LECTURERS' EXPERIENCES OF INEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) INTO TEACHING AT A COLLEGE OF EDUCATION

BY

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DECLARATION

I, 'Mabohlokoa Lydia Maoba, declare that this dissertation is my own work, and has not been submitted previously for any degree in any university.

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RESEARCHER **DATE**

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SUPERVISOR

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DEDICATION

This piece of work is dedicated to my family and friends

- My late father, Ntate Benjamin Ts'okolo Mofephe for his eagerness to give his children a bright future. He has been the pillar in my entire struggle for success. May his soul rest in peace.

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TABLE OF CONTENTS

CHAPTER TWO

CHAPTER THREE

CHAPTER FOUR

CHAPTER FIVE

CHAPTER SIX

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

BKL	Bund-Lander-Kommision
CEL	College of Education in Lesotho
E-education	Electronic education
EFA	Education For All
E-learning	Electronic learning
E-mail	Electronic mail
HEI	Higher Education Institutions
HTML	HyperText Markup Language
ICT	Information and Communication Technology
ILS	Integrated Learning Systems
IS	Information Systems
ITs	Information Technologies
MDGs	Millennium Development Goals
MoET	Ministry of Education and Training
NCDC	National Curriculum Development Centre
NEPAD	New Partnership for African Development
NUL	National University of Lesotho
ODL	Open Distance Learning
OHP	Overhead Projector
OLS	Online Learning Systems
PRSP	Poverty Reduction Strategy Paper
PSSP	Public Sector Strategic Plan
SADC	South African Development Countries
STIC	School Technology Innovation Centre
TAT	Technology Adoption Theory
UKZN	University of KwaZulu-Natal
UNESCO	United Nations Educational Scientific and cultural Organisation

ABSTRACT

In 2005, the Lesotho Information and Communication Technology (ICT) policy introduction prescribed that all educational institutions for formal learning must play a major role in the improvement of teaching and learning mechanisms that develop a society that is ICT literate and capable of producing ICT products and services. This policy is part of the motivation for this study. The study's focus is to explore the extent to which ICT has been integrated in teaching and learning in one of the Lesotho higher education institutions. Its fundamental aim is to understand the ways in which the Lesotho College of Education (LCE) integrates ICT in teaching and learning environments.

My study adopted the mixed method approach which based fact on an interpretive paradigm, with lecturer's interpretations regarding ICT integration in the college collected through structured questionnaires which were hand-distributed to purposefully selected lecturers as study participants. These questionnaires served as the basis and guide for face-to-face individual interviews of lecturers from the Computer studies and Agricultural/Environmental studies departments who were interviewed at their respective offices. Two sessions of sixty minutes, non-participatory observation of thirty computer studies students were also conducted. This study was guided by the activity theory/model based on the construction of real social change for pedagogy in a college. The concepts of the theory/model have been used to analyse the findings of this research.

The findings of this study indicate that ICT integration creates opportunities in teaching and learning, where learning is focused on learners, and educators are only facilitators. Despite the opportunities that ICT has in learning, obstacles such as lecturers' lack of skills and incompetence in ICT literacy, limited resources and the infrastructure were found to be major factors hindering ICT integration in the college of education in Lesotho. The recommendations are that staff development and financial support should be considered a priority in ICT integration in this context. Also that ICT integration should include internal and external partners who can donate funds that will help in the implementation of ICT in teaching and learning at Lesotho's institutions of higher education.

CHAPTER ONE

Preface to the study

1.1 Introduction

In most developed countries where Information and Communication Technologies (ICTs) are used, the integration of modern technologies into education has enhanced teaching and learning (Earle, 2002). The globalisation process and rapid technological changes, for example, made knowledge a critical determinant of competitiveness in the world economy. In this context, nations can play an important role in assisting related ministries in the process of taking advantage of the opportunities in Information and Communications Technologies (ICTs) (infoDev, 2009) and can help them contribute to education goals and poverty reduction strategies.

Martin and Vallance (2008) argue that since the beginning of modern civilisation, the world of education has been coloured and influenced by the availability of various technologies. They argue technologies are made available in order to assist humans perform activities faster, more efficiently and more effectively. Martin and Vallance (2008), state that it is in this context that technology is introduced in various fields and is adapted for use in the classroom. They state further that Information and Communication Technology (ICT) is the most current technology which offers the use of a range of Information Technologies (ITs) such as internet applications and the World Wide Web to educators. They insist that as a result of ICT utilisation, teaching, learning and classroom management have become much easier and more successful. The aid of efficiency software programs such as word processing applications, databases, presentation tools and electronic spreadsheet can be used by educators is one of the reasons for the positive impact of ICT. Their emphasis is on the distribution of information, and information sharing via the internet, where teaching and learning activities are possible inside and outside the classroom.

Educators use ICT to the fullest in the classroom when they encourage their students to develop various skills that are required for effective use of present and future ICTs. (Tusubira & Mulira, 2008). In order to bring about effective ICT integration, Govender (2006) argues that an educator's attitude should be considered. ICT services and systems in Higher Education Institutions (HEIs) generally pose a lot of challenges which, if not properly addressed, lead to heavy investment without the corresponding desired organisational efficiency gains (Tusubira & Mulira, 2008).

1.2 Background and Rationale

According to Isaacs (2007), Lesotho has begun to take necessary steps to promote higher levels of ICT access and usage in its communities and education institutions. This is despite Lesotho's poor ICT infrastructure and high levels of poverty. In Isaacs' 2007 view, the Government of Lesotho has taken the initiative to adopt a national ICT policy which makes some references to the education sector where it states that educational officials should integrate ICT in all its schools. According to Isaacs, the expectation of the Lesotho Ministry of Education and Training (MoET) is that educators, as sources of knowledge, should implement ICT into their teaching strategies. The emphasis is that all institutions should integrate ICT into the teaching and learning of all subjects (Kingdom of Lesotho, 2005).

The National University of Lesotho (NUL) and the College of Education in Lesotho (CEL) are the two institutions in which both primary and secondary teachers are trained. The college offers both in-service and pre-service training for teachers in the two phases (Primary and Secondary). As this is the only College of Education, most of the Lesotho teachers are trained there.

In this ever-changing world where most things are influenced by the use of technology and where Lesotho is eager to integrate ICT into teaching, one might wonder whether the Ministry of Education had considered some necessary preparations leading to the integration of ICT into teaching at schools, particularly at the teacher training colleges

where teachers are trained. Isaacs (2007) argues that although the ICT integration process is under consideration, the vital questions that one would ask in relation to teacher training colleges are:

- Are teachers trained at the two institutions being exposed to a wide variety of ICTs?
- Are they equipped with sufficient ICT skills to enable them to integrate ICT into their pedagogical strategies?
- Does their training provide enough exposure to the advantages that ICT integration provides in education, and
- are they ready to face obstacles that might be presented by ICT integration?

In a discussion forum held in 2006 at Lehakoe club in Maseru, the presentation by the National Curriculum Development Centre (NCDC) officer, Mr. Malefetsane Nketekete was entitled 'Is Lesotho Ready for the Challenge?' (Nketekete, 2006). The presentation outlined the challenges that Lesotho faces in trying to integrate ICT into teaching and learning. He states that, since 1979, schools had been using ICTs without elaborate policy guidelines from the Ministry of Education and Training. According to Nketekete (2006), integrating ICTs in school curriculum is a very complex process which requires commitment from all stakeholders, and strong and effective monitoring.

This study intends to explore and understand how the College of Education in Lesotho integrates ICT into teaching and learning. The emphasis is on the types of ICTs used, how such ICTs are used, to understand how the use of ICTs in teaching and learning impacts on lecturers' teaching and the students' learning, and to understand the obstacles that are encountered when integrating ICT into education. The focal point of this study is directed towards the lecturers who are expected to equip the teacher trainees with ICT skills.

1.3 The College of Education in Lesotho (CEL)

The college was a Lesotho government institute under the direct control of the Ministry of Education and Training (MoET) from 1975 to April 1999, and was scheduled to

become an autonomous institution after that. CEL trains primary school and junior secondary school teachers at both pre-service and in-service levels. It has slowly been turned into an autonomous institution to help improve its efficiency (Lefoka, 2000).

Though currently autonomous, the College still adopts the principles of the Ministry of Education and Training (MoET) whose mission statement is 'To develop and implement policies which ensure the acquisition of functional literacy among all Basotho and the development of a productive, quality human resource base through education and training" (Kingdom of Lesotho, 2001). To meet the requirements of the ministry, one of the objectives set for higher education institutions is to increase the number of internet users and expand Science and Technology programs.

To ensure the provision of quality education in its environment, the College opened the School Technology Innovation Centre (STIC) on 11 June 2008. The purpose of the centre was to provide teacher trainees with current technology innovations that are necessary for them as education innovators, and to meet the MoET objective of increasing the number of internet users and expanding the technology infiltration program.

1.4 Motivation of the study

The researcher's interest in ICT began in the Educational Technology specialisation lecture, where the researcher was given a task to evaluate the South African 2003 White Paper on e-Education. The paper had outlined that the world is changing, and that ICT is central to the prevailing changes where digital media has revolutionised the information society, and the advances of ICT dramatically change the teaching and learning process (Department of Education, 2004). This interest grew when the researcher came across the Lesotho ICT policy whose mission was 'to fully integrate ICTs throughout all sectors of the economy in order to realise rapid, sustainable socio-economic development' (Ministry of Communications, Science & Technology, 2005). The policy outlined the objectives relating to ICT integration in all Lesotho institutions as follows:

- Education institutions must play a major role in improving teaching and learning mechanisms that develop a society that is ICT literate, and capable of producing local ICT products and services
- Education institutions must ensure that ICT literacy is part of core curricula
- These institutions should use ICTs to expand access to education as well as improving the quality of education

The researcher was highly motivated by the contents of this policy and wanted to understand the ways in which Lesotho institutions integrate ICT into teaching and learning as a means of fulfilling the set objectives. The researcher could have used any institution other than CEL. The choice was motivated by the fact that CEL produces primary and secondary school teachers, both in-service and pre-service, who are expected to integrate ICT into teaching and learning.

1.5 The statement of the problem

Marumo (2006) states that the Lesotho ICT policy was designed in 2005, yet teachers may not be aware of its existence, and in her study, she partly explains the lack of engagement with its objectives. In other words, lack of engagement with, or without implementation of the policy may not be an act of reluctance to change, but because teachers are not exposed to ICT in education. The Lesotho Ministry of Education has piloted the integration of ICT in only six high schools. In the study conducted by Marumo (2006), the results indicated that schools do not have any syllabus guiding them on how to go about integrating ICT into education. Furthermore, teachers lack skills which can be used in the integration process, thus more investigation should be affected in a teacher training college in order to understand how school teachers are equipped with the relevant skills they can use when they enter the field of education.

1.6 The importance of the study

As outlined in the statement of the problem, not much has been done to guide teachers as to how to integrate ICT into education. Most of the studies on ICT integration relate to countries other than Lesotho. The results of this study may help the College to recognise the gaps in so far as ICT integration in their institution are concerned. The researcher's

recommendations can be used as one of the stepping stones for ICT integration improvement. If the College considers the researcher's recommendations, the institution could definitely produce teachers who would understand how to integrate ICT into schools on completion of their studies; hence meeting the policy objectives of both the MoET and ICT.

1.7 The focus of the study

The aim of this study is to investigate and explore how lecturers experience the integration of ICT into their teaching practice at the college of education in order to improve its usage at school level.

1.8 The scope of the study

The College encompasses two campuses, and in the context of this study, the researcher intends to call them campus A and campus B. Research in this study, however, focuses on campus A. This study does not consider the content of the subjects that are taught, nor the pedagogy in terms of lecturers' use of ICT resources, but focuses on the experiences that lecturers encounter in the integration process.

1.9 The research questions

The researcher attempts to answer the following critical question, with other sub-questions:

Research question:

How can lecturers integrate ICT into teaching practice at the college of education in order to improve its integration at school level?

- What ICT tools are currently being utilised by the college of education in Lesotho
- How do lecturers and students use available ICTs and what benefits do they have?
- What challenges do lectures and students face when integrating ICT into teaching and learning?

- What is ICT integration into teaching practice at the college?

1.10 The structure of the study

This study is sub-sectioned into six chapters. The first chapter attempts to introduce the study. It covers the background of the study and the profile of the research area, the motivation of the study that outlines the reasons which persuaded the researcher to conduct the current study, and the statement of the problem, specifying the outstanding problem that required research. This explains the study, and states that participants and their organisation will benefit from the results of this study. The focus of the study explains what the core of the study is, as well as the scope of the study and also outlines the boundaries of the study. The research questions are the fundamentals of the study and guide the entire study. The structure of the study serves as the summary of the whole study.

The second chapter includes the definition of concepts, the review of literature related to the integration of ICT into education. It also outlines the findings of different scholars who have investigated ICT integration into teaching and learning. The purpose of discussing the research findings of studies conducted in other countries is to review the ICT integration level to which Lesotho is compared.

The theoretical concepts of the activity theory that have guided this study are discussed in chapter three of this dissertation. This section focuses on the principles, basic structure and relevance of activity theory to transformation as it applies to ICT integration in education.

Chapter Four outlines the structure that the research followed. It presents the research design and methodology, where the research paradigm and type of research approach used in this study are discussed. It also outlines and discusses the methods of collecting data.

Chapter Five presents, analyses and interprets data; where the principles from activity theory have been used to form themes grouping similar responses together and categorising them for this study. Chapter six concludes the study, and provides recommendations based on the research findings. It also intersects the research findings, research literature, theories that guided the study, and the researcher's comments and recommendations.

1.11 Conclusion

The contents of Chapter One provide an overview of this study and introduce readers to the strategic principles which lead to an understanding of the ICT integration process in a teacher training college in Lesotho. This chapter is the skeleton to which the following chapters will add the flesh directing the understanding of the ICT integration process. This chapter locates the introduction of ICT integration and provides the background and rationale of the study, while also defining the research site and the reasons for choosing it for this particular study. A brief description regarding the researcher's motivation to explore and understand ICT integration in teaching is presented. The statement of the problem has been included in this study and explains the need for this particular study. Chapter One serves as a preface to the whole study and states its importance and relevance. The scope of the study discusses the research site and the focus, which is the exploration of ICT integration. The research questions which are the fundamentals and guide this study are also part of Chapter One.

CHAPTER TWO

ICT integration in teaching and learning

2.1 Introduction:

Information and Communication Technologies (ICTs) have the potential to enhance access, quality and effectiveness in education in general, and to enable development of better teachers, in particular (Janssens-Bevernage, Carnille & Mwaniki, 2002). For Ely (1999), the impact of integrating ICT into higher education results in transformations that include the enrichment of the ICT culture among students and educators. Despite all the positive impacts of ICT in education considered by these scholars, other scholars such as Kok (2008) point out that challenges concerning the lack of available software, familiarity, skills and knowledge of ICT and classroom management are some obstacles hindering ICT integration into education systems. This limits the possibilities that ICTs have as far as the enhancement of quality education is concerned. This does not deny the fact that, although ICTs can be used for enhancement of quality education, some challenges have been experienced by those who have previously integrated ICT into their institutions; which elicits the assumption that this might also happen in ICT integration at a college.

Kundishora and Phil (2006) argue about the issue of challenges encountered by South African schools, and point out that library information education and training in Africa is going through rapid change with difficult challenges to overcome. To support Kundishora and Phil's argument, Isaacs (2007, p.5) addresses the challenges which Lesotho is encountering in so far as the integration of ICT is concerned, and affirms that "despite its poor ICT infrastructure and high levels of poverty, Lesotho has begun to take necessary steps to promote higher levels of ICT access and usage in its communities and educational institutions". Isaacs (2007) outlines that, among other challenges that Lesotho is facing, is the need for the financial resources required to meet the growing demand of well-educated local teachers and the need for literacy and vocational training outside formal academic settings.

2.2 Concepts used in this study

The core of this chapter is based on an understanding of the concept of ICT in terms of how it is integrated into education. The related purpose is to review the various literature available, where authors argue about the types of ICTs used in the classroom situation and the impacts of their usage. It also focuses on the challenges institutions encounter when integrating different types of ICTs in their education systems. The concepts used in this study are lecturer, experiences, teaching, and teaching and learning.

2.2.1 Lecturers

Lecturers are full- or part-time members of the faculty, employed by a university or college to teach or lecture on a particular subject (Hornby, 2000). In the context of Lesotho, lecturers are sometimes called educators. In the study under investigation, the researcher's focus is on full-time members of the faculty of education who are employed by a college of education in Lesotho.

2.2.2 Experiences

Knowledge acquired from work, or in life, skills, attitudes, ideas and perceptions of a certain concept or phenomenon (Golanouli, Murphy & Gardner, 2004). In the current study, the assumption is that due to their daily involvement in the teaching field, lecturers have acquired certain skills and attitudes, hence have ideas and perceptions regarding ICT integration in their institution.

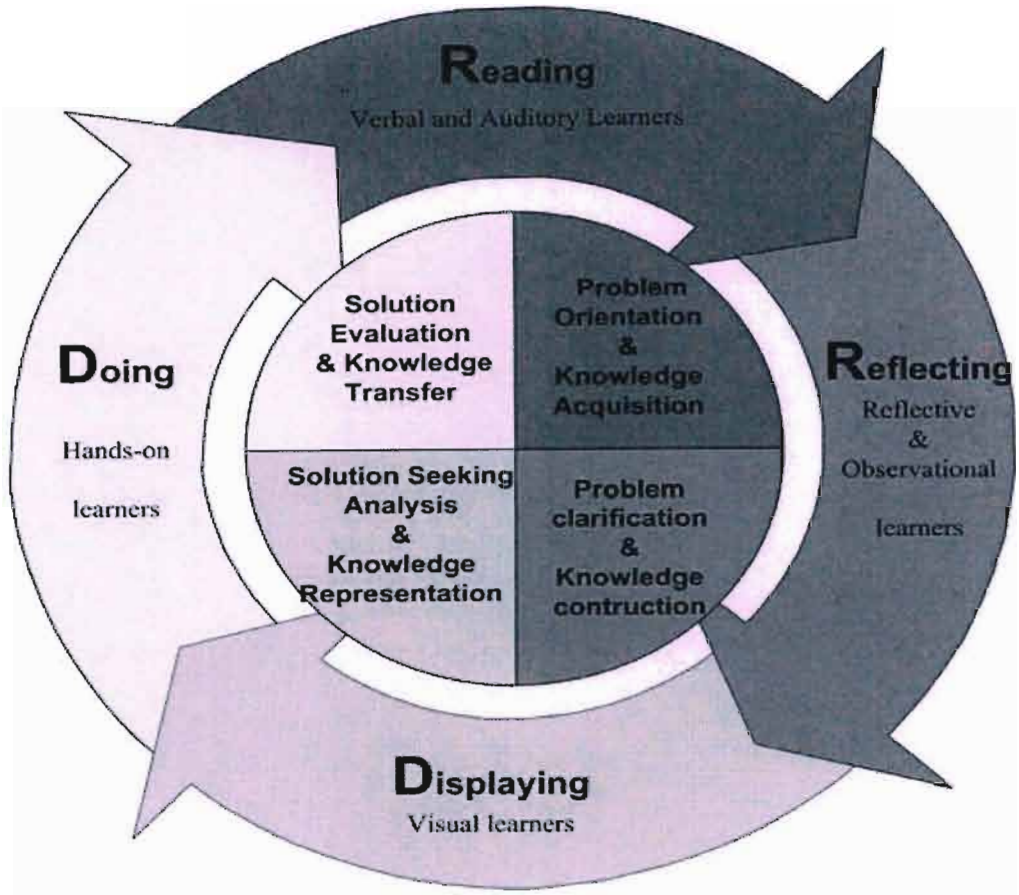
2.2.3 Teaching

Teaching refers to the activities of educating or instructing; activities that impart knowledge or skills (Hornby, 2000). In this context, teaching refers to activity which lecturers engage in, where they use various tools, and engage students in innovative actions where they use ICT resources to facilitate teaching.

2.2.4 Teaching and learning

According to Kolb (1984) and Zhenhui (2001) teaching and learning is knowledge by acquaintance where through direct experience lecturers/teachers use teaching and learning resources to help learners in different learning styles to acquire knowledge.

Figure 1: Bonk and Zhang's Phases of R2D2.



Copied from McKinneys (2008)

Available from Bonk's publicationshare.com website at

http:www.publicationshare.com

The teaching and learning model in figure 1 above supports teaching and learning as the transference of knowledge from the teacher to the student through the use of materials which are manipulated to facilitate the process. Traditional teaching and learning differ from the current information age teaching, hence the need to integrate technological

resources into teaching and learning. Through reading of internet sources and manipulation of ICT tools learning can display observable learning outcomes. It is at this juncture that students can be critical thinkers, hence solve their own academic problems by engaging in various activities. Knowledge construction is possible only where students use some resources (McKinney, 2008). According to McKinney the model of Bonk and Zhang classifies learning activities in four different phases or aspects of learning, namely Doing, Reading, Reflecting and Displaying.

2.2.4.1 Doing (Hands-on activist learners)

Teaching and learning is done through doing and experimenting. Kolb (1984) refers to 'doing' in teaching and learning as knowledge by acquaintance which he believes occurs through direct experience where lecturers and learners make use of resources. He asserts that kinesthetic learners are the target group of learners. Wang and Woo (2007) propose that various types of ICTs should be used for teaching and learning to provide both lecturers and learners with teaching and learning tools. ICT related activities employed in this teaching and learning style are web-based survey research, online tutoring, online role play and wikibook projects (Bonk & Zhang, 2008).

2.2.4.2 Reflecting (Reflective and observational learners)

Reflective and observational learners acquire knowledge by transforming what they have experienced while using some resources. Knowledge is transferred from concrete to abstract. Huitt and Hummel (2003) state that Piaget's stages of development indicate that at this stage, teaching and learning methods which have been used are related more to abstract knowledge acquisition than at the 'doing' stages. Silver-Hmelo (2009) argues that reflective observational lecturers facilitate students' learning by engaging them in collaborative learning where peer tutoring and collaborative learning are possible on the web. Teaching and leaning at this stage is procedural.

2.2.4.3 Reading (Verbal and auditory learners)

Reading is all about saying out written words, either silently or loudly. Brandford, Brown and Cocking (2009), state that teaching and learning are possible through reading. Their argument is that true engagement of learners in active reading requires students to control their own learning. According to Snyder (2002), digital immigrants bring various learning skills including reading, into the classroom. Lecturers and students use e-books, websites and other ICTs to provide students with appropriate information needed for their academic work. Hopkins (1993), in his typology of learning styles asserts that verbal and auditory learners base their knowledge acquisition on comprehension. According to Huslaman, Muncu and Usluel (2008), verbal and auditory learners read to understand underlying reasons and concepts relating to their field of study. According to Bonk and Zhang (2008), possible activities in reading include online poetry, online language lessons, text messaging and fact finding and information acquisition.

