may result in crafting an e-learning strategy that details the support processes necessary for e-learning. Enforcing such strategies means technical staff must be well equipped before they facilitate migration of the existing resources to a new learning platform.

The primary step for technical staff preparedness for e-learning may begin with the creation of an e-learning awareness policy, which outlines the expectations of technical staff. Technical roles may include acquiring or developing a meaningful system and building user confidence with smooth running of the Internet and Intranet. With an identified unit responsible for student learning and a staff resource centre to train lecturers, the strategic focus should target capacity to restructure the Local Area Network (LAN) and provide good planning for local content development. The strategy should include managing a stable Internet connection and ensuring the backbone is strong enough to access electronic resources from remote locations as required. It is important to ensure effective management of the Internet; optimization of the bandwidth and Internet usage that will provide maximum benefit for users. Technical policies and strategic plans are necessary because they capture factors that enforce the support level for lecturers usage of the resources and provides for continuous training of technical staff.

Adequate budget and funding at every stage of the implementation process will ensure that resources needed for operational support are adequately available. Adequate planning of support procedures provides the confidence and motivation that technical

staff need to operate, knowing that the tools and resources are available for support services. The implications of improper planning for e-learning together with the ad-hoc approach of acquiring and supporting ICT resources at the UG was the poor impact of the LMS KEWL in the UG curricula. Checklists of technical staff strategic considerations are shown in Table 6.6.

Table 6.9

Technical staff level strategy

Technical staff level considerations
Adequacy of technical capacity for e-learning
Motivation and commitment to e-learning support services
Clarity of role of e-learning support
Confidence in resources to support e-learning
Adequacy of technological capacity for e-learning
Clarity of technical staff's role for e-learning implementation
Adequate staff to support e-learning

6.4.6 Technological Level Strategies

In drawing from the technology dimensions, it was determined that any technology level strategy should focus on the physical technology, technical infrastructure, and the platform for the learning system.

6.4.6.1 Technology Infrastructure

1) State of ICT infrastructure, vision and plan for e-learning: The UG and ICT strategic plans were good basis of direction in developing state-of-the-art infrastructure. However, the strategic plan may require evaluation, and further planning to provide hotspot facilities at various locations where students and lecturers access the information and learning content. The strategic refocus of the technologies must be integrated in terms of redefining how the infrastructure is going to support the vision and plan for e-learning. Concerns that, the infrastructure was unable to support e-learning were drawn from the fact that, 1) users were not well informed about what was available to be used and what was not. 2) Support services were not prompt, inadequate bandwidth, poor Internet connectivity, and unstable electrical power supply. Hence, the strategic plan must highlight how these factors will be addressed for successful e-learning. This may include effective communication of the available resources,

increasing the bandwidth through common partnerships, providing and supporting an uninterrupted power supply and effective management of the Internet resources.

2) *Infrastructure supporting Teaching and learning:* The thriving of blended learning as the preferred form of e-learning means the physical infrastructure must promote effective lecturer to student interaction. Lecture rooms should be e-learning compliant and provide student access to workstations, and electronic resources. On infrastructure for teaching and learning, though management had argued that the university had brought on-board a number of measures over the years to facilitate teaching and learning, these measures were not related to e-learning. The strategic plan must target planning that will resource all lecture rooms with the required technological infrastructure (workstations to access learning resources from remote locations). The focus of the plan must be; 1) to make lecture rooms ICT and e-learning friendly, 2) ensure that all learning centres out of the main university's campus were e-learning supported.

3) *Resourcing faculties and departments:* Adequate planning must begin with what departments and faculties have, and establish what is needed to ensure a successful implementation process. This means acquisition and maintenance of resource must be planned managed in an ad-hoc manner. The essence of the infrastructure policy should be to ensure that best practice approaches were not compromised and decisions made are consistent with e-learning implementation processes that were initiated. Faculties and departments will be required under the strategic process to plan and budget ahead before any implementation process. Implications are that training on effective planning and budgeting must be done. With proper planning good durable equipment will be acquired to avoid the high frequency of resourcing laboratories and ICT locations with replacement of broken equipment.

4) *Infrastructure usage strategy to achieve objectives:* The infrastructure usage strategy must show how the available resources will be optimised to support e-learning. Wireless communication resources being piloted must be well configured so that barriers that will frustrate users will be minimised if not eliminated. A strategy for access will be one of increasing the number of computers at the faculties, and promoting student computer ownership. This may be done by exploring options around enabling students to acquire laptops from the university in partnership with computer manufacturing companies.

6.4.6.2 Technical Infrastructure

Essential ICT infrastructure necessary for e-learning must be widely distributed regardless of the pilot process. All lecturers must have access to resources that would facilitate e-learning. It is relevant for the UG to investigate why multimedia and videoconference facilities (wireless resources and modules accessible through the web) were not adequately being used though they were available. A strong case must be made to recruit adequate technical staff with competencies to support e-learning. Clear distinctions must be made between technical staff for e-learning and technology staff for infrastructure support, the setting-up of a response team to provide prompt technical support service must be recommended and enforced.

Practical steps must be taken to address the unstable power supply and concerns about installing robust electronic systems and infrastructure that would stand the test of time. The security of the network infrastructure, computers and multimedia resources, (allowing only authorised users to have access), and a redundancy plan or network redistribution policy are critical. Implications are that, with a policy and strategy covering these problems, when failures occur they would be recovered within the shortest possible time with minimal inconvenience to users. Exceptionally critical are the crafting and implementation of some redundancy plans in the network. Such plans would build user confidence in the network or the delivery method, which would facilitate acceptance and diffusion of e-learning among lecturers. With the university's website not authenticated, making it vulnerable for frequent hackers attack, the e-learning strategic plan should detail the authentication of all necessary web-resources that require protection. Furthermore, the focus on monitoring and maintenance of the infrastructure needs attention. Implications are that, the neglect of such sensitive factors may have the negative effect of building up obsolete resources in the long-term. A consistent evaluation of the infrastructure enhances systems maintenance and may break the culture of poor maintenance of infrastructure.

6.4.6.3 Course/Learning Management System

In considering the fact that learning systems are required to be designed and built in-house, or acquired as an enterprise product, any UG e-learning strategy must be preceded by a careful evaluation of the system as a whole. Core among the strategic factors deducted from the dimensions as relevant for the UG include; 1) the selection criteria for the LMS, 2) efficient use of the resources by all stakeholders, 3) continuous

support and maintenance of the system and 4) periodic evaluation and upgrade of the system.

Effectively, it is critical to identify users with leadership qualities from faculties to participate in trial sessions that would be relevant for instruction in the discipline areas. Critical items supported by best practice (Awidi, 2008) include, ensuring; 1) fairness of the system to all users irrespective of their location. That means users must approve and accept the system as friendly and useful to their needs, 2) reliability of the system in meeting the UG's corporate objectives of teaching and learning outcomes, 3) validating the system - confirmed through trial versions to ensure that users can access what the system claims or is designed to provide, 4) key features necessary for learners to acquire the necessary skill and competencies they expected from using the system, 5) proper documentation of the system – key records of the system must be simple to use, easy to understand and easily accessible, 6) provides support for individual learning plans and 7) practicability of the extent of training to use the system, scalability of the hard and software; actual staff skill and competencies, timeliness of the system and other factors considered critical.

Ensuring that resources were efficiently used through policies means that the processes of e-learning being adopted and users' expectations are adequately supported by the system. A well-structured plan for continuous support and maintenance of the system must be outlined to ensure reliable support services. A structured plan for periodic evaluation of the system is required to ensure sustenance of the systems support. A summary checklist for the technical and technological levels are shown in Table 6.7

Table 6.7a

*Technical and technological level strategy***Technical and technology level considerations**

Infrastructure access and support anytime and where
Clarity of technology policy and objectives for e-learning
Clarity of defined strategy technology role in e-learning
Clearly defined mission and vision of ICT integration in teaching and learning
Clarity on cost benefit assessment of ICT in teaching and learning
Clarity on hidden cost for technology and e-learning
Clarity of technology platform for e-learning
Evaluation and consensus on selection/development of e-learning application
Adequate technical support for technology resources
Clarity on hidden cost of technical resources and support services
Clarity of redundancy plan
Technology infrastructure
Readiness for e-learning
Funding and budgeting to invest in continual upgrade
Evaluation and selection/development of e-learning platform
Reliability of power supply
Security and access to computer and multimedia resources
Investment in infrastructure
Policy and strategy for e-learning
Procedures for upgrade of software tools
Adequacy of bandwidth support for e-learning
Reliability of Internet resources

6.5 Strategic model for e-learning implementation

“What policy and strategy approaches would effectively inform and guide an e-learning implementation in the context of the University of Ghana”

The preceding Section 6.1-6.2 confirms that the major problems of e-learning faced by the UG (aside from external factors) were strategies appropriate for successful e-learning implementation. Notable among the problems were; 1) the appropriate knowledge about e-learning and how to get users to accept and adopt it, 2) the appropriate ways to adopt and implement e-learning that will enhance user efforts, and 3) promoting e-learning integration UG wide and obtaining effective user participation. The solution to these problems were synthesised from perceptions and expectations expressed by management, lecturers, students and technical staff, from which factors were identified and dimensional tools developed (Section 6.3), to show the gaps between actual practices and desired practices. In Section 6.4 six strategic areas were identified with implications of what must be done to bridge the gap between actual practices of the UG and desired practices.

A strategic model for e-learning implementation containing dimensions that may be used as diagnostic tools was developed and discussed. This approach has been structured into an eight-stage framework shown in Figure 6.10. Although these stages were drawn from the UG's experiences, they may be applicable to institutions with similar characteristics to the UG. These eight stages are;

1) ***Separating the strategic level dimensions into strategic areas***: Identify and separate the dimensional areas as illustrated in Section 6.3 into strategic levels (management, lecturers, pedagogy, students, technical staff and technological). This helps implementers to establish the gap between actual practice and desired best practice in each of the strategic areas identified. The process involves two main activities; i) identify and state critical factors with the likelihood of influencing e-learning implementation (specific to the context and related to the environment, educational effectiveness, flexibility of the system and user engagement). These factors will provide understanding and direction to the implementation process, ii) identify and state motivational factors that will facilitate or enhance acceptance and adoption by users. .

