

**AN EVALUATION OF THE EXTENT TO WHICH INFORMATION AND
COMMUNICATION TECHNOLOGIES HAVE BEEN INTEGRATED IN THE
TEACHING PROCESS IN SELECTED COLLEGES OF EDUCATION IN ZAMBIA**

By

Lemmy Kangwa

**A dissertation submitted to the University of Zambia in partial fulfillment of
the requirements for the award of the degree of Master of Education in
Education Administration and Management**

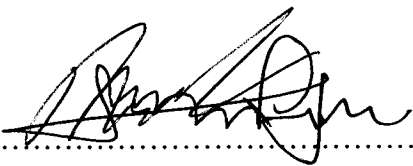
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DECLARATION

I, Lemmy Kangwa, do hereby declare that this dissertation represents my own work and it has not previously been submitted for the award of a degree at the University of Zambia or any other university.

Signature.....

Date.....30-05-12

DEDICATION


This work is dedicated to my wife Francisca, our children Shoka, Lukonde and Malama; and to my late parents Mr. Vitaliano “Sox” Kangwa and Mrs. Joanna Mwansa Kangwa.

CERTIFICATE OF APPROVAL

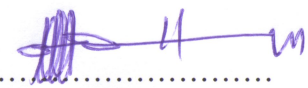
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LIST OF ACRONYMS

| | |
|---------------|--|
| AVU | African Virtual University |
| CAZ | Communication Association of Zambia |
| CDC | Curriculum Development Centre |
| CDMA | Code Division Multiple Access |
| CE | College of Education |
| CHCE | Chipata College of Education |
| CLCE | Charles Lwanga College of Education |
| CoL | Commonwealth of Learning |
| DALICE | David Livingstone College of Education |
| DODE | Directorate of Open and Distance Education |
| DoE | Department of Education |
| EFA | Education For All |
| E-Mail | Electronic Mail |
| FET | Further Education and Training |
| FNDP | Fifth National Development Plan |
| GET | General Education and Training |
| GPRS | General Pocket Radio Service |
| GSM | Global System for Mobile Communication |
| HIV | Human Immuno-deficiency Virus |
| HEI | Higher Education Institution |
| ICT | Information and Communication Technology |
| IRI | Interactive Radio Instruction |
| ISP | Internet Service Provider |
| IT | Information Technology |

| | |
|----------------|---|
| KACE | Kasama College of Education |
| KICE | Kitwe College of Education |
| LCD | Liquid Crystal Display |
| LAN | Local Area Network |
| LICUS | Low Income Countries Under Stress |
| MACE | Mansa College of Education |
| MCT | Ministry of Communication and Transport |
| MDGs | Millennium Development Goals |
| MMCE | Malcolm Moffat College of Education |
| MOCE | Mongu College of Education |
| MoE | Ministry of Education |
| MU | Mulungushi University |
| MUCE | Mufulira College of Education |
| NISTCOL | National In-Service Teachers' College |
| NRDC | Natural Resources Development College |
| ODL | Open and Distance Learning |
| PC | Personal Computer |
| PTDDL | Primary Teachers' Diploma by Distance Learning |
| SOCE | Solwezi College of Education |
| SSA | Sub-Saharan Africa |
| TEVET | Technical Education and Vocational Training |
| TVTC | Technical Vocational Teachers' College |
| UNDP | United Nations Development Programme |
| UNESCO | United Nations, Educational, Scientific and Cultural Organization |

| | |
|---------------|---|
| UNZA | The University of Zambia |
| USA | United States of America |
| VVOB | Flemish Association for Development Co-operation and Technical Assistance |
| WAN | Wide Area Network |
| WWW | World Wide Web |
| ZAMISE | Zambia Institute of Special Education |
| ZATEC | Zambia Teachers' Education Course |
| ZICTA | Zambia Information Communication Technologies Authority |
| ZNBC | Zambia National Broadcasting Corporation |

ABSTRACT

The purpose of the study was to evaluate the extent to which information and communication technology is integrated in the teaching process among Colleges of Education in Zambia. Specific objectives were: To identify the ICT equipment used in the teaching process, to establish the role of ICT in the teaching process, to determine the factors that influenced the use of ICT in the teaching process and to assess the effectiveness of the integration of ICT in the teaching process in Colleges of Education. The theory of integration as devised by UNESCO (2004) was used to inform this research.

This research employed both qualitative and quantitative survey research approaches. The target population comprised college principals and lecturers as well as ICT coordinators in colleges of education, Ministry of Education National ICT coordinator and the ICT coordinator from the Curriculum Development Centre (CDC). The sample consisted of 70 lecturers, purposively sampled (through homogenous type of purposive sampling) from four colleges of education: Chipata, Kitwe, Solwezi and the National In-Service Teachers' College. The same (purposive) sampling technique was used to select an ICT coordinator and a principal from each of the four CEs. One Ministry of Education National ICT coordinator was also selected as an informant. From CDC, one ICT coordinator was also purposively selected to be part of the sample. This brought the total sample size to 80. A questionnaire, semi-structured interview, observations, discussions and audio recording were used to collect data from the field. Constant comparative and narrative methods were used to analyze the primary data. This involved classification of words and phrases that related to the same content into major themes prior to discussion and conclusions.