2.2.4.4 Displaying (Visual learners)

Visual learners acquire knowledge by seeing. They look at things and try them to see if they work for them. Lecturers and students at this stage use ICTs such as Smart boards, cellular phones and Overhead Projectors. According to Clarke, Flaherty and Yankey (2006), most of the students are visual learners and prefer to be taught through pictures, diagrams, charts and demonstrations that improve the balance between verbal and visual learning, hence offering significant learning benefits. In teaching and learning, Lecturers can use ICTs to display information using images in the form of static pictures, animations and video to accommodate the needs of visual learners

2.2.5 Information and Communication Technology (ICT)

ICT is an acronym that stands for Information Communications Technology (UNESCO, 2000). Apart from explaining an acronym, there is no universal definition which can satisfactorily define ICT, because the concepts, methods and applications involved in ICT are continuously developing on an almost daily basis, and it is difficult to keep up with the changes which occur at such a fast pace (Marumo, 2006). Marumo states that the C in

the middle of IT is important because it emphasises the inclusion of communication between devices used in the technology.

According to Zhao and Frank (2003) ICT is an umbrella term which includes communication skills or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems, as well as other various services and applications associated with these. These include video conferencing and distance learning. ICTs are often defined in relation to a particular context, such as ICTs in education, health care, or libraries (UNESCO, 2000). The term is somewhat more common in the phrase used to describe a range of technologies for gathering, storing, retrieving, processing, analysing, and transmitting information (Marumo, 2006). With regard to the definitions given above; one would consider that the concept ICT can be defined differently in different contexts where it is used as a vital tool for service delivery.

2.2.6 ICT literacy

This is the acquisition of basic skill in the use of technological devices (Marumo, 2006). The contents of this study portray ICT literacy as an essential and critical issue to be considered in the integration process. Jager and Lokman (1999) ICTs are computing and communications facilities that have features which can support teaching, learning and a range of activities in education. Baskin and Williams (2006) support the Jager and Lokman (1999) and specifies internet-based research to support enquiry, integrated learning systems (ILS) to teach basic numeracy. Moser (2007) outlines that ICT-related activities include the use of broadcast material or CD-ROMs as sources of information, micro-computers with appropriate keyboards and other devices to teach ICT literacy, technology devices which are used to facilitate communication for pupils with special needs; electronic toys to develop spatial awareness and psycho-motor control; email to support collaborative writing and sharing of resources, and video-conferencing to support the teaching of modern foreign languages.

2.2.7 Information and Communication Technology Integration

Information and Communication Technology integration into teaching and learning is a significant improvement essential in this Information Age (Baskin & Williams, 2006). According to Baskin and Williams (2006, p.2), "existing digital rhetoric (particularly in relation to teacher professional development) foregrounds the use of ICTs and locates learners and teachers and ICT leaders as users of technology".

Teacher competence has previously been associated with skill variety, where it is rooted in institution-based ICT professional development, and teachers are expected to be agents of change, assemble reasonable ICT competencies, and demonstrate capacity for time management (Guha, 2003; Bitner & Bitner, 2002). Educators' access to ICTs and their acquisition of adequate skills are necessary for ICT integration into teaching and to enhance transformation of pedagogy and social awareness (Zhao, Pugh, Sheldon & Byers, 2002). Regardless of all ICT integration's positive impacts which bring innovations to teaching and learning in the classroom situation, Ertner, Addison, Lane, Ross and Woods (1999) emphasise that challenges such as educators' lack of knowledge/skills, lack of technical assistance, inadequate training opportunities, weak infrastructure, and lack of administrative assistance, serve as contributing factors to ICT integration failure.

Roblyer, Edwards and Havriluk (2004) emphasise that, for an effective integration of technology into teaching, factors to be addressed prior to the integration include curriculum integration which guides and gives direction as to how ICTs should be designed to make them relate to school-based curriculum goals and content; spatial integration, that channels how ICTs should be structured to enable lecturers to be embedded in classroom learning activities. Baskin and Williams (2006) also specify temporal integration, and explain that it is a direction leading to designing ICT activities which will connect to established learning activities and pedagogical integration, which indicate how ICT choices connectively align with teaching approaches and attitudinal integration, and the extent to which ICTs are considered problematic by lecturers and students.

ICT integration in higher education is an area that is currently facing several challenges as a variety of participants play a role. Forces that operate in institutions and classrooms may be influential in bringing about changes which are beyond the direct control of the ministries of education (Pelgrum, 2001). Wilson and Stacey (2004) indicate that the expected education changes from the industrial society to the Information Age should encompass information which is openly available to both students and lecturers, helping students to find appropriate instruction which guides their independent learning. He also argues for ICTs capability to provide learners with skills that can help them evaluate their own learning progress, with the emphasis being on communication, collaborative, interactive and active learning. According to the Asian Development Bank (2007), effective ICT integration needs realistic human and financial resources to ensure sustainability and changes which can enable students to find answers to most of their questions, and to enable them to become problem-solvers, hence becoming motivated by their work which is expected to improve at each integration stage.

2.2.7.1 ICT integration stages

As in all other innovations, ICT integration cannot be effected overnight, but needs to follow certain stages as stated by Marshall (2006). Fox and Henri (2005, p.5) assert that, "each ICT integration stage has its own patterns of change and support requirements". ICT integration stages are outlined in table 1 below

Table 1: ICT integration stages

Stages	Characteristics
Entry	Instruction is traditional, with teacher-directed activities. Some common instructional technologies include chalkboards, textbooks and overhead projectors. As they begin to use the computer technologies in the traditional environment, educators typically encounter problems such as resource management. The support needed for educators at the entry phase include providing time for planning with peers and opportunities for staff to share experiences with their non-participating colleagues.

Adoption	At this stage educators begin to show more concern about integrating technology into their daily lesson plans. Traditional whole-group lecture and seat work are still employed as instructional strategies. Technology is integrated through common activities such as typing, word-processing as well as or drill-and practice activities. Educators begin to anticipate problems and develop strategies to solve them, but they still need technical support and training.
Adaptation	Integration of new technologies into traditional classroom practice occurs during this stage. Lecturers and students have learnt to use computers, and are engaging in communication, collaborative, active and independent learning. Four support issues are addressed at this juncture; firstly, encouraging, peer observation and team teaching, secondly, the introduction of a flexible schedule that permits the above activities; thirdly, the training of staff to enable them use software tools such as spreadsheets, databases, graphics, hypermedia and email; finally, the inclusion of other technologies such as videos, scanners and interactive whiteboards.
Appropriation	Personal appropriation of the ICT tools by individual students and lecturers is a key element at this level. Educators' personal attitude toward technology is a fundamental measure at this level of integration. Educators and students understand technology's usefulness and apply it smoothly as a tool to complete their tasks. More interactions between students are observed as they regularly work on their computers. There is evidence of project-based instruction, collaboration and creative schedules. At this stage, professional growth through conferences and presentations is encouraged, and technology integration goals are revised.
Invention	Educators experiment with new patterns of instruction, where they begin to see knowledge as something that students must construct, rather than something to be transferred. Interdisciplinary project-based instruction,

	team teaching and individually paced instruction are properties at this phase. Classroom interactions change, student experts assist both their peers and lecturers with technology. Students engage themselves in more collaborative work. To indicate their appreciation, lecturers write about and publish their technology experiences to create an ongoing support system with other outside worlds through e-mail and the internet, sharing their knowledge with other educators.

Fox and Henri (2005) perceive ICT integration stages as valuable as these help people who integrate ICT into their teaching to understand what to do at each stage, as a result they emphasise that the ICT integration stages should be followed during the implementation process.

2.2.7.2 Transformative ICT integration

Rogers (1995) asserts that ICT integration is an innovation. Moore and Brown (2005) encourage ICT integration and state that it can be successfully be used in an inclusive educational class. They further assert that ICT integration should be planned and go into stages. Martin and Norwich (1999) and Wilson-Strydom and Thomson (2005) discuss ICT integration levels that portray what technology integration is like, as well as define three levels of ICT integration as follows:

Literacy – students learn to use some materials. No technological tools are used. Learning can be done effectively with paper and pencil. Today reading and reading instruction are more broadly conceived notions of literacy accessible through ICT integration (Leu, Kinzer, Coiro, & Commack, 2004).

Adaptive – students learn to use tools to do what they could not do before. The types of activities are the same as those which were possible before. Students' word-processing assignments are adaptive. There are benefits of doing word-processing. Students can use computers to type the work that they previously did with pen and paper.

Transformative – students learn to do academic work that they could not do before. Students can create the history of a family project with video and audio clips. Communication skills are acquired, where students can communicate with each other via chat rooms and discussion forums. PowerPoint presentations can be used to replace the use of overhead projectors.

2.3 ICT in education

"Achievement of universal primary education, which is one of the basic Millennium Development Goals, can be facilitated by emerging technologies, as well as the old ICTs such as radio and television" (UNESCO, 2006, p.6). Although a technology curriculum has been successfully integrated into education, the integration process is successful only when initiated by classroom educators (Clark, 2000; Guha, 2003; Govender, 2006). The argument that Govender proposes is that ICTs are used to support and enrich learning where they are used in the widespread achievement of educational goals. Tondeur, Van Keer, Van Braak, and Valcke (2008) assert that educators' require training to adequately cope with the current situation and new pedagogical strategies that are meaningful, reasonable and usable should be explored.

The curriculum used to design lessons that are provided to students is largely influenced by what peers believe and do, as well as by other intangible cultural factors (Asian Development Bank (2007). Passey, Rogers, Machell and McHugh (2004) point out that theories of educational shift can effectively be based on the conceptualisation of social reality which appreciates knowledge as personal, subjective, and as being developed and interpreted with outstanding of social context. Wilson (1994) states that ICT can be used for online learning and has the capability of providing cognitive scaffolding that enables students to acquire complex concepts and understand the connection between them.

Manning (1999) highlights the issue of using ICT, and asserts that it allows both educators and students to effectively communicate their thoughts on the subject matter. According to Lage, Platt and Treglia (2000), the use of ICT material and considering students' learning styles serve as matching initiatives to be adopted by education. ICT

also serves as a medium through which students can anticipate real life situations (Lumsden and Scott 1998; Simkins, 1999).

Some researchers such as Cameron (2004) indicate how ICT facilitates the implementation and adoption of technology into education, and outline problems encountered in the process of integrating ICT into education. Benzing and Christ (1997) argue that ICT does not have much impact on educators and the methods which they use in the education system. They emphasise that there is a need for ICT implementers to examine ICT-based activities and strategies used in education planning, and to consider the complexity of the context within which these are used. In the late 1990's, most governments developed strategic plans to strengthen their investments regarding ICT integration into education as the current and rapid rise of the internet and World Wide Web usage urged the adoption and institution intention to access these innovative facilities (Zhao & Cziko, 2001). These authors propose that ICT in education is the basic issue in which students and lecturers play an important part, and that ICT is set to be influential in bringing about changes which are beyond their direct control in institutions and real classroom situations.

The successful integration of ICT within the institutional system is set to ensure quality education where specific objectives are considered to serve as factors enabling possible implications on the integration process (Brown, Thomas, Van der Merwe & Van Dyk, 2007). Access to different types of ICT in teaching pedagogical approaches, learning and production, as well as other specific contributing factors enable ICT sustainability in education, particularly in higher education (Brown, Thomas, Van der Merwe and Van Dyk, 2007). Govender (2006, p.90) indicates that "web-based learning provides links to other teaching resources such as references, email, bulletin boards and discussion groups".

2.4 The role of Educators in ICT Integration

"Computer hardware becomes available to an increasing number of institutions where more attention needs to be given to capacity-building of the key transformers in this

process; namely: teachers" (UNESCO, 2006. p.6). According to UNESCO, teacher education institutions may either assume a leadership role in the transformation of education or be left behind in the whirl of rapid technological change.

ICT integration in higher education creates cognitive opportunities for teaching and learning in institutions (Jonassen, Peck & Wilson, 1999). Despite the cognitive opportunities which they outline, there are still outstanding obstacles relating to some factors which contribute towards the failure or success of ICT integration. According to Lim and Khine (2006), one of the major determinants of the success, or lack of success of ICT initiatives in education is the educator. This argument is also reflected in the writings of Roblyer, Edwards and Havriluk (2004) and Govender (2006) who assert that the educators' perceptions of the use of technology to improve existing educational practices usually determine the extent and effectiveness of ICT integration in the classroom.

Martin and Vallance (2008; p.8) state that "without the input and acceptance of teachers, the developments of useful educational technology projects are hindered". The approach that Martin and Vallance adopt in so far as the role of educators in ICT integrated classrooms is concerned is that educators are not only 'gatekeepers' of the classroom, but they are the greatest source of information about curriculum design and educational content. According to Martin and Vallance the educators' efforts to integrate ICT into the school curricula are seemingly limited by some obstacles which are either extrinsic to teachers (these include lack of access to hardware and software, and insufficient time to plan ICT mediated instructions) or are basically rooted in educators' beliefs about teaching and learning, or both. The researcher, as an experienced teacher, supports Martin and Vallance, and states that teachers, as curriculum designers and implementers should be equipped with ICT resources, as well as the appropriate skills which are necessary for the ICT implementation and technology adoption into teaching.

Due to practical and philosophical barriers which are continuously reported by educators, little innovation has taken place in the way learning is being conducted in the ICT-

mediated classrooms, compared to traditional ones (Lim & Khine, 2006). In advocating educators' involvement in teaching and learning, Marshall (2006) asserts that ICT has become an add-on tool for the classroom environment.

According to Lim and Khine (2006, p.2), "access to ICT technical support, teacher discomfort with ICT, scarcity of high-quality content in many subject areas, lack of institutional vision incorporating ICT and the constraints of academic schedules and department structures are the major barriers to ICT integration". Lim & Khine (2006) point out that certain obstacles that hinder educators' ICT integration progress including a lack of teaching experience with ICT, "outside support for teachers using ICT, supervising students when using ICT, ICT specialist teachers to teach the computer skills, time required to integrate technology into curriculum, and financial support" (Lim & Khine, 2006, p.2) are great determinants of the success or failure of ICT integration in teaching and learning.

Educators' intentions of integrating ICT into teaching and learning do not only end in the classroom. According to Lim and Khine (2006, p.2), "policy makers, school administrators and teachers, have been searching for appropriate strategies to manage the barriers to effective ICT integration". Their argument is that, although a lot of literature has been cited as portraying different aspects of ICT in institutions, ranging from cognitive opportunities, pedagogical strategies through international ICT innovative practices, less has been said about the barriers which educators encounter when integrating ICT. Lim and Khine (2006, p.2) address the involvement of educators in ICT and assert that, "as the integration of ICT in schools gain momentum, there is an increased urgency to identify the barriers and formulate strategies to address them". Tusubira and Mulira (2008) argue that people tend to be rooted to their traditional teaching strategies. They insist that in most institutions the central level and junior employees are not empowered to take decisions; even if they have the capability to make such decisions; instead the person at the top is there to make all decisions (Tusibira & Mulira, 2008). In this manner, the involvement of educators in ICT integration displays barriers which, if not properly dealt with, may hinder the integration progress.

2.5 The Adoption and Integration of ICT in Higher Education

Advances in Information and Communication Technologies, particularly the emergence of the internet, currently serve as the major sources of international information where tertiary educators have been motivated to develop rich, technology-based teaching and learning environments (Birch & Sankey, 2008). According to Birch and Sankey, access to multimedia provides students and educators with an opportunity to engage interactive learning resources which enhance their traditional learning environments.

As a consequence, distance education educators are now moving away from their traditional, print-based education, and are adopting the technology-based teaching and learning strategies in which they develop suitable teacher-centred course materials (Birch & Sankey, 2008; Fiee, 2003). This involves the use of multimedia and ICT to develop dynamic strategic plans that cater for students' different sensory and learning styles (Birch & Sankey, 2008; Zwyno, 2003).

According to Chen and Fu (2003) and Sankey (2006), the development of new strategies has been indicated as reflecting a positive impact, where students' attention rates are improving, leading to improved learning performance of learners with all learning styles. Their emphasis is that, before making conclusions about the use of technology for teaching and learning, and shifting away from the traditional, print-based courses to a technology-based format; universities, colleges and individual academics need to be more informed of the key motivations and enablers underpinning the change required, and to learn from people who have been innovators and early technology adopters and users of these new ICTs.

Betts (1998) and Schifter (2002) state that a number of studies have examined factors which influence educators' adoption of and ICT integration across a wide range of educational contexts. They discovered that issues such as academics' willingness to participate in distance education, and their reluctance to change to the current online learning hinder the ICT adoption process. Recently, researchers have focused on the academics' attitudes toward the development of online courses (Ebersole & Vordam 2003; Weston, 2005). Very limited studies have focused on factors which influence

educators' adoption and integration of ICT for the purpose of designing and delivering technology-based course materials that replace the previous distance education (Birch & Gardiner, 2005; Gordon, 2005; Sankey & Hill, 2005).

Educators' attitudes are not the only factors contributing to the failure or success of the adoption and integration of ICT into the education system, but issues such as infrastructure are to be considered for a successful ICT integration. Birch and Gardiner (2005) point out that where ICT has been successfully integrated into education, a variety of ICTs are used.

2.5.1 Types of ICTs being used in higher education

Wilson-Strydom and Thomson (2005) argue that specific objectives considered to have possible implications on the ICT integration process include access to ICTs, where the use of different types of ICTs in teaching and learning are effects of sustainable ICT integration. Wilson-Strydom and Thomson (2005) categorise and explain types of ICTs in three different sectors, namely: Information Systems, Control Systems and Communication Systems.

2.5.1.1 Information Systems

The type of ICT used in this sector is a computer, where the focus is on managing the institutional data and information:

- Types of ICTs include spreadsheets and databases (used to create 'what if' models)

2.5.1.2 Control Systems

Control Systems are made up of software and hardware and carry out sets of programmed lessons or computer controlled systems. These are used for input, processing and out-put of data:

- Types of ICTs used in this system include computers, tape-recorders and laptops.

2.5.1.3 Communication systems

In communication systems, the output of ICT is the successful transport of data from one place to another. The types of ICTs used in this system include combined printers, scanners, photocopiers; televisions with built-in internet connections, and web browsers and mobile phones with internet and digital cameras, laptops, table computers that have mobile internet access and built-in handwriting recognition.

2.5.2 How ICTs are used in higher education

Social reality is rapidly changing, and higher education studies must adjust to the international context where technology development is facilitating new communication strategies (Sanyal, 2001). According to Sanyal, all these changes are forcing universities and colleges to change, not only their degree structures and study methods but also to renew some situations that, until now, seemed stable as teaching methodologies. ICTs are becoming more and more important in higher education teaching and learning processes, claiming new spaces and conditions of learning and the application of professional roles for lecturers (Phillip & Cameron, 2008). Outlined below are the ways in which Olivier (2004) believes ICTs can be used to change the educational objectives and perceptions of the teaching and learning process which will eventually change the roles of lecturers and students. Olivier (2004) classified the use of ICT with instructional purposes into four categories, and explains how each is used.

Olivier (2004) indicates that consolidated activities are mostly used by lecturers, while other activities which are gradually being implemented are used by students, where they search for the information necessary for their academic work. According to Olivier, some activities are not common and are mostly used by lecturers. Olivier further outlines that some ICT-related activities are used in higher education. Outlined below are some examples which Olivier describes.

2.5.2.1 Consolidated activities: (used mostly by lecturers)

According to Munoz-Repiso and Teledor (2006), the internet is one of the tools used by lecturers to guide their teaching, where they ask students to look for information and

resources to prepare for the classes. They also recommend certain internet sites to their students (websites, electronic magazines, dictionaries, search engines etc.). Olivier (2004) asserts that lecturers use some internet tools to communicate with their students and other lecturers (e-mail, discussion forums, chat-room and videoconferencing) and also draw up and use presentations (PowerPoint, Overhead Projectors) to facilitate the ICT integration process.

2.5.2.2 Activities gradually being implemented

Lecturers require their students to use ICTs in activities related to their subject (search for information to solve their academic problems); they also guide them as to how to use ICTs in activities related to their subject (the study of a particular topic). Phillip and Cameron (2008) postulate that activities that lecturers, who are now gradually implementing ICT into their teaching, teach their students to use specific computer programs in their professional fields (Excel/SPSS for Mathematical calculations; Microsoft FrontPage for designing websites) and require them (students) to use ICT activities to relate to their subject (publication of information on the internet).

2.5.2.3 Uncommon activities

Some of the activities where ICTs are integrated into teaching are not popular, and in most cases are used by very competent lecturers. These activities are used by lecturers to design multimodal material (integrating text, image and audio). They also use ICTs to collaborate with other lecturers in their field of expertise to prepare activities and learning resources (Olivier, 2004). According to Olivier, lecturers use their own websites to support their face-to-face classes, to follow the students' learning through online tutorship and to propose collaborative working strategies to their students, mediated by ICT (Online Learning System (OLS).

2.5.2.4 ICT-related activities

ICT-related activities include, for example, the use of keyboards, effects and sequencers in music teaching; devices to facilitate communication for pupils with special needs, and electronic toys to develop spatial awareness and psycho-motor control (Olivier, 2004;

Adam & Tatnall, 2008). Adam and Tatnall (2008) assert that, in an ICT-integrated classroom, emails are used to support collaborative writing and sharing of resources, while video-conferencing is used to guide and support the teaching of modern foreign languages. Olivier (2004) further argues for the use of the internet as a tool appropriate to integrate into transformative teaching, and states that internet-based research can be successfully used to support enquiry. For Clark (2004), integrated learning systems (ILS) can be integrated into the teaching of basic numeracy.

2.6 The Impacts of Using ICT in Higher Education

Information Technology (IT) holds out considerable promises as an aid to educational management and administration (Jones &. Kelly, 2003). ICT support, on the other hand may be essential, if the range and flexibility of learning opportunities made by Information Technology is to be realised (Munoz-Repiso & Teledor, 2006). The internet, simulation program and spreadsheet applications allow students to see the relevance of their studies, by providing them with opportunities to address the 'what if' questions. At the same time, such experiences fulfil pedagogical goals of allowing students to apply theories, use evidence, and recognise the legitimate range of application of economic analysis (Velenchik, 1995). Students should be competent and confident users of ICT so as to effectively gain from learning through ICT resources, and to be supported by the appropriate use of these resources where e-learning is possible, and various impacts are apparent.

2.6.1 The impacts of ICT as outlined by Clark (2004)

The characteristics of successful e-learning are self-confidence, motivation and a positive attitude; being a good communicator and collaborator and a competent user of ICT (Olivier, 2004). Through e-learning, learners are provided the potential for greater freedom to choose the place, pace and time of an individual's learning which is based on the degree of e-learning course varieties. The degree is expected to differ from course to course and within learning styles (Olivier, 2004). Clark (2004) outlines the following benefits which ICT integration brings to the classroom.

2.6.1.1 Learning styles

All students have preferences about the way they like to learn. These preferences are called learning styles. E-learning is appropriate for different learning styles, which are based on seeing, hearing and doing (Dowling, Moore & Brown, 2005). Dowling, Moore and Brown assert that, E-learning has the capability to provide a variety of opportunities to choose from. These include interacting with content within a large visual element, and working with others through communication technologies (Clark, 2004; Hermans, Tondeur, Van Braak & Valcke, 2008).