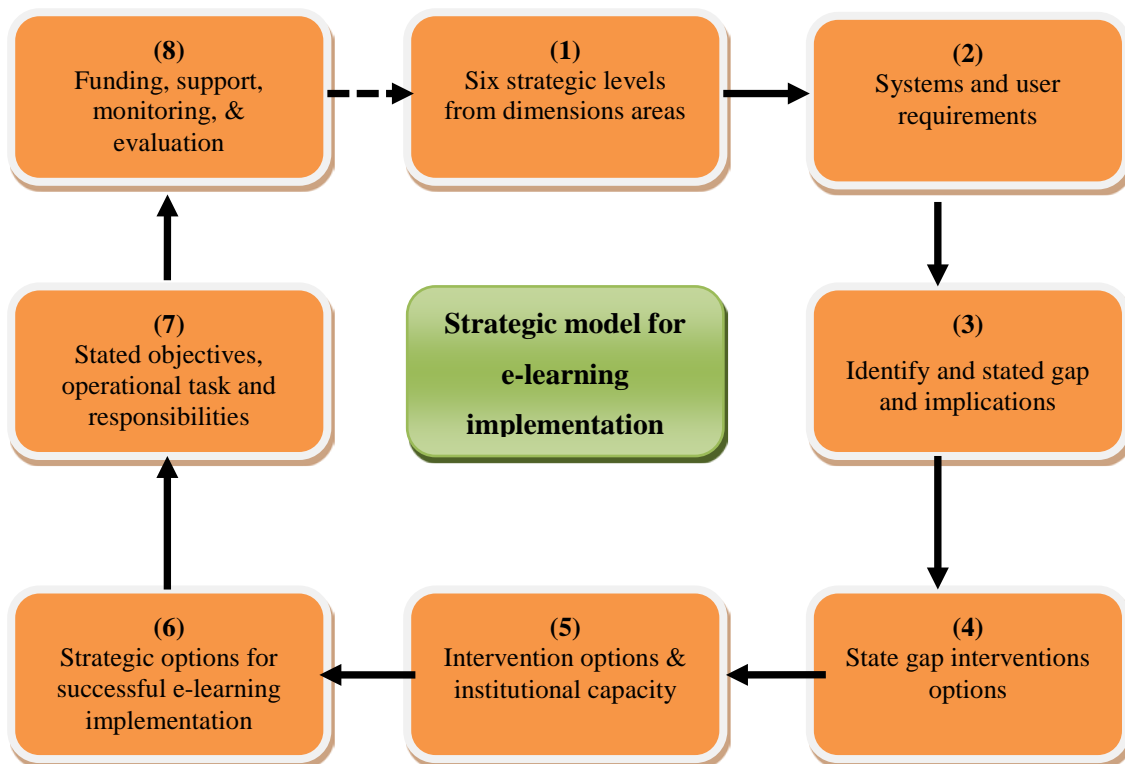


Figure 6.10 Generalised e-learning implementation based on the experience of the University of Ghana (UG)

2) **Establish system and user requirements:** Assessment of the strategic levels are required. Expectations expressed by users will demonstrate what they require for the system implementation process. Such expectations must be matched with the system requirements for the expected e-learning model desired by the university and stakeholders;

3) **Identify and state gaps and implications:** Comparative analysis of the gaps established on the dimensional lines and system requirements are matched. The gaps established here determine the direction of action, which depends on management support and commitment to the implementation process;

4) **Gap intervention options:** Intervention options available from the gaps established must be carefully explored. This may be done by stating clearly, what appropriate interventions may be needed to feel the gap;

5) **Intervention options and the institutional capacity:** The intervention options must be compared with the institutional capacity to identify workable options. Resources should be matched with resources needed to address the gap. Management priorities and commitment to e-learning are critical to this process;

6) ***Strategic options for e-learning implementation:*** The UG experience demonstrates that such strategic options may be in partnership with other institutions or bodies, government and by the institution's initiatives;

7) ***State objective and responsibilities:*** The most critical part of the process was the statement of objectives for each strategic dimensional area. Each strategic area must be informed by policy, and have a stage by stage plan of operational activities to achieve the objectives. It was critical that a project management team is set-up with specific task, responsibilities, and timeline. The team may take leadership from stage one.

8) ***Determine funding, monitoring and an evaluation process:*** Management leadership, commitment, and support must be demonstrated with well-defined and supported priorities. The processes must be monitored and evaluated to refine policy and the strategic level dimension processes.

The uniqueness of this model, and the dimensions created in Section 6.3.1-6.3.6, is that it proposes a two level approach to establishing the gap between current and desired e-learning practice and this therefore allows for the identification of the interventions required.

6.6 Chapter Summary

In this Chapter 6 the research findings were discussed in three categorised areas, in direct response to the research sub-questions. It was established that factors surrounding e-learning implementation at the UG had Institutional (management), People and Technological implications. Factors considered critical but wanting at the UG were lack of vision, objectives, policies, and strategic plan for e-learning. There was inadequate leadership and commitment, undefined priorities for e-learning and inadequate consultation with key stakeholders to ensure e-learning was successfully implemented. The national infrastructure on which the university depended was poor. Factors that affected lecturers, students and technical staff were influenced by the lack of cost benefit analysis, unclear efficacy gains for lecturers, lack of clarity to inform valuable learning experiences, lack of concrete target for adoption, and the absence of incentives and reward systems structure. It was also shown that users' dissatisfaction with the e-learning resources were influenced by the factors of inadequate capacity for e-learning support, inadequate technical and technological infrastructure, and inadequate leadership and coordination of resources. Users were not well engaged with using the resources because they had no confidence in the institutional provisions for e-

learning, lack of personal orientation towards e-learning, negative influence of the social system, inadequate user skill and competencies and inadequate staff development initiatives.

With regard to motivation for e-learning, it can be concluded that management's goal for adoption relied on several factors that include being current with trends in educational technology and gains to be achieved through managing increase student numbers and promoting distance education. Lecturer and student motivation for acceptance and use of e-learning were related. The emphases of the motivational factors were on adequacy of infrastructure resources, available support, relative advantage, reward systems, social systems and institutional conditions and capabilities. Technical staff motivations were influenced by staff capacity, resources for support services and proper documentation. Linear dimensions were used to represent the gaps that exist between the actual practices at the UG and desired best practices. They represent approximate performance positions at the UG used to determine the six strategic level approaches that are required for e-learning implementation. Although the linear dimensions are used to represent the state of the UG, they may be applicable to other universities. Further research may be able to develop instruments to better position a university on the dimensions suggested in this chapter.

CHAPTER 7

SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

7.0 Introduction

In the preceding Chapter factors affecting and motivating e-learning implementation were discussed. Dimensions were created as a guide to show where the UG was positioned at the time of the research. On the basis of this, strategies were recommended to improve the likelihood of a successful e-learning implementation. In this Chapter a summary of the thesis is presented in Section 7.1. The results are summarised in Section 7.1.1, limitations in Section 7.1.2, implications in Section 7.1.3 and recommendations in Section 7.2. Finally the conclusion to the thesis is presented in Section 7.3.

7.1 Summary

The primary purpose of this research was to explore and design an e-learning implementation framework that may serve as a guide to a successful and sustainable e-learning implementation in ICT-challenged environments, in this case the University of Ghana (UG). To achieve this data was collected from management, lecturers, students and technical staff at the UG. This data revealed the approaches and procedures currently being used. These were compared with good practice from literature allowing strategies to be developed for the UG. The need for this research was demonstrated in the difficult challenges the UG had faced over the years in their efforts to integrate ICT in teaching and learning and in their attempts to establish e-learning at the university. Although an e-learning system was launched in 2004, and technology infrastructure improved over the years, this effort was not sustained. This caused some financial loss to the UG which was also faced with inadequate financial support for administrative operations. Hence, it was believed that by examining current practice at the UG, identifying best practice from the literature, and reviewing the experiences of other successful institutions with regard to e-learning significant factors for the UG would be identified. It is hoped that through a review of these factors the UG management, project team leaders, and primary stakeholders may gain a better understanding of e-learning adoption and diffusion. It is believed that an implementation framework that takes into accounts the unique challenges within the UG environment will serve as a guide to facilitate a successful and sustainable e-learning implementation.

The overarching research question for this study was, “What policies and strategic approaches would effectively inform and guide an e-learning implementation; in the context of the University of Ghana?” To facilitate the research process three sub-questions (Chapter 1) were asked:

1. What are the factors surrounding e-learning implementation in an ICT-challenged environment?
2. Which of these factors motivate the effective use of e-learning resources in an ICT-challenged environment?
3. What implementation strategies are likely to be successful in an ICT-challenged environment?

Findings from the research were discussed and structured using three critical strategic domains (Institution, People & Technology) under which each of the research sub-questions was investigated. The research evidence showed that although the UG had embraced government policy on ICT use and integration in higher education, (evident in infrastructure investment and acceptance of an ICT strategic plan), efforts have not been well translated into e-learning. With its extant infrastructure, the UG is positioned to use technology to enhance access to higher education, lower the cost of education and improve the quality of education, similar to universities in ICT-rich environments. Although, comparatively it had poor bandwidth and Internet connection; efforts to achieve ICT maturity through identifying challenges and appropriate strategies has the potential to result in a successful e-learning implementation.

Broad as the topic may appear, the thesis was restricted to what the UG was doing with ICT integration in teaching and learning as well as the procedures they were using in e-learning implementation. The main assumption underlying the thesis was that, once the UG identifies its strategic goals, and gets its people, capacity, and resources balanced, a sustainable e-learning implementation could be achieved. The research confirms that e-learning was workable at the UG. However, there are inherent institutional, people and technological considerations that must be enhanced or reviewed to achieve successful e-learning. The institutional domain represented by management has supported the building of a technology infrastructure with the capacity to enhance and sustain e-learning. Initiatives identified by the research confirm the institutional drive towards the use of ICT resources to support and enhance teaching and learning. However, best practice models that can effectively promote the adoption and diffusion of e-learning have not been used. With the emphasis on technology, the acceptance of e-learning was

practically achievable if resources are available and procedures are combined effectively with good e-learning practices. The literature search for this thesis identified that Rogers Diffusion of Innovation Adoption Model, principles from CBAM, and Collis & Moonen's 4-E Model could form a sound basis for an e-learning implementation. The answers to the research questions summarised below are structured according to the Institutional, People and Technological domains.

7.2 Research Findings

7.2.1 Research Question 1

What are the factors surrounding e-learning implementation in an ICT-challenged environment?

Factors surrounding e-learning implementation at the UG centred on the Institutional (management), People, and Technological domains. Critical observations from the findings were that the UG's problems for e-learning adoption were three fold; 1) the problem of knowledge and acceptance, 2) the capacity (know-how) to move from acceptance to adoption, and 3) effective user engagement and UG wide diffusion. Participants generally agreed that it is critical that management understand the nature of the problems described above. Some of the critical limiting factors are lack of vision, objectives, policy and strategy, poor communication, inadequate funding, lack of incentives and reward systems, unrealistic expectations of e-learning, and a lack of technology driven priorities. Overcoming the management limitations depends on how well institutional practices and models are understood and can be adopted within the context of the environment. The implications of this are that strategies are required to address the issues and ensure that management understands its role and is committed to provide leadership, funding and adequate support. Having a policy that supports these strategic processes is essential. The UG's unsuccessful continuing effort in integrating KEWL Next-Gen (LMS) in its curriculum is explained by these management factors.

Participants in the surveys, focus groups, and interviews generally agreed that the critical People factors were primarily lack of skill and competencies for e-learning, inadequate technical support services, lack of confidence in the technology infrastructure to support e-learning, and a lack of incentives to adopt e-learning. The lecturer and student factors affected their attitude towards ICT acceptance in teaching and learning. There was a lack of enthusiasm to experiment in terms of how the e-learning resources could support their teaching and learning efforts. The problem was

magnified by the lack of management leadership and inadequate commitment to provide the required training and resources. Hence, e-learning and engagement were narrowly understood by users in terms of PowerPoint presentations, and the use of servers as learning repositories. Technological and technical issues were evident in low bandwidth, poor Internet service access by users, (though the UG had a modern NOC), inadequate access to computers and ICT resources, and a lack of resources for e-learning. Furthermore, there was poor budgeting and inadequate funding to develop and maintain the technology infrastructure. These had effects on educational effectiveness and users' engagement with e-learning.

7.2.2 Research Question 2

What are the factors that motivate the effective use of e-learning resources in an ICT-challenged environment?

The responses from participants revealed that management's motivation for e-learning was driven by perceptions of its potential to improve higher education access, provide lecturers with greater control in the lecture rooms, improve teaching and learning, and minimise the cost of higher education. Bridging the educational gap between ICT-rich Universities and the UG through technology was also a goal. Management motivation was demonstrated by the different initiatives in building ICT infrastructure, and in partnership initiatives with other universities through the AAU.

With regard to the people domain, lecturers and students were willing and motivated when provided with adequate training, improved access to Internet and Intranet connections, improved access to computers and ICT resources, and adequate technical support. It was observed that HODs and lecturers were expectant of management to provide policies, guidance, and leadership for e-learning. They were willing to use e-learning resources if the resources were going to enhance student learning, improve their teaching, and minimise their workload. Lecturers also wanted to be provided with incentives that would encourage them in their use of e-learning. The lecturers expected management to prioritise technology use in teaching, learning, and research as opposed to administrative services. Particular emphasis was laid on providing pedagogical resources that will enhance authentic learning, as well as support for content development. Students' dissatisfaction with e-learning was expressed primarily with regard to the inadequacy of computers, limited access to the Internet and computer resources, and incentives for e-learning. Technical staff were de-motivated by

inadequate staffing and resourcing which exerted pressure on their services and the effectiveness of their operations. They were willing to show dedication and commitment if they had a workable and resourced policy, proper training, and improved staffing. It was observed that along with poor documentation of infrastructure installations and support services there was only limited support for staff and funding and budget approval was minimal. These issues had a demotivating effect on technical staff.