It was found that the most commonly used ICT equipment among CEs was a desktop computer (42 per cent). Although the TV and the radio were popular ICT equipment, they only scored 21 and 15 per cent respectively of all ICT equipments that were in use; 14 per cent of the responses showed that laptops were also used in the teaching process and the least used was the liquid crystal display (8 per cent). In terms of ICT use by course or subject, most responses (20 per cent) showed that they were mainly in computer classes, 17.7 per cent of responses indicated total none use of ICT equipments in any subject or course. Mathematics and natural sciences were tied at 15 per cent. Other courses in which ICT was used included social sciences (10 per cent), Local Languages and Art were both at 6 per cent, Music (5 per cent), English Language (4 per cent), and the least being Physical Education which accounted for 1.5 per cent as shown in table six. The factors that influenced ICT use in CEs included lack of good policy framework, poor ICT skills among lecturers and inadequate funding and resources. In summary it was concluded that the extent of integration of ICT in the teaching processes was low and had not been effective as it met neither national nor international standards as outlined in the Zambia MoE ICT policy and the UNESCO framework respectively. Further research, infrastructural development, ICT skills training and others were among the recommendations of the study.

CHAPTER ONE: INTRODUCTION

1.1 Background

There is a growing concern in Africa about the use of computers to support learning in educational institutions. Information and Communication Technologies (ICTs) are used to gather, analyze, modify and exchange information. They are used in almost all spheres of human activity. The computer and the internet are increasingly making their way into teaching and learning practices and processes (Boakye and Banini, 2008). Education is a basic human right. When that right in the context of educational growth and self-fulfillment is granted development opportunities, it is likely to be accompanied by improvement in the individual's and society's well being as a whole. The inseparable themes of improving access and quality of education are at the heart of Millennium Development Goals (MDGs) and Education For All (EFA), (Olakulehin, 2007). As education systems expanded, the question was how the EFA goals could be achieved when most countries in Africa were faced with a myriad of problems that seemed insurmountable.

Most learning is improved or enhanced through the use of learning support materials that are carefully constructed and carefully used. Some complex issues in education or learning process require mixing of advanced tools of teaching unlike over reliance on the traditional ones such as charts, chalk board, books, a pen, and paper, among others which marred most learning processes especially in the 20th century (Rosenberg, O'Donoghue and Olvitt, 2008). They further argued that for the development of learning, support materials that were flexible and adaptable to diverse and changing contexts, recognizing aspects such as language, purpose and topical complexity was necessary. Mbanjwa (2002) further argued that the educators' ability to appropriately select and mix both traditional and modern learning support tools was key. One of the modern tools which could be mixed with the common methods in teaching processes at various levels of tertiary education and particularly in teacher education is the use of Information Communication Technology (ICT) such as internet, Television, radio, Video Conferencing, Cell Phones and others.

In the Zambian context, where ICT applications used to have so little to do with the core business of teachers' educators, trends in modern society demand for ICT integration into the

teaching process among teacher education colleges. With the introduction of the ICT facilities in some institutions such as the University of Zambia, our attitudes and those of our students have changed. Internet meant that we had access to a wealth of information and the problem is no longer ‘how do we get more information, but rather how we cope with all the information that is out there and what we can do with it’ (Anderson and Glen, 2003).

Over two decades ago, the unfortunate reality was that for many African countries such as Zambia, larger socio-economic issues preceded improving the quality of education. Poor learning outcomes remained a tremendous challenge in most countries in Sub-Saharan Africa (SSA). As a result many African countries, including Zambia were significantly disadvantaged globally as well as in terms of their national priorities by poor performance of the education sector. Teachers had an indispensable role to play in the education system. To have quality education, there was need to have sufficient and well trained teachers/teacher educators in different techniques of teaching.

The Ministry of Education (MoE) (1996: 107) reaffirms: “The quality and effectiveness of any education system largely depends on the quality of its teachers. They are the single most important factor in determining success in meeting the goals”. In the national policy document of the Ministry of Education (1996) it is further acknowledged that the two pillars on which professional competence of teachers rested were initial and on-going in-career professional and personal development. In the 21st century, one of the means through which teacher educators’/trainers’/learning facilitators’ competencies could be continually developed to ensure effective teaching process is through the integration of ICT.

The Zambian economy has historically been heavily dependent on mining. Mining being a high-tech industry contributed significantly to the country’s early introduction to Information Technology (IT). The Telecommunications’ Act set up in 1994 placed Zambia in a leading role as an African country in the use of ICT in Africa. After the Act, the Communication Authority of Zambia (CAZ), now the Zambia Information Communications Technologies Authority (ZICTA) was created. The roles of the CAZ included issuing telecommunications service and supplier licenses and overseeing the growth of the telecommunications industry in Zambia. However, there had not been any major improvements in the technology industry or in the

implementation of the ICT policy (Isaacs, 2007). It is further acknowledged that “Zambia is the pioneer of Internet in Sub-Saharan Africa outside South Africa in the early 1990s. However, this advantage has not been exploited as the country now lags behind many African countries that embraced internet services only a few years ago” (Ministry of Communications and Transport, 2006:11).

Up to 2007, Zambia’s ICT development was still heavily anchored on mobile operators, fixed line operators and Internet Service Providers (ISPs). In 2007, there were approximately 500, 000 internet users, 700 telecentres and cybercafés with 30 ISPs countrywide. In 2008, there were, 3,200,000 mobile phone subscribers representing a teledensity of 22.5 percent. In 2009 the number of mobile subscribers rose to over 4, 000,000 while in the same year the number of fixed line telephones was only 90, 951. In 2009 there were approximately 1. 3 million internet users representing a penetration rate of 11.9 per cent (Isaacs, 2010).