2.6.1.2 Interaction

Through interaction, which is considered a dialogue between ICT users and learning systems, brought about by what appears on the computer screen, and the input device such as the mouse and the keyboard, users become motivated by the ability to adapt to their individual needs (Clark, 2004; Hennessy, Ruthven & Brindley, 2005).

2.6.1.3 Learning resources

Learning materials such as WebPages, downloaded files
and online databases play a major role in the ICT classroom (Clark, 2004; Hew & Brush, 2006) are examples of online and interactive materials.

2.6.1.4 Collaborative and individual learning

E-learning allows participation inlearning; where people who would under normal circumstances unsuccessfully take part are provided an opportunity to engage in the learning process (Tsoi, Goh & Chai, 2000). According to Hew and Brush (2006), engaging learners in activities provides opportunities for collaboration among students, where they successfully collaborate with other students from different cultures and backgrounds.

2.6.1.5 Formal and informal learning

E-learning course design varies considerably, and as a result, determines the degree of freedom and the desire of students to learn. This flexibility of program is highly

dependent on the objectives of the course, whether for formal or informal learning (Clark, 2004).

2.6.1.6 Support

Lee (2001) asserts that as an innovation in teaching and learning, the use of ICT attracts peers, friends and family, all of whom provide support, motivating students to learn in and out of school.

2.6.1.7 The Tutor's role

In an ICT integrated classroom, educators serve as facilitators and supporters of students rather than in a traditional class, where they used to be controllers and directors. Through e-learning, students are more active, because their learning is learner-centred and they are responsible for their own learning (Lim & Chai, 2008).

2.6.1.8 Student's role

E-learners prefer to be more independent and self-reliant than traditional learners. They possibly learn from their peers and tutors. In ICT-mediated classrooms, students engage in activities which can promote their critical thinking (Wang & Woo, 2007). Wang and Woo assert that ICT integration in the classroom can provide students with appropriate skills that help them to take control over the content, pace and sequence of their learning.

2.6.1.9 Assessment

ICTs enable a systematic consideration of what the educator wants from an e-learning course, where diagnostic and performance-based assessments are possible; enabling the educator to deal with each individual's need (McAlpine & Gandell, 2003). According to Earle (2002) where ICTs have been successfully integrated into teaching, methods used for assessment include writing online reflection journals, peer evaluation, or portfolios. ICT-based assessment includes computer-based testing, multi-media program development, PowerPoint presentation, web log-writing or concept map construction.

2.6.1.10 Equity issues

It is clear that there are critical equity issues related to the uses of ICTs in education. ICT use also holds a very real promise for facilitating the greater inclusion of marginalised groups into existing educational practices and environments (Wang & Woo, 2007; Clark, 2004).

2.6.1.11 Special Needs and Disabilities

There is a richly documented history of what works – and what does not – related to the uses of ICTs to assist in the education of students with a variety of disabilities, both cognitive and physical (Snell, 1999). Certain applications of ICTs have been shown to have positive and important effects on the educational development of students, exhibiting a great variety of special needs (including blind and deaf students and those who are learning disabled) (Barker & Torgesen, 1995)

For many learners, alternative methods of input to the computer, such as the joystick and touch-screens, may provide easier access to students who have special educational needs (Cromby, Standen & Brown, 1996). The point made by Cromby, Standen and Brown (1996) is that resources like Braille-translation software can be used by disabled students to produce text and Braille versions. According to McDonald, McPhail, Maquire and Millet (2004) hearing-impaired students can also benefit from ICT, where technological tools such as emails can be used to give them quality of access to communication.

2.6.1.12 The Impact on Motivation

The impact on motivation varies. Students' motivation levels are influenced by the types of tools they use and how they use such resources. Availability of resources in the classroom also motivates students, hence providing quality education (Barker & Torgesen, 1995). Sufficient evidence by Adam and Tatnall (2008) indicate that ICT usage can have a positive impact on student motivation; such gains in motivation tend to be linked closely to students who are already the most academically motivated and who are the highest achievers; and this is possible where ICTs can be successfully used in

education (Birch & Sankey, 2008). Cuban (2001) suggests that ICTs be used to improve administrative efficiency; disseminate teaching and learning materials to teachers and students; improve the ICT skills of teachers and students, and allow teachers and students access to sources of information from around the world where they can share ideas on education and learning, collaborate on joint projects, and conduct lessons from a remote location. According to Adam and Tatnall (2008), technology can make a significant difference to educate all students regardless of their educational needs.

2. 7 Factors influencing academics' adoption and integration of ICT

It may be noted that the academics' adoption and integration of ICT in education is influenced by both industrial and individual factors (Birch & Sankey, 2008). According to Birch and Sankey (2008) personal factors would include opportunistic, practical, psychological and pedagogical motivations and inhibitors. They outline these factors as below:

2.7.1 Institutional factors

The basic factors which contribute to the success of the adoption and integration of ICT in the education system are organisational and administrative support, professional development and training, peer support, mentors and the presence of technology professionals (Afshari, Abu Bakar, Su Luan, Abu Salan & Fooi, 2009). At a practical level, sufficient administrative support and the necessary infrastructure and resources are essential facilitators of educators' adoption and integration of ICT into teaching and learning. Birch and Sankey (2008) state that some of the contributing factors which enable effective ICT integration include the involvement of specialised personnel for the use of technological materials and training of other academics in the best ways in which ICT can be integrated into the curriculum.

Betts (1998), Covington, Petherbridge, Egan and Warren (2005) and Moser (2007) assert that peer support, the presence of mentors, role models and technology champions who are prepared to collaborate and share their experiences, conduct workshops and coach colleagues in the use of technology, also appears to lead to more rapid diffusion of ICT

among academics. They provide an example of a situation where early ICT adopters experience success in ICT implementation and become interested in encouraging others who may eventually consider adopting the same strategies. Cuban (2001) asserts that using ICT for instruction can only be used effectively if teachers perceive it to enhance their instruction.

2.7.2 Opportunistic motivation

Dowling, Moore & Brown (2005) define opportunistic motivation as the opportunity granted to users of particular resources, enabling them to successfully and effectively gain good results of whatever they are doing. Most of the educators who have successfully integrated ICT into their teaching and learning have identified the opportunities granted to students (Moser, 2007). In an effective ICT integration, students are provided with access to rich sources of information on the internet which incorporates hyperlinked examples and activities into courseware, serving as a motivating feature in exploring the use of technology to enhance teaching practices (Schifter, 2002). On the other hand, educators incorporate the opportunity to integrate multimodal elements into their courses with the technology usage to provide a more engaging and interactive learning environment for their students (Cartwright and Hammond, 2007). The major concern in opportunistic motivation should be based on the cost of adopting and integrating ICT into education (Dowling, Moore & Brown, 2005).

2.7.3 Pragmatic motivation

Maguire (2005) argues that pragmatic motivation for the adoption and integration of ICT includes the desire of academics to respond to the students' needs for greater access, flexibility and convenience in the use of ICTs for their learning purposes. For Schifter (2002), ICT is a key motivating factor for academics' participation in providing extra flexibility in students' distance education, in terms of place, mode and time to study. Wolcott and Betts (1999) confirm that some academics are driven by passionate motivations to do what makes life easier for their students. Providing the convenience of communicating effectively with students via electronic means, independent of time and place is perceived to be genuine advantages (Ebersole & Vorndam, 2003).

For the successful adoption and integration of ICT, some academics argue that lecturers need to be trained to use technology to enable them to use technology-based courses which are to be accepted and valued by their students (Carroll-Barefield, Smith, Prince & Campbell, 2005).

2.7.4 The Psychological Motivations and Personal Characteristics

Academics' perception of technology influence their decision to engage in the use of ICTs in teaching (Moser, 2007). Educators who enjoy the intellectual challenge of developing and testing innovative ideas, gain personal satisfaction for integrating ICT into their teaching (Clark, 2004; Carr, 2007; Brown, 2005).

Successful ICT integration and using technology for innovative purposes seems to be considered a success for educators who are considered innovators and early adopters of these new technologies (Rogers, 1995). Rogers argues that academics who are more exploratory are more likely to try new innovative ideas than less adventurous academics. ICT adoption provides educators with a feeling of renewal, and provides them with an opportunity to reinforce their teaching (Jones & Kelly, 2003). The consideration of the educators' attitudes towards technology usage, where they consider the advantages of the use of technology over the use of other current methods, compatibility with other current practices, perceived usefulness and perceived ease of technology use, should be the primary determinants of what should be adopted (McDonald, McPhail, Maguire & Millet, 2004; McAlpine & Gandell, 2004).

Earle (2002) and Capobianco and Lehman (2004) point out that underpinning any genre that is being used to design and deliver learning resources is the sound and clear pedagogical rationale to avoid educators' failure in integrating ICT into education. The use of ICT should be motivated by pedagogical needs and goals, where educators aim to improve the learning outcomes of their students by enhancing their cognitive and social outcomes, with the intention of developing lifelong learners (Sankey & Hill, 2005).

ICT should be designed to achieve more learner-centred active learning, to improve student inquiry, and to encourage high-order thinking (Capobiano & Lehman, 2004; McAlpine & Gandell, 2003). According to Eastman and Swift (2001) and Maguire (2005), educators who have the desire to integrate and adopt ICT effectively into their teaching should be driven by their need for students to communicate effectively in an electronic environment, and should be competent in the use of multimedia. The need for a technology-rich society requires the development of more flexible textual practices that cater effectively for ICT implementers to function in varied contexts (Leu, Kinzir, Coiro & Commack, 2004). This argument maintains that these practices include the involvement and commitment of educators.

2.8 Barriers to ICT integration

The classroom environment is a complex and dynamic one in so far as teaching and learning are concerned. It places a high level of demand on the teacher, especially when s/he attempts to integrate innovative tools or practices in his/her classroom situation (Lim & Khine, 2006). Caroll-Barefield, Smith, Prince and Campbell (2005) argue that one of the greatest challenges that the integration of ICT in education faces is overcoming the barriers to the integration of technological tools into teaching and learning. They categorise the ICT barriers into two orders: first-order barriers and second-order barriers.

2.8.1 First-order barriers

According to Ertmer (1999, p.50), first-order barriers to ICT integration are "obstacles that are extrinsic to teachers". Ertmer, Addison, Lane, Ross and Woods (1999) assert that first-order barriers include obstacles such as lack of access to an ICT infrastructure, insufficient time available to teachers to prepare adequate instruction; where they are allocated a maximum time of 45 minutes for one lesson, as well as lecturers' ignorance and inability to familiarise themselves with ICT integration.

Atkin and Vasu (2000) and Sandholtz (2001) argue that inadequate technical and administrative support is another contributing factor to the failure of an effective ICT integration. Supporting what other researchers have emphasised, Rosen and Weil (1995)

state that a lack of training provided to lecturers is a barrier to the effective integration of ICT in education. To familiarise themselves with ICT tools outlined barriers, Lim and Khine (2006) argue that the need to problem solve ICT technical issues could make it difficult to students to conclude lessons in given time frame.

2.8.2 Second order barriers

Ertmer (1999) discusses obstacles that slow down fundamental change towards ICT integration and points out that these can be said to be second-order barriers. According to him, second-order barriers are based on lecturers' underlying beliefs about teaching and learning, and are sometimes not immediately noticeable to others, or even to the educators themselves. According to Lim and Khine (2006), second-order barriers cause more difficulties than the first-order barriers. Their perception is that second-order barriers are less substantial, more personal and are deeply embedded.

Rogers, in *Diffusion and Innovations* (1995, P.24), states that, "it matters little whether or not an innovation has a great degree of advantage over the idea it is replacing. What does matter is whether the individual perceives the relative advantage of the innovation". The examples of second-order barriers encompass educators' lack of belief that ICT enhances the learning process. Zhao and Cziko (2001) argue that lecturers' belief systems about students in their institutions, good teaching in their institutional content, and the role of ICT in their students' lives where teachers are unwilling to change, serve as a barrier to ICT integration.

2.8.3 Other ICT integration barriers

The implementation of Information and Communication Technology services and systems in higher education institutions (HEIs) generally creates many challenges which, if not properly dealt with, have the possibility to lead to heavy investment without corresponding organisational efficiency gains (Tusubira & Mulira, 2008). These challenges include a lack of organisational information policy, lack of top-level commitment, defining the role of ICT as one of the tools, rather than the solution and the core to institutional transformation. According to Tusubira and Mulira (2008), making

ICT responsive to the organisational vision and mission, developing a systematic method of efficient utilisation, a lack of appropriate information resource management and appreciating the critical stages in information systems implementation are some of the fundamental barriers hindering the integration process.

Without the input and acceptance of lecturers in ICT integration, development of educational technology innovations and projects is hindered (Lim & Khine, 2006). Lim and Khine (2006) argue that there should be some set strategies that should be used as a resolution management of most, if not all of the ICT integration barriers.

2.9 Managing ICT integration barriers

Lim and Khine (2006) examine and identify barriers to ICT integration and suggest that research should be affected to find ways in which these barriers can be overcome to support effective ICT integration in education. Lim and Khine (2006, p.3) state that, "different barriers may appear at different points in the integration progress; schools need strategies dealing with these barriers to support teachers in the integration of ICT".

The strategies outlined by Barker and Pearce (1995) as an effective means by which ICT integration barriers can be overcome include professional development, curricula development and technical administration, as well as pedagogical support. They specify that policy-makers, institutional administrators and educators have been searching for appropriate strategies to manage the barriers that hinder effective ICT integration. Adams (2005) advocates that regular programmed professional development opportunities keep lecturers aware of the need to enhance their ICT practices, and to keep them current with the ever-changing faces of ICT, providing them an opportunity to successfully use a variety of ICTs. Management of ICT integration from above calls for an investigation of lecturers' experiences of ICT integration, with the intention of understanding whether they encountered any barriers in the ICT integration process.

2.10 ICT integration in overseas countries

The comparative analysis detailed below indicates ICT integration initiatives for educational innovations in three different European countries, namely: the Republic of Korea, the Federal Republic of Germany and the United States of America.

2.10.1 ICT integration in the Korean Ministry of Education

According to Lee (2003), the Korean Ministry of Education is taking some initiatives of integrating ICT into education started as far back as 1987, when the Ministry of Education published the 'computer Education Strengthening Plan'. The Master plan for Educational Reform designed in 1990 was developed to formalise the use of computers in schools. The concept of computer education initiated a new phase where it was adopted and continuously in use under what was then called 'Educational informatisation' (Lee & Duncan-Howell, 2009). Jung's (2005, p.5) argument is based on Lee and Duncan-Howell's statement, and emphasises that the presidential commission on educational reform and change in contents, methods and objectives concerning the educational system have ensured that "the Korean EduNet is an integral educational internet services for K12 students and teachers managed by the Korean Education and Research Information services". These services have been created to provide more effective ICT training, and allow teacher trainers to search for materials and download self-training resources.

Lee (2003) explains that, in 1996, the Ministry of Education granted the committee's plan and established the Implementation Plan for Promoting Educational Informatization. He asserts that the Korean Ministry of Education proposed seven tasks which would be used as a way forward to integrate ICT into education. The tasks which were set were to build an infrastructure, the development and dissemination of multimedia software for instruction, the diffusion of distance education, advancing an information infrastructure for science and research, database building for academic information, digital library building, and the development of a networked co-research and experimentation system.

According to Lee (2003, p.5), "building an information infrastructure was specified into the distribution of computers for students and teacher use, installation of multimedia equipment, and construction of computer networks enabling internet use in schools". For him, the proposed plan was completed in 2000, where at least one computer lab with both the internet and multimedia equipment was provided in every institution. With regard to the strengthening of ICT education, some aspects of computer education were put into practice; information literacy, education about ICT skills, and utilisation of ICT within the curriculum and information literacy were provided as optional, and regarded as an extra-curricular activity in the regular curriculum.

Lee (2003) explains that since 2001, information literacy was originally regarded as an extra-curricular activity but later became compulsory. Education became compulsory in the elementary schools where it was used in almost every subject. He states that the task of teacher training for ICT use was classified into four categories: firstly, ICT training for in-service teachers, secondly, encouraging study groups for ICT integration into subjects, activation of contents for teachers' use, and introduction of an ICT skill certification skill. Other strategies which were used to promote development and the dissemination of educational contents included hosting educational software exhibitions. According to Jung (2005) the entire integration effort in Korean education, which started in 1980, and was only implemented in 2003 confirms the consistency of ICT integration, especially where the focus is on an effective adoption of ICT into education. In his last remarks Jung (2005, p.5) affirms that ICT integration in Korea is at the stage where "teachers' networking is based on the assumption that professional development should be an integral part of daily practice for all teachers".

2.10.2 ICT Integration in German Education

(Lee, 2003, p.4) states that rapid development of microelectronics in 1980's media education began to embrace the theme of technology". Lee (2003, p.8) states that "with rapid development of microelectronics in the 1980's, media education began to embrace the theme of information technology education. In 1984 the Federal Government – the Lander Commission for Planning and the Promotion of Research, designed a framework

[Information Technology Education] in schools and training. The framework suggests provision of students' ICT experiences, their recognition of basic structures of ICT and utilization of ICTs as well as opportunities and risks that they encounter. To Lee (2003), some strategic ICT integration plans included acquiring the criteria for independent assessment, decisions and actions in all situations where Information and Communication Technologies play an important role and establishing a rationale relationship to Information and Communication Technologies.

Lee (2003) points out that another ICT integration task which was published by the Bund-Lander-Kommision (BKL) in 1987 focused on the overall concept for Information and Communication Technologies, was meant to examine the categorisation of individual experiences with Information Technology, the introduction to the handling of computers and their peripherals, as well as teaching knowledge about the possible application and control of Information and Communication Technologies. Meister (2003) asserts that considerable initiations have been made to integrate ICT into German higher education, where the government has provided substantial amounts of money for the integration process.

Meister (2003) states that the Germany Federal Ministry of Education and research projects support institutions of higher education to make the integration a success. Lee (2003) points out applications such as the introduction into algorithmic representations of problem-solving, insight into the development of electronic data progressing and creating an awareness of the social and economic effects of the diffusion of microelectronics. According to Lee (2003) all these tasks, including the aim of the presentation of the chances and risks of Information Technology building up a national attitude towards technology, and the introduction of problems related to privacy and data protection were among others, and included preparations leading to the successful ICT integration into classroom situations in Germany.

Lee (2003) furthermore insists that, as more was done, educational reform was affected and the previous set tasks were improved where the focus was now more on education; and he adds that the use of interactive technology already used at home and in spare time

would, on the other hand, become an essential tool for teaching. In an advanced ICT integration process, development of skills in dealing with media and computers (media skills), communication and cooperation with other schoolchildren and schools across the world, including the creative preparation of new teaching and learning materials suitable for the media, and the use of databases and libraries were among some ways in which teaching was conducted in Germany (Hellens, Clayton, Beekhuyzen, & Neilsen, 2009) Hellens, Clayton, Beekhuyzen, and Neilsen (2009) noted that, among other improvements in the education sector in Germany, was the exchange of teaching concepts and laterals, especially in re-training teaching staff and changing the role of the teaching staff to the more advanced and transformed pedagogical structure. Hellens, Clayton, Beekhuyzen, and Neilsen (2009, p. 11) claims that in Germany "student are using computers regularly so they are not unfamiliar with them, which can be a great start to enter ICT pathway at tertiary level". Although ICT integration in Germany is progressing von Hellens, Clayton, Beekhuyzen, and Neilsen (2009, p. 11) declare that "common challenges faced by German teachers are lack of resources and training".

According to Lee (2003), in 1998 additional funds were provided to German Schools to fulfil the set tasks of integrating ICT into education. At the time, an initiative of launching the internet in primary schools had gone beyond schools' boundaries, and had encompassed citizens' projects. Teacher training was such a basic portfolio in the promotion, that the Ministry of Education authorised a particular project that would develop a model for ICT education in teacher training at university level (Lee, 2003). Despite various efforts which have been made to update ICT integration in Germany, Schulz-Zander and Kristine (1997) argue that German schools are still lagging behind with an average percentage of 2.92 of students and 5.12 of educators having access to the internet.

The argument that Lee (2003, p.7) presents as a barrier to the rapid ICT integration in Germany is that "German society still takes a critical attitude within media education tradition while sinking into a competitive world in terms of ICT integration at the national level". His perception is that the German society's critical attitude towards the

media seems to be hindering their technological development, encouraging their traditional and cultural techniques to remain in sight.

2.10.3 ICT Integration Initiatives in American Education

The United States of America has, since 1998, initiated a series of educational reform measures in order to get ready for an information-reliant society (Lee, 2003). According to Lee, in 1998 the Star Schools Program was launched as a means of improving instruction in school subjects, particularly with regard to traditionally under-served students. He asserts that new technological tools were used to capitalise on new interactive communication technologies, which include satellite delivery systems, open broadcasts, cable, and the internet. He points out that this education reform was based on the delivery of distance education courses and the services which were conducted primarily in the United States of America and globally as well as the rest of the globe. As a follow-up to their previously launched program; the American government initiated the AMERICA 2000 reform. Its focus was on discussing the then educational problems in a summit held in 1991, where 50 governors were invited (Lee, 2003). According to Lee, some educational reforms such as the 1994 [GOALS: AMERICA 2020], the 1990s [National Information Infrastructure Act] and the 1993 [National Competitiveness Act], **all discussed the issues of ICT integration into USA education.**

Measures to effectively change the previously acts which did not successfully satisfy the integration of ICT, were taken and new Acts were proposed to integrate comprehensive systems for the acquisition and use of technology and technology-enhanced curricula, instruction and administrative support resources/services all of which would then be used to improve the delivery of educational services (Sang, Valcke, Van Braak & Tondeur, 2009). Lee (2003) reminds us that, in 1996 the [Technology Literacy Challenge] announced four operational goals which were intended to meet educators' and students' needs. These stipulated that all teachers in the nation would have the training and support they needed to help students learn using computers and the internet. All teachers and students would have modern multimedia computers in their classrooms. Every classroom

would be connected to the internet and effective software and online learning resources would be an integrated part of every school's curriculum.

According to Sang, Valcke, Van Braak and Tondeur (2009, p.7) "ICT integration is influenced by the complex of students teachers' constructivist teaching beliefs". Their argument is that, although some promising ICT integration developments have been made in America, there is still a "need for the development of pre-service teachers' confidence, knowledge and beliefs about technology".

To help further the comprehensive ICT integration related national policies, the USA administration financially supported the various programs which made initiatives for successful ICT integration (Lee, 2003). Lee asserts that sets of ICT integration-related policies were designed in 50 American states, where each state addressed the issue of teacher training, staff development, and financing for technology. His perception is that a great deal of success in ICT integration has been achieved in America. Despite all the initiatives that are being taken by European countries to integrate ICT into education, developing countries are still struggling to effectively adopt ICT into their higher education teaching and learning programmes.