Towards a model for e-learning implementation

The factors identified in the sections above were synthesised into a number of dimensions under the domains of Institution, People and Technology. These dimensions were further classified into six sub areas: management (Institutional domain), lecturers, pedagogy, students, technical staff (People domain), and technology (Technological domain). The UG was then positioned on these dimensions by comparing good e-learning implementation practices from literature with the current UG practice as determined by the research data. Examining the gaps between current and ideal practice revealed implications for the UG and led finally to the development of strategic goals. This tool may serve as a guide to help other institutions identify where they are positioned compared to good practice approaches. Comparisons can then be made between the operational practices and desired performance practice; the difference will suggest strategies that may lead to a successful e-learning implementation. The dimensions presented in this thesis are not necessarily linear and future research is required to further develop them into properly measurable scales. The development and use of this model enabled the Researcher answer research Question 3.

7.2.3 Research Question 3

What implementation strategies are likely to be successful in an ICT-challenged environment?

Implementation strategies likely to facilitate successful e-learning implementation are discussed in Sub-section 7.2.1-7.2.3

7.2.3.1 Institutional domain

The Institutional domain policy and strategic process describes recommendations for management to ensure that e-learning is successfully implemented at the UG. Recommendations are based on the research findings, the UG's goal of using technology to achieve first class research, teaching, and improved quality education.

Management level strategies

Recommendations for management level strategies were centred on the dimensions in Section 6.3 and the checklist presented in Section 6.4. To facilitate effective e-learning at the UG (achieve readiness and workable strategic options) through middle level management, who play important role in policy implementation, the following are recommended. Although there were several issues, only management factors considered critical were recommended. Recommendations for the planning and action process are:

Planning and Action Process

- 1. Set-up and support a unit responsible for e-learning, with a well-defined institutional vision, mission, and goal for e-learning. The goals should be in the short, medium and long terms.*
- 2. Determine and state e-learning objectives for each strategic level (lecturers, pedagogy, students, technical staff, and technology). State the rationale for each strategic level objective, the educational effectiveness and benefits to be derived.*
- 3. Determine the operational activities, task and sub-task, required resources for the task at each strategic level, and systems specifications to meet users' needs. Users and systems requirements for e-learning must be clearly stated and linked to the operational activities.*
- 4. Determine the training needs that best suit the tasks and sub-tasks for e-learning at each strategic level. Skills and competencies required for each strategic level may be related directly with e-learning objectives. This must meet both management and users' expectations*
- 5. Determine persons, units, and institutions that have the capacity to provide best practice support for capacity building (training). An action process of evaluating existing skill and competencies and support services are necessary in designing the training needs.*
- 6. Targeted courses for e-learning and the pilot process should be determined. A well-structured pilot process will motivate early participants to effectively engage with the hands-on demonstration of the e-learning process.*
- 7. Determine the operational process that would meet e-learning objectives for courses identified. Critical issues required at this stage include the determination of pedagogy and learning approaches that best suit the targeted courses and facilitate authentic learning.*
- 8. Allocation of resources to users and support service providers. Monitor the formative and summative evaluation processes to align with institutional goals and to refine policies and strategy for the implementation process.*

In addition to the above management must show leadership, strong financial and personal commitment by ensuring that faculties and departments with e-learning courses were well resourced and supported. Budgetary allocations aside other allocations should aim at ensuring a continuous electricity supply to keep the university's system running, this must not rely solely on the national grid. Training may cover such issues as budget preparation for departments and faculties to build capacity for effective and efficient management of internal financial resources to support e-learning and technology infrastructure.

It is recommended that e-learning decisions involving faculties must involve departments and unit heads within the faculties. In the medium to long-term management may explore a partnership relationship with private sector institutions to provide capacity building services through e-learning. For the UG to be positioned competitively management should consider the role of all stakeholders, particularly external stakeholders with policies that would attract them, and ensure they have the needed support. A synergy of partnership should be established between the UG and other institutions such as the Senior High Schools (SHS), industry, government, and universities running similar programmes. Channels of communication must be clearly defined to ensure users are well informed. A recommended structured process of documentation to guide the gradual implementation process is shown in Figure 7.1 below. This process is aimed at helping institutions implementing e-learning to move from an uncoordinated 'fire fighting' approach to a more structured coordinated process.

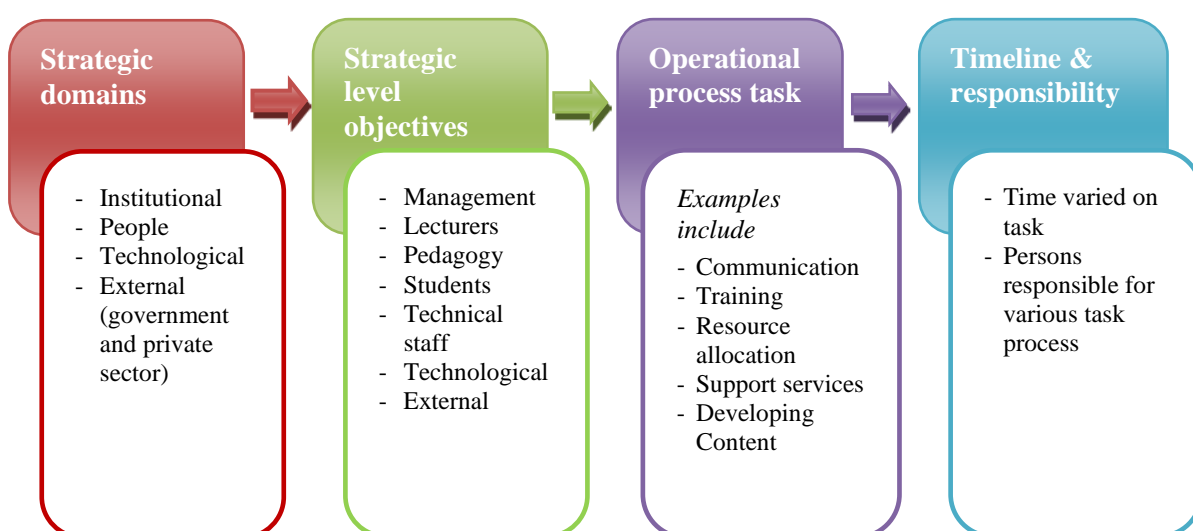


Figure 7.1 Structured example of short-term plan for implementation

7.2.3.2 People domain

The goal for People domain recommendations is to harness the available resources effectively to support users and technical staff efforts. Management and users have high expectations of technology as a panacea for the university's problems. It is worth noting that the adoption of innovative technologies will not always result in a solution to problems that are essentially human. Some approaches to using computers and computer resources may create more problems, and cause users to waste time in solving such problems. Hence, a good understanding of users' e-learning problems is important, before identifying the appropriate technology resources needed to solve their problems. The implementation process at the UG must be gradual to ensure that both lecturers and students will accept and adopt it. Some relevant recommendations for the People domain strategic levels are presented below.

Lecturer and pedagogy level strategies

- 1. Develop effective communication channels and create e-learning awareness. Clear communication of UG's policy on e-learning is necessary, as most lecturers will not adopt the LMS without a policy.*
- 2. Consult with lecturers in developing faculty e-learning strategic plan. Discipline specific plans are necessary for e-learning pedagogies that will result in authentic learning to be adopted.*
- 3. Comprehensive faculty and lecturer needs-assessment to identify teaching and pedagogical needs are necessary for designing lecturer training programs.*
- 4. Training of lecturers may emphasis on developing e-learning course content embedded in effective pedagogies for authentic learning. Course objectives must be well defined, there must be effective content, delivery and feedback. Training must focus on e-learning curricula design and delivery.*
- 5. Peer support resources should be encouraged. Identify enthusiastic users with personal qualities to motivate and support peers to accept and adopt e-learning. This must be recognised and rewarded as contribution to faculty and department.*

Student level strategies

- 1. Train students in independent learning skills, time management and online interaction.*
- 2. Encourage and engage students to use computers and Internet resources to study, research, and discuss learning related activities*

3. *Institutional promotion of student computer ownership with flexible terms payable by students. This can be promoted through a trusted partnership arrangement with corporate institutions at factory prices.*
4. *Increase the stock of computers; provide unlimited access to computers and Internet resources, incentives to use resources, and a help desk to support students.*
5. *In the short-term selected elective courses based on faculty requirements may be introduced for online learning.*

Technical staff level strategies

1. *Improve staffing situation through a manpower audit*
2. *Provide adequate training to support and management e-learning resources*
3. *Provide adequate resources for support services and reward improved support services.*

In summary, training in e-learning pedagogy and the modes of delivery should be well explored and structured to prevent direct transfer of the traditional pedagogical approaches currently used. It is emphasised that good e-pedagogy and modes of delivery are necessary for authentic learning. The building of skill and capacity for support services may be structured to meet users' specific needs. It is recommended that communities of learning among students be developed to ensure authentic learning, since e-learning requires great motivation for the individual learner. Further clear policy and structure for learning content management should be outlined. With regard to content development, management must ensure that the cost of this process is minimised. Management may ensure that quality assurance standards, maintenance policy and strategies for replacement of obsolete machines are enforced. Thus, it is important to ensure that all content follows accepted standards that students are motivated to use online resources, and they have the appropriate competencies for e-learning.

7.2.3.3 Technological strategic dimension

The technological strategic dimension involves the policies and stage-by-stage processes to enable the infrastructure and technical resources to be used as a tool to enhance the e-learning implementation. Policies may emphasise best practices regarding infrastructure use and replacement with the full support of management. A strategic plan is recommended for both the technological and technical infrastructure. The following recommendations are made:

1. *Develop partnership with private service providers to increase the UG's bandwidth and speed of Internet access.*
2. *Private ownership of computers and computer resources should be promoted to complement the UG provided computers and computer resources.*
3. *Clearly state the functional roles of learning management systems and learning content management systems within the e-learning system.*

In summary, it is recommended that management may promote research and explore emerging technologies that will enhance authentic e-learning. Medium to long-term strategies are required to ensure the UG is updated with technology integration in teaching and learning. Use of satellite and wireless communication resources should be strongly pursued, as landline infrastructure resources are not well developed. Enhance the use of mobile access to content by providing students with personal computers with access to the Internet and server resources.

7.3 Limitations of this study

There were a number of limitations to this research, hence although it is possible that recommendations may be applicable in other ICT-challenged environments, the findings should not be generalised.

In Summary the research was limited by the following:

- The research focused on activities and practices at only the UG. Results reported applied only to the UG at the time data was collected, hence it should not be generalised
- Research instruments developed could not capture all of the detailed information required to make generalisations from the findings.
- Data analysis was largely qualitative, which means the subjective nature of some conclusions cannot be ruled out
- The data collection period was short, not allowing for longitudinal study.
- Funding was a major limiting factor and only one visit to the UG for data collection was possible.

7.4 Policy recommendations for e-learning implementation

The framework for this research was founded on the 3 domains of Institution, People and Technology. It is clear from this research that without policies in each of these domains a successful e-learning implementation is unlikely. Hence it is strongly recommended that the UG develop and implement the following policies.

- *A policy supporting an e-learning vision, mission, objective and strategy*
- *A policy supporting planning and verification of user needs, resources, and the tasks involved in e-learning implementation*
- *A policy supporting the operational processes involved with task (activities)*
- *A policy supporting adoption and adaptation strategies including a timeline*
- *A policy supporting the pilot and roll-out processes and quality assurance*
- *A policy supporting the technical and technological infrastructure*
- *A policy supporting pedagogy and content development*
- *A policy covering ethics and security in the e-learning environment*

In conclusion, with robust policies in place the researcher asserts that the UG has the academic and technical capacity and capability to successfully implement e-learning over time. The policies will empower the facilitation of management commitment to planning, coordinating, organising, and controlling the implementation process.