In 2008 an optic fibre was being laid to ensure fast broadband internet services. Three companies, namely the Zambia Electricity Supply Corporation (ZESCO), Copperbelt Energy Company (CEC) and Zambia Telecommunications Company (ZAMTEL) were spearheading the project to link Zambia through the Indian Ocean marine optic fibre to the Atlantic marine optic fibre. Optic fibre technology has an advantage over satellite in terms of real time transmission and the very low bit error rate it provides (Munsaka, 2009). The major developments in the ICT sector from 1994 are summarized in Table 1 below:

Table 1: Major developments in the ICT sector in Zambia

| Date | Event |
|------|--|
| 1994 | Telecommunications Act put in place: this led to the increase of private participation and subsequent liberalization of the sector. Internet introduced by Zamnet Communication system, a company owned by the University of Zambia |
| 1995 | Cellular Telephony introduced by Zamtel |
| 1996 | Coppernet Solutions starts operations |
| 1997 | Zamtel launches internet services |
| 1998 | Zamcel receives mobile license |
| 1999 | Telecel replaces CDMA with GSM |
| 2000 | Mobile subscribers surpass the number of fixed line subscribers for the first time |
| 2001 | Microlink and UUNet enter the ISP market |
| 2002 | Zamtel migrates GSM technology |
| 2003 | Independent Broadcasting Association (IBA) Act: ZNBC amendment Act |
| 2005 | MTN acquires 100% shares of Telecel Africonnect launches MiMAX broadband services |
| 2007 | National ICT Policy launched by Government |
| 2008 | Celtel rebrands as Zain, subscribers number exceed 2.5 million |
| 2009 | ICT Bill launched CAZ Universal access fund launched First International fiber network reached Zambia WiMAX reaches 9 provincial centres |

Source: Munsaka (2009)

There is substantial evidence that if used appropriately for specific contexts, ICT can be an effective tool for supporting teaching and learning. “In the sphere of education, ICT has the

potential to improve the quality of education and training through e-learning and online learning” (Ministry of Education, 2007: 2). However, the integration of ICT in education is a contentious issue. Ministry of Education (2007) reaffirms that ICT integration is a complex process and as such, all education stakeholders require clear guidance on what is expected of them throughout this process. It is therefore no longer a question of technology being integrated in the school setting, but rather a question of when and how to integrate the technology so that it benefits both educators and learners. Countries that fail to recognize and respond according to the new trends in new content and new methodologies in education may find it very hard to compete in the new global economy (Kozma, 2003). Cox et al (2002), further observe that new technologies such as internet and computers are often introduced and even forced into schools in ways that do not enhance teaching and learning. They further argue that Ministries of Education are most often too eager to import computers into schools without putting in place a policy environment and curriculum that supports their integration of technology into teaching in ways that ensure equitable success. For any successful integration of technology, ICTs inclusive, in the teaching process, there is need to understand and appreciate the dynamics of such integration. Even the highest learning institution in Zambia, UNZA, is still grappling with how to ensure proper integration of ICT in the teaching process. Premised on this synoptic background this research assessed the effectiveness of integrating ICT in the teaching process among selected colleges of education (CEs) in Zambia.

1.2 Statement of the Problem

Whilst Zambia’s ICT policy advocates for effective integration of ICT within the entire education sector to support administration, teaching, learning and research (Ministry of Education, 2007), it is not precisely known the extent to which ICTs have been integrated in the teaching process in colleges of education in Zambia. This lack of concise certainty on the extent of integration of ICTs turns out to be a problem because education planners, policy makers and others would not have an informed basis to ensure effective integration of ICT in the teaching process. This provoked the need to carry out this study.

1.3 Purpose of the Study

The purpose of the study was to evaluate the extent to which ICTs have been integrated in the teaching process among colleges of education in Zambia. Arising from the purpose of research were the following specific objectives:

1.4 Specific objectives

1. To identify the ICT equipment(s) used in the teaching process in Colleges of Education
2. To establish the role of ICT in the teaching process in Colleges of Education
3. To determine the factors that influenced the use of ICT in the teaching process in Colleges of Education
4. To assess the effectiveness of ICT integration in the teaching process in Colleges of Education.

In order to meet the above specific research objectives, the following questions were addressed:

1.5 Research Questions

1. What ICT equipment is used in the teaching process in Colleges of Education?
2. What is the role of ICT in the teaching process in Colleges of Education?
3. What factors influence the use of ICT in the teaching process in Colleges of Education?
4. How effective is the integration of ICT in the teaching process in Colleges of Education?

1.6 Rationale/significance of the study

Zambia's ICT policy advocates for an effective integration of ICT within the entire education sector to support administration, teaching, learning and research (Ministry of Education, 2007). Therefore, the findings of this study may enlighten policy makers, lecturers and other stake holders on the extent of integration of ICTs in the teaching process in Colleges of Education and in other learning institutions. The findings may also add to the existing literature at UNZA and other learning institutions and provide valuable information for further research.

1.7 Conceptual definitions/framework

In this study the concepts below have the following operational meanings:

Education: Deliberately structured and hierarchical system of learning to bring about behavioural change in a particular context.

Integration: The act of combining or adding ICT into already existing teaching tools to make a unified whole and bring about more effective teaching/learning outcomes. It is about using new tools to help students master the key concepts and skills embedded in the natural science, social studies, art and other curriculum standards. It is not about power pointing, spread sheeting or word processing. The focus is on teaching and learning strategies that make a difference in daily practice and on activities translating into stronger student performance.

Teaching Process: Refers to the way of instructing learners in order to bring about behavioral change.