2.11 Developing Countries and ICT Integration in Schools

Integration and use of electronic information resources has created subsequent changes in the provision of information, where professionals integrate ICTs into their teaching (Watt & Ashcroft, 2005). Watt & Ashcroft state that since the integration of ICTs into education, the discussion has been on the impacts that the integration would bring, and the information gap between developed and developing countries. To add to what Watt & Ashcroft (2005) have indicated regarding ICT integration in developing countries, Fong (2009, p.471) specifies that "It came to light that technological disparities can occur within single developed countries rather than between developed and developing countries".

2.12 ICT Integration in African Countries

An investigation of teacher training in ICT in African countries at both in-service and pre-service levels, with respect to the development of African teachers, reflected that the focus is on the developing teachers' theme-based capabilities, (ICT integration) or contextual ICT skills (Watt & Ashcroft, 2005). The preference here is for ICT skills which need to be integrated into teaching practices. The findings of different studies such as Lee (2003) indicate that most African countries have identified the requirements to start with; and have outlined developing teachers' basic ICT literacy as a priority for ICT integration into the classroom.

The other question that needs attention is whether the focus should fall on capacity building in pre-service or in-service teachers. Although the preference in Watt & Ashcroft's (2005) case is to train both pre-service and in-service teachers, an obstacle exists regarding the available ICT resources; where the suggestion is in favour of training pre-service teachers whose desire for change is greater than that of in-service teachers (old dogs don't like new tricks). According to Fong (2009) the current ICT gap in African pre-service teacher training and the need to transform the current teacher training colleges is an essential issue to consider before we can even think of possible pre-service ICT teacher training. In most African Teacher Training Colleges, the lack of infrastructure and the lack of ICT trained teacher educators serves as a contributing factor to transformation.

The importance of matching the mode of delivery and the type of training to the audience in order to ensure cost effectiveness and successful integration after training should be considered a priority in the ICT integration process (Fong, 2009). Fong's perception is that it would be a waste of money if teachers are provided with ICT skills which require a complex ICT infrastructure yet the tools at their disposal are so basic that they cannot put what they have learnt into practice.

Bridges.org (2002) asserts that as a way of balancing grassroots perceptions against the considerations and priorities of national government towards ICT integration into South

African schools, the importance of sufficient access to ICT has been considered a priority in the ICT integration process. The assumption is that, if teachers are able to truly realise the potential transformative beliefs of ICT integration in education, then ICT integration will be possible and also that cultural language and cultural relevance are contributing factors in ICT integration.

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According to Wilson-Strydom and Thomson (2005) most of the courses which are held to teach African teachers ICT skills are conducted through of face-to-face instruction, and are designed to teach basic ICT skills. They are not linked with pedagogy. The findings outlined by Wilson-Strydom and Thomson (2005) indicate that few of the African teacher training colleges offer pre-service ICT training. All higher education institutions seem to be in the process of integrating ICT into their education systems, and South Africa is not an exception.

2.12.1 The Integration of ICT in African Higher Education Institutions

Brown, Thomas, Van der Merwe and Van Dyk (2007) declare that African higher education institutions are at the point where they are striving to improve their Information and Communication Technologies (ICTs) infrastructure, content and skill; making resources available to meet the growing needs of students and faculty; and responding to the pressure for effectiveness. He also outlines that institutions are confronted with the dilemma of turning ongoing ICT initiatives into opportunities, and understanding what ICTs mean to the transformation of higher education in general, and to research and learning.

2.12.2 ICT Integration in South Africa

In 2003 the South African government designed and implemented the draft White paper on e-education, transforming teaching and learning through ICT, where the Minister of Education indicated that the supply of a telecommunication infrastructure for learning and teaching is gradually increasing, and many schools are expected to exploit the benefits of ICT to enhance the quality of teaching. The minister stated that the

introduction of ICT in South African schools should create new possibilities for learners and teachers, where teachers are expected to engage in new ways of information selection.

The study conducted by Govender (2006) about Information and Communications Technology (ICT) in teaching and learning set out to investigate whether educators in KwaZulu-Natal have the necessary attitudes and competencies needed to achieve the goals set in the specified White Paper, that is, whether they are competent enough and ready to use ICT in their educational environments. The findings of this study indicate that some educators found the use of technology in teaching and learning beneficial, and stated that "computers can enhance learner's learning". A small percentage of educators however, still found the integration of technology in teaching and learning to be a waste of time and said "school will be a better place without computers". It is because of the educators' attitudes that ICT integration in South African schools has not yet been effective. Govender (2006, p. 137) specifies that "lack of educators' involvement in technology has been caused by lack of suitable training". In conclusion, he asserts that "pedagogical beliefs and practices are more difficult to change and many educators do not want to change them" (p.151).

Govender (2006) specifies that where educators are eager to integrate ICT into their teaching, they are restricted by the lack of the necessary skills and, as a result, continue using their traditional strategies. Innovations in South Africa affect Lesotho positively or negatively, and this is true of the integration of ICT. Kalanda and De Viliers (2008), state that South African teachers' confidence and skills levels are higher than those of the Lesotho teachers. They also argue that South African schools have accepted infrastructures with ongoing maintenance programs for hardware and software, all of which are managed by an external service provider. The other factor that they focus on is that Lesotho and South African teachers ought to attend workshops and computer fairs as a way of developing their skills and confidence in ICT integration. The previous studies such as Marumo (2006) regarding ICT integration in teaching propose that appropriate strategic planning should be done, whereby teachers get appropriate training and adequate resources which they can use to transform and integrate ICT into their teaching

strategies. All of these issues should be carefully considered before even thinking of integrating ICT into teaching.

2.13 The Lesotho National ICT Policy

Isaacs (2007, p.2) avers that "despite its poor infrastructure and high levels of poverty, Lesotho has begun to take the necessary steps to promote higher levels of ICT access and usage in its communities and education institutions". As an initiative to ICT integration, the MoET has aligned its existing education strategy which outlines the role of ICTs with the national ICT policy whose stated vision is 'to create a knowledge-based society fully integrated in the global society by 2020'. Marumo (2006), states that the vision predicts the successful development and operation of ICTs by 2015. He asserts that besides the ICT policy vision, the policy also outlines its mission, which is to "fully integrate Information and Communication Technologies throughout all sectors of the economy in order to invest in ICT education and human resource development by requiring that ICT literacy and training programmes be available throughout the education system, and within the public at large". This will ensure a growing resource pool of ICT professionals with standardised skill sets and can guarantee that appropriate incentives are in place to retain these workers and provide an assurance of lifelong learning among the population at large, promoting on-the-job training and retraining within the public and private sectors, and promoting electronic distance learning to maximise scarce resources that expand access to educational training and research.

Isaacs (2007, p.5) asserts that "educational institutions also feature among the key stakeholders identified to play a major role in realising the policy, by improving teaching and learning mechanisms that promote ICT literacy and produce local ICT products and services". His emphasis is that these institutions should ensure that ICT literacy is part of the core curriculum, and that they should use ICT to expand access to education, as well as to improve the quality of teaching and learning.

2.13.1 The Implementation of Lesotho ICT Policy in Lesotho Education

Lesotho teachers are eager and keen to continue integrating technology into education, and to use it as a teaching and learning tool where the integration is yet to emerge (Kalanda & De Villiers, 2008). In their study, Kalanda & De Villiers identified the following main issues that hinder ICT integration in Lesotho: teachers require appropriate training and workshops; more time should be set aside for technological orientation, and lesson planning should be restructured to suit the ICT integration process. They assert that students' use of computers and hardware and software infrastructures require systematic maintenance and upgrades.

Marumo (2006) outlined that all Lesotho institutions were supposed to integrate ICT in the teaching and learning of all school subjects. In her findings, Marumo (2006, p.63) outlined that "the ICT policy document published by the Ministry of Information Science and Technology in 2005 did not include guidelines for educators on how to implement ICT at schools". She states that the lack of available guiding tools hindered ICT integration in Lesotho schools. According to Marumo, financial restrictions are also contributing factors which serve as obstacles to ICT integration in secondary schools.

Marumo (2006) outlines that ICT personnel were unqualified teachers who were computer literate, but had no skills with which to integrate ICT into their teaching. As a result, they used their own discretion, basing their integration on the skills which they had. The conclusion that Marumo reaches is that ICT is not effectively integrated into teaching and learning in Lesotho secondary schools. More research needs to be carried out in teacher training colleges/universities (higher education institutions) to understand the initiatives that could be taken to integrate ICT in their teaching and the way to prepare teacher trainees.

2.14 Lesotho Education and Training Background

The Lesotho government serves as the main provider of education and training and is responsible for almost all education sub-sections operating under the education system in terms of policy-making and financial support (Mofokeng, 2008). According to

Mofokeng, the Lesotho education system policy is highly influenced by international and regional initiatives such as 'Education for All' (EFA), The Millennium Development Goals (MDGs), the South African Development Community (SADC) Protocol on Education and Training and the New Partnership for Africa's Development (NEPAD). She states that at a national level, the 1993 constitution of Lesotho, Vision 2020, Poverty Reduction Strategy Paper (PRSP), and Public Sector Strategic Plan (PSSP), provide the focus for the long–term future, thus laying the ground for a favourable legislative and policy environment.

As a way of achieving the 2020 vision which states: 'by 2020 all Basotho shall be a functionally literate society with well-grounded morals and ethical values; adequate social scientific and technical knowledge and skill', the PSSP stipulated goals and objectives which are supposed to have some implications for both distance and open learning systems (Mofokeng, 2008). She indicates that PSSP's goals and objectives include improvement and access, efficiency and equity of education and training at all levels, improvement of the quality of education and training in all Lesotho schools, and ensuring that curricula and materials are relevant to the needs of Lesotho, and are conistent with appropriate standards and are gender responsive. According to Mofokeng (2008) some of the objectives of PSSP are to ensure that both vocational/technical and non-formal education programs respond to the needs of industry and the communities in general, and achieve the equivalence, harmonisation and standardisation of the education and training systems nationally, regionally and internationally.

As a way to achieve the PSSP outlined objectives, Mofokeng asserts that the Lesotho Ministry of Education and Training (MoET) has recognised the need to improve the quality of teaching and training in the country. It has also therefore taken some initiatives to adopt ICT in education services. Mofokeng (2003, p.3) asserts that, "it sees the existing knowledge of or information gaps (the digital divide) between itself and the advanced world as a development constraint". As a result a national ICT policy has been developed in order to provide a framework for utilisation of ICTs". The ICT policy specifies that ICTs will be used to facilitate education and lifelong learning and

support the private sector in the delivery of on-the-job training programmes (in-service training).

Open learning, distance and online learning are used interchangeably, and serve similar purposes of providing learning to in-service students, replacing the face-to-face tutor-learner interaction (Fiee, 2006). To add to Fiee's argument, Lesotho Ministry of Education and Training (1995) explains that the Lesotho Open Learning and Distance Learning (ODL) Objectives are to provide high quality educational programmes at all levels, to create human resources for the world of work, to provide opportunities for continuous professional development and lifelong learning for improved livelihoods, and to enhance the use of ICTs and multimedia to increase access to quality ODL programmes.

According to Mofokeng, the National University of Lesotho (NUL) and the College of Education in Lesotho (CEL) are currently dual mode institutions which offer Open and Distance Learning (ODL), where both institutions currently use print as the only source of communication in their Teacher Distance Education Programmes; although some initiatives are still being made to improve this situation. To verify Mofokeng's findings, the researcher decided to take measures that would investigate ICT integration in the College of Education in Lesotho. The above literature together with the theoretical framework, have been used to inform this study.

2.15 Conclusion

The literature review of this study serves as a guide to understanding how ICT integration has been investigated by other researchers. It has specified and categorised various types of ICTs used in the integration process. It has also outlined different ways in which ICT resources can be used to mediate teaching and learning in the classroom situation. The literature has also been used to denote the benefits of integrating ICT into teaching and learning. The challenges which other scholars have outlined in as their findings have been

summarised in this chapter. Finally, the researcher has outlined the findings of studies regarding the integration of ICT in other countries.

The contents of this chapter provide a general idea of what researchers from different countries and different contexts express as their findings regarding ICT integration in teaching and serve as a guide to the study under exploration. In the next chapter, this study focuses on the explanation of the theoretical framework which has been used to guide this study.

CHAPTER THREE

Theoretical Framework

3.1 Introduction

A theoretical framework is the theoretical perspective (Draper, 2003) which is used to guide the study. According to Jokela (2001) a research framework defines the categories of output the research can produce. Jokela further asserts that, a research framework can be used to a set of different research activities that can be used to produce specific outputs. In this study the theoretical framework has been used as a basic approach by which the researcher understands the process of integrating ICT into teaching and learning. The contents of this chapter have outlined the activity theory and its models and principles which have also have been discussed in detail in this chapter. These are the fundamentals of this study which will in Chapter Five be used to analyse the findings of the current study.

To understand the way in which ICT is being effectively integrated into teaching and learning, the researcher based this study on the activity theory of the technology adoption theories which serve to answer the critical questions, and act as the theoretical framework of the study at hand. The social learning theory focuses on the learning that occurs within a social context, and considers that people learn from one another, including concepts such as observational learning, imitation, and modelling (Wilson, 2007).

According to Wilson (2004), the concept 'theory' is an explanation of a set of related observations or events based upon proven hypotheses, verified multiple times by detached groups of researchers. All of the above studies indicate that ICT integration needs planning, where community members jointly suggest the rules and strategies to be followed during the integration process. They also indicate that the integration parties should be involved and should use all appropriate ICT integration tools which will enable educators, in the case of this study, lecturers, to successfully integrate ICT into education. The above studies indicate that, although it is with good intentions that ICT is integrated

into teaching, obstacles hindering the integration process are always encountered and may often hinder the integration processes

3.2 Activity theory

Activity theory was founded by the Russian Psychologist Vygotsky (1896 to 1934). Vygotsky (1978) claims the activity theory to be a socio-cultural lens through which researchers can analyse human activity procedures. Vygotsky's argument is that the activity theory should be used to determine the integration of human activity and awareness within the environmental context. Mezirow (1997), the founder of the transformative theory, asserts that the activity theory provides a wider conceptual framework which can be used to understand the social and cultural setting of integrating ICT into teaching and learning. In the current study, the researcher intends to observe and interview lecturers at a teachers' college, which is their natural setting. The target group is the lecturers, from whom the researcher wants to understand how they integrate ICT into teaching and learning.

Mezirow (1997) defines activity theory as a transformative theory used as a process of becoming changed by what one learns in some meaningful ways. In this study activity theory is used to understand the lecturers' experiences when integrating ICTs into teaching as a transformative strategy used in the twentieth century. According to Mezirow activity theory defines frames of reference as the structure of assumption through which people see and understand their experiences. Mezirow further asserts that in order to transform, one needs a contribution of resources and power used in a particular way as a means of gaining profitable transformation. With the information provided through interviews, questionnaires and observations, the researcher aims to understand the ICT resources used in the integration process, how such resources have been used in different activities, the impacts of such activities and the challenges encountered in the integration process.

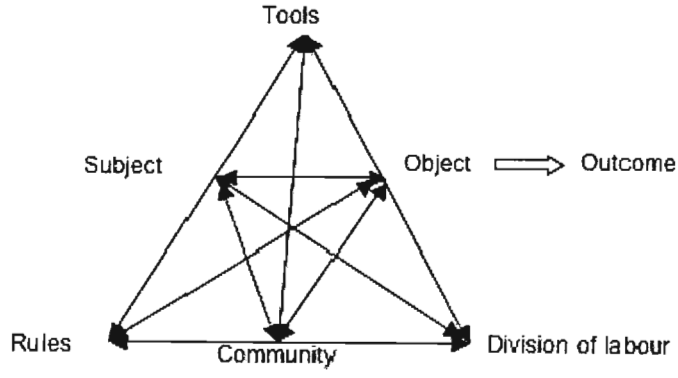
Activity theory provides a descriptive framework for ICT integration, through which concerned parties (lecturers) can better understand and classify the cognitive, physical

and social process of adopting and integrating ICT into teaching and learning, involving a specific task, and how such tasks can be related to a larger motivating activity (Pollini, 2009). The objective of this study is to use activity theory principles to classify cognitive (intentions and objectives), physical (activities in which lecturers engage in when integrating ICT), and social tasks (involvement of concerned parties) which take place in the ICT integration process.

3.2.1 Activity theory in relation to transformation

Lessard, Hagemeinster, and Daile (2007) contend that lecturers should engage in activity in order to have experience which will help them transform. This includes the use of ICT mediated tools, strategies and teaching methods which are different from the ones previously used. This means that they have to change the way they used to do things. While integrating ICT into teaching, ground rules and objectives must be set. This calls for the involvement of parties other than the lecturers. Involvment in ICT integration as a way of transformation may bring about some challenges which lecturers, as ICT adopters may encounter, and these might require their immediate attention if their objective is to obtain positive impacts. Outlined in Figure 2 below is the structure of the activity theory.

Figure 2: The basic structure of the activity theory



(Copied from Mlitwa, 2007).

This study's intention is to develop a way of understanding the types of ICTs used, how these resources were used in transformation from the old usages of resources which were

not ICT devices. The researcher also wishes to investigate in order to understand how lecturers, the college management, the Lesotho Ministry of Education and other concerned parties have set rules guiding the integration process. This study will also focus on exploration, with the aim of understanding the challenges which need to be dealt with as a way to successful ICT integration.

3. 3 The structure of the activity theory

The activity theory involves both societal and individual levels, where it is based on the assumption that particular tools, both technological and non-technological can be used to transform teaching and learning (Lim & Hang, 2003). Rules are set where collaborative practices and certain strategies are followed as a way of testing the hypothesis. This includes setting some objectives, in this case, the integration of ICT into teaching and learning. Subjects (this refers to teachers and students) form groups which can be in the form of learning groups, professionals, community members, government and non-governmental organisations who have the same view and intention of helping to make ICT integration a success. According to Kuuti (1996) these parties work jointly and engage in activities such as training of lecturers, engaging students in project-based learning to make ICT integration a success and to achieve expected positive results. The aim of the study is to understand the lecturers' experiences when integrating ICT in their college. The activity theory structure explained in Figure 4 below outlines the components of ICT integration in teaching.

3.3.1 Mediating tools

Lim and Hang (2003) assert that tools (ICT and non-ICT ones) should be used to mediate between the college and its object (the intention to use ICT as a transformative tool in teaching and learning). Lim and Hang argue for tools and artefacts as resources used to enable ICT integration. Lim and Hang (2003) specify training of senior ICT instructors/availability of ICT personnel, staff training, and use of tools as appropriate for ICT integration. Lim and Hang (2003) further propose that ICT resource-computers (including computer tools) e.g. email/ school websites, digital cameras, videos, cellular

phones, printers, scanners and non-ICT tools: administration of ICT integration facilities, electricity, should be considered a priority in ICT integration in the classroom setting. The researcher intends to use this principle to understand the types of ICTs used to integrate ICT at a college.

3.3.2 Rules

According to Lim and Hang (2003), rules are procedures and policies which mediate the college and the community, and these would include the Lesotho ICT policy (stating the need to achieve the 2020 vision by integrating ICT into all Lesotho schools). Lim and Hang assert that rules can also be explained as transformative teaching methods which are ICT-mediated and are used to integrate ICT into teaching and learning. In this study, the researcher intends to understand how the following rules have been applied in the ICT integration process. According to Kuuti and Virkkunel (1994) tools are enabling the automation of the integration routine.

3.3.2.1 Rules as transformative teaching strategies

Collaboration, project-based learning, informed learning (through the use of the internet) active learning, and authentic learning are also considered to be transformative teaching strategies which make use of ICT integration. ICT-based learning and problem-solving are founded on the principles of ICT integration (Engestrom, 1999).

3.3.2.2 Rules as policies and procedures leading to ICT integration

Rules are used to guide and lead the integration process. The school policy and planning to incorporate the ICT process into its institute's teaching and learning is a basic need for successful ICT use and integration into the college environment. Costs and budgets should be included in the college master plan of ICT integration. The managerial mandate of staff involvement which should go together with support from the college authority throughout the entire ICT integration process should also be included in the plan (Mlitwa, 2007).

3.2.2.3 Subjects

Lim and Hang (2003) indicate that in activity theory; people responsible for ICT integration are regarded as subjects. In this study, lecturers are regarded as subjects because they are the ones responsible for the ICT integration process. The researcher was concerned about the following issues regarding lecturers as ICT integration subjects, and considered the issues outlined below as factors which could possibly affect their intention to integrate ICT into teaching and learning. The researcher wishes to understand how factors such as gender, age, educational background, qualifications, professional background/current work experience with ICT (for own use, using it for teaching, leisure, teaching and resources access status) and availability of this activity (integration of ICT into teaching and learning) can affect the ICT integration process.

3.2.2.4 Object

The intention of integrating ICT into teaching is mainly for transformation. In activity theory, the term object refers to all the motives, aims and objectives leading to ICT integration. The application of new practices and transformations in the teaching and learning field through which ICTs are utilised, are said to be the main reasons for ICT integration in teaching at the college, hence called objects in activity theory.

According to Lim and Hang (2003), in activity theory, objects are the set aims and objectives of the college for integrating ICT into teaching and learning. Objects to be considered in this study include lecturers' experiences of achieving the college aim to work collaboratively online, to use ICT resources to fulfil the requirements of the Ministry of Education that all Lesotho higher education should integrate ICT into learning and teaching of all their subjects. Other issues for consideration are meeting the transformation issues on child-centred learning, where students can find information for themselves from the internet, rather than getting it from their lecturers, and understanding the specific beliefs of lecturers regarding the intention of integrating ICT into the college as well as their (lecturers') engagement and involvement in the ICT integration process.

3.2.2.5 Community

Kuutti and Virkkunen (1994) assume that effective ICT integration will only become available if the activity includes corporate consumers, governments, organisations and individuals. In this study, community is classified into two categories; firstly, community as people, and then community as practices. Kuutti and Virkkunen (1994) state that community in ICT integration enables supporting communicative actions and makes the network of actors visible. Kuutti and Virkkuneln categorise community as follows:

3.2.2.5.1 Community as people

In ICT integration within the college setting there is a learner group. This term refers to all students in the college, school/organisation. In this regard, the college with all its properties forms part of the community, The term 'professionals' refers to the college lecturers, the Ministry of Education, which although it does not control the running of the college still makes certain contributions to the college and its smooth running. Non-governmental organisations who sometimes serve as hardware and software suppliers, Microsoft, and Lesotho telecommunications and the society form part of the college community considering all the contributions they make to the integration process.

3.2.2.5.2 Community as practice

Community as practice within the college in relation to the integration process encompasses pedagogies, didactic integrative discovery, and opportunities for dialogue, where lecturers can voice their opinions guiding the integration paths, structures and processes regarding the integration process. The degree to which learners should have over and the control responsibility to use ICTs is also considered as 'community as practice'.