7.4.1 Recommendation for future research

In view of the importance universities in ICT-challenged environments are attaching to e-learning implementation future research may focus on comparing institutional practices in a longitudinal study in order to make more generalisable recommendations. Future research should further focus on refining and developing appropriate scale measures for the dimensions recommended in this study. The aim would be to provide a more measurable linear scale that would allow implementers of e-learning to objectively determine where their institutions are positioned, and thus to adopt strategic measures to facilitate successful e-learning implementation.

Future work may be extended in investigating in what ways policies and strategic level processes affect e-learning implementations. Discipline specific processes (using the strategic dimensions) may be investigated to standardise pedagogical processes that will facilitate authentic e-learning. An objective for this future research would be one of investigating the extent to which e-learning has improved educational delivery considering the national and institutional culture of teaching and learning. A long term goal for ICT-challenged environments is to explore partnership initiatives with governments and private institutions for e-learning delivery.

7.5 Conclusion

The nature of the problems and factors identified provide the Researcher and the UG a clear understanding of the policy and strategic practices required to ensure a successful e-learning implementation. It has been established that an effective combination of the Institutional, People, and Technological factors provides a clear perspective of what is required from the management team at the UG to facilitate a successful e-learning implementation. Provision of adequate infrastructure is important but not sufficient in itself to promote e-learning. Management level policy, clear objectives, strategy, leadership and commitment, funding, as well as priorities that meet user needs are critical for implementation. Lecturers' understanding of the relative advantage to gain from adopting e-learning, their capacity to engage (training), and incentives are seen to be important. Technical staff need training, adequate resources to support users and motivation to develop innovative services. Students also need training, motivation, and the direction of lecturers to engage in the effective use of the resources and to move away from the focus on using Internet resources for entertainment and social media. Provided management leadership and commitment is assured, and users are satisfied with the resources and support services available, e-learning will be successful and sustainable at the University of Ghana.

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APPENDICES



Appendix A1

Information Letter (To all research participants)

HUMAN RESEARCH ETHICS COMMITTEE

For all queries, please contact:
Research Ethics Officer
Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Fax: 6304 2661
Email: research.ethics@ecu.edu.au

Faculty of Education
2 Bradford Street
ECU Mount Lawley
Perth, WA 6054

Dear Lecturer/Student/Technical staff

Research Project:

E-Learning implementation strategies for ICT Challenged Environment

My name is Isaiah T. Awidi, a PhD research candidate of Edith Cowan University, Perth. I am conducting a research to investigate policy and strategy processes that will inform and facilitate successful e-learning implementation in ICT challenged environments. The research activities to gather information include:

- Survey questionnaire
- Interviews
- Focus Group Discussion (FGD)
- Observation at the research location

I am therefore happy to invite you to participate in this research. Please be assured that every data and information gathered, results and findings are for the research purpose only. The anonymity and confidentiality of respondents are all guaranteed. The data and information on this research are accessible only by the researcher and the two supervisors working with the researcher.

Please note that participation in this research is voluntary and you can withdraw your consent at any stage of the research process before the final submission of the Thesis. Should you have any queries regarding the research process/study, please do not hesitate to contact me or any of my two supervisors:

- Research candidate: Isaiah T. Awidi; i.awidi@ecu.edu.au;
i.awidi@student.ecu.edu.au
- Principal Supervisor: Dr. Jeremy Pagram; j.pagram@ecu.edu.au;
- Co-Supervisor: Dr. Martin Cooper; m.cooper@ecu.edu.au

If you wish to talk to an independent person, you may contact: The Researcher Officer, Edith Cowan University. 100 Joondalup Drive, Joondalup, WA 6027. Phone: +61-8 6304-2170. Email: research.ethics@ecu.edu.au

Yours faithfully,

Appendix A2

Consent Forms (To all research participants)



LECTURER/TECHNICAL STAFF/STUDENT CONSENT FORM

RESEARCH PROJECT: *E-Learning Implementation Strategies for an ICT Challenged Environment.*

I _____, have read the information and been informed about all aspects of the above research project. I am happy to participate in the research project as requested by the researcher. I understand that I may withdraw from the project at any time.

I agree that the research data gathered for this study concerning my activities can be published provided I am not identifiable in any of the reports that are produced.

Signed _____ Date: _____

MANAGEMENT CONSENT FORM

RESEARCH PROJECT: *E-Learning Implementation Strategies for an ICT Challenged Environment.*

I _____, have read the information and been informed about all aspects of the above research project. I am happy to participate in the research project as requested by the researcher. I understand that I may withdraw from the project at any time.

I agree that the research data gathered for this study concerning my activities can be published provided I am not identifiable in any of the reports that are produced.

Signed _____ Date: _____

Appendix A3



Letter Seeking Permission to Carry out Research (The Registrar and Pro-Vice Chancellor)

HUMAN RESEARCH ETHICS COMMITTEE

For all queries, please contact:
Research Ethics Officer
Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Fax: 6304 2661
Email: research.ethics@ecu.edu.au

Faculty of Education
2 Bradford Street
ECU Mount Lawley
Perth, WA 6054

Dear Registrar/Pro-Vice Chancellor

Research Project: Request for permission to conduct a study at the University of Ghana, Legon

My name is Isaiah T. Awidi, a PhD research candidate of Edith Cowan University, Perth. I am conducting a research to investigate policy and strategy processes that will inform and facilitate successful e-learning implementation in ICT challenged environments. The goal of the research is to develop a framework that will guide e-learning implementation that will be successful and sustainable in the short, medium and long-terms. The research activities to gather information include:

- Survey questionnaire for lecturers, technical staff and students
- Interviews for management, deans, heads of department, lecturers, technical staff and administrators
- Focus Group Discussion (FGD) for students
- Researcher and lecturers demonstration of e-learning in the faculties of science and social science
- Observation of ICT resources, teaching and learning at the University of Ghana

I am therefore happy for your permission to conduct this research in the university and to use any resources that will facilitate the research process. Please be assured that every data and information gathered, results and findings are for the research purpose only. The anonymity and confidentiality of respondents are all guaranteed. The data and information on this research are accessible only by the researcher and the two supervisors working with the researcher.

Participation in this research is voluntary and participants can withdraw their consent at any stage of the research process before the final submission of the Thesis. Should you have any queries regarding the research process/study, please do not hesitate to contact me or any of my two supervisors:

- Research candidate: Isaiah T. Awidi; i.awidi@ecu.edu.au;
i.awidi@student.ecu.edu.au
- Principal Supervisor: Dr. Jeremy Pagram; j.pagram@ecu.edu.au; +61-8 9370-6331
- Co-Supervisor: Dr. Martin Cooper; m.cooper@ecu.edu.au

If you wish to talk to an independent person, you may contact: The Researcher Officer, Edith Cowan University. 100 Joondalup Drive, Joondalup, WA 6027. Phone: +61-8 6304-2170. Email: research.ethics@ecu.edu.au

Yours Sincerely,

Appendix A4



Email Information letter (To all research participants)

HUMAN RESEARCH ETHICS COMMITTEE

For all queries, please contact:
Research Ethics Officer
Edith Cowan University
100 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Fax: 6304 2661
Email: research.ethics@ecu.edu.au

E-MAIL MESSAGE TO PARTICIPANTS

Dear Sir/Madam

Research Project: E-Learning implementation strategies for an ICT Challenged Environment

My name is Isaiah T. Awidi, a PhD research candidate of Edith Cowan University, Perth. I am conducting a research to investigate policy and strategy processes that will inform and facilitate successful e-learning implementation in ICT challenged environments. The research activities to gather information include:

- Survey questionnaire
- Interviews
- Focus Group Discussion (FGD)
- Observation at the research location

I am therefore happy to invite you to participate in this research. Please be assured that every data and information gathered, results and findings are for the research purpose only. The anonymity and confidentiality of respondents are all guaranteed. The data and information on this research are accessible only by the researcher and the two supervisors working with the researcher.

Please note that participation in this research is voluntary and you can withdraw your consent at any stage of the research process before the final submission of the Thesis. Should you have any queries regarding the research process/study, please do not hesitate to contact me or any of my two supervisors:

- Research candidate: Isaiah T. Awidi; i.awidi@ecu.edu.au; i.awidi@student.ecu.edu.au
- Principal Supervisor: Dr. Jeremy Pagram; j.pagram@ecu.edu.au; +61-8 9370-6331
- Co-Supervisor: Dr. Martin Cooper; m.cooper@ecu.edu.au

If you wish to talk to an independent person, you may contact: The Researcher Officer, Edith Cowan University. 100 Joondalup Drive, Joondalup, WA 6027. Phone: +61-8 6304-2170. Email: research.ethics@ecu.edu.au

Yours Sincerely,

Appendix B: Research Instruments

Appendix B1 Lecturer Survey

Lecturers Survey Questionnaire

Dear Sir/Madam.

Anonymous Questionnaire/Survey: This is an anonymous questionnaire. Please read the information Letter carefully as it explains fully the intention of the research project. Please ensure that you do not write your name (or any other comments that could identify you) on the questionnaire. By completing the questionnaire, you are consenting to take part in this research. E-Learning is defined here as the use of computers and internet resources by lecturers for teaching and learning. Please kindly spend some few minutes to answer the following questions.

Background:

1. Gender ☐ Male ☐ Female
2. Which faculty do you belong to? ☐ Social Studies ☐ Arts ☐ Administration
☐ Science. ☐ Law. ☐ Others. Please Specify.
.....
3. How many course(s) units do you teach in academic year?
.....
4. How many students do you teach (on average) per course unit?
☐ Less than 25 students ☐ 26- 50 students ☐ 50-100 students
☐ 101-150 students. ☐ Others please specify.
.....
5. Do you have any other work (eg. Consultancy, part-time lectureship) aside teaching in this university?
☐ No, Full-Time Lectureship ☐ Yes, Part-Time Lectureship ☐ Yes, Consultancy services ☐ Others. Please specify.
.....
6. Have you had any formal training in pedagogy (effective techniques of teaching) as a teacher/Lecturer?
☐ No training in pedagogy ☐ Yes, Trained Teacher/Lecturer
☐ No, Learnt on the Job ☐ Other, please specify.
.....
7. What is your position/status at the faculty? ☐ Assistant lecturer ☐ Lecturer
☐ Senior Lecturer ☐ Other, please specify.
.....
8. How long have you been teaching in this university? ☐ Below a year ☐ 1-5 years
☐ 6-10 years ☐ 11-15 years ☐ 20 years and above

Skill and Usage of computer-based ICT resources

9. How often do you personally use the computer to perform any task? ☐ Never ☐ Sometimes ☐ Often
10. How will you describe yourself with regards to using computers?
☐ Have little knowledge about the use of computers. ☐ Beginner.
☐ Intermediate user. ☐ Advance user of the computer. ☐ Not applicable
11. Do you have a personal computer with Internet connection? Please tick as many as are applicable to you.

Computer <input type="checkbox"/> Yes <input type="checkbox"/> No	Internet Connection <input type="checkbox"/> Yes <input type="checkbox"/> No
---	--

Laptop	Desktop	Other, specify	None	Broadband	Dial-up	Wireless	None
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Technology: ICT experience in professional work

12. To what extent do you make use of the following ICT resources/services in teaching and learning? (1=Never; 2=Rarely; 3=Sometimes; 4=Often; 5=Very often). Tick the appropriate box with X.