Information and Communication Technology (ICT): a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information. These technologies include computers, the internet, broadcasting technologies (radio and television), and telephony.

e-Learning: Learning at all levels both formal and non-formal that uses an information network-the internet, an intranet (LAN) or extranet (WAN), whether wholly or in part, for course delivery, interaction and/or facilitation.

Blended Learning: refers to learning models that combine tradition classroom practice with e-learning solutions.

Curriculum: A series of planned instruction that is coordinated and articulated in a manner designed to result in the achievement by students of specific knowledge and skills and the application of this knowledge.

Pedagogy: The beliefs and actions of teachers including their teaching strategies, the organisation of learning experiences and of the learning environment generally.

1.8 Theoretical Framework

The theory of ICT integration as expounded by United Nations Education Science and Culture Organisation (UNESCO, 2005) has been adopted to inform this research. The integration of ICT has been studied by the UNESCO (2005) during which it developed the criteria for assessing the effectiveness of integration of ICT into the teaching process. Where ICT has been effectively integrated, teacher educators set high targets for their students with clear descriptions of the objectives and how ICTs will help them achieve those goals. Moreover, a variety of technological and assessment tools are well developed.

There must also be an effective learning environment that extends beyond the classroom to home-based study as well as effective training in practical integration of technology into classroom activities and not only basic computer functions. Other requirements include a supportive infrastructure for ICT, quality content and materials, enabling policies and strategies (including legal and ethical guidelines for use of ICT), practice informed by evaluation and research, vision and leadership, student-centered approaches to learning, and relevant assessment tools (UNESCO, 2005). Figure one below provides the visual impression of the theoretical framework that guided this research.

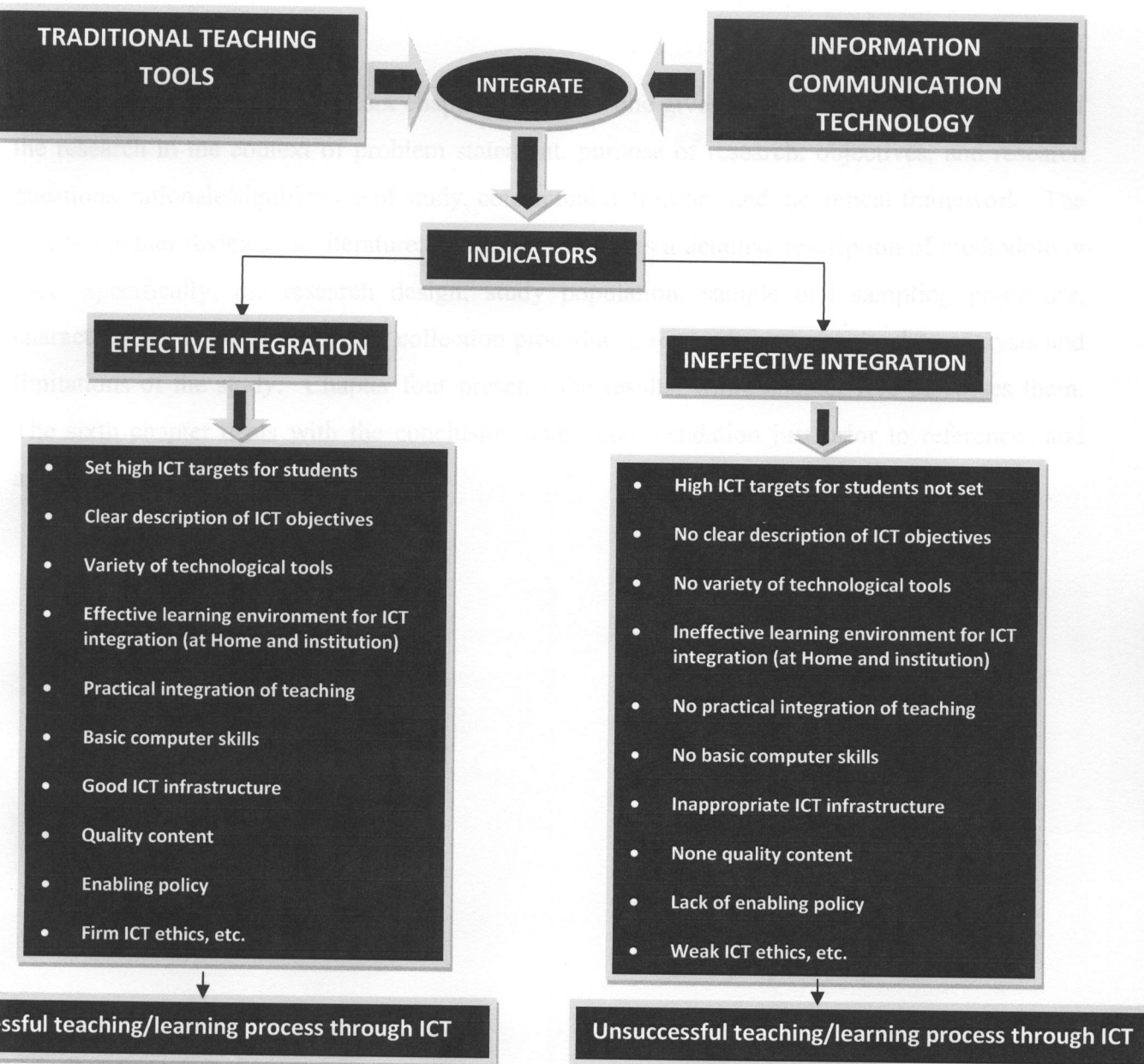


Figure 1: Diagrammatical representation of this research's theoretical framework

This research used some of the theoretical parameters shown in figure one above to evaluate the extent of ICT integration in the teaching process in selected Colleges of Education in Zambia.