These are the people who contribute towards the effectiveness of ICT integration, and may include stakeholders from the Ministry of Education and other non-governmental parties which can contribute towards an effective ICT integration. This is normally a group of people who have the same objective and use the same tools to achieve their goal. This study will focus on the exploration of the different parties responsible in the

integration process at the college, in an endeavour to understand the practices which have been used to make the integration process a success.

3.2.3.6 Division of labour

Integration of ICT into teaching and learning is a process which needs involvement of different parties who can contribute towards the success of ICT into teaching and learning. In this study the researcher intends to understand the contributions made by each of the ICT integration parties such as learners, lecturers, ICT personnel/ICT trainers, ICT representatives and lecturers within the management board and the college management at large.

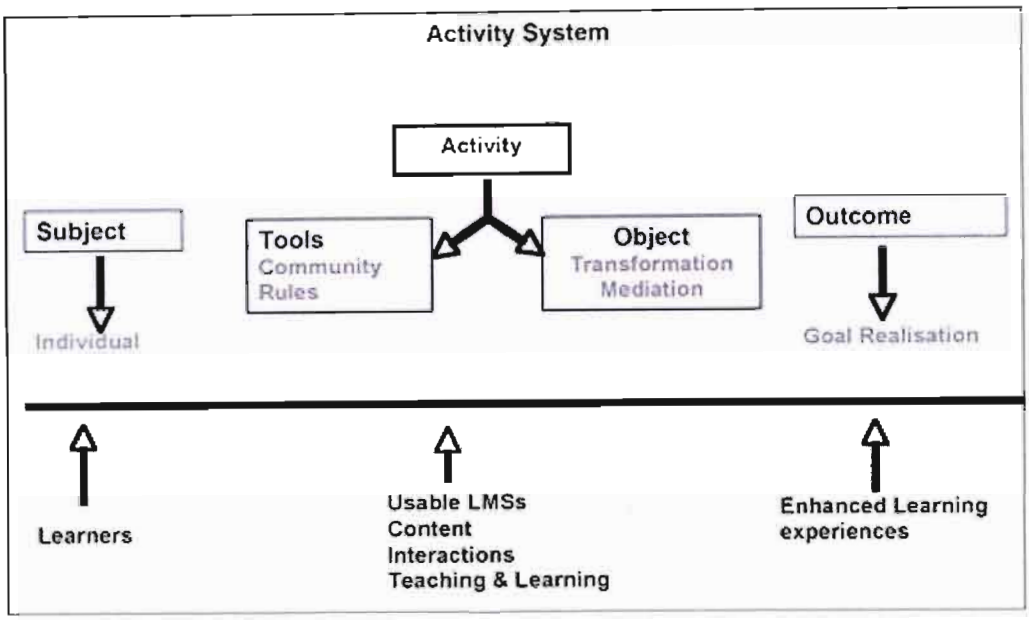
3.2.3.7 Outcomes

ICT integration is based on the hope that it will bring about transformative changes. These expected developments are based on research findings (Lim & Hang, 2003). The researcher intends to explore this issue in order to understand the impact which ICT integration has had on the college. These include the successes, challenges and obstacles which lecturers encountered when integrating ICT into their teaching. The prediction is that ICT integration may bring about outcomes such as active learning, learner-centred learning, collaboration and problem-solving and motivation.

The integration of ICT into an institution is a long-term process and needs special attention from concerned parties; not only the college community, but other parties outside the college environment. It is therefore the researcher's intention to use other scholars' findings to explore the outcomes of ICT integration at a college.

The concepts of the activity theory postulate that the adoption of technology into education systems, ICT integration in particular, has brought about observable outcomes (Mlitwa & Kachala, 2009). Mlitwa and Kachala argue that ICT integration encourages a collaborative activity system which allows all concerned parties to access the college ICT resources, as the way of facilitating the integration process. Outlined below is the activity system.

Figure 3: Activity system



(Copied from Mlitwa and Kachala, 2009)

The model in Figure 3 above indicates how the successful activity system of ICT integration should progress. An activity is ICT integration, and lecturers as individuals responsible for the integration process are expected to deal directly with learners whom they teach. Teaching is like a three-legged pot whereby three parties, lecturers, students and the school authority form a college community. As stated by Feenburg (2003), technology is at this stage regarded as an indifferent tool that merely exists to achieve user purposes.

As part of the college community, the college ICT personnel compile a strategic plan and set rules guiding ICT integration development. The rules they set should correlate with the objective of integrating ICT into teaching with the intention of transforming the teaching strategies. At this stage, ICT users, the curriculum content, and activities performed in the teaching and learning process should provide enhanced learning experiences, hence goal realisation.

3.3 Conclusion

The researcher will use the components of the activity theory, tools, subject, object, rules, community, division of labour and outcomes to analyse the data collected from participants. These participants will have specified the types of tools used at the college, how lecturers as subjects determine rules guiding how such tools should be used, how the college community is involved in the integration as a way of involvement in the integration processes which would eventually bring about expected observable outcomes. In Chapter Four, the researcher attends to the research methodology, explaining, for example, how data collection was effected. The analysis of such data will then be indicated in Chapter Five of the current study. This chapter served to give an overview of the activity theory which will be used to analyse data in chapter five. The next chapter provides the methodology guiding this study, where an explanation for the choice of this methodology will be outlined, as well as an explanation of the data collection strategies followed when conducting this study.

CHAPTER FOUR

The research design of the study

4.1 Introduction

This chapter intends to outline ways in which the researcher went about the data collection process. It also explains the research design and methodology, the research approach, the setting and sample, methods of data collecting, ethical considerations, and permission to conduct the study, as well as piloting of the study.

4.2 Research design

Creswell (2003) defines the mixed-method approach as a sequential explanatory design which involves collecting and analysing quantitative, and then qualitative data in two successive phases within one study. The researcher has identified qualitative methodology as an appropriate approach for the current study. Nevertheless, to a limited extent, quantitative data was used to validate the research findings. Therefore, to some extent a mixed method approach was used.

4.2.1 Mixed Method Approach

This study adapted the mixed method research which Creswell (2003) defines as research involving both qualitative and quantitative data in a single study, or in multiple studies in a sustained program of inquiry. According to Matter (2000), the mixed method approach is an inquiry process of understanding based on a distinct methodological tradition of inquiry that explores a social or human problem, analysis, words, and detailed reports from informants, views and perceptions from observations, and where the study is conducted in a natural setting. The mixed method approach was used because the researcher intended to use interview and observations which would bring out in-depth qualitative information, while questionnaires were used to collect quantitative data from a large population and to allow participants to provide information that they would feel uncomfortable disclosing in face-to-face interviews (Cohen, Manion & Morrison, 2007).

To collect the qualitative data, the researcher engaged in face-to-face verbal description interviews and non-participatory observations. Principles from the activity theory have been used to analyse collected data, and participants' responses were used to outline the categories that were used to discuss the research findings. The assumption in a study conducted like this is that the research findings should answer the critical research questions which are based on the case that has been investigated.

4.3 The Case Study

The researcher considered the case study to be appropriate for this study; because as Adelman, Jenkins and Kemmis (1976) explain, in case studies, the decision is to focus on inquiry around an instance, and evidence is systematically collected. In Hamel and Fortin's (1993) terms, case studies are primarily concerned with the interactions of factors and events, while the full picture is obtained through observations and interviews. Each organisation has its common and unique features, and displays ways in which these features affect the implementation of systems and the way organisations function (Bauer and Gaskell, 2003). The researcher intended to investigate how the College of Education in Lesotho (CEL), as an organisation implements the system of ICT integration into teaching and learning, and to understand how this system affects the way the college is run. The purpose of this single case study was to find internal reality where the research participant lecturers were expected to outline their experiences and perceptions with regard to ICT integration in their context.

4.4 The Exploratory paradigm

An interpretive paradigm is used to collect a variety of material, personal experiences, life story interviews, questionnaires and detailed non-participant observations in their natural setting, with the purpose of understanding the social interactions within that particular context (Denzil & Lincoln, 2000).

In this mixed-method research, an interpretive paradigm was used to explore with the intention of understanding the social meaningful actions of CEL lecturers through the direct detailed interviews, questionnaires and observations which serve to inform the

researcher as to how lecturers integrate ICT in their institution (Neuman, 2000). The purpose was to arrive at understandings and interpretations of how CEL lecturers integrate ICT through the manipulation of ICT resources to sustain their education systems in their social world, which is their teaching and learning by students (Neuman, 2000). To support Neuman's argument, Bertram (2004) asserts that in an interpretive paradigm reality is defined by the interaction between the knower and the known, where direct observation of human activity and interaction in an ongoing and naturalistic setting aims to discover and describe the culture in the educational setting.

4.5 Target Participants

This is a group of entities within a context in which the research method is being conducted (Anderson, 1993). The researcher could have investigated all lecturers at CEL as the research population, but due to financial problems and time constraints, found that it was impractical and disadvantageous (Anderson, 1993) to investigate such a large number, hence a small sample was selected. This has informed the current study.

4.6 The Description of the Research Sample

Sampling is the process of selecting units (e.g., people, organisations) from a population of interest, so that by studying the sample the researcher(s) may generalise fairly obtained results back to the population from which they were chosen (Trochim, 2006). Twenty lecturers were selected from the faculty of Agriculture studies, Science and Mathematics education, Computer studies, Education studies, Technical studies, Religious education, and Language studies.

4.6.1 Sampling Method

The snowball purposive sampling method was used to select participants for this study. In research dealing with people, snowball sampling is used as a technique for developing research participants where existing study subjects recruit future subjects from among their associates, and is affected where it is difficult for the researcher to access the required population (Bell, 2003). Being a foreigner in the CEL environment, it was rather difficult for the researcher to select participants. The only person who could identify the

research participants was the Computer studies lecturer who had previously been introduced to the researcher by a friend.

The researcher used the snowball purposive sampling method because it was one of the possible research methods that could be used. The Computer Study lecturer who was introduced to the researcher identified two female Science lecturers who had previously attended his ICT training and explained the purpose of the study, as well as the importance of their involvement as participants. The two identified lecturers recruited other lecturers who had attended similar training with them, and the number increased until all the twenty participant lecturers had been selected.

4.7 Data collection methods

Mitchel and Jolley (2004) define data collection methods as sources of information. They point out that data collection methods can be used to collect either primary or secondary data. In this study, the researcher used observations and interviews to collect primary data which were qualitative in nature (usually in the form of words). As a means of collecting data directly from informants, the researcher used questionnaires which provided quantitative data (which is usually in the form of numbers, or where one can make counts of words used) which was used to validate the qualitative data (Lankshear & Knobel, 2004).

4.7.1 Questionnaires

According to Lanshear and Knobel (2004), questionnaires are an inexpensive way to gather data from a potentially large number of respondents. They argue that these are often the only feasible way to reach a number of reviewers, large enough to allow statistical analysis of the results. The structured questionnaires, consisting of closed-ended questions, were used as a means of obtaining statistically useful information. The designed questionnaires were given to twenty participant lecturers and outlined the research topic and the purpose of the study. For 100% return of the questionnaires, the researcher hand-delivered the questionnaires which were filled in and collected instantly. Questionnaires were used mainly because they provide information from a large number

instantly, saving the researcher's time and money, yet they also provide information that participants pagemay not be comfortable to mention in face-to-face interviews. Methodological triangulation was used in an attempt to improve validity by intertwining questionnaires, interviews and observations as data collection methods that guided this study. Outlined below is the biographical information of the questionnaire participants.

Biographical information of the questionnaire participants

Participant lecturer profile consists of eleven male and nine female lecturers, all with the university graduate degrees and years of experience ranging between ten and thirty years of teaching experiences. These are the lecturers who responded to the research questionnaires. Lecturer K and R are both from the computer studies, highly ICT literate and responsible for the integration of ICT in the college. Lecturer K is responsible for the School Technology Innovation Centre (STIC), while lecturer R is mainly responsible for ICT resources and maintenance; both lecturers are computer studies lecturers. Lecturer A, Q and M are in the faculty of Agriculture and environmental studies. Lecturer Q is ICT literate and very eager to integrate ICT into her teaching, but does not have enough skills that can be used to do this.

Lecturer A and M have undergone ICT literacy trainings, but can only use ICTs for communication among themselves and other lecturers, not for teaching. For lecturer B, C and L from the Mathematics department ICTs are only for computer studies lecturers, they have each, undergone ICT literacy training only once and felt that it was too difficult for them to use as a teaching resource as a result do not bother to integrate IT into their teaching. Four lecturers, lecturer D, P, Z and I, computer literacy training was only a refresher source for those who were already literate. Only lecturer I felt that ICT integration was a need, as a result is taking major initiatives to integrate ICT into her teaching, although sometimes affected by the fact that students know more than he knows about the utilization of ICTs in the college.

Lectures MZ, PR, LM and AB are the heads of departments in the faculties of Education Studies, Agriculture, Mathematics and Science and Language studies, they are all

computer literate and responsible for ICT integration in their departments, they encourage lecturers in their departments to attend the training sessions, but do not give them as a mandate, hence leave the trainings optional. Lecturer H is a Religious education lecturer who is computer literate and believes in the impacts of ICT integration in the college, but does not intend to integrate it into his teaching claiming that it is difficult to use in the teaching situation. B, N, and C were from Home economics department, ICT literate and had each, attended ICT training, but once. Lecturers O, U, and V were from technology education and apart from the experience that they claim to have obtained from their prior universities, had not attended any ICT training in the college.

4.7.2 Interviews

An interview is a conversation between two or more people (the interviewer and the interviewee) where structured questions are asked by the interviewer to obtain information from the interviewee (Best, 2003; Cohen, Manion & Morrison 2007). Interviewing is a technique that is primarily used to gain an understanding of the underlying reasons and motivations for people's attitudes, preferences or behaviour (Henning, Rensburg & Smith, 2004). The principal advantage of interviews is its adaptability, where probing can be used (Borg, 1981; Best, 1997).

In the current study, a semi-structured interview schedule (see Appendix C) was used to interview lecturers. Three lecturers, one female, and two males were interviewed for a period of twenty to thirty minutes. The three interviewees were selected from the sample who answered the questionnaires. The two males were selected because they were competent in facilitating ICT integration, while the female lecturer, though not competent, was ICT literate and reflected her ICT literacy when responding to the questionnaire.

The researcher intended to use interviews because they allow for probing where clarity of questions is required and obtained for provision of accurate information. The researcher was able to gain silent information displayed through tone of voice, facial expressions and hesitations (Henning, Rensburg & Smith, 2004). In this study, interviews were used

to pilot the observation method. The use of a tape recorder and a digital camera was negotiated with participants prior to the interview and observation processes.

The researcher explained the research topic and indicated why she was conducting such an interview. Best (2003, p.182) asserts that, "the interviewer can explain the purpose of his investigation, and can explain more clearly just what information he wants". Detailed-oriented elaboration and clarification probes were done during the course of the interview where the researcher had to ask follow-up questions.

After the interviews the recorded interviews were played back while the researcher and the concerned participants individually listened to what had been said. The reason was to clarify what both the researcher and participant might think needed explanation. According to Best (2003, p.183), "interviews recorded on tape may be played as often as necessary for complete and objective analysis at a later time". To validate data obtained through questionnaires and the interviews, the researcher also engaged in a non-participatory observation where direct observation was intended to see the types of ICT which were used, how they were used and the impacts that would bring.

4.7.3 Non-participatory observation

"Both reliability and validity of observation are improved when observations are made at frequent intervals by the same observer" (Golafshani, 2003). The researcher used non-participatory observation as one of the research methods because particular focus had to be directed to aspects which would answer the critical research questions. The observation checklist was used to help the researcher focus on only those issues which would answer the research questions. To validate the observation sessions, the researcher was engaged in two observations which were carried out at two different intervals. The first observation was done in the first semester, while the other one was done in the second semester.

During the observation, the researcher recorded all the required information instantly; recordings included the types of ICTs which were used in the lecture room, how those

ICTs were used, and the researcher could also determine the problems encountered in relation to the use of IT during the observation. The researcher also identified the impact of ICT adoption in the classroom. (Some impacts which were not identified were outlined by the lecturer during the break period). Facts which were observed included the layout of the classroom, number of students, number of students per computer, types of ICTs which were used, and the role of the students; these included their engagement in activities. Teaching methods used during the observation, observable impacts of using ICTs and identified obstacles were among the issues observed.

According to Best (2003), observation methods enable insight into real classroom situations, where the researcher does not have to rely on the opinions and perceptions of the participants, but sees what the sample used for this research have given as their responses.

4. 8 Sample area

This case study was conducted at a College of Education in Lesotho (CEL), the only teacher training college in the country. The college is comprised of campus A and campus B. Campus A serves as the main campus, and is situated about three kilometres from the Maseru Municipality. The college offers training for both in-service and pre-service courses in primary and secondary studies. The college was chosen as the sample area because teachers who are being trained in this institution are the ones who face the real world of education after their training, and, if well-trained in ICT integration, would successfully integrate this into their schools, as a result fulfil the national ICT policy objective. Secondly, campus A could easily be reached by the researcher, and lastly, the researcher's assumption was that this campus would be better resourced compared to campus B which had only recently been opened. Facts and interpretations collected from campus participants were used as the findings of this study.

4.9 Facts and interpretations

Bertram (2004) defines a fact as anything certainly known to have occurred or to be true. According to Goddard and Melville (2001), facts are merely a way of identifying a phenomenon around us, and they specify that there are different ways of obtaining these facts. This can be through literature, where most of the work is done by scholars who have done similar research in different aspects of life. Other ways of getting facts are through observations and interviews and questionnaires. In this study, the researcher engaged in an extensive review of literature that provided information regarding integration of ICT in higher education. The researcher used face-to-face individual interviews, questionnaires and non-participatory observation to confirm and validate the literature data. The validity and reliability of the research were confirmed by various data collection methods and the related literature.

4.10 Reliability and Validity

Reliability and validity in social sciences simply means the trustworthiness of the study. The commonly used words to define reliability and validity in a qualitative research are credibility for reliability (meaning the trustworthiness of collected data), and consistency for validity (meaning the uniformity of collected data) (Golafshani, 2003).

4.10.1 Reliability

Reliability in applied educational measurement may be defined as the level of consistency of data measurement, or its sustainability over time. It is the degree to which an instrument measures the same way each time it is used under the same condition with the same subjects (Cohen, Manion & Morrison, 2007; Best, 1997). To test the reliability of the instruments that were used for data collection, the researcher investigated the participants in June, and repeated similar investigations in August. The researcher's assumption was that implementing the research measurement at two separate incidences would prove relevance of the study, hence proving the reliability of the research instruments. Validity of this study was also considered.

4.10.2 Validity

The strength and the consistence of the research findings are referred to as the validity of the study which Denzil and Lincoln (2000) defined as the best available approximation to the truth of a given assumption, suggestion, or conclusion. According to Mouton (2001), although research for ultimate truth is an indefinable ideal, interpretations of data should be based on valid data. To validate all facts collected from participants, the researcher used the mixed mode approach which Creswell (2003) argues to be one of the ways used to construct validity of the research. The researcher also used theoretical triangulation and methodological triangulation to validate the findings of this research.

Participants were entitled to the option of being informed of the study results, given their contributions during the investigation; addressing this desire would be consistent with the principle of respect for persons that govern much of the ethical foundation (O'Donoghue & Punch, 2003). The researcher therefore decided to present the research findings to the research participants as one way of validating the research findings. Cohen and Manion (1986, p.69) argue for triangulation in a study and assert that "finding ways to permit interested participants to learn the results of their studies in ways that do not place burdensome demands on investigators and staff is essential if we are to conduct research with full respect for the participants".

4.10.3 Triangulation

Triangulation is an attempt to map out, or give a more detailed and balanced picture of the situation. It provides the richness and complexity of human behaviour by studying it from more than one standpoint (Henning, Rensburg & Smith, 2004). Triangulation is used as a method of cross-checking data (Cohen & Manion, 1986; O'Donoghue & Punch, 2003). In this study, the researcher used investigator triangulation, where, through the literature review, the researcher used the findings of various other researchers who had previously done their studies on ICT integration. Theory triangulation was also used, where the activity theory and models had been used for triangulation purposes. Methodological triangulation was used to validate the findings of this research. Bertram

(2004, p.133) states that "interpretation of data must be based on valid data," hence provide appropriate information collected in triangulated methodology.

4.11 Permission to undertake the study

The researcher wrote a consent letter (Appendix F) to the rector of CEL asking for permission to use his institution as a site of research. The contents of the requisition letter explained that the researcher intended to interact with the relevant faculties of the college during the development of the research. The researcher received a positive response which indicated that the researcher was expected to:

- respect the rights of informants to choose whether to give information and whether to be named;
- acknowledge in the research project this permission, and any written source in the college that the researcher uses and;
- provide the college with a copy of the thesis on completion of the research process and abide by the ethical considerations outlined by the college.

4.12 Ethical considerations

The researcher made sure that before individuals became research subjects, they were notified of the following:

- The research topic, aims of the research, methods, probable benefits and potential dangers of the research;
- their right to withdraw from participation in the research and their right to terminate their participation; and they were granted confidentiality of their responses and anonymity of their names;
- the state of being free from danger as a result of informing the current study;
- and the need for their consent to the use of cameras and tape-recorders and;
- the benefits that the study would bring to them as individuals or to their institution.

According to Lanshear and Knobel (2004), no individual shall become a subject of research unless s/he is given notice about the benefits, dangers, and freedom of

participation, and is granted confidentiality, and provides freely given consent indicating that s/he agrees to participate. Lanshear and Knobel assert that individuals shall only be included in the final report, or in any other communication prepared in the course of the project, if they have given formal permission for their inclusion in the research beforehand. All participants who took part in this study signed the consent forms, granting the researcher the opportunity to use their information when analysing and interpreting the findings of this study.

4.13 Data Analysis, Interpretation and Presentation

The last steps that the researcher was engaged in were to analyse (explain what the data inform or state) interpret (explain what the data means) and present (outline) the findings of the data.

4.13.1 Data analysis

Data analysis consists of three channels of activity that take place at the same time: data reduction, data display and conclusion drawing and verification (Goddard & Melville (2001). According to Bell (2003, p.127) "raw materials data taken from questionnaires, interview schedules and observation schedules and checklists etc need to be recorded, analyzed and interpreted". His emphasis is that a hundred separate pieces of interesting information would mean nothing to a researcher or to a reader, unless they had been placed into categories.

Data analysis means close or systematic study, or separation of a whole into parts for study (McMillan & Schumacher, 1997). The researcher used the principles of the activity theories/models to form themes whose meanings were explained, and outlined the participants' responses under each theme to form categories that answered the critical questions. The discourse analysis was used to analyse collected data where a number of approaches were used to analyse written, spoken and sign language used during the data collection process. Data cannot speak and need to be interpreted in a number of ways so that readers can understand the statements made (Bertram, 2004).