Use of Computers and ICT resources to support teaching		Scale				
1	I use computer workstations in the classrooms when teaching my students	1	2	3	4	5
2	I make use of computers in the library and encourage my students to do same to enhance their learning efforts	1	2	3	4	5
3	I use personal computers at home to prepare for lecture material	1	2	3	4	5
4	I use e-mail services in the university to community with my students	1	2	3	4	5
5	I use web and Internet resources to support teaching and learning	1	2	3	4	5
6	I use wireless resources in the university support teaching and learning	1	2	3	4	5
7	I use the Learning Management System (LMS) KEWL to support teaching and learning	1	2	3	4	5
8	I use authoring and planning tools to support teaching and learning	1	2	3	4	5
9	I use the server provided as a repository of learning materials for students	1	2	3	4	5
10	The course I teach has online modules which students can access	1	2	3	4	5
11	I use video conferencing resources to support teaching and learning	1	2	3	4	5
Use of e-learning resources to engage students learning		Scale				
1	I use e-learning resources to develop learning content for students	1	2	3	4	5
2	I use e-learning resources to engage students in classroom activities	1	2	3	4	5
3	I use e-learning resources to engage students learning outside the classroom	1	2	3	4	5
4	I use the e-learning resources to communicate learning activities with students	1	2	3	4	5
5	I use ICT and e-learning resources to collaborate with peers	1	2	3	4	5
6	I use e-learning resources to engage students in practical activities	1	2	3	4	5
Use of ICT and Internet resources to support teaching		Scale				
1	I have a personal computer provided by the university to engage in e-learning	1	2	3	4	5
2	I have access to the Internet and Intranet resources provided by the university	1	2	3	4	5
3	I use ICT and PowerPoint resources to teach regular students in the university	1	2	3	4	5
4	I use ICT and PowerPoint resources to teach part-time students of the university	1	2	3	4	5
5	I use ICT and Internet resources to give assignments to students	1	2	3	4	5
6	I use ICT and Internet resources to provide feedback to students	1	2	3	4	5
7	I use the university server as a repository of learning resources.	1	2	3	4	5

Relevance of E-learning: (For lecturers using e-learning and ICT resources to teach)

13. Does e-learning give you any advantage over teaching several courses in different lecture rooms?

- [] Yes [] No [] Not Applicable
14. Does e-learning give you any advantage over teaching different course units in a semester?
[] Yes [] No [] Not Applicable
15. Do the lecture rooms you teach in have ICT resources (computer, Internet, projectors, multimedia resources) to support your teaching efforts? [] Yes [] No [] Not applicable

Professional Development

16. How often have you participated in any professional development program in the past year?
(1=Never; 2=Rarely; 3=Sometimes; 4=Often; 5=Very often). Tick the appropriate box with X.

	Participation in Training	Scale				
1	I participate in professional development programs organized for e-learning	1	2	3	4	5
2	I participate in computer training programs organized for lecturers	1	2	3	4	5
3	I participate in training seminars and workshops aimed at promoting e-learning	1	2	3	4	5
4	I am trying to learn and use computers to support my teaching but feel frustrated	1	2	3	4	5

17. Please describe the type of training activity you participated in.

.....
.....

Pedagogy

18. In your opinion, what is the university's policy on teaching approach?
[] Classroom face-to-face [] E-learning [] face-to-face and e-Learning [] Other

19. What teaching approach do you personally use as a lecturer?

.....

20. If lecturers are supported with ICT resources for teaching and learning, please describe the type of support you receive as a lecturer.

.....X

.....A

Are you satisfied with the type of ICT support you currently receive? [] Yes [] No

21. How will you rate the ICT services provided? [] Fair [] Good [] Below average
[] Average [] Above average [] Excellent

22. Over the last semester, learning activities with your students involves which of the following teaching approaches? Please tick as many as are applicable.
[] Working in groups. [] Developing collaborative learning skills [] Negotiating activities
[] Working on self-paced activities. [] Presenting work to the class [] Tackling real-life problems
[] Understanding their own learning. [] Focus on higher learning skills [] Analyzing Information

23. In your opinion, which of the following statements are applicable to the situation in the university? (1=Strongly agree; 2=Agree; 3=Neutral; 4=Disagree; 5=Strongly disagree).
Tick the appropriate box with X.

Clarity of efficacy gain in engaging in e-learning		Scale				
1	I am aware that ICT and e-learning can be used to support students learning but have never used it in my teaching	1	2	3	4	5
2	I am beginning to understand the process of using computers and can think of tasks in which it might be useful	1	2	3	4	5
3	I believe more and more lecturers are using ICT resources to support teaching	1	2	3	4	5
4	I believe there is good and adequate access to Internet for all users	1	2	3	4	5
5	I am more interested in the effect of e-learning on my professional development	1	2	3	4	5
6	I am gaining a sense of confidence in using the computers for specific task	1	2	3	4	5
7	I am starting to feel comfortable using computers to teach	1	2	3	4	5
8	I can use different ICT applications and facilitate its use as a learning tool	1	2	3	4	5
9	I have successfully integrated ICT and e-learning in the courses I teach	1	2	3	4	5
Pedagogical preference		Scale				
1	I prefer to direct students activities and choose learning resources for them	1	2	3	4	5
2	I prefer experiment with activities based on students choice of learning approach	1	2	3	4	5
3	I prefer to give students full ownership of learning, constructing meaning and solving problems	1	2	3	4	5
Reservation about e-learning adoption		Scale				
1	I am not concern about using computers to teach. I can do without them	1	2	3	4	5
2	I have concerns about students attitude towards e-learning	1	2	3	4	5
3	I am concern about having enough time to organize myself using e-learning	1	2	3	4	5
4	I have doubts about the effectiveness of e-learning to enhance teaching and learning	1	2	3	4	5
5	There are other approaches that will work better than emphasis on e-learning	1	2	3	4	5
6	I believe e-learning will not work well in this environment	1	2	3	4	5

Management commitment and barriers to successful e-learning implementation

24. In your opinion how will rank/rate the following activities of management to facilitate successful e-learning implementation? (1=Very important; 2=Important; 3=Neutral; 4=Unimportant; 5=Very Unimportant). Tick the appropriate box with X.

	Leadership and commitment	Scale				
1	Creating awareness of faculty policy and clear objectives for e-learning	1	2	3	4	5
2	Creating awareness of faculty strategic plan for e-learning	1	2	3	4	5
3	Adequate information about relevance of e-learning for the efficiency of teaching and quality of education in the university	1	2	3	4	5
4	Provision of computers to all academic staff (lecturers)	1	2	3	4	5
5	Committed funds to support lecturers who will participate in the use of e-learning resources	1	2	3	4	5
6	Rewarding lecturers for the use of computer-based ICT resources	1	2	3	4	5
7	Supporting and recognizing individual lecturers e-learning initiative	1	2	3	4	5
8	Peer-to-peer support in using e-learning resources	1	2	3	4	5
9	Management's administrative support for e-learning users	1	2	3	4	5
10	Adequate technical support for e-learning users	1	2	3	4	5
11	Continuous training of academic staff in the use of ICT resources for e-learning	1	2	3	4	5
12	An identified task-force mandated for continuous evaluation of the e-learning process	1	2	3	4	5

25. In your opinion which of the following issues do you consider a barrier to the successful implementation of e-learning in your university? (1=Strongly agree; 2=Agree; 3=Neutral; 4=Disagree; 5=Strongly disagree). Tick the appropriate box with X.

	Perceptions of barriers to successful e-learning implementation	Scale				
1	Lecturers lack sufficient time to accept and adopt e-learning	1	2	3	4	5
2	Lack of adequate funding to support the development of e-learning content/resources	1	2	3	4	5
3	Lack of adequate technical support for computers and ICT resources	1	2	3	4	5
4	Lack of adequate user training to accept and adopt e-learning	1	2	3	4	5
5	Computers and available ICT resources for e-learning are unreliable	1	2	3	4	5
6	Computers and available ICT resources for e-learning are inadequate	1	2	3	4	5
7	Scheduled times of computer training are inconvenient to the lecturers	1	2	3	4	5
8	The generic computer training programs are irrelevant to my teaching needs	1	2	3	4	5
9	The curriculum of courses are not suitable for e-learning	1	2	3	4	5
10	Lack of users skill and competencies for e-learning	1	2	3	4	5
11	The courses I teach are not suitable for e-learning	1	2	3	4	5
12	Lack of incentives and reward system to motivate user acceptance and adoption	1	2	3	4	5
13	Lack of adequate management and administrative support	1	2	3	4	5
14	Lack of evidence that using computers will enhance teaching and learning	1	2	3	4	5
15	Difficulty in managing students learning in an e-learning environment	1	2	3	4	5
16	Lack of standards e-learning adoption (lecturers and students role in e-learning)	1	2	3	4	5

Lecturer Computer Skills

26. Please describe your level of computer literacy by ticking the appropriate box that is applicable to your skill in computer usage

Word processor	Can't do much	Can print a document, change fonts, spell check, insert footer and page numbers.	Can insert images, create tables, change Page Setup, change margins.	Can use columns and sections, set up styles, use mail merge.
Spreadsheets	Can't do much	Can enter data and calculations, format cells, use Sort, insert and delete rows and columns, create and modify charts [graphs].	Can use complex formulae, use absolute and relative cell references, use multiple worksheets.	Can use filtering, can use conditional formatting, Can import data.
Databases	Can't do much	Can create simple tables, use simple queries to retrieve data, use wizards to create reports and forms.	Can use relational databases, use wizards to create forms, sub-forms or portals, use more complex form design tools.	Can create and use parameter queries, create summary reports, use complex functions in queries.
Slideshow software	Can't do much	Can create a slide show, insert images, change font and layout.	Can navigate during a presentation, add animation, transitions, and hyperlinks.	Can create a master slide, include sound, print handouts, add navigation buttons.
Email	Can't do much	Can create send and access emails, can add to and access Address book entries.	Can store messages in folders, locate Sent and Deleted messages, add a Signature, can add attachments.	Can create a mailing list, set up a discussion list.
Computer File Management	Can't do much	Can save files in a folder, create and name folders, can navigate between folders, copy, delete and rename files.	Can recognise file types, navigate between drives, directories, and into a network, use Help files, install software.	Can zip and unzip files, do complex searches for files, create short-cuts, use control panels to connect to networks.
The Internet	Can't do much	Can navigate to known web sites, can create Favourites, do basic searches.	Can use advanced searches, organise Favourites, alter browser preferences, save images and text.	Can conduct complex searches, download and install software and plugins, use different browsers.
Web page authoring	Can't do much	Can create pages and links, insert and format text, insert images, use tables, create external links.	Can create a site using naming conventions and folder structure, insert sound, upload files to the web, use alt text.	Can build a complex site, insert components such as JavaScript.
Digital photography	Can't do much	Can take and delete pictures in-camera and transfer images to a computer.	Can review images on camera, adjust camera settings such as flash and close-up.	Can adjust camera menu options such as resolution and shutter speed.
Image editing	Can't do much	Can edit images including crop, scale, rotate and delete.	on computer can change file size, resolution and format (eg jpeg, png) as appropriate to purpose.	Can undertake complex image manipulation using special effects.
Video photography and editing	Can't do much	Can adjust camera settings (zoom and replay), transfer file to computer, assemble with minimal editing.	Can use basic software to introduce transitions, import and edit sound track, add titles and subtitles.	Can use advanced software to apply complex editing and special effects.

Thank you for participating in this Survey.

Student Questionnaire

Dear Student.

Anonymous Questionnaire/Survey: This is an anonymous questionnaire. Please read the information Letter carefully as it explains fully the intention of the research project. Please ensure that you do not write your name (or any other comments that could identify you) on the questionnaire. By completing the questionnaire, you are consenting to take part in this research. E-Learning is defined here as the use of computers and internet resources by lecturers for teaching and learning. Please kindly spend some few minutes to answer the following questions.

Background of Students

1. Gender of respondent? ☐ Male ☐ Female
2. Which faculty do you belong to? ☐ Arts ☐ Social Studies ☐ Science
3. What program are you currently enrolled in?
.....
4. Are you a full-time student or part-time student? ☐ Full-Time ☐ Part-Time
5. What level are you currently enrolled in? ☐ 100 ☐ 200 ☐ 300 ☐ 400 ☐ 600 ☐ 700

Skill and usage of ICT resources

6. Have you ever used a computer for personal or academic tasks?
☐ Very often ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
7. How would you describe yourself with regards to the use of computers?
☐ Beginning ☐ Intermediate ☐ Advanced
8. Do you own a personal computer? ☐ Desktop ☐ Laptop ☐ None
9. Where did you learn how to use the personal computer?
☐ Before I came to the university. ☐ After I came to the University, privately
☐ By the university organised programme for students
10. Please list in order of importance the four main activities you normally use computers for, and state the estimated average time spent on each activity in a day.