1.9 Organization of the Study

This dissertation is made up of six chapters. Chapter one gives a synopsis of the background of the research in the context of problem statement, purpose of research, objectives, and research questions, rationale/significance of study, conceptual definitions and theoretical framework. The second chapter reviews the literature. Chapter three gives a detailed description of methodology used, specifically, the research design, study population, sample and sampling procedure, characteristics of the sample, data collection procedures, research instruments, data analysis and limitations of the study. Chapter four presents the results, while chapter five discusses them. The sixth chapter deals with the conclusion and recommendation just prior to references and appendices respectively.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Having shown the introductory chapter in the preceding segment, this chapter presents literature review. It first shows synoptic debates on the significance of studying integration of ICT into the teaching process and thereafter, the global, Africa's and Zambia's perspectives on integration of ICT in the teaching process just prior to a summary of reviewed literature respectively.

2.2 Debates on significance of studying integration of ICT into teaching process

Integration of ICT in education has been a contentious issue. At one extreme there are some who are not convinced that ICT will bring the pedagogical benefits that have been promised (Cuban, 1996). At the other extreme, advocates claim that technology would change the educational landscape forever in ways that will engender a dramatic increase in the performance of learners (Papert, 1995). In between the two extremes, there are others who adopt a balanced approach. They are convinced that ICT, if properly integrated, has the potential to enhance the teaching and learning process (Apkan, 2002; Thompson, 2002). If properly integrated, ICT-enabled education has the potential to promote the development of student's decision-making and problem solving skills, data processing skill, and communication capabilities (Whitworth and Benson, 2003). Lafferriere, Breuleux and Bracewell (1999:17) add that "Given the right conditions for access and use, significant gains in student learning are recorded with ICT" and Kirschner and Selinger, (2003); Loveless and Dore, (2002); and Scrimshaw, (2004) contend that integrating ICT is a complex process of educational change and the extent of ICT applications in schools is still extremely varied and, in many instances, very limited.

ICT in education should not be considered as a replacement for face-to-face instruction, but rather as a support to "attain objectives that have not been attained efficiently otherwise: expanding access, promoting quality, improving the internal efficiency of educational systems, enhancing the quality of education, and preparing new and old generations for a technology-driven market place" (Haddad and Jurich, 2002: 47). Muzumara (2008) further noted that a computer cannot replace an average teacher but with careful planning, it can enhance the

teaching and learning process. Technology in education offers a number of benefits to the educational community and the society. Despite all such paradigmatic debates concerning the significance of ICT in educational process, Clark and Sun (1996), Means and Olsen (1997) and Williams (2002), contend that the benefits of technology to education include:

- a) An enhanced learning environment for learners. Technology provides a motivating learning environment whereby learners are given the opportunity to be constructively engaged with instruction. Research has revealed that, if properly implemented, learners can reap the pedagogical benefits of technology in the classroom. Implementation of the constructivist model of learning rather than the traditional instructivist model being increasingly advocated by experts.
- b) Powerful tools to supplement teachers' instruction in the classroom. If properly used by teachers, ICT can foster more interest in learning on the part of students, and teachers can use it in the instruction of their respective subjects. It has the potential to make instruction easier, more challenging and motivating for teachers.
- c) An administrative tool for teachers and administrators. Apart from classroom instruction, teachers are also involved in administrative duties such as record keeping, lesson planning, preparing handouts and examination papers, tutorials and slides, and in analyzing results.
- d) Increased access to education and inclusive education in the school. Schools are centres of integration of all students regardless of their cultural, racial, and socio-economic backgrounds, as well as their strengths and weaknesses in any area into an integrated school community. Technology can enable schools to promote equal access to education and has the potential to offer increased access to students with disabilities.
- e) A communication platform. In the near past, geographical distance was a major obstacle to communication around the world. The scenario has changed with technology; through networks and the internet, it is now possible to communicate with anyone anytime around the globe. Students, teachers, and administrators can communicate and exchange knowledge, meet peers and experts, and share work in collaborative projects through the use of ICTs.

- f) A passport to employment and to gaining competitive edge in the global economy. In both developed and developing countries, job markets are increasingly demanding a computer literate workforce. ICTs in education can prepare students now to integrate the world of work and competition of the future.
- g) Studying and understanding the factors that influence the use of ICT in the teaching process is crucial because this knowledge could provide “guidance for ways to enhance technology integration” (Schoepp, 2005:2) and encourage greater use of ICT. Identifying the fundamental barriers may assist educators to overcome these barriers and become successful technology adopters (Al-Alwani, 2005).
- h) Generally, research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century. If designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning (Tinio, 2004: 5).

Having provided the general picture on significance of studying ICT integration in the teaching process, the following section provides some reviews from a global perspective.

2.3 Global perspectives on integration of ICT in the teaching process

The emerging technologies of the 21st century will require teachers to be instrumental in knowledge production, modification and application rather than being consumers. In order to be prepared for this, teachers’ educators need to use ICT effectively and creatively. Globally there is a general consensus to promote the integration of Information and Communication Technologies (ICTs) into educational processes in schools, colleges and universities. The renewed enthusiasm for this integration finds global support based on a number of reasons. One of them being that technology would help the quality of education to the expectation that it would sustain and promote lifelong learning (Robinson and Latchem, 2003).