4.13.2 Data interpretation

Collected data is the most important issue in the research; that is why it is very important for researchers to ensure that interpreted data is as valid as possible (Bell, 2003). According to Bell, interpretation of data can only be as valid or truthful as the data collected. Interpreting the observation data was done through narratives; where identified patterns which had been previously analysed were then explained. The researcher used both narratives and quotes to interpret both observation and the interview responses. For questionnaire responses, the researcher used grouped similar responses and explained them to give them meaning. Collected interview, observation and questionnaire data were analysed, interpreted and presented to make a clear picture that could easily be understood.

4.13.3 Presenting data

Quantitative research techniques generate a mass of numbers that need to be summarised, described and analysed (Bell 2003). Characteristics of the data may be described and explored by drawings, graphs and charts, doing tabulations, and calculating means and standards deviations (Henning, Rensburg & Smith, 2004; Bell 2003). Bell (2003, p.157) asserts that "qualitative data are usually presented in texts, using quotes or short case studies, but researchers may also use graphs, tables, diagrams or matrices". In this mixed method approach, the researcher used tables, and texts to present the research findings which are believed to have provided valid data, as triangulation was used to validate data and a pilot study was used to examine the ease of response.

4.14 Pilot study

The pilot study was conducted with the intention of identifying any problems which might interfere with the investigation, due to a lack of understanding on the participants' side; whether this arose due to long, unclear questions, language and grammatical errors, and/or repetition or ambiguity. According to Cohen, Manion and Morrison (2007) pilot studies are conducted to identify factors such as long sentences which do not make sense, and ambiguous sentences which may elicit inaccurate responses.

The researcher selected five University of KwaZulu-Natal (UKZN) Educational Technology students to participate in the pilot study. These participants were granted anonymity and confidentiality where their names and their data would be kept a secret between themselves and the researcher. They were also informed that they were at liberty to withdraw from the study at any time convenient to them. Each student was given a questionnaire (similar to the one used in the true study) to answer, and the following results were reflected:

- There were no ambiguous sentences
- No grammatical and spelling mistakes were identified
- Questions were said to be brief and easy to understand
- All questions were adequate and responded to the research questions.

Although the pilot study did not reflect any direct problems, there were some limitations which could hinder the research progress if they were not taken into consideration.

4.15 Limitations of the study

The lack of transportation between Lesotho, where the study was conducted, and the University of KwaZulu-Natal (UKZN) where the study was supervised, would serve as an inconvenience to the researcher. As a result, the researcher intended to spend most of the time in Lesotho collecting data and coming on regular basis to see the supervisor, or else sending the chapters of the study by email. One major limitation was finding more number of interviewees. Although most of the lecturers were ICT literate, they did not use ICT for teaching, as a result could not provide the researcher with responses which would answer the critical research of the study. The researcher did not have an option, but to use only three lecturers, as a result, the results of this study cannot be generalised.

4.16 Conclusion

Chapter Four served as a guide to understanding how data was collected from the informants. It also supplied readers with an understanding of how the researcher went about with the entire exploration of the ICT integration process. It enlightened readers concerning the manner in which the entire study was investigated. Chapter Five will focus on the analysis of data collected through interviews, observations and questionnaires.

benefits that ICT provides. The study conducted by Govender (2006) shows that due to the South African White Paper on e-Education, most South African schools have been

CHAPTER FIVE

Data analysis and Interpretations

5.1 Introduction

This chapter presents the process of the data analysis and the meaning of data (interpretation). Since "data do not speak for themselves" (Bertram, 2004 p.137), the operations of organising, analysing and interpreting data will be discussed to give meaning to the data collected. In this mixed method research; qualitative data are used as an inductive process of organising the data into categories. The categories and patterns used for data analysis and interpretation emerge from the raw data collected. From the sample of twenty lecturers, three sessions of face-to-face individual interviews were conducted with three lecturers. There were two sessions of non-participory observation. The quantitative data is presented in numerals, where all similar responses are grouped under one theme and categorised. All collected data are presented texually as well.

5.2 Analysis and interpretation of data

Data analysis is the process of transforming raw data into usable information which is often presented in the form of a published analytical article in order to add value to the statistical output (Huberman, 2002). According to Schoenbach (2009), data analysis is an accurate way to display and provide visual representation outlined for the interpretation and evaluation of collected research data. According to Schoenbach (2009, p.2), "analysing the data and interpreting the results are the "reward" for the work of collecting the data".

The contents of this chapter seek to analyse and present data which were collected through three individual interviews and two sessions of non-participant observation, with the purpose of understanding Information and Communication Technology integration in teaching and learning at a College in Lesotho. The researcher has presented the analysis in two segments, namely: data analysis and interpretations. The researcher's findings are

presented into themes and categories using activity theory/models where the principles from the models were also used to categorise participants' responses.

To make the findings of collected data meaningful, the researcher discusses the participants' profiles which may influence their experiences in regard to the types of ICTs which are being utilised at the college, how such ICTs are being used, and the impact of using them as well as the challenges encountered in the process of ICT integration.

Table 2: Biographical information of interviewee participants

Gender	Years of teaching experience	Post level	ICT literacy	Qualifications
Male	13	Lecturer (computer studies)	Highly literate	BSc.
Female	15	Lecturer (Environmental/ Agricultural studies)	Literate	M sc. (Agronomy and Farming Systems)
Male	7	Lecturer (Computer studies)	Highly literate	PhD. (Maths, Science and Technology Education)

5.3 Observation of the ICT mediated classroom

A semi-structured observation check-list (Appendix E) was used to capture some open exploration of ICT integration within the learning environment. In the process of the observation, the researcher kept records of all the events as outlined in the check-list. Issues which were recorded included the computer laboratory layout, the lesson sequence, the types of ICTs used, and the role of participants during the lesson. The

researcher was aware of the activity theory principles/constructs as stated in the literature and used them to analyse collected data.

The observation check-list outlined below was used to facilitate rich data and add quantitative flesh to the qualitative bones of data collected through interviews and observation sessions of the current study. This observation has also been used to triangulate data collected through questionnaires and face-to-face individual interviews, which have also been used to analyse findings for this study.

Table 3: Observation notes of classroom lessons 1 & 2

Key characters	Observation outline	Comments
Date	**19th June 2008**	
Layout	Evidence shows that an aesthetically pleasing, but functional working environment will provide a positive attitude to learning and help to optimise learning potential (Su, 2009) To create a positive learning environment for a school's ICT Classroom, the following factors will be taken into consideration. layout furniture and chairs lighting flooring ventilation and noise absorption electrical installations and health and safety security access to peripherals such as printers and scanners installation and location of presentation/display equipment (projectors and interactive whiteboards) storage	**For both lesson one and two the same layout was portrayed.** The chairs and furniture were placed in rows, with enough spacing that allowed both the lecturer and students to move between rows. The light was sufficient, not too bright and not too dim, but adequate for learners to see what they were doing. The floors were dry and allowed students and the lecturer to move freely. This ICT classroom is far from other ordinary classrooms, with windows high enough to prevent any distortion, mainly noise. The roofing is free from noise absorption because of the material which has been used for the roofing. The electricity installation is for the whole college and in the ICT classroom there are sockets which supply all the ICT equipments with enough

		electricity. The electrical connections are covered to prevent any possible danger. Printers and scanners are placed in front of the classroom for everyone to access, without interfering with other students. The display is done on a prepared place on the wall; high enough for all students to see what is being displayed.
Number of students	50 for lesson one 55 for lesson two	
No. of students per computer	The number of students per computer is determined by the level of technology integration. According to Sheffield (2007), all students need to have equal access to computers, software and technologies for effective technology integration.	**Lesson one:** 20 groups of 2 students per computer and 10 students working individually 2 students: one computer **Lesson two:** 25 groups of 2 students per computer 5 students working individually Ratio of student per computer 2 students per computer
Types of ICT	Technologies which are appropriate for teaching and learning in an ICT classroom include computers, the internet, broadcasting technologies (radio and television) and telephony (Cox, undated).	The types of ICTs used for both lesson one and lesson two included: Computers which were connected to the internet. A scanner and a printer were also available for ICT usage. Students' digital cameras and cellular phones are used as additional ICT equipment, and are available for use. The lecturers' laptop was used for demonstrations.
The role of students and teachers in an	In an ICT-mediated classroom, students are expected to take care of	**Lesson one:** Revision on

ICT-mediated classroom	their ICT-related tasks. Knowledgeable students also provide technical assistance to their peers (Lim, Pek & Chai, 2005). A teacher's role in an ICT-mediated classroom is to monitor the ICT environment and to ensure order and task accomplishment (Lim, Pek & Chai, 2005).	Microsoft Word work was done as an introduction to the new lesson of Microsoft Excel usage. Students were introduced to Mathematical calculations where Microsoft Excel was used. Students were collaborately working on the computers where each pair had to make some calculations using Microsoft Excel. **Lesson two:** twenty two groups of students worked in pairs and the other one worked alone, to do Microsoft Word work tasks, which was part of their revision work. Students were engaged in an activity where the lecturer introduced Microsoft Excel as a way by means of which Mathematical calculations could be made. Students were given Mathematical tasks to perform, where they were asked to use Microsoft Excel to make some calculations.
Lesson sequence	Using ICT in the classroom involves organising supporting activities for the lesson objectives, lesson sequence, and types of ICT and non-ICT tools used. (Lim, Teo, Wong, Khine, Chai & Divaharan, 2003)	**Lesson one:** An introduction of the previous lesson was done, where the demonstration method was used through the utilisation of ICT equipment. The lesson developed, and included the introduction of the new lesson and the involvement of students in activities where ICTs such as computers, the lecturer's laptop and the printer were used to achieve the lecturer's set objectives. **Lesson two:** Students were asked questions relating to the

		activities which can be performed through the utilisation of Microsoft Word. Responses indicated that students use Microsoft Word for tasks such as word processing, inserting tables, inserting pictures in the text and doing borders and shading. The lecturer demonstrated how to open Microsoft Excel; one of the Microsoft Office programs. He demonstrated how Microsoft Excel can be used for calculations. Students were given tasks to perform, where they were supposed to do Mathematical calculations. They used the printers to print out products of their work.
Learner involvement (Learners' activities)	The fundamental idea underlying the "perceived usefulness" construct is that students must be meaningfully engaged in learning activities. The belief is that Information Technology can facilitate instruction in ways which are difficult to achieve otherwise (Davis, 2000).	**Lesson one** Logging onto computers using their own passwords. Learners were engaged in active learning where they collaboratively worked on a given project where they were instructed to use Microsoft Excel to do calculations. Authentic learning was therefore displayed, as students were able to discover new ways of doing calculations where Microsoft Excel could be used. **Lesson two** Logging onto their computers using their own passwords. The lecturer involved his students in a revision exercise where he asked them to answer questions relating to the use of Microsoft Word. Students' responses indicated

		that they use Microsoft Word for inserting tables, inserting pictures in the text and doing borders and shading. Students carried out tasks in pairs, where they were required to calculate Mathematical problems.
Teaching methods in an ICT classroom	Teachers' desire for effective ICT integration in teaching calls for proper training, provision of adequate teaching materials and coordination between what students should learn and how teaching materials are used (Galanouli, Murphy & Gardner, 2004).	Teaching methods used for both lesson one and two included demonstrations, lecture, and collaborative discussions where learners worked together to perform given tasks.
Impacts of integrating ICT in teaching and learning	Hennessy and Deaney (2004) state that there is evidence from research that ICT can make a difference to students' learning, and more substantial gains in students' attainment are achievable.	**Lesson one** Use of both Microsoft Word and Micro Soft Excel helped students to perform tasks such as word processing, inserting pictures into text, and undertaking Mathematical calculations. Students were motivated as they engaged themselves in activities, collaborative learning was promoted; they could explore and find out other ways in which Microsoft can be used; these included bolding, using different fonts, different font sizess as well as cutting and pasting of texts. **Lesson two** Students revised the lesson previously done on the use of Microsoft Word (word processing, cutting and pasting and inserting pictures into texts). They were introduced to Microsoft Excel (making Mathematical calculations). Students engaged in activities where they used Microsoft Excel to perform given tasks.

Identified obstacles	Despite research studies showing the cognitive opportunities that information and communication technologies (ICT) provide for teaching and learning in schools stories relating to the difficult and ineffective integration of ICT in schools are common (Fabry & Haggs, 1997)	In both lesson one and two, similar obstacles were identified. ICTs, one scanner, and two printers could not cater for thirty computers which were shared by students. Other ICTs such as digital cameras, cellular phones that were sometimes used were students' own properties. Some students' ICT competence made it very difficult for the lecturer to put them at the same level with students who were using computers for the first time.

Table 3 above indicates that ICT is being integrated (although to a limited extent) in education at the College of Education, which is confirmed by the existence of the computer lab in which the observation process took place. The observation data analysis displayed in the table 3 above was outlined to validate interview data analysed and interpreted below.

5.4 Interview data

The interview data were collected from each lecturer's office at the college for a period of twenty to thirty minutes. The research findings of the interview data in this mixed method project have been analysed using principles as follows:

Firstly, the tape-recorded interview data were transcribed for preparation of analysis; then the researcher sent the transcripts back to participants for trustworthiness and validity.

Member checking relies on the assumption that there is a fixed truth of reality that can be accounted for by a researcher and confirmed by a respondent (Angen, 2000; Sandelowski, 1993). In this mixed method research, member checking was used to help improve the accuracy, credibility, trustworthiness and transferability.

Secondly, transcribed data were coded and identified, data segments were grouped into themes which were based on the principles of activity theory/models. Outlined below is the discussion of the interview data.

Critical question one: What tools are being utilised to integrate ICT into the college of education in Lesotho

Principle 1: Tools

Codes and definitions

Tools are referred to as all facilitating factors which enable ICT integration (Lim & Hang, 2003). In this case Lim and Hang classify tools as ICT tools and non-ICT tools.

Categories from interview s respondents:

Non-ICT tools:

ICT personnel, ICT managerial teams, infrastructure, and teacher training

1. "Microsoft is one of the partners that came with the program called PIL (Partners in Learning)".
2. "Microsoft has also provided the college with the computer laboratory and the equipment that you can see".
3. "Some companies come to help us even with the training of teachers".

Non-ICT tools as people/community

1. "I am IT personnel, and I am responsible for the training of teachers".
2. "The support that we get from the government, the managerial support and the support from the entire college community as well as the support from the non-governmental agencies have made ICT integration in the college a success".

Non-ICT tools as strategies

"We do not have specified strategies and rules guiding the ICT integration. We as ICT specialists decide what we think is suitable for the integration of ICT in this college".

ICT resources are ICT sources which are used to mediate teaching process using ICTs

1. "Students use digital cameras and cellular phones to do Agricultural projects".
2. "Microsoft provided us with the centre, computers, a scanner and the printer that you can see to speed up the integration process".
3. "Some lecturers still prefer to use overhead projectors to do their presentations".
4. "I bundle my course on the website, so that all materials will reach my students on the local website for the course or the WebPages".
5. "I always find the use of the video camera, the use of the internet; you know that they are very important".
6. "We use the internet tools in HTML".

Critical question two (a) How do lecturers and students use available ICT?

Principle two:

Objectives (object) are aims of integrating ICT into teaching at a college.

The group of people (community) as members of ICT integration provide support for the integration process.

Responses

1. "With the use of available ICTs students are able to work on their own. They use the internet to find appropriate current information".
2. "Students use work prepared for them on the school website and sent their feedback using email".
3. "To me, the use of the chalkboard and overhead Projector is history, I feel comfortable doing my presentations using PowerPoint".
4. "I try to stipulate that my students use digital cameras or cellular phones if they have these, for their projects".
5. "I help my students work together to do their academic work".
6. "Even my colleagues here at the college, although they do not integrate ICTs into their classrooms, they ask students in their respective disciplines to work with ICT specialists to perform their academic tasks".

7. "Small groups of students work together to do their projects and other academic work".

Critical question two (b) what benefits do they have?

Objective

ICT integration is aimed at transforming teaching and learning strategies where lecturers are expected to change their ways of teaching to the use of ICT resources. ICT integration means to: help lecturers and students to gain experience in working collaboratively online, to use ICT resources to meet the transformation issues of child -centred learning.

1. "It is through the use of ICTs that my students have opportunities to social discourse".
2. "A teacher can come to the class and present his lesson, and students have time to practice that in the LAN".
3. "The use of ICTs has increased the curiosity, knowledge and experience of things that my students learn in class".
4. "Through ICT integration in teaching, my students now have achievements which are beyond the classroom experience".
5. "With ICT integration, it becomes easy for me to give students work even if I am not there".
6. "ICTs promote child-centred learning where learners are able to discover things for themselves".
7. "ICTs help students with real world projects".
8. "It is through the use of ICTs that my students engage in exploration and inquiry".
9. "ICTs allow discussion through the internet".
10. "The use of computers, digital cameras, cellular phones and other ICTs promote critical thinking among my students".

Critical Question three

What challenges do lectures and students face when integrating ICT into teaching and learning?

Challenges experienced by lectures during integration of ICT into teaching.

Responses

1. "Some of the available ICTs are only accessible for the students' use and are unauthorised for use by lecturers".
2. "A lack of appropriate ICT facilities and resources are factors hindering ICT integration".
3. "Some of us are denied the right to voice our understanding of the kind of training we expect from the ICT experts. As a result, we cannot integrate ICT into our teaching".
4. "The college management team has not included us in the formulation of rules and objectives guiding the integration process".
5. "As the school community, we were not involved in the formulation of ICT integration objectives".
6. "A lack of ICTs used to integrate ICT in the college hinders the integration progress. In some cases students and lecturers have to use their equipment to achieve the integration objective".
7. "We are restricted by a shortage of ICT resources in communicating with our colleagues from other colleges and universities, both locally and internationally".
8. "With scarce resources that the college has, one cannot say lecturers have successfully integrated ICT into teaching".
9. "No proper rules have been set to help support lecturers in the course of ICT integration".
10. "We, lecturers, lack adequate communication concerns with the people responsible for ICT integration in the college, whether they are management, non-governmental organisations or the government. As a result we fail to voice our views regarding the integration process".
11. "Due to insufficient ICT training, we, lecturers do not have competency to use ICT resources".
12. "Insufficiency of ICT laboratory resources slows down efforts to integrate ICT in our teaching strategies".

13. "A shortage of ICT tools used by lecturers to implement ICT into teaching hinders collaboration between lecturers and other ICT integration parties".

To facilitate data collected through observation and interviews, the researcher used questionnaires.

5.5 Data collected through questionnaires

A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents (Cohen, Manion & Morrison, 2007). Cohen *et al* state that questionnaires are often designed for the statistical analysis of the responses. The researcher used questionnaires to validate data collected through interviews and observations because they are cheap, and do not require as much effort from the questioner as verbal or telephone surveys, and often have standardised answers that make it simple to compile data (Bell, 2003; Cohen, Manion & Morrison, 2007). Table 4 below outlines the data analysis for questionnaire participants' responses

5.5.1 Table 4: Summary of ICT utilisation at CEL (critical question one)

Types of utilised ICTs	Yes	No
Computers	**20**	**0**
Newsletters, daily bulletins	**0**	**20**
Email	**20**	**0**
Discussion boards	**0**	**20**
e-library	**0**	**20**
Multimedia appliances	**0**	**20**
Internet services	**20**	**0**
Laptops	**0**	**10**
Interactive whiteboards	**0**	**20**
Overhead Projectors	**15**	**5**
Televisions	**2**	**18**
Radios	**0**	**20**

Computer hardware	**20**	**0**
Computer software	**20**	**0**
Smart boards	**0**	**20**
Digital cameras	**2**	**18**
Cellular phones	**2**	**18**
Printers	**18**	**2**
Scanners	**6**	**14**

Table 4 above indicates that all twenty lecturers who responded to the questionnaire use computers (both software and hardware). Out of twenty lecturers, fifteen indicated that they use OHPs for their presentations, eighteen use printers and six stated that they use scanners. From the total number of twenty, only two use both digital cameras and cellular phones for their teaching purposes. This indicates that many lecturers still use low-order technology such as OHPs, while very few of those who are ICT literate and competent in using ICTs for teaching and learning use high technology tools such as PowerPoint, which is appropriate for presentations.

Use of modern technologies such as computers, scanners, digital cameras and cellular phones for teaching and learning requires competence in ICT integration, not only ICT literacy. Like all other innovations, ICT integration cannot be done overnight, but needs to follow certain stages as stated by Lim and Khine (2006) who assert that due to practical and philosophical barriers which are continuously reported by educators, little innovation has taken place in the way institutions conduct ICT-mediated lessons compared to traditional ones. In conclusion, one could say that ICT integration at the college is at a level which still needs all college population involvement.

5.5.2 Critical question two: How do lecturers and students use available ICTs...

Table 5 presents findings obtained from the lecturers, who responded the questions on how they, together with their students make use of ICT tools which are available in their institution. Table 6 presents findings which discuss lecturers' responses regarding the benefits of using ICTs for teaching and learning at the college.

Table 5: How ICT s are used at CEL

Do you use ICTs available in your institution to:	Yes	No
Search for academic information	13	7
Do academic research	11	9
Perform administrative purposes	9	11
Enroll students	9	11
Do your presentation	15	5
Communicate with students and other lecturers	10	10
To do academic projects	8	12
Engage in discussions	10	10

Table 5 above indicates how ICTs are used at CEL. Eleven lecturers claim that they use ICTs for doing academic research, thirteen for searching for information, nine for performing academic activities, and nine stated that ICT is used for students' enrolment in their institution. From twenty lecturers, fifteen indicated that they use ICTs to do their presentations; ten use them for communication purposes, eight for doing academic projects, while ten stated that they use ICTs to engage in discussions. Fifteen lecturers prefer to use OHPs to do their representations, while others use PowerPoint. According to Woo, Herrington, Agostinho and Reeves (2007), innovative instructors have implemented authentic activities in physical classrooms for decades, and advances in Web technology make the use of authentic activities in fully online or blended courses

increasingly realistic. The case with CEL indicates that most of the lecturers use e-mails to communicate with each other, while communication tools such as discussion forums and chat rooms are not used. This indicates that lecturers are ICT literate, but do not integrate ICT into their teaching.