#	Four most performed activities using a computer and Internet resources	Estimated time spent on each activity
1		
2		
3		
4		

- 10b. Do you subscribe to private Internet services? ☐ Yes ☐ No

10c. If yes, how much do you pay each month on average?

ICT application in learning approach

11. In your opinion, which of the following statement are applicable to you? How often does the following resource support your learning efforts? (1=Very often; 2=Often; 3=Sometimes; 4=Rarely; 5=Never). Tick the appropriate box with X

	Student use of ICT resources to support learning	1	2	3	4	5
1	I have easy access to computers in my faculty and department	1	2	3	4	5
2	The courses I take in the university have online components (use of KEWL)	1	2	3	4	5
3	My lecturers use computers and PowerPoint slide to teach in class	1	2	3	4	5
4	My assignments are given online which I download from the course site	1	2	3	4	5
5	Feedback to my assignments are given online	1	2	3	4	5
6	Learning materials for the course I take are posted online, which I download	1	2	3	4	5
7	My lecturers encourage and instruct me to use the ICT and Internet resources to support my learning	1	2	3	4	5
8	I have adequate technical support when using the computers and Internet resources	1	2	3	4	5
9	I am able to make enough time to use the computers and Internet resources to study	1	2	3	4	5
10	I have adequate information (providing specific guidelines) on how to use the computers and Internet resources to enhance my learning efforts	1	2	3	4	5
11	The computers and Internet resources I use support student to student interaction	1	2	3	4	5
12	The computers and Internet resources I use support lecturer to student interaction	1	2	3	4	5

Technology

12. To what extent has the current ICT resource facilitated/influence your participation in the following academic activities? (1=No effect; 2=Very little; 3=Little effect; 4=Some effect; 5=Much effect; 6=Very much effect). Tick the appropriate box with X

	Statement	1	2	3	4	5	6
1	My access to course registration is enhanced	1	2	3	4	5	6
2	My research and learning activities are enhanced	1	2	3	4	5	6
3	I have adequate access to all information relating to my studies in the university (Registration, enrolment, course units, administrative circulars)	1	2	3	4	5	6
4	I have access to library resources in the university and beyond	1	2	3	4	5	6
5	I do and submit all my assignments online.	1	2	3	4	5	6

Motivation to use computer-based resources for learning

13. In your opinion which of the following statements are applicable to your situation. (1=Strongly disagree; 2=Disagree; 3=Indifferent; 4=Agree; 5=Strongly agree). Tick the appropriate box with X

	Students motivation to use ICT resources to support learning	1	2	3	4	5
1	I am self-motivated to accept and use e-learning resources to enhance my learning	1	2	3	4	5
2	I have very little knowledge about e-learning and how I can benefit from it	1	2	3	4	5
3	I am interested and wish to know how e-learning can enhance my learning	1	2	3	4	5
4	I wish to know how e-learning will impact on my learning and future career	1	2	3	4	5
5	I have concerns about e-learning and unwilling to participate	1	2	3	4	5
6	I preferred contact sessions with my lecturers to e-learning	1	2	3	4	5
9	Students receive feedback from lecturers and are guided by them	1	2	3	4	5
10	The class sizes are too large for to encourage students learning	1	2	3	4	5
11	In the current system, learning is restricted to classrooms and the campus	1	2	3	4	5

14. Please describe how the following activities have motivated you to use the KEWL or any ICT resource in the university to support your learning? (1=Highly motivated; 2=Motivated; 3=Least motivated; 4=Rarely motivated; 5=Not motivated). Tick the appropriate box with X

	Students motivation to use ICT resources to support learning	1	2	3	4	5
1	Computer literacy training program organized for students	1	2	3	4	5
2	Previous personal experience with using computers and Internet resources	1	2	3	4	5
3	Personal knowledge (adequate) of the Internet and Intranet resources	1	2	3	4	5
4	Lecturers aligning computer usage with learning objectives	1	2	3	4	5
5	Lecturers efforts in promoting communication with students through the use of e-mails and ICT resources	1	2	3	4	5
6	University policy and lecturers instruction that I access all learning resources electronically	1	2	3	4	5
7	The frustration of attending face-to-face lecture session	1	2	3	4	5
8	The high Internet and access and speed available in the university	1	2	3	4	5
9	I pay for the use of computers and ICT resources each academic year	1	2	3	4	5
10	Time spent commuting to lecture session are reduced	1	2	3	4	5
11	The institutional policy that all students must use the computers for learning	1	2	3	4	5
12	Submitting and receiving feedback of assignments online	1	2	3	4	5
13	The computers are used to support administrative work and not teaching and learning					

Culture influence on Teaching and Learning Approach

15. In your opinion which of the following statements are applicable to your situation.

(1=Strongly disagree; 2=Disagree; 3=Indifferent; 4=Agree; 5=Strongly agree). Tick the appropriate box with X

	Students motivation to use ICT resources to support learning	1	2	3	4	5
1	I preferred the contact session with my lecturers because students are encouraged to ask questions in class	1	2	3	4	5
2	The present culture of learning helps us to depend on each other for learning and is therefore more important for me than independent	1	2	3	4	5
3	Group decisions are valued more than individual decisions, because different ideas are shared with alternatives to solutions	1	2	3	4	5
4	I am really concerns about obtaining good grades, which is more important than attending lecture sessions. (I focus my attention on getting good grades)	1	2	3	4	5
5	Learning for me means memorizing the content to pass the examinations	1	2	3	4	5
6	I prefer getting information from the lecturers on what to study than learning on my own	1	2	3	4	5
7	Learning is very competitive among students	1	2	3	4	5
8	Some students engage others to write their assignments for them	1	2	3	4	5

Students suggestion to e-learning Implementation Process

16. What training needs will you require to successfully use computers to enhance your learning?

.....
 What resources would you like to see in place before you accept and use the e-learning resources?

17. In your view what role can students play to ensure that e-learning implementation in the university is successful?

.....

18. Any suggestions on how you can be involved in the implementation process?

.....

Please describe your level of computer literacy by ticking the appropriate box that is applicable to your skill in computer usage

Word processor	can't do much	Can print a document, change fonts, spell check, insert footer and page numbers.	Can insert images, create tables, change Page Setup, change margins.	Can use columns and sections, set up styles, use mail merge.
Spreadsheets	can't do much	can enter data and calculations, format cells, use Sort, insert and delete rows and columns, create and modify charts [graphs].	can use complex formulae, use absolute and relative cell references, use multiple worksheets.	can use filtering, can use conditional formatting, can import data.
Databases	can't do much	can create simple tables, use simple queries to retrieve data, use wizards to create reports and forms.	can use relational databases, use wizards to create forms, sub-forms or portals, use more complex form design tools.	can create and use parameter queries, create summary reports, use complex functions in queries.
Slideshow software	can't do much	can create a slide show, insert images, change font and layout.	can navigate during a presentation, add animation, transitions, and hyperlinks.	can create a master slide, include sound, print handouts, add navigation buttons.
Email	can't do much	can create send and access emails, can add to and access Address book entries.	can store messages in folders, locate Sent and Deleted messages, add a Signature, can add attachments.	can create a mailing list, set up a discussion list.
Computer File Management	can't do much	can save files in a folder, create and name folders, can navigate between folders, copy, delete and rename files.	can recognise file types, navigate between drives, directories, and into a network, use Help files, install software.	can zip and unzip files, do complex searches for files, create short-cuts, use control panels to connect to networks.
The Internet	can't do much	can navigate to known web sites, can create Favourites, do basic searches.	can use advanced searches, organise Favourites, alter browser preferences, save images and text.	can conduct complex searches, download and install software and plugins, use different browsers.
Web page authoring	can't do much	can create pages and links, insert and format text, insert images, use tables, create external links.	can create a site using naming conventions and folder structure, insert sound, upload files to the web, use alt text.	can build a complex site, insert components such as JavaScript.
Digital photography	can't do much	can take and delete pictures in-camera and transfer images to a computer.	can review images on camera, adjust camera settings such as flash and close-up.	can adjust camera menu options such as resolution and shutter speed.
Image editing	can't do much	can edit images including crop, scale, rotate and delete.	on computer can change file size, resolution and format (eg jpeg, png) as appropriate to purpose.	can undertake complex image manipulation using special effects.
Video photography and editing	can't do much	can adjust camera settings (zoom and replay), transfer file to computer, assemble with minimal editing.	can use basic software to introduce transitions, import and edit sound track, add titles and subtitles.	can use advanced software to apply complex editing and special effects.

Thank You for Participating in this Research

ICT Support Questionnaire

Background

1. Gender of respondent. ☐ Male ☐ Female
2. In how many Faculties do you/ICT Unit currently provide support?You.....ICT Unit
3. In how many departments in all do you/ICT Unit currently provide support? ...You...ICT Unit
4. What is the current staff strength of the Unit you work in (minus administrative staff)?
.....
5. How many departments (which are to be supported) are currently not supported by your Unit?
6. What is the current ICT budget of the university? (**For managers Only**)
7. What proportion of this budget is allocated to teaching and learning? (**Managers only**)
.....
8. What are the major components of the ICT budget for the university? (**Managers only**)
.....

ICT in Infrastructure – Institutional Level

9. What is the current computer to student ratio in the university? (**Managers only**)
.....
10. In your opinion, how will you describe the adequacy of the infrastructure resources to support e-learning? ☐ Completely inadequate ☐ Inadequate ☐ Useful
 ☐ Adequate ☐ Completely adequate
11. Are you aware and familiar with the following: (1=Strongly agree; 2=Agree; 3=Neutral; 4=Disagree; 5=Strongly disagree). Tick the appropriate box with X.

	Awareness of provisions for e-learning	1	2	3	4	5
1	The government policy and strategic plan higher education	1	2	3	4	5
2	The university's strategic plan for e-learning	1	2	3	4	5
3	The university ICT strategic plan clearly describes the process of acquiring, maintaining and upgrading hardware and software for e-learning	1	2	3	4	5
4	The use of ICT facilities on campus covers all the departments of the university	1	2	3	4	5
5	The use of ICT and Internet services on campus are regulated	1	2	3	4	5
6	The Network infrastructure system in the university is stable	1	2	3	4	5
7	The technology infrastructure to support e-learning is widely available in all departments	1	2	3	4	5
8	The technical staff strength is adequate to support administrative, academic and e-learning services.	1	2	3	4	5
9	The technical support staff are adequately informed and aware of their role to support e-learning	1	2	3	4	5
10	The technical staff strength is adequate to support e-learning implementation in all faculties	1	2	3	4	5
11	The technical staff currently require adequate training to implement and support e-learning	1	2	3	4	5
12	The technical staff in the university has the capacity and resources to develop and e-learning system	1	2	3	4	5
13	The university may select an appropriate LMS for the market as platform for e-learning					

12. How will you describe the current function of the ICT facilities and equipment in the University? ☐ Poor ☐ Fair ☐ Good ☐ Very good ☐ Excellent

Technology

13. In your opinion, which of the following statements are applicable in your institution? (1=Strongly agree; 2=Agree; 3=Neutral; 4=Disagree; 5=Strongly disagree). Tick the appropriate box with X.