2.3.1 Integration of ICT in teaching process in the European Union

According to European SchoolNet (2006), the use of ICT in education and training has been a key priority in most European countries during the last decade, but progress has been uneven. There are considerable differences of e-learning maturity within and between countries, and

between schools and tertiary institutions within countries. In some European countries such as Austria, institutions have embedded ICT into the curriculum, and demonstrate high levels of effective and appropriate ICT use to support teaching and learning across a wide range of subject areas. Despite the technological endowment in Europe, other countries within are in the early phase of ICT adoption, characterised by important enhancements of the learning process, some developments of e-learning (ICT enabled learning), but no profound improvements in learning and teaching. Such progress had taken place and had been achieved at considerable cost. In Denmark, the government has invested in their national ICT project a sum of €43m over a four year period. The United Kingdom (UK) has spent only for the ICT test bed project⁷ an amount of 34 million pounds (€49m) over a four year period involving various teacher education colleges. In 2004, the UK announced that it planned to spend up to 700 million pounds (€1,05bn) in ICT by 2006. This study by European SchoolNet (2006) revealed the importance of investing in ICT. Some of these countries have well established ICT in their learning institutions. However, what still needs to be examined is the types of ICT returns these investments have brought.

2.3.2 Integration of ICT in teaching process in the United States of America (USA)

By 2010 the U.S.A's ICT demand needed over twice the number of computer software engineers, data communications analysts and computer support specialists than it had in 2000. As reported by Crosby-Nagy and Carfora (2000), these trends signal that the knowledge worker era has arrived and we are seeing more and more people seeking access to higher education. Due to these workforce trends and a host of fundamental socio-economic changes in both the USA and other forward-thinking economies, it is no mystery that e-learning has emerged as strongly as it has, and equally no surprise how the use of ICT applications has penetrated the university classroom. Students around the world are increasingly exploring ways to access higher education outside the traditional in-classroom, in-person, and teacher-student paradigm (Saettler, 1990). Internet penetration in the classroom has also sufficiently enabled students to collaborate and experience learning in unprecedented ways. ICTs have been used in the developing world to help overcome teacher shortages as well as to develop and upgrade teaching skills (Hawkins, 2002). From the context of the USA however, the massive integration of ICT into teaching and learning processes was not precipitated by educational vision, but by socio-economic

needs/circumstances and busy schedule of the citizens. This therefore, makes it somehow difficult to determine the effectiveness of the educational outcomes of ICT integration.

2.3.3 Integration of ICT in the teaching process in Eastern Asia and the Pacific

During the school year 2008-2009, the Ministry of Education and Training (MOET) of Vietnam launched the “Year of ICT” to produce a breakthrough in educational innovation. In light of this development Peerraer and Van Petegem (2009) carried out a policy analysis to study the national vision and mission on integrating Information and Communication Technology (ICT) in education in Vietnam. The policy analysis focuses on the most recent developments in guidelines on ICT and education, in the context of the movement on “Friendly Schools, Active Students”. In their survey research, they argued that ICT is high on the education reform agenda of many countries in East Asia. New policies for educational reform are built around the premise and promise of effective ICT integration in teaching and learning (Richards, 2004). However, in practice the use of ICT for teaching practice is limited at best. Analysis of integration of ICT in education cannot afford to decontextualize the computer from wider social and political variables that shape the larger context of schools (Selwyn, 1999). Despite this, the findings showed that Vietnam is trying its best to integrate ICT in its educational system especially in Teacher Education Colleges.

The demand for higher education has accelerated worldwide. Between 1999 and 2008, the number of students enrolled in higher education institutions (HEIs) increased by 65 million, with much of the growth being seen in East Asia and the Pacific. In fact, the global demand for higher education is predicted to expand from less than 100 million students in 2000 to over 250 million in 2025 (Peerraer and Van Petegem, 2009). This is likely to include the rising numbers of adults who seek to enroll in courses to upgrade their skills and qualifications. Despite the impressive statistics, most regions around the world have yet to reach this target. Governments and educational institutions are looking for innovative ways to increase access to higher education and improve the quality of their programmes and courses in a bid to improve their competitiveness. The prevalence of information and communication technology (ICT) and the

impact it has made in all aspects of our lives are compelling reasons for HEIs to try to capitalize on 21st century tools and technologies to address 21st century issues and challenges.

This has motivated some HEIs in taking the lead to reshape the landscape of their educational systems as well as teaching and learning practices. Over time, the number of universities embracing new technologies to conduct the business of education is expected to soar. However, many HEIs may require guidance and assistance in their change process to minimize their teething problems, reduce costs, utilize appropriate technology and tools, and engage staff with proper knowledge and skills. UNESCO Bangkok coordinated a research study to document the use of ICT for higher teacher education in the Asia and Pacific region in 2009. Open and Distance Learning (ODL) has opened the door to higher education for many students.

The burgeoning number of ODL students can be attributed in part to the increasing use of ICT in HEIs, as testified by the educational institutions featured in this report: Symbiosis Centre for Distance Learning in India has more than 200,000 students from all over India and over 40 countries, with 150 employees and over 400 visiting faculty members. Moreover, Shanghai Television University, an open university in China, serves more than 100,000 teachers and students, and Korean National Open University is a mega-university for ODL with more than 180,000 students (Danaher and Umar, 2010). The flexible teaching and learning system is well suited for students who are unable to attend regular classes, and facilitates self-paced learning. Even traditional universities are offering distance learning and integrating blended learning to complement their face-to-face classroom settings as described in the case studies from Queensland University of Technology, one of Australia's largest public universities hosting 40,000 students and 4,000 staff, and Nanyang Technological University in Singapore, a tertiary institution with about 30,000 undergraduate and graduate students. The cases from East Asia and the Pacific are among the best examples where lessons could be drawn.