5.5.3 Critical question two continued ...and what benefits do they have?

Table 6: Benefits of integrating ICTs in the college

ICT integration	Yes	No
Integrated society	0	20
Information openly accessible	10	10
Helps students find appropriate instruction	18	2
Guides independent learning	5	15
Helps students to evaluate their own learning	3	17
Places high emphasis on communication	18	2
Negative students' and lecturers' attitudes and perceptions regarding ICT integration	5	15
Students are:		
More active	17	3
Able to learn in and out of the college	17	3
Involved in collaborative learning (much team work)	18	2
Able to ask questions	15	5
Able to learn in cooperative learning through communication skills	18	2
Provided with relevant information and answers	19	1
Highly motivated	18	2
Engage in problem solving	18	2
Engage in creativity	17	3
Has the curriculum provided:		
For ICT-related objectives of the school	13	7
For the presence of difficult types of teaching practices	10	10
For ICT attainment targets	5	15
The realisation of ICT-related objectives	10	10

For the use of email/WWW for instructional purposes	**11**	**9**
For an increased percentage of students/teachers using WWW	**17**	**3**
For an increase in internet-related activities of students	**18**	**2**
Technology applications by students	**18**	**2**
Adequate skills used to achieve the curriculum goals	**5**	**15**
Does the ICT integration plan cater for:		
Prescriptions regarding the training of teachers	**5**	**15**
Learners' attendance rate (satisfactory)	**10**	**10**
Expenditure on staff development	**4**	**16**
Types of internal information exchange	**3**	**17**
Availability in-house/external training courses	**6**	**14**
Self-assessment of ICT skills	**3**	**17**
Does the college management consider the:		
Existence of written policies	**2**	**18**
ICT-related policy measures	**2**	**18**
Lecturers' and students' attitudes towards ICT integration	**2**	**18**
Technical support regarding infrastructure	**2**	**18**
Priorities for external support	**2**	**18**
Are innovation issues:		
Satisfying ICT-related activities	**20**	**0**
Other (specify)		

Table 6 above indicates that students are the ones who benefit greatly as far as ICT integration in teaching and learning is concerned, where they are actively engaged in collaborative learning. They can also ask questions where their technology application increases and they become problem-solvers, hence becoming motivated by what they do. The table also indicates that the college management is not fully engaged in technology integration which delays the integration progress.

5.5.4 Critical question three: what challenges are lecturers facing when integrating ICT into teaching and learning?

Table 7 below lists obstacles that lecturers may or may not have experienced when integrating ICT into their teaching. Where a lecturer made no selection (yes/no) a third column was used to indicate this (Don't know).

Table 7: Obstacles encountered when integrating ICT

Obstacles	Yes	No	Don't know
Insufficient number of computers	20	0	0
Lecturers' lack of knowledge/skills	20	0	0
Difficult to integrate instruction	0	7	13
Scheduling relating to time allocation	0	12	8
Insufficient lecturers' time	0	12	8
www: not enough connections	0	11	9
www: insufficient technical support	0	14	6
Not enough space to integrate ICT	0	11	9
Weak infrastructure (telecommunication)	19	1	0
Software not adaptable enough	0	6	14
Students know more than lecturers	0	12	8
www: slow network performance	0	5	15
Lack of lecturers' interest	13	0	7
Difficult use, low achieving studies	0	5	15
Telecom infrastructure weak	16	3	1

Lack of administrative assistance	**0**	**18**	**2**
Software not in language instruction	**0**	**20**	**0**
Lack college board support	**0**	**4**	**16**
No plan to prevent theft	**0**	**5**	**15**
Other (specify)			

Table 7 analyses barriers which lecturers encounter at the college where the entire group of twenty lecturers indicated that insufficient number of ICT resources hinders the ICT integration process. The same number of twenty lecturers advised that insufficient training of lecturers serves as a hindrance to effective ICT integration. From the twenty lecturers who were investigated, sixteen indicated that managerial support is a source of failure with regard to the ICT integration process. Nineteen of the twenty lecturers indicated that the lack of infrastructure was delaying ICT integration in their college.

Most of the participants felt that lecturers' lack of interest in ICT causes the entire integration of ICT in the college education to fail. The questionnaire data indicated that most of the lecturers agree that the insufficient number of computers, the lack of ICT knowledge/skills, a weak infrastructure; the lack of lecturers' interest and administrative assistance, as well as lecturers' incompetence are contributing factors to the failure of ICT integration. This means that although there are observable positive impacts; there are still some obstacles which need to be dealt with.

To a certain extent, lecturers at the college have been trained to integrate ICT into their teaching. Lecturers argue that even though they have had some training, the training they had only provided them with basic ICT literacy, and could not provide them with the skills they need to integrate ICT into their teaching strategies. It might be that the training received tended to make lecturers ICT literate, rather than capable of pedagogy for ICT integration. According to Rosen and Weil (1995), lack of training provided to lecturers is

a barrier to the effective integration of ICT in education. Lecturers' responses indicate that the training that they get is not sufficient to allow them to integrate ICT into teaching and learning. Lecturers' insufficient training, together with other previously discussed obstacles hinders the ICT integration process at CEL; therefore a substantial approach should be considered a priority to achieve effective ICT integration in teaching and learning at the college.

5.6 ICT integration findings from interviews, observations and questionnaires

The following table defines each of the constructs extracted from the activity theory models/theories and thereafter links the different categories that the researcher extracted from the data. Categories used in Table 9 are responses which participants provided through interviews, questionnaires and two sessions of non-participant observation sessions.

The contents of Table 8 are discussed in the following paragraphs. Responses relating to each critical question have been classified under themes where the definition of each theme is given. Participants' responses have been used, and form categories under each theme

Table 8: Themes and Themes	Categories
Theme 1: Tools and artefacts used as mediators between subjects and objects during ICT integration process.	▪ ICT personnel ▪ ICT resources ▪ Non-ICT resources
Theme 2: Educator-Learner involvement	▪ Collaborative learning ▪ Active learning ▪ Learner-centred learning ▪ ICT-based learning ▪ Authentic learning ▪ Collaboration ▪ Creativity ▪ Problem-solving
Theme three: Subjects and community involvement in ICT integration enhancement	▪ Lecturers-community social relationship ▪ Technical support Usefulness of ICT integration
Theme4: ICT integration constraints	▪ Lecturers' incompetence ▪ Lack of lecturer training ▪ Insufficient ICT resources

The findings of this study are indicated in order to confirm or refute the contents of related literature through the exploration of ICT integration where questionnaires, face-to-face interviews and non-participatory observations were conducted. The principles of the activity theory have been used to answer the critical research questions. The findings analysed below are based on data collected and the literature review is used to support it.

5.6.1 Theme one

Tools and artefacts used as mediators between subjects and object during ICT integration process.

Tools used to integrate ICT into teaching are time-saving and also have the ability to offer education of a higher quality (Demiraslan & Usluel, 2008). Lim and Hang (2003), state that tools that aid ICT interaction include ICT and non-ICT tools.

5.6.1.1 ICT tools

The findings of this study indicate that the CEL does not have a set ICT integration curriculum, but that two computer studies lecturers have designed ICT activities which help students to engage in various activities. Mr. K's response was, "*It is through the use of ICTs that my students have opportunities for social discourse*". To expand on Mr. K's response MR. R. commented that the use of a variety of ICTs enhances his teaching, and enables him to use learner-centred approaches which allow students to become critical thinkers. His response was, *"the use of computers, digital cameras, cellular phones, overhead Projectors and other ICTs helps promote critical thinking among my students"*.

5.6.1.2 Non-ICT tools

Lim and Hang (2003) assert that non-ICT tools consist of anything other than ICT resources that can be used to facilitate the ICT integration process. Non-ICT tools which are used at the college under investigation are the Microsoft Program in Learning (PIL), lecturer training, the provision of the School Technology Innovation Centre (STIC) by Microsoft. To specify the availability of non-ICT resources in a college, Mr. K. said, *"Computer companies, and all these came together and helped the college and the centre*

to acquire the equipment that you can see". To add to Mr. K's statement, Mr. R explained that, *"management encouraged all lecturers to attend the training".*

5.6.1.3 ICT personnel

Toudeur, Van Keer, Van Braak and Valcke (2008) assert that for ICT integration in teaching, preparation of teaching personnel is an essential tool to facilitate the integration process. Toudeur, van Keer, van Braak and Valcke (2008) argue that ICT personnel should be responsible for ICT resource management, decision-making, preparation of ICT learning programs, determining ICT integration readiness, and dealing with issues regarding the ICT school policy. With regard to the current study, the findings revealed that two college ICT personnel were responsible for the smooth running of ICT integration. Mr. K. confirmed this, saying, "In *actual fact, I am an IT person and I am responsible for the training of teachers".* Mr. R. emphasises the availability of ICT personnel and states, *"I had experience of the utilisation of ICTs from abroad".*

5.6.2 Theme two: Educator-Learner involvement

Preparation is a priority in the ICT integration process where lecturers in a college should consider the formulation of rules and regulations and school policy designing and planning how the entire ICT integration should be put into practice. This includes the determination of procedures which will be used in the ICT integration process (Lim & Chai, 2003). Research studies in education have shown that information and communication technologies (ICTs) coupled with the necessary pedagogical strategies facilitate the development of higher order thinking skills (Hannafin, Land, Hannafin & Oliver, 1997). The activities leading to successful ICT integration at a college were observed, and these indicated that learners and lecturers were involved in collaborative, active, learner-centred, authentic, creative and problem-solving learning strategies.

5.6.2.1 Collaborative learning

A growing amount of interest within the field of educational research has been focused on what is described as the classroom learning environment (Fraser, 1999) where students and lecturers collaboratively interact with ICTs, hence obtaining quality

education. The results obtained through interviews, questionnaires and observations indicated that students at the college use various ICTs to engage in class projects that they do collaboratively on the internet, which is their source of information. Students also work in groups, and engage in discussions to share ideas, and exchange photographs which they have taken with their cellular phones and digital cameras.

5.6.2.2 Active learning

Active learning is an umbrella term that refers to several models of instruction that focus on the responsibility of learners (Fink, 1999; Eison, and Bonwell, 2003). In this study, students were engaged in activities where they took the responsibility to engage in assignments which they would struggle to perform without the use of ICTs. These activities include replacing the use of pen and paper with Microsoft word-processing, and using Microsoft Excel for Mathematical calculations. With the use of ICTs, students could possibly engage in activities which their lecturers had prepared on their school website.

5.6.2.3 Learner-centred learning

Learner-centred learning is an active and dynamic process through which learners develop thoughtful understanding, taking into consideration their own pace and time to engage in learning activities (Fink, 1999). While given class projects in their disciplines, such as agricultural projects, students at CEL used ICTs to find ways of doing the projects and consulted their computer studies lecturer who guided them on how to go ahead with the project. It became their responsibility to find all the necessary ICT resources such as digital cameras and cellular phones which they used to do the projects and they created their own time in which to perform such tasks.

5.6.2.4 ICT-based teaching and learning

When positive decisions from the supervising administration are successful, implementation requires students to be able to perform the basic ICT skills prior to integrating ICT in teaching and learning of various academic subjects (Bottino, 2004). Bottino states that such skills include operating the hardware, basic operating system

functions, and general productivity tools. Students at CEL were guided by the computer studies lecturers to engage in activities such as operating computers, cellular phones digital cameras and the printer to fulfil their academic projects of which an Agricultural project is an example.

5.6.2.5 Authentic learning

Learning-by-doing is generally considered the most effective way to learn; where the internet and a variety of emerging communication, visualisation, and simulation technologies now make it possible to offer students authentic learning experiences ranging from experimentation to real-world problem solving (Lombardi, 2007). For authentic learning, students at CEL worked in groups while they embarked on their agriculture project. Lombardi asserts that authentic learning is not a new concept, but has been used as a key concept in constructive theory.

5.6.2.6 Creative learning (creativity)

According to EAEA (2008), learning can no longer be regarded as a body of knowledge/skills of unquestionable facts and theories, but is more about the applied shaping of a person who can create things for himself. Through manipulation of computers, students can learn more, even those who have not been taught by the teacher. Instead of using their digital cameras to take pictures of eroded areas as indicated by the lecturers, some of the students used the Goggle image search to find pictures of eroded areas, pasted them into their texts and completed their projects.

5.6.2.7 Problem-solving

ICT integration into teaching and learning creates effective and quality learning situations (Wang & Woo, 2007). According to Snell (1999) ICT integration is a tool utilised in curriculum areas where prior knowledge is combined with acquired information to help the learner find workable solutions, and to create new ideas and knowledge. At LCE students' exploration in computer studies helped them use the internet to find information for themselves. They also used Microsoft word to bold their work and underline it, and to cut and paste texts and pictures from one text to another.

5.6.3 Theme three: Subject/community involvement in ICT integration enhancement

Various surveys suggest that access to ICT by teachers and learners is increasing dramatically, and that the quality of this provision is also improving (Moore & Brown, 2005). At CEL, students' involvement in ICT integration has served the college for some time, and the findings reveal that the interaction which lecturers and students have had with ICTs has promoted the lecturer-community social relationship where ICT specialists help the integration process to be a success.

5.6.3.1 Lecturers-community social relationship

The findings of the study under observation have revealed that the Lesotho Ministry of Education, the Lesotho government and the non-governmental agencies such as Microsoft and Vodacom Lesotho have contributed towards ICT integration in the college of education so much that observable social relationships can be witnessed. This lecturers-community relationship has helped the college to achieve their ICT integration objective, hence the involvement of Microsoft in the introduction of the School Technology Innovation Centre (STIC) and the training of both in-service and pre-service teachers, where ICT specialists and the entire college community work together to make ICT integration a success.

5.6.3.2 Technical support

Atkin and Vasu (2000) and Sandholtz (2001) argue that inadequate technical and administrative support is another contributing factor to the failure of an effective ICT integration. In terms of technical support which the college gets while in the process of integrating ICT in its teaching strategies, the results disclosed that there are two ICT specialists to help the integration process run smoothly. Lecturers stated they get technical support as well as the guidance they need regarding ICT integration in their own classes. There is an IT personnel member, whose work is to help other lecturers and the college community as a whole with their ICT technical problems.

5.6.4 Theme four: ICT integration constraints

Isaacs (2007) has indicated that regardless of conditions of poverty, that Lesotho is facing, it has started taking measures to integrate ICT into some of its schools. The results of this study indicate that although some rules have been set to guide the integration process, lecturers still encounter some obstacles which hinder the integration process. Among others, lack of appropriate ICT tools which can be used to facilitate the integration process can be outlined.

5.6.4.1 Lack of Lecturer training

Lecturers at CEL feel that the training which they have had is not adequate for them to be able to integrate ICT into their teaching strategies. They indicate that the training offered by the college can be considered as refresher courses where new trainees cannot cope. The lecturers at CEL specified the fact that training offered by the college is encouraged but not mandated, and that, as a result, most of the lecturers do not find it necessary to attend such training sessions, and continue using their traditional ways of teaching. Lecturers who have been trained say that they have trained only in ICT basics and that, as a result, they still encounter problems when they try to integrate ICT into their teaching. The lack of lecturer training slows the ICT integration process at this college.

5.6.4.2 Lecturers' incompetence

Wood and Smith (2005) state that lecturers' incompetence in the use of ICT facilities hinders the ICT integration process where these lecturers lack ICT skills appropriate for the integration process. Due to their incompetence, some of the lecturers at LCE felt that they could not integrate ICT into their teaching, and therefore reflected ignorance in familiarising themselves with ICT integration in the subjects that they teach.

5.6.4.3 Insufficient ICT resources

Wood and Smith (2005), state that inadequate ICT facilities hinder the ICT integration process. The inadequate number of ICTs used at LCE, and the incompetence of lecturers who claim that the inadequate number of ICTs at CEL make it difficult for lecturers to gain the necessary skills and have access to technology to incorporate into their teaching.

Lecturers would still use available resources if they were not so scarce, is also a hindrance. Lecturers claim that besides the ICT available in the college computer lab, there are some resources in the laboratory which they claim are only accessible to students. Their issue of the use of ICTs is that students have greater opportunities to use the college ICT resources, which is why they always encourage their learners to use all available ICTs to do their academic work, regardless of the subjects they are working on.

5.7 Implication

The inference was that lecturers should by now be using a variety of ICTs in all college courses for the enhancement of teaching and learning. Since the Lesotho ICT policy was formulated long ago, the assumption was that all higher institutions would by now be integrating ICT in their pedagogical strategies, hence gaining all the available equipped with various kinds of ICTs that they use to meet the outlined objectives in that document. The researcher thought that the Lesotho government would similarly not expect institutions to integrate ICT into education without setting a strategic plan that these institutions should follow, and funding them with money that could be used to establish an infrastructure, ICT resources, and maintenance as well as teacher development. Though CEL is taking measures to integrate ICT into teaching and learning, it still needs the government's financial support for effective integration.

5.8 The review of the chapter

Responses from participants indicate that ICTs used at LCE include computers, where the internet and emails are mostly used. They also make use of scanners, printers, cellular phones, and digital cameras, as well as overhead projectors. The impacts that they experience are the active learning of students, learner-centred learning, ICT-based teaching and learning, authentic learning, collaboration, creativity, problem-solving as well as motivation among the college population.

The barriers identified were a lack of a managerial mandate, insufficient teacher training, lecturers' incompetence, insufficient resources, lecturers' lack of skills, a lack of top-level commitment, and a lack of managerial and technical support, as well as the lecturers' ignorance in familiarising themselves with ICT integration.

5.9 Conclusion

The findings of this study indicate that ICT integration at the college is still at an early stage, where only two lecturers have the ability to integrate ICT into their teaching. The two available ICT specialists are responsible for the formulation of school regulations and the rules guiding the integration process at the college. Lecturers are not familiar with these rules and, as a result; do not attend the training which is offered. Students use all the available ICTs to engage in school activities for all school subjects, even for those teachers who are reluctant to integrate ICTs into their teaching. Regardless of all the efforts which are being taken to integrate ICT into teaching at the college, the lack of facilities, insufficient resources and lecturers' incompetence are still outstanding barriers to ICT integration at CEL. The final chapter of this study focuses on the conclusion and recommendations.

CHAPTER SIX

Conclusion and Recommendations

6.1 Introduction

This chapter seeks to draw conclusions and make recommendations based on the study 'Lecturers' experiences of integrating ICT into teaching at a college'. This study is focused on the lecturers' utilisation of various types of ICTs, how they make use of such resources and the effectiveness of ICT in teaching and learning situations.

This study intends to narrate the findings of the study in conjunction with the literature review (Chapter 2) and the theory obtained and discussed in Chapter 3 of the current study to answer the critical research questions; the researchers' commentary and to provide recommendations based on the research findings. The researcher intends to portray the purpose of the study, the materials and methods used to collect the research data as well as the results which will be used to make recommendations in terms of the study under investigation.

6.2 The Purpose of the study

The purpose of the study was to explore and understand the tools used, and how they are utilised in teaching and learning at CEL. The study also investigated the effectiveness of ICT integration in students' learning as well as the perceived barriers of ICT integration as experienced by lecturers.

6.3 Materials and the research methods

A descriptive interpretive research design of the mixed method approach was investigated to explore and understand the case of ICT integration in teaching and learning in a college of education in Lesotho. The sample of twenty participant lecturers was purposively selected and the snowball sampling method was used. From the sample of twenty participant lecturers who responded to the questionnaires, three lecturers were purposively selected to engage in three face-to-face individual interview sessions. Two sessions of non-participatory observation were conducted with the two different groups

of first year primary diploma students. Frequency counts and descriptive data analysis were used to present the findings of the questionnaires, interviews and observation data and answer the critical research questions.

6. 4 The research findings

Baskin and Williams (2006) insist that for effective ICT integration; the factors to be addressed include issues such as curriculum, spatial, temporal, pedagogical and attitudinal integration, which the college seems not to have considered when deciding to integrate ICT into teaching and learning. As a result, these issues do not enable ICTs to be embedded into classroom learning activities. It is therefore evident that only ICT literate personnel integrate it into their teaching. These lecturers do not consider ICT integration problematic. The college does not have any designed curriculum and structured plan which lecturers can follow when integrating ICT into teaching. The pedagogical teaching strategies which most of the lecturers use do not integrate ICT. Lecturers do not deny the fact that ICT integration is necessary, *per se,* but they state that they feel their knowledge is not adequate for ICT integration.

ICT integration stages include entry, adoption, adoption, adaptation, and appropriations as well as invention (Steketee, 2005). Steketee asserts that at the adoption stage, educators begin to show more concern about how technology can be integrated into their daily lesson plans. Technology is at this stage being integrated in teaching and learning. At this point, educators begin to anticipate problems such as inappropriate skills and competence of ICT usage and develop strategies to solve them. It is then that educators begin to perform basic technology instruction which still needs technical support and training.

The findings of this study indicate that ICT integration at CEL is at an adoption stage where lecturers and students begin to show concern about ICT integration. Though other lecturers do not use ICT for teaching themselves, they do send their students to competent lecturers to help them use ICT to do their assignments and academic projects. Most of the lecturers still use traditional strategies to teach their students. Technology is

integrated into teaching and learning by some lecturers, where students use various tools for common activities such as word-processing and calculating mathematical problems. Lecturers still anticipate problems which need more technical support.

Smith (2001) explains that technology integration is categorised into three phases which he defines as Literacy, Adaptive, and Transformative. The findings of the current study indicate that the college courses are at different stages, with only of the lecturers meeting the criteria for the adaptive stage. Students perform activities such as word-processing and the use of spreadsheets together with computers, cellular phones, digital cameras, scanners, and printers for their learning. In addition to this, availability of ICT tools in the college manpower; international and national partners, managerial and technical support provide the college with facilities that enhance the integration process.

Ebersole and Vordam (2003) asserts that more recent studies are focused on educators' attitudes toward adoption and integration of ICT for the designing and delivery of technology-based course materials, hence conclude that educators are the major sources of success or failure of ICT integration in education sectors. The findings of the study under investigation indicate that, although lecturers at CEL do not have negative attitude towards ICT integration, they are hindered by having received insufficient training and, as a result, feel that they are under skilled to integrate ICT into their teaching. Lecturers' ICT integration is also hindered by the limited amount of resources which are basically intended for students' use.

The types of ICTs used at CEL include Information Systems (IS), Control Systems and Communication Systems. ICT usage in IS is focused on computers, where computers at LCE are used for managing the instruction process and where lecturers bundle their work on the school website for students to use, even in the absence of the lecturer. The communication systems encompass both hardware and software that perform programmed instructions where ICTs such as combined printers, scanners, photocopiers, mobile phones, digital cameras, and table computers are connected to an accessible

internet provider. The control systems available at LCE include computers which lecturers use in their offices for managing the instruction data and information.

The findings of this study outlined how ICTs available at CEL are used in various ways which include consolidated activities, activities which are gradually being implemented, and ICT-related activities.

6.4.1 Consolidated activities used at CEL

- use of the internet, to look for information and resources to prepare for classes;
- use of recommended internet sites which students use for their learning. Such internet sites include websites, and search engines;
- lecturers' use of emails to communicate with their students and other lecturers and;
- lecturers' drawing up of and use of overhead projectors to do their presentations.

6.4.2 Activities gradually being implemented

- Lecturers require their students to use ICT in activities related to their subject (search for information which helps them to solve problems and for the study of a particular topic);
- Lecturers teach their students to use specific computer programs in their professional fields (Excel for mathematical calculations and Microsoft Word for word-processing) and;
- They require their students to use ICT activities in response to their subject (class projects).

6.4.3 ICT-related activities

ICT-related activities include, for example, the use of:

- computers with appropriate keyboards and other devices to teach ICT literacy;
- email to support collaborative writing and sharing of resources and;
- internet-based research to support enquiry.

The findings of this research are based on the benefits that ICT integration has in teaching and learning and this include motivation. Mr R. specified this when he said, *"Everybody is excited, lecturers and students alike"*, and Mr. K stated with regard to the issue of motivation that *"ICT is basically an interesting tool that we would all want to use"*.