	Technology and Infrastructure adequacy for e-learning	1	2	3	4	5
1	The university currently has an Internet facility that serves and supports the entire community adequately	1	2	3	4	5
2	The university has Internet facilities that support academic and administrative staff communication	1	2	3	4	5
3	The university has the ability to run e-learning programs in partnership with other institutions	1	2	3	4	5
4	Internet access and speed in the university is very good	1	2	3	4	5
5	Increase in ICT resources available in the university currently is promoting e-learning adoption	1	2	3	4	5
6	The climate of change to use ICT resources to support teaching is promoting e-learning	1	2	3	4	5
7	There is currently adequate technical support for lecturers using ICT resources to support their teaching efforts	1	2	3	4	5
8	The general level of technology infrastructure in the university adequate and supportive of e-learning	1	2	3	4	5
9	The students we support have positive attitudes towards the use of computers and ICT resources available	1	2	3	4	5
10	The lecturers we support have positive attitude towards the use of computers and ICT resources available	1	2	3	4	5
11	The university has its own server and does not depend on private service providers	1	2	3	4	5
12	The ICT unit provides computer-based training for all students	1	2	3	4	5

14. What is the current bandwidth size used by the university? (**Managers only**) Upload.....
Download

15. What is the estimated average speed of your bandwidth? (**Managers only**)

Capacity and Support for Teaching and Learning

16. Currently, which of the resources listed in the table below are adequately supported by technical staff; with regard to teaching and learning? (1=Not at all; 2=Very little; 3=Little; 4=Much; 5=Very much)

	Technology resources supported for e-learning	1	2	3	4	5
1	E-mail services	1	2	3	4	5
2	Internet and web resources	1	2	3	4	5
3	Wireless resources	1	2	3	4	5
4	Course/Learning Management System	1	2	3	4	5
5	Authoring and planning tools, network resources	1	2	3	4	5
6	Course modules accessible through the Internet	1	2	3	4	5
7	Video conferencing facilities	1	2	3	4	5
8	Learning resource applications (SPSS; EndNote; NVivo etc)	1	2	3	4	5

17. In your opinion, which of the following statements are applicable in your institution?
(1=Always; 2=Very often; 3=Often; 4=Sometimes; 5=Rarely; 6=Never). Tick the appropriate box with X.

	Technical staff role and opinion	1	2	3	4	5
1	Technical staff support computer-base resources and activities for teaching and learning (e.g. projectors, virtual boards; etc)	1	2	3	4	5
2	Computer-based resources are adequately available to all lecturers	1	2	3	4	5
3	Computer-based resources used by lecturers are all supported by the ICT unit	1	2	3	4	5
4	The available resources can support e-learning implementation effectively	1	2	3	4	5
5	Technical staff have the appropriate capacity to recommend resources appropriate for e-learning	1	2	3	4	5
6	Generally the lecturers we support have low level of experience in using ICT resources	1	2	3	4	5
7	Generally the students we support have low level of experience in using ICT resources	1	2	3	4	5

18. If the university has resources that can support e- learning, please list those resources.

.....

19. If the university has the resources, how does the ICT Unit intend to develop and implement an e-learning system according to the strategic plan?

.....

Please, briefly describe the current roles of the ICT support unit in the University?

.....

20. In your opinion which of the following factors do you consider limitation to e-learning adoption? (1=Strongly agree; 2=Agree; 3=Neutral; 4=Disagree; 5=Strongly disagree). Tick the appropriate box with X.

	Technical staff perspectives e-learning limiting factors	1	2	3	4	5
1	Technical staff are well motivated enough to stay on the job	1	2	3	4	5
2	The ICT units in the university are understaffed to support an institution wide e-learning	1	2	3	4	5
3	There is inadequate support from central administration to facilitate efficient support services	1	2	3	4	5
4	The lecturers do not appear to have adequate time to adopt e-learning	1	2	3	4	5
5	Financial support to develop technology-based activities is woefully inadequate	1	2	3	4	5
6	Technology resources available in the university are not reliable, and cannot be effectively supported	1	2	3	4	5
7	The users we support appear not to be interested in e-learning	1	2	3	4	5
8	There are no clearly defined programs, plan, and standards for e-learning. Expectations of technical staff is therefore unknown					
9	The bureaucratic process of acquiring resources does not promote infrastructure development					

Senior Management and ICT Managers Only

21. Which of the following Strategies will you consider important for the implementation of e-learning? (NB: VI- Very Important; I- Important; N – Neutral; U- Unimportant; VU- Very Unimportant)

	Strategies	VI	I	N	U	VU
A	Establish the university website as a main promotional and external communication tool for the institution					
	Establish an institutional intranet, based on Web portal software, as a key internal communications tool for the institution.					
	Incorporate appropriate new technologies into the university Web and intranet sites.					
	Maintain the accuracy and currency of the university Web site and intranet.					
B	Form advisory teams comprising faculty and individuals representing all aspects of the university community.					
	Establish mutually beneficial partnerships with businesses and corporations where there is sharing of both benefits and risks.					
	Establish links between the UG and other high schools, colleges, businesses, and governmental agencies to transfer data to support e-learning and career development.					
	Establish university academic/faculty links to high schools, colleges and business for team teaching and shared programming.					
C	Create and implement a call center plan.					
	Evaluate and implement a troubleshooting software system with clear forwarding and escalation paths for help requests that cannot be satisfied immediately.					
D	Produce and implement a faculty development plan that provides appropriate levels of technical and pedagogical training for faculty (including adjuncts) of varying levels of ability.					
	Ensure that the staff of campus ICT support unit is adequate to ensure that sufficient ongoing technical and pedagogical training and support is available for faculty.					
E	Plan activities that encourage goodwill.					
F	Create and implement a staff training program.					
	Adjust university's workforce and procedures to exploit staff computer strengths.					
G	Develop and implement a plan for e- student services.					
	Provide student e-mail accounts.					
H	Provide students with the computer tools necessary to manage their academic progress.					
	Ensure that an e-learning readiness online self-assessment is easily available to all potential e-learning students.					
I	Ensure that all students have the technical skills to succeed at the University.					
	Develop methods to enhance opportunities for student academic success.					
	Expand the e-learning orientation for e-learners.					
J	Establish and communicate an appropriate information technology advisory structure.					
	Establish processes and incentives to promote the active use of computer across the faculties and colleges.					
	Develop, in conjunction with the information technology governance structure, policies and procedures necessary to encourage faculty to engage in e-learning.					

Thank you for participating in this Survey.

Appendix C: Interview Questionnaire (Guide)



Appendix C1: ICT Technical Staff

Interview Guide for ICT Support Staff

1. What is your role in this university?
2. In your opinion what do students who come to this laboratory use the resources for?
3. In your opinion which websites do the students browse most? Any statistics or documentary evidence?
4. Which skill activities are you normally consulted for assistance?
5. To what extent do students who come to the lab know how to use the computers available?
6. In your work as supporting lecturers and students, what are some of the major problems you have encountered so far?
7. What software is installed on the computers in the laboratory?
8. Have the university acquired license for all the applications running on the computers?
9. Can you please describe the electricity situation/management in this university?
10. How many computers do you have in the laboratories in this department?

Academic Work

1. From your estimation what percentage of the students uses the facilities here for academic work? (searching for academic information and writing)
2. What type of academic work do you normally offer assistance?
3. What form of assistance do you give to lecturers using computers for academic work?

Students Comments

1. Some students have indicated that they get frustrated because they waste so much time in the queues, while others use the machine to play games or chat. In your estimation is this a fair complaint from the students?
2. They also complain that they have limited space in the UG accounts given to them, meanwhile they are unable to access their yahoo and hotmail accounts. Do you consider this as a concern?
3. Some complain that they do not know how to use the computers for academic work. Are these complaints realistic?

Thank you for participating in this survey

Appendix C2: Management

University Management Interview Guide

1. Please, share with me briefly the university's philosophy for teaching and learning? What is the university's concept and understanding of e-learning? Why is it relevant for the university?
2. Currently, what are the priorities of the University with regards to teaching and learning?
*How was ICT/e-learning introduced in the university? **Researcher's guide (RG)**; What is management doing to promote e-learning? **Researcher's guide***
3. Given the ICT infrastructure in the university, how will you perceive teaching and learning to be in the university in the next 5 years? *Is e-learning currently, widely used in all faculties?*
4. Please share with me the guiding principle or strategic process used for e-learning implementation in the university? *(What activities were involved? **RG***
5. How are current conditions and capabilities within the university supporting e-learning initiatives? **RG**: *Technology and technical infrastructure; management commitment; users (Culture of teaching and learning, perception and acceptability, attitude towards ICT etc); economic factors; political factors. **RG**: Are all faculty members using e-learning resources to teach? why has some faculties' not integrated e-learning in their teaching and learning approach?*
6. What external factors influenced or are influencing the e-learning implementation process in the university? What external factors motivated or frustrated to e-learning implementation? **RG**: *National ICT infrastructure; national institutions responsible for higher education (NAB, NCTE); competitive institutions; any social environmental factors; collaborations with internal and external institutions. **RG**: Repeat for internal factors*
7. What were/are the university's options for e-learning? *Would the universities internal resources match that of the external environment? **RG**: Respondents to explain the various processes involved in achieving an e-learning action plan in the university or means by which e-learning can be implemented? **Enquire about**: Technical abilities, HR, Finance, Technology and Pedagogy*
8. Which of the identified options were desirable for the university? *How does the identified option fit into the university's goal? **RG**: Capabilities of the university to implement e-learning? (Human Resource, Technological, Financial and Physical Infrastructure)*
9. Are there any set of long-term objectives and action plans that would achieve the most desirable options?: *Are there any short-term (annual) objectives and action plans that are compatible with the selected set of long-term objectives and action plan of the university? **RG**: What are your expectations of management?; Are there any pedagogical issues that should be considered?; Cultural, Human resources, Political, Social*
10. Are there any set of activities outlined to implement the action plan choices by means of: Task, People, and Structure: *How is the organizational structure going to be affected? Technologies. Reward Systems*
11. How do you intend to measure or evaluate the success of the action plan process as an input for future decision making?

Appendix C2.1 Deans, of Faculties

1. In light of technology integration in higher educational delivery from the past decade, please, are you aware of the university's (faculty) priorities current with regards to teaching and learning?
2. How do you perceive teaching and learning in the university to be in the next 5 years?
 - a. Do the universities need strategies for the teaching and learning approaches – why do universities need strategy for teaching and learning? (**RG**): *Would you consider e-learning an appropriate strategy for teaching and learning in this context?*
3. What is the university's current guiding principle on teaching and learning? How do you explain the concept of e-learning? *Would you consider the concept to be relevant within the context of the University of Ghana?*
4. Would current conditions and capabilities within the university support e-learning initiatives? **RG**: *From your experienced view, why has the faculties' not integrated e-learning in their teaching and learning approach, though KEWL was introduced in this university some 6 years ago? Why has e-learning not been successful in the University of Ghana?; What internal issues would you consider as frustration for e-learning implementation? This is to find out if there are any lecturer frustrations. What are lecturers' expectations of management? What support would lecturers consider critical for the successful implementation of e-learning? (Are there any cultural issues?)*
5. Are there any external factors that must be considered in e-learning initiatives in Ghana? What external factors would you consider as frustration to e-learning implementation? *(Economic, Social, Political, Technological, Ecological -PESTE)*
6. What are the university's (faculty) options for e-learning? Would the universities internal resources match that of the external environment to would promote e-learning? *What strategic options to e-learning would the lecturers consider workable within the context of the University of Ghana? Why do they consider it is the most workable option?*
7. Which of the identified options are desirable for the university? How does the identified option fit into the university's goal? *Which e-learning initiative approaches would you consider workable – top-down or bottom-up?*
8. Are there any set of long-term objectives and action plans that would achieve the most desirable options?
9. Are there any short-term (annual) objectives and action plans that are compatible with the selected set of long-term objectives and action plan of the university?
10. Are there any set of activities outlined to implement the action plan choices by means of:
11. How do you intend to measure or evaluate the success of the action plan process as an input for future decision making?
12. In your expert view, would you consider management initiative for e-learning implementation to be more successful than initiatives form individual academics and faculty?