2.4 Africa perspectives on integration of ICT in the teaching process

This section shows the reviews of literature on integration of ICT in teaching and learning processes from different selected countries in Africa.

2.4.1 Case from Kenya

A survey by UNESCO (2005) revealed that the Kenya Teachers' Training College (KTTC) had undergone a major transformation since it established a Learning Resource Centre (LRC) in 2002. The LRC was established using flexible modes and innovative methods as a learning centered place where lecturers and students came to teach, learn and undertake research. It embodies an ICT unit of 48 networked computers and with funding from UNESCO the ICT unit is linked to a wireless satellite connection that provides a 24-hour internet access. The LRC remains open after hours and on Saturdays to allow lecturers, students, and non-teaching staff to browse at a fee of US\$ 0.75 per minute (UNESCO, 2005). UNESCO further notes that, at KTTC, more than 100 teacher educators have been trained in ICT, Internet research, modern teaching/learning approaches, and the development and writing of open learning materials. Most of this training takes place during short and regular in-house workshops. Almost 500 pre and in-service teachers have been offered training on internet research. Basic ICT skills training were offered at the beginning of the project (UNESCO, 2005).

The focus of the capacity building programme has changed. Workshops concentrate on specific education-related themes and tasks, including efficient internet research, the pedagogical rationale for ICT integration, problem-based learning, innovative instructional methods such as flexible learning and information literacy. Lecturers attend the workshops when they feel ready and are offered unlimited access to the computers in order to experiment. It is compulsory for students to attend workshops as part of their curriculum. Most lecturers and students start using the internet for personal searches. Once they are comfortable with the computer, they start discovering resources for more professional use. The provision of internet access triggered interest and enthusiasm in both lecturers and students to undertake training in how to deal with the wealth of information available to them. Users initiate a search process to access relevant information and for means to integrate this information into learning and teaching practices. This search process promotes the use of higher order thinking and reasoning and problem-solving skills. Lecturers and students are guided through this process which ultimately leads to the efficient and effective handling of information and its incorporation in educational settings. During the first two years of the project, this flexible approach was possible because there was no ready-made training package (UNESCO, 2005). So even though some scholars such as Cuban

(1996), Peat and Franklin (2003) argued that ICT would not bring the pedagogical benefits in teaching and learning process, UNESCO's research in Kenya proved that ICT integration in the teaching process promotes the use of higher order thinking and reasoning and problem-solving skills. The only challenge for the UNESCO's findings could be that concepts such as higher order thinking and reasoning may be quite difficult to verify.

2.4.2 Integration of ICT in the teaching process in Ghana

A survey by Boakye and Banini (2008) investigated teachers' readiness for the use of ICT in Ghanaian schools. Using a case study approach, they established that 71 per cent of the teachers did not use ICT in classrooms, 49 per cent of the teachers used ICT to prepare lesson notes, 55 per cent of the teachers had some knowledge of web browsing, 71 per cent used email, and 78 per cent tried to make an effort to learn how to use the computer. Despite the limited use of computers by teachers in their teaching, many agreed that the computer had changed the way students learnt. Moreover, 24 per cent of the teachers had received some form of training through the use of computers, with quite minimal training in the pedagogical integration of ICT. The two researchers came to a conclusion that, most teachers did not seem prepared to integrate ICT in their teaching practices. Boakye and Banini (2008) generally provided an insight into the main ICT themes such as accessibility, use of ICT, and others. However, there had not been clear evidence explaining on how the computer changed the way students learnt, making it quite challenging to assess the effectiveness of the integration of ICT in the teaching process.

2.4.3 Integration of ICT in the teaching process in South Africa

Investigations by the Department of Education (DoE) (2010) showed that South Africa was known to invest heavily in education in a structured and focused manner, and was therefore a country whose experience was relatively likely to provide useful lessons for the rest of Africa. South Africa was highly developed in the use of distance education, and had a strong emerging culture of mobile learning. Since 1994, the South African education curriculum had undergone comprehensive changes to make it responsive to the education of a diverse range of learners and to the needs of the 21st century labour market. The *e-Education White Paper* of 2004 stressed the benefits of ICT for teachers, learners, managers and school administrators, especially with respect to the use of ICT in enhancing the quality of the teaching and learning process. This was

also emphasised in the National Education Policy Act of 1996, which promoted enhancements in the quality of education and educational innovation (Department of Education, 2010).

The South African Government approved a policy and strategy for Free and Open Source Software (FOSS). FOSS had been proposed as a means to enable South Africa to develop content and programmes in education using local languages. The importance of connectivity is recognised by the *e-Education White Paper*, which also specified that the Department of Basic Education (DBE) should support refurbished facilities for second-hand computers and set minimum specifications for refurbishments (Department of Education, 2010). Power is also a requirement, and the *e-Education White Paper* stipulates that the Department of Education should work closely with the Department of Minerals and Energy to prioritise electrification of General Education and Training (GET) and Further Education and Training (FET) institutions (Department of Education, 2010). While the discussion here does not detail all of the policies it demonstrates that South Africa has a number of cross-sectoral and mutually supportive policies that create a strong environment for the integration of ICT in education. Successful implementation of policy requires enabling institutional arrangements. South Africa has a number of public entities and agencies concerned with ICT, and a national commission to advise on ICT development in the country. There are also agencies that support ICT in education as part of their mandate. The researches by the South African DoE mainly investigated the factors that influenced integration of ICT in teachers' educators. The research demonstrated that effective policy implementation measures had facilitated effective implementation of ICT in the teaching process. It is probably for this reason that South Africa's use of ICT in teaching is unmatched by any country south of the Sahara. Indeed Zambia's colleges of education and the MoE have a lot of lessons to derive from the South African case. Technological advancement and solidarity towards a common goal would also bring about the intended purpose of ICT in the teaching process (Department of Education, 2010). The current research actually revealed that there had been poor policy framework and technological endowment to ensure effective integration of ICT in teaching and learning processes.