ICT integration at CEL provides collaborative, active and interactive learning where students work in pairs to engage in class activities and academic projects. It is through ICT integration that both students and lecturers at CEL access information from around the world and share ideas on education and learning issues.

The research explorations indicate that ICT integration does not only provides institutions with benefits, but that there are also numerous obstacles in the path of integrating ICT into teaching. Due to the unavailability of an institutional ICT policy and mission statement, barriers mentioned by the lecturers included a lack of lecturers' access to ICT resources. Available ICT resources in the centre and in the library are only for access by students. Further barriers exist in the limited amount of resources, with a total of only fifty computers in the centre, one scanner, one printer and cellular phones and digital cameras which belong to students, plus inadequate technical and administrative support. Management does not compel lecturers to attend ICT training, and, as a result those who feel that they do not need ICT for their teaching ignore the training offered by the college ICT personnel. The training of lecturers in computer literacy does not prepare them to integrate ICT into their teaching and there is a lack of top-level commitment. Lecturers' responses indicate that a lack of interest on management's behalf is hindering ICT integration, and this affects lecturers' readiness to integrate ICT in their teaching.

6.5 The theoretical framework

The findings of this study have been categorised into concepts of the activity theory which answers the critical questions of the study under investigation. This ICT integration study was based on the socio-cultural setting of the Lesotho educational

institution and is intended to investigate ICT integration which is set to trigger changes in academic activities within the college curriculum content and interpersonal relationships within the college environment (Pollini, 2009). This study is also intended to use concepts of the activity theory for analysis, with the intention of understanding how the interpersonal activities in the college are affected by ICT integration innovations and transformations.

The activity theory has been adopted and used to analyse the findings of this study; and to describe how tools and artefacts have been used to enhance the success of the college objective of integrating ICT into teaching, as a transformative teaching and learning strategy which engages learners and lecturers in various activities. The activity theory has also been used to analyse how various parties, as part of the college community, contribute towards ICT integration. Finally, the theory was used to scrutinise the outcomes brought forth by the entire ICT integration process.

To summarise the analysis by means of the activity theory in this study, Leonti'ev (1974, p.46-47) explains:

> *Human psychology is concerned with activity of concrete individuals, which takes place whether in a collective-that is, jointly with other people - or in a situation in which the subject deals directly with the surrounding world of objects-e.g., at the potter's wheel or the writer's desk - if we removed human activity from the system of social relationships and social life, it would not exist...the human individual's activity is a system of social relations. It does not exist without these relations.*

The Leonti'ev (1974) model of activity was used to analyse the human relationship and college objective within the college setting, where the college community as subjects of this study engages in the ICT integration process. The study analysed how tools and rules were used to enhance the integration process and the emphasis was on understood the contributions that the college community make to facilitate integration which should result in observable outcomes. Leonti'ev's (1974) model's assumption is that an activity

should be mediated by tools where an activity is jointly performed, hence successful and fruitful results obtained.

6.6 Commentary

The literature, the theory and the findings of this study showed that ICT integration involves the use of various types of ICTs for teaching and learning where it enhances the education systems on both the lecturers' and students' side. It does not, however deny the fact that trying to integrate ICT into education, lecturers encounter various kinds of barriers which, if not addressed, hinder the integration process.

When taking initiatives to integrate ICT into its institutions, CEL has implemented some measures to meet the objective of the Lesotho ICT policy that has instructed institutions to integrate ICT into their teaching and learning, so improving the quality of education. The college has opened the School Technology Innovation Centre (STIC) as a symbol of its intention to engage with the ICT integration plan. Although the centre has some ICT resources, the researcher felt that they were not adequate for the whole college which offers full time training to primary, secondary and tertiary students, as well as primary part-time students. Students have to make arrangements with librarians for bookings before they can actually use the e-library; this does not provide for any free time during which students might wish to avail themselves of the ICT resources.

Students make use of ICT resources with ease, but they can only get assistance from two lecturers who are competent in ICT. Most of the lecturers were not even aware that ICT resources could be used for teaching. It was therefore not remarkable that most of the responses which some lecturers provided were questionable. Lecturers are not yet ready to integrate ICT into their teaching and learning, particularly not until they receive adequate training which will enable them not only to use ICT resources, but to integrate them into their teaching.

From the researcher's point of view, some lecturers were not even invited to the opening of the STIC, and, as a result were not aware that such an occasion was taking place. Amazingly, students make use of the centre and the library where they utilise all of the available ICTs to perform academic tasks for all their subjects, not only for computer studies where they are guided on ICT resources usage.

6.7 Gaps

Studies conducted by Kalanda and De Villiers (2008), when comparing ICT integration in both South Africa and Lesotho, indicated that an existing gap is surprisingly increasing. After reading the study by Govender (2006) and Marumo (2006), it became very clear that the South African government is implementing measures to make ICT integration into its institutions a success, while Lesotho is lagging far behind.

6.8 Recommendations

ICT integration in Lesotho is facing many challenges that need to be addressed with immediate effect otherwise the existing ICT integration gap between Lesotho and other countries will never close. This section proposes to provide recommendations which are based on the findings of the current study. According to Baskin and Williams (2006, p.2), "existing digital rhetoric (particularly in relation to teacher professional development) foregrounds the use of ICTs and locates teachers and ICT leaders as users of technology". Recommendations of this study are made with great considerations of the study principles rules, subject, tools, community, division of labour and object.

Rules

The findings of this study reflect inappropriate planning, where ICT specialists are the ones responsible for regulations of rules guiding ICT integration at the college. This has led to an integration which does not demonstrate expected results. The researcher's recommendations regarding rules are that rules guiding the integration process should be discussed by representatives of lecturers from all college faculties. There should be

school policies guiding types, access and how ICT integration tools should be used. ICT integration protocol regarding the use of the internet should consider ethical issues dealing with control and restricting the use of the internet for functions other than those for educational purposes.

Subjects

Findings of the current study indicate that lecturers' reluctance to integrate ICT is an integral point hindering ICT integration process at the college. This reluctance is the result of inadequate training, restricted access by lecturers to the college ICT resources and a lack of ICT integration skills. It is therefore a recommendation from the researcher that lecturers, as subjects of ICT integration in the college, be included in the planning strategies of ICT integration. They should be given an opportunity to voice their views regarding ICT integration. The management should prescribe how the training of teachers should be undertaken and indicate how the ICT specialists and other international professionals on the subject should perform such trainings. Thorough supervision of ICT integration should be done to ensure one hundred percent integration rate. Regular workshops should be held to upgrade lecturers' ICT literacy skills.

Tools

According to the lecturers, the lack of appropriate resources and unauthorised access to the college tools are hindering ICT integration processes at the college; and these include both non-ICTs and ICT tools. These problems call for immediate attention or else the integration process is at risk and has a limited chance of success. The researcher's recommendation is for the college to instruct the IT/ICT specialists in the college to engage in the training of lecturers to equip them, not only with ICT skills, but with proper skills which will enable them to integrate ICT into their teaching. With regard to insufficient resources, the researcher suggests that the Ministry of Education in Lesotho be provided with the annual college integration budge including it in its strategic planning. The college should invite participation by international and national partners who can provide the college with some resources.

Object

Some of the college objectives are to achieve the 2020 strategic plan and to meet the aims of the Lesotho ICT policy which states that all Lesotho institutions should integrate ICT into their teaching mechanisms with the aim of improving the quality of education in the country. With limited resources, inappropriate lecturers' ICT skills, and insufficient support from management, the success of ICT integration at the college is at risk. The researcher therefore recommends that set objectives be designed and that as the college designs these objectives, great care and appropriate channels and integration stages should be taken into consideration.

Community

Although the college is now autonomous it is still partly under the Lesotho Ministry of Education's guidance and, as a result should involve representatives from the ministry when designing the strategic plan of ICT integration in the institution. College management should be involved, and should be responsible for the entire ICT integration process. The college ICT specialists/personnel should form part of the ICT integration panel which is to be responsible for the integration. Students, as part of the college community, should have a representative on the panel to assist in decisions concerning students' integration of ICTs. International and national role-players should be incorporated into all ICT integration processes; Lesotho communication systems such as Telecom Lesotho should be invited to join the college ICT integration panel.

Division of labour

All panel members, administrators; national and international parties should play an important role in making the ICT integration process a success. Annual reports should be provided to ensure involvement of all parties, and each party should discuss its successes and limitations, and portray its future plans at such meetings. The annual college ICT integration budget should be discussed. It is at this juncture that challenges such as the lack of resources can be identified and attempts can be made to address these. The running of the centre, though under the management of the ICT specialists, should benefit the entire college community, not only students. This calls for lecturers to be able to

access these benefits as well. Lecturers, stakeholders, ICT specialists, government agencies and non-governmental agencies should work together to facilitate ICT integration success and to promote quality transformation which is conducted through ICT utilisation.

Outcomes

One of the main reasons for ICT integration into teaching at the college and in all other higher education institutions as the South African Ministry of Education (2003) states is to use e-education for transformation, where educators are expected to use technological devices to replace their traditional resources. Inspectorate (1995) as an informative manual for teachers, is arguing for observable ICT impacts and involvement of all Lesotho governmental authorities in the ICT integration process. The recommendations for a successful ICT integration at the college of education in Lesotho would be based on proper planning of the integration process. The planning should clearly indicate how the integration stages should proceed, and should state who will be responsible for the integration. All roles should also be clear and all of the strategies should be discussed regularly. The successes, progress and impacts of the integration should be discussed and revised for the sake of excellence of teaching in the college community.

6 .9 Concluding remarks

This study was carried out to explore the extent to which Information and Communications Technology have been integrated into teaching and learning at a College of Education in Lesotho. The researcher attempted to answer the following questions

- What ICTs are currently being utilised by the college of education in Lesotho?
- How do lecturers and students use available ICTs and do they benefit from their use and;
- What challenges are lectures facing when integrating ICT into teaching and learning?

The results of this study indicate that ICT integration at the Lesotho College of Education is only in its inception, where only two lecturers are competent enough to integrate ICT in their teaching. They also indicate that although other lecturers are not using ICT in their teaching, they do ask their students to work together with the two lecturers who are competent in ICT integration, meaning that students perform all their academic activities in other subjects other than computer studies with the guidance of the computer studies lecturers and use different ICTs to perform such tasks.

The findings also specify that training is offered at the college, but the type of training offered only provides lecturers with basic ICT literacy which is not appropriate for ICT integration in the teaching process. The lecturers' concerns are that the training offered at their institutions is voluntary and not mandated, and that as a result some lecturers just ignore this training and continue using their traditional methods of teaching.

The research results also show that although lecturers are eager to integrate ICT into their education systems, the lack of resources affects their initiatives and hinders the ICT integration process. Respondents are aware of all the benefits brought about by ICT integration, which is why they encourage their students to use a variety of ICTs for their academic work. Students use available ICTs for various activities such as word-processing with Microsoft Word, calculating mathematical problems with Microsoft Excel, taking pictures with their cellular phones and digital cameras and inserting these into their texts, together with the information that they have obtained from the internet. They also use printers and scanners to perform their educational tasks.

This study indicated that some lecturers felt that ICT integration is a difficult task and that, as a result they do not take the initiative to use ICTs in their teaching. They expect management to implement measures which will lead them to accept ICT integration as a need, not as an opportunity to ease their workload. They complain about the insufficient amount of resources, yet they do not use the little that the college can provide them.

This study has answered all the critical questions by specifying the types of ICTs which are used at LCE, how such ICTs are used, the benefits that ICT integration has for education, as well as the barriers which have hindered the integration process at the college.

The researcher is convinced that much needs to be done by the authorities in Lesotho to make ICT integration in teaching and learning a reality, and to enhance the learning experiences of students and lecturers.

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APPENDIX A

CONSENT CERTIFICATE

Researcher: I certify that I have gone through the consent procedure as laid out above fully and carefully with my proposal research participants.

Name: (Block letters)

Signature:

Date:

Place:

APPENDIX B

Research participant: I certify that the informed consent procedure laid out above was explained to me by the above mentioned researcher in person; that I understand everything in it and freely agree to participate. I also understand that I am at liberty to withdraw from the study at any time convenient to me.

Name: (Block letters)

Signature:

Date:

Place:

APPENDIX C

AN ESTIMATED INTERVIEW SCHEDULE FOR INVESTIGATING LECTURERS

My name is 'Mabohlokoa Maoba, a Master of education student specialising in Educational Technology at the University of KwaZulu-Natal. I am currently conducting a study at your college on the integration of ICT in teaching and learning. My topic is 'Information and Communication Technology (ICT) at Lesotho College of Education (Maseru)'. I thought that it would be a good idea to find out from you as users and implementers of technology, how you integrate ICT into your teaching and your students' learning.

I would like to ask you a few questions about your education and experiences regarding ICT integration.

BREAKING THE ICE:

- Firstly, in which faculty are you lecturing and for how long have you been lecturing at this institution?
- How are the relationships between you and your students?

QUESTIONS INTENDED TO ANSWER CRITICAL QUESTION ONE What ICTs are currently being utilised by the college of education in Lesotho?

- What do you understand by the concept ICT?
- What types of ICT do you use for your teaching?
- What ICTs do your students use for their learning?

QUESTIONS INTENDED TO ANSWER CRITICAL QUESTION TWO How do lecturers and students use available ICTs, and do they benefit from their use?

- How do you make use of all available ICTs in your teaching?
- How do students make use of the college ICT resources in their learning?
- Which are the results of using ICT for your teaching?
- Which are the impacts of using ICTs for your students' learning?

QUESTIONS INTENDED TO ANSWER CRITICAL QUESTION THREE

What challenges are lectures facing when integrating ICT into teaching and learning?

- What factors affect the ICT integration process in your teaching?
- What are the barriers hindering the ICT integration in the college?
- Which factors obstruct ICT integration in your students' learning?

APPENDIX D

QUESTIONNAIRE FOR LECTURERS AT LESOTHO COLLEGE OF EDUCATION

Thank you for agreeing to participate in this study. You are requested to fill in this questionnaire which will be used by the college to uplift the standard of ICT integration into its education systems. This questionnaire is confidential, and will not be used to identify you, as an individual, nor your institution. Your participation is highly appreciated. The results of this study will enable the researcher to make appropriate recommendations which will help the college to formulate comprehensive procedures which will lead to an effective ICT integration. There are no right or wrong answers, therefore feel free to answer this questionnaire.

Name of an institution:

Gender:

Years of teaching experience:

Make a tick in an appropriate box to indicate the ICTs which are currently being utilised in your institution

Types of utilized ICTs	Yes	No
Computers		
Newsletters, daily bulletins		
Email		
Discussion boards		
e-library		
Multimedia appliances		
Internet services		
Laptops		
Interactive whiteboards		
Overhead Projectors		
Televisions		
Radios		
Computer hardware		
Computer software		
Smart boards		
Digital cameras		
Cellular phones		
Printers		
Scanners		

Table 1

Table 2 is set to examine how ICTs are used.

Indicate by ticking an appropriate response in relation to how you use available ICTs.

How ICTs are used	Yes	No
Operating a computer (saving files, keyboarding)		
Writing documents with a word-processor (typing, editing and layout)		
Making illustrations with graphical programs		
Calculating with spreadsheet programs (sheet creation, using formulas)		
Writing simple programs (in logos, Pascal)		

Communicating via email with the teacher and other students		
Sending, searching for and using electronic forms of information		
Applying software to track students' progress		
Dictate and organise integration of computers in subjects		
Use specific programs for subjects		
Evaluate and select instructional software		
Use computers for individualizsed learning programs		
Adapting software to fit school subject content		
Communication between learners/learners and the teacher		
Connecting the lecturer (s) and the outside world		
Academic research		
Students, enrolment		
Other (specify)		

Table 2

Table 3 is designed to understand expected changes brought about by the integration of ICT.

Indicate if ICT integration has achieved the following expected changes to education in the information society

Changes in education

ICT integration	Yes	No
Integrated society		
Information openly accessible		
Helps students find appropriate instruction		
Guides independent learning		
Helps students to evaluate their own learning		
Places high emphasis on communication		
Negative students' and lecturers' attitudes and perceptions regarding ICT integration		

Students are:		
More active		
Able to learn in and out of the college		
Involved in collaborative learning (much team work)		
Able to ask questions		
Able to learn by cooperative learning through communication skills		
Provided with relevant information and answers		
Highly motivated		
Engage in problem-solving		
Engage in creativity		
Has the curriculum provided:		
For ICT related objectives of the school		
For the presence of difficult types of teaching practices		
For ICT attainment targets		
The realisation of ICT-related objectives		
For the use of email/WWW for instructional purposes		
For increased percentage of students/teachers using WWW		
For increase in internet-related activities of students		
Technology applications by students		
Adequate skills use to achieve the curriculum goals		
Does the ICT integration plan cater for:		
Prescriptions regarding training of teachers		
Learners' attendance rate (satisfactory)		
Expenditure on staff development		
Types of internal information exchange		
Availability in-house/external training courses		
Self-assessment of ICT skills		
Does the college management consider the:		
Existence of written policies		
ICT-related policy measures		

Lecturers' and students' attitudes towards ICT integration		
Technical support regarding infrastructure		
Priorities for external support		
Are innovation issues:		
Satisfying ICT-related activities		
Other (specify)		

Table 3

The purpose of table 4 below is to investigate the challenges and obstacles encountered in ICT integration.

Tick yes or no to give an appropriate response relating to challenges/obstacles encountered when integrating ICT into teaching and learning

Obstacles	Yes	No
Insufficient number of computers		
Lecturers' lack of knowledge/skills		
Difficult to integrate instruction		
Scheduling relating to time allocation		
Not enough copies of software		
Insufficient lecturers' time		
WWW: not enough simultaneous access		
Not enough supervision staff		
Lack of technical assistance		
Outdated local college network		
Lack of information about software		
WWW: not enough connections		
WWW: insufficient technical support		
Not enough space to integrate ICT		
Weak infrastructure (telecommunications)		
Quality of lecturer training too slow		

Software not adaptable enough		
Students know more than lecturers		
WWW: slow network performance		
Lack of lecturers' interest		
Difficult use, low achieving studies		
Telecom infrastructure weak		
Lack of administrative assistance		
Software not in language instruction		
Lack college board support		
No plan to prevent theft or vandalism		
Other (specify)		

Table 4

Adapted from Baskin and Williams (2006) and Pelgrum (2001)

I hereby give my consent that my responses in this questionnaire may be used for academic research purposes.

Participant's signature

APPENDIX E

The observation checklist presented in table 5 below was used to collect the observation data

An observation checklist of the ICT integrated classroom lessons 1 & 2

Key characters	Observation outline	Comments
Date	19th June 2008 & 20th June 2008	
Layout ➢ furniture and chairs ➢ lighting ➢ flooring ➢ ventilation and noise absorption ➢ electrical installations and health and safety security ➢ access to peripherals such as printers and scanners ➢ installation and location of presentation/display equipment (projectors and interactive whiteboards) storage		Lesson one Lesson two

Number of students		
No. of students per computer		Lesson one: Lesson two:
Types of ICT		Lesson one Lesson two
The role of participants		Lesson one Lesson two
Lesson sequence		Lesson one Lesson two
Learner involvement (Learners' activities)		Lesson one Lesson two
Teaching methods in an ICT classroom		Lesson one Lesson two
Impacts of integrating ICT in teaching and learning		Lesson one Lesson two
Identified obstacles		Lesson one Lesson two

APPENDIX F

APPLICATION LETTER FOR PERMISSION TO CONDUCT THE STUDY

University of KwaZulu-Natal
Edgewood Campus
Pinetown
10th April 2008

The Rector
Lesotho College of Education
P.O.BOX 1393
Maseru
Lesotho

Dear Sir/Madam

Re: application to conduct a study

I wish to seek permission to conduct a study at your site. I am a current student at the University of KwaZulu-Natal, pursuing my Master of Education degree in Educational Technology investigating the study, "Information and Communication Technology integration in teaching and learning at Lesotho College of Education (Maseru)".

The purpose of this study is to explore with the purpose of understanding the types of ICTs which are being used at the college, how available ICTs are being used and to explore the impacts of integrating ICT into teaching and learning as well as to understand barriers which the college encounters when integrating ICT into teaching and learning.

Please note the following points:

1. Collected data will be available and provided to concerned parties, and be treated with confidentiality. Data will be kept safely with the UKZN School of Education for five years after which it will be destroyed.
2. Identity of my participants will remain anonymous.

3. Participation is voluntary and participants are at liberty to withdraw at any time should they feel uncomfortable.
4. With regard to compensation, participants will be pre-acknowledged for their involvement and be given a vote of thanks.

   This study is being supervised by Dr. W.D. Govender who can be emailed at govenderd50@ukzn.ac.za.

APPENDIX G

University of KwaZulu-Natal
Edgewood Campus
Pinetown
10th April 2008

The Research Participant
Lesotho College of Education
P.O.BOX 1393
Maseru

Dear Sir/Madam

Re: invitation for the research participation

You are cordially invited to participate in the study "Information and Communication Technology (ICT) integration in teaching and learning at Lesotho College of Education (Maseru)". The researcher's intention is to investigate through face-to-face interviews, non-participatory observations, and questionnaires, the types of ICTs which are being used at the Lesotho College of Education, how available ICTs are used and to understand the impacts of integrating ICTs into the education systems. Finally, the researcher intends to explore to the barriers to ICT integration at the college.

The researcher is intends bearing the following issues in mind:

1. Data collected will be available and provided to concerned parties, and will be treated with confidentiality. Data will be kept safely by the UKZN School of Education for five years after which it will be destroyed.
2. Identity of my participants will remain anonymous.
3. Participation is voluntary and participants are at liberty to withdraw at any time should they feel uncomfortable.

4. With regard to compensation, participants will be pre-acknowledged for their involvement and be given a vote of thanks.

This study is being supervised by Dr. W.D. Govender who can be emailed at govenderd50@ukzn.ac.za.

LESOTHO COLLEGE OF EDUCATION
P.O. BOX MS 1393, MASERU 100, LESOTHO
TELEPHONE: (+266) 22312721 : TELEGRAM ADDRESS: BOSUOE

Ms. M. L. Maoba,
Rosewood Flat 2,
University of Kwazulu-Natal,
Edgewood Campus,
Private Bag X03,
Ashwood 3605,
South Africa.

2nd June 2008

Dear Ms. Maoba,

Permission to Conduct Research at LCE

On behalf of the Rector, I wish to acknowledge your letter of 25th March 2008 requesting permission to collect data at this college for your master's research on "ICT integration in teaching and learning at Lesotho College of Education".

By this letter you are authorised to collect the data at this college. We expect that you will:

- Respect the rights of informants to choose whether to give information and whether to be named.
- Acknowledge, in your work, this permission and any written sources in the College that you use.
- Provide the College with a copy of your thesis, when completed.

I wish you good luck with your study.

Yours sincerely

Mrs. L. Maqalika-Lerotholi
Deputy Rector, Administration

Lesotho College of Education
RECTOR
2008 -09- 02
P.O. Box 1393
Maseru - 100
Tel.: 09266-22315973

Cc. The Rector

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