Appendix C3: Lecturers and Heads of Department (HODs)

Interview Questionnaire for Lecturers and Heads of Departments

Please kindly express your brief opinion on the following questions:

1. Are you involved/engaged with e-learning in your department? If yes, how long? If no, why are you involved in e-learning given its advert on the university portal?
2. How would you describe e-Learning within the context of the university?
3. How would you describe the relevance or otherwise of e-learning in the university?
4. Are you able to highlight on your university/faculty/department vision, policy, objectives, and strategic plan for e-learning?
5. Are you able to highlight on the process of e-learning implementation in your department?
6. Can you highlight briefly on your role/expectations of you for e-learning?

Operational question from pre-research investigations (where applicable):

7. From your experienced view, why are many departments and lecturers not involved/engaged in e-learning although an e-learning LMS was launched?
8. In your experienced view what practical steps can the university take to make e-learning successful?
9. What would you consider as lecturer frustrations in the adoption and use of ICT resources in the university?
10. What are your expectations of management for effective e-learning deployment?
11. What relevant support would you consider critical for e-learning implementation?

Researchers guide: *Please briefly explain in terms of the following.*

- a. *Human Resource; Pedagogical; Technology and Technical infrastructure*
- b. *Cultural; Political; Social; Environment*

12. In your expert view, what strategic approach to e-learning implementation would you consider workable in the context of the university/faculty/department and why?
13. What initiative approaches were considered workable within the context of the University?
 - a. *Bottom-up; Top-Down*
14. In your view, what role can lecturers play in making e-learning successful in the University?
15. Do you have expectations of rewards to motivate the integration of e-learning in the educational delivery in the university?
16. Please is there any more information you will wish to provide.

Thank you for participating in this research

Appendix C4: Government and External Stakeholders



Appendix C4.1 Ministry of Education

(Minister of Education; ICT Co-ordinator (MOE))

Government position on E-Learning in Higher Education

Please kindly advice on the following?

1. Given the impact of e-learning in educational delivery across the world, are there any clear objectives and policy for e-learning implementation in higher education in Ghana?
 - a. What is government's e-learning plan for universities of Ghana?
2. Are there any governmental strategic plans for e-learning implementation in the universities?
 - a. What resources are available from which the universities can benefit from?
 - b. What governmental activities have been outlined from which the universities can benefit from?
3. Any funds allocation for the purpose?
4. Any research-based collaborative efforts with other institutions?
5. Any partnership between well-resourced universities in other parts of the world and the universities in Ghana?

Appendix C4.2

Ministry of Education (MOE), National Accreditation Board (NAB), and National Council for Tertiary Education (NCTE).

1. What is the current role of your ministry/institution in higher educational delivery?
2. Any brief background on how your institution has been involved in e-learning in the public universities of Ghana? (*Only where it is applicable*)
3. What is the working concept of e-learning pursued by your ministry to facilitate e-learning? (*Where applicable*)
 - What is government/your institutional policy on e-learning in the public universities of Ghana? **RG:** *Are there any guiding principles for teaching and learning in the universities? How do you see teaching and learning in the educational delivery in Ghana in the next 5 years? (Only where it is applicable)* **Researchers Guide (RG).** **NAB:** *Any policy on accreditation of e-learning programmes in the universities? What is the policy on accreditation (evidence required).*
 - **NCTE:** *Any policy on budgetary allocation for e-learning in the universities? (This would help to measure government to e-learning as proposed in the ICT4A document). What proportion of budget allocations for public universities goes into e-learning? What proportion does the UG receive?*
4. What internal conditions and capabilities within your ministry/institution do you consider necessary and strength to promote the integration of e-learning in the universities from which the University of Ghana (UG) can benefit from?

Probing Question: *What infrastructure/resources have the government through your ministry/institution provided from which the UG can take advantage of? What national resources are available? Does your ministry/institution have enough internal resources and capacity to promote and support e-learning in the universities? Are there any political and psychological factors to be considered?*
5. What external factors would you consider critical in e-learning implementation in the universities? **RG:** *Are there any political and psychological factors you would consider necessary in the implementation of e-learning?*
6. Are there any desirable action plans for e-learning implementation in the universities? Are there any activities outlined for the universities?; **RG:** *Are there any set of long-term objectives and action plans that would achieve the most desirable options for e-learning? Are there any annual and short-term action plans that are compatible with the selected set of long-term objectives and action plans for e-learning in the universities?*
7. Are there any set of activities outlined to implement the action plan choices by means of:
 - a. Budgetary resource allocation – Any financial commitment; Task; People; Structure; Technology; Reward Systems
8. How do you intend to measure or evaluate the process of the action plan to ensure standards are not compromised?

Appendix C4.3

Association of African Universities (Head Office)

The AAU has been included because it is involved in ICT capacity building for Universities in Africa. They also provide funding for training and organizing seminars in the universities. This is to help me investigate the influence or effect of these external factors in the strategy implementation process.

1. What is the role of your Association in higher educational delivery in Africa?
2. Any brief background on how your institution has been involved in e-learning in the public universities of Ghana?
3. How do you explain the concept of e-learning?
4. What is your institutional policy for e-learning in the public universities of Ghana?
What is the AAU doing to promote e-learning in African Universities?
5. Are there any guiding principles for teaching and learning in the universities? How do you see teaching and learning in the educational delivery in Ghana in the next 5 years?
6. What internal conditions and capabilities within your ministry/institution do you consider necessary and strength to promote the integration of e-learning in the universities from which the University of Ghana (UG) can benefit from?

Probing Question:

What infrastructure/resources have your institution provided from which the UG can take advantage of? What national resources are available?

Does your ministry/institution have enough internal resources and capacity to promote and support e-learning in the universities?

7. What external factors would you consider critical in e-learning implementation in the universities?
8. Are there any desirable action plans for e-learning implementation for the universities?
Are there any activities outlined for the universities?
Are there any set of long-term objectives and action plans that would achieve the most desirable options for e-learning?
Are there any annual and short-term action plans that are compatible with the selected set of long-term objectives and action plans for e-learning in the universities?
9. Are there any set of activities outlined to implement the action plan choices by means of:
- Budgetary resource allocation – Any financial commitment; Task; People; Structure; Technology; Reward Systems
What step by step activities would you recommend to be followed to make e-learning successful in the public universities?
10. How do you intend to measure or evaluate the process of the action plan to ensure standards are not compromised?

Appendix D Students Focus Group Discussion

1. How long have you been involved in using the KEWL (e-learning system in the university)?
2. What is your understanding of e-learning?
3. How were you introduced to learning in the electronic environment?
4. Are you involved in delayed time e-learning or real-time e-learning? Can you please describe to me how you use the KEWL environment to study? (where applicable)
5. Have you enjoyed using the environment to study? How has it enhance your learning efforts in the university? Please explain
6. What has been your motivation for using e-learning?
7. What has been your frustration and challenges with using the KEWL to study?
8. Given the two hours limited time of using the university provided computers and Internet resources, how do you and your lecturers use the resources effectively within the limited time
9. What will be your recommendation to management on what must be done to improve e-learning in the university, from its current operations?

Appendix E: Additional Data Summary in Tables and Figures

Appendix E1: List of Tables

Table 5.2

Student: Lecturer Ratios at the UG

Year	Total Student Enrolment	Rate of Change in Enrolment	Number of Teaching & Research	Rate of Change in Academic Staff	Lecturer: Student Ratio
1990-91	4,017	8.36	-	-	-
2000-01	14,647	264.6	616	-	1: 24
2009-10	37,353	155	314	(0.96)	1: 119
2010-11	38,376	2.74	275	(0.14)	1: 140

Source: Summarised from annual UG basic statistics (1990-2011).

Table 5E.1

Computer literacy skills and competencies of lecturers

Competencies in Task Performance	Not Much		Beginner		Intermediate		Advance	
	N	%	N	%	N	%	N	%
Word processor	26	11.0	61	25.8	49	20.8	67	28.4
Spreadsheets	47	19.9	109	46.2	22	9.3	19	8.1
Databases	79	33.5	79	33.5	20	8.5	10	4.2
Slideshow software	59	25.0	62	26.3	35	14.8	33	14.0
Email	18	7.6	67	28.4	72	30.5	41	17.4
Computer File Management	30	12.7	88	37.3	42	17.8	38	16.1
The Internet	21	8.9	82	34.7	52	22.0	46	19.5
Web page authoring	103	43.6	57	24.2	9	3.8	13	5.5
Digital photography	64	27.1	68	28.8	28	11.9	34	14.4
Image editing	72	30.5	68	28.8	25	10.6	28	11.9
Video photography and editing	97	41.1	54	22.9	22	9.3	14	5.9

Table 5.1.3

Barriers to e-learning implementation at the UG

Perceived barriers to e-learning implementation	SA	A	N	D	SD	Mean
Lecturers do not have sufficient time to engage in e-learning	20.0	20.0	8.6	37.1	8.6	3.04
There is inadequate financial support to develop computer based learning	31.4	31.4	14.3	11.4	8.6	2.25
There is lack of technical support regarding the computers	37.1	22.9	17.1	20.0	2.9	2.36
Computer training is offered at inconvenient times	17.1	11.4	42.9	22.9	2.9	2.89
Generic computer training is irrelevant to teacher needs	5.7	20.0	11.4	37.1	14.3	3.29
There is lack of sufficient/adequate computer training for lecturers	28.6	28.6	20.0	14.3	2.9	2.25
Computer in the university is unreliable	25.7	22.9	20.0	20.0	5.7	2.57
There is scarcity of computer for faculty	25.7	22.9	5.7	37.1	2.9	2.54
The curriculum does not allow enough time to integrate use of computers the teaching I do	8.6	20.0	14.3	28.6	22.9	3.54
Lecturers lack some basic computer skills	17.1	31.4	20.0	22.9	2.9	2.61
Computer and use of ICT resources do not fit well in the course I teach in the university.	2.9	8.6	2.9	31.4	45.7	4.25
Current reward structure does not adequately recognise lecturers using computers	17.1	25.7	40.0	11.4		2.43
There is lack of support from administration	22.9	37.1	11.4	22.9	2.9	2.43
There is no enough evidence that using computer will enhance learning		5.7	8.6	60.0	25.7	4.11
Classroom management is more difficult when using computers	2.9	8.6	2.9	54.3	28.6	4.00
There is no programme standard as to what is expected for teaching with computers	28.6	17.1	28.6	17.1	5.7	2.61

1-Strongly Agree; 2-Agree; 3-Neutral; 4-Disagree; 5-Strongly Disagree

Table 5.2.1E.
Students participating in survey by faculty (N=236)

Level	Faculties						Total
	Arts	Social Studies	Science	Agriculture	Administration	Law	
	%	%	%	%	%	%	
100	47.8	10.6	1.9	36.8	.0	.0	15.3
200	8.7	26.6	86.8	13.2	95.0	12.5	41.5
300	17.4	34.0	7.5	.0	5.0	12.5	17.8
400	26.1	23.4	3.8	28.9	.0	75.0	19.9
600	.0	5.3	.0	18.4	.0	.0	5.1
700	.0	.0	.0	2.6	.0	.0	.4
Total	9.7	39.8	22.5	16.1	8.5	3.4	100.0

Table 5.2.2E
Students experience in using ICT resources

Relationships	Pearson Chi-Square Tests		
	Value	df	Asymp. Sig. (2-sided)
Level by use of computer for personal or academic task	13.898a	15	.533
Level by self-rated computer literacy skills	21.414a	10	.018
Level by computer ownership	19.928a	15	.175
Level by where computer literacy was acquired	25.346a	10	.005
Faculty by use of computer for personal or academic task	14.921a	15	.457
Faculty by self-rated computer literacy skills	17.864a	10	.057
Faculty by computer ownership	43.394a	15	.000
Faculty by where computer literacy was acquired	25.281 ^a	10	.005

Table 5.3.1E
Infrastructure deployment on campus

Infrastructure deployment on campus	N	Mean	SD
The use of ICT facilities on campus does not cover all the departments	11	3	1.48
The university network system is stable,	10	3.6	1.08
The university has a widely available technology infrastructure	11	3.36	1.21

Scale: 1=Strongly Agree; 2=Agree; 3=Neutral; 4=Disagree; 5=Strongly Disagree