2.4.4 Integration of ICT in the teaching process in Uganda

Uganda was selected as a case study country in expectation that it would draw out lessons for those countries such as Zambia where there had been some effort to introduce ICT in education but where there was no coordinated framework. Uganda, by contrast with South Africa, had a fragmented approach to ICT in education. Uganda first developed a National ICT Policy framework in 2003, which recognised the potential of ICT in supporting development across different sectors including education. The development of an education sector-specific ICT policy in 2005 was another outcome and it aimed at coordinating the disparate ICT projects which would be taking place within the education sector. It touched on a range of issues that needed to be addressed in providing a supportive environment for integrating ICT in education. These included legal and security aspects, infrastructure, curriculum revision, and ICT skills training for teachers at different levels (Department of Education, 2010). Many participants thought that Uganda lacked a unified national direction with which to deal with ICT in education. One of the challenges to slow integration of ICT in teaching process was attributed to the fact that most of those who were making decisions were trained at a time when ICT was not used in education and so did not appreciate the need. Ministry of Education officials pointed out that bureaucratic delays in implementation negatively affected Uganda's integration of ICT into the education system. The overall conclusion of the research was that Uganda was still at the starting stage with respect to integration of ICT in education.

2.4.5 Integration of ICT in the teaching process in Senegal

Senegal was ahead of Uganda in terms of setting up the necessary policy environment. The Ten Year Education and Training Programme of the Ministry of Education included objectives for the connection of schools to the Internet, development of computer education, use of ICT in education to improve teaching and learning, use of ICT for school management, and development and implementation of a blueprint for an information system for the sector (Department of Education, 2010). In 2009, Senegal developed a policy for the education sector, along with a master plan. It would appear that the critical policies that Senegal would use as a basis for integrating ICT in education were recent (2009) and were just moving to the

implementation stage, which would explain the fact that important indicators did not yet identify Senegal as an example to emulate (Department of Education, 2010).

2.4.6 Integration of ICT in the teaching process in Somalia

According to Hare (2007), the educational policy efforts in Somalia had been focused on reviving the education system, increasing enrolments, and reducing the school drop-out rates unlike ICT. There were some private tertiary institutions especially in Mogadishu that used ICT but more as an administrative tool than as something integrated into teaching and learning processes. In order to give an impetus to the integration of ICT in the teaching and learning process, the United Nations Development Programme (UNDP), World Bank and the African Virtual University (AVU), were supporting the Somali Institutional and Capacity Development Project (SICADP) whose outputs included other tertiary institutions through increased use of ICTs.

The Online Distance Learning Initiative which was launched in 2005 enabled teacher educators and students to attain internationally accredited university qualifications and build their research capacities through expanded access to global learning and knowledge through partnerships with institutions in other countries. The six institutions being supported by UNDP under the World Bank Low Income Countries Under Stress (LICUS) Distance Learning and Connectivity Project are East Africa University (Bossaso), Puntland State University (Garowe), the Somalia Institute of Management and Administration Development (SIMAD) (Mogadishu), Mogadishu University, University of Hargeisa and Amoud University (Borama). They are also part of the African Virtual University (AVU) network giving them access to digital resources and on-line short courses. This research by Hare shows us the significance of stakeholder partnership in building a firm ICT-based learning environment.

2.4.7 Integration of ICT in the teaching process in Libya

In their survey research in Libya, Rhema and Miliszewska (2010) acknowledged that the growing influence of technologies on the education sector requires developing countries to follow the example of the developed countries and adopt technology in their education systems. Despite being relatively behind, the Libyan government eventually responded to this challenge

and started investing heavily in the reconstruction of its education system, and initiating national programs to introduce information and communication technology (ICT) into education. In addition, there are plans to establish virtual campuses in many universities and colleges to provide an advanced platform for learners and instructors (Rhema and Miliszewska, 2010) The two researchers stressed the issues that needed to be considered and addressed in adopting ICT in the learning and teaching processes including technological infrastructure, curriculum development, cultural and language aspects, and management support. Their research also outlined the prospects for the integration of e-learning into Libyan higher education. One thing that came out more prominent in their research was the need to propose an integrated approach to advancing the introduction of e-learning in Libya and this is a good lesson for other countries in Africa.

2.4.8 Integration of ICT in the teaching process in Zambia

MOE's draft ICT policy on education has set its vision within the broader framework of "Educating Our Future" and the "Strategic Plan 2003-2007" and has also taken into consideration the National ICT Policy and the FNDP. The policy identifies ICT priorities set in different thematic areas as content, distance education, teacher training, financing, administrative and support services of the MOE Strategic Plan (Ministry of Education, 2007). The policy on ICT in education is guided by the following principles:

- It must fit into national policies on education and ICTs
- There is commitment to establishing strategic partnership with stakeholders
- There is combined effort with government, the private sector, and NGOs
- The policy reflects general standards that the Ministry of Education wants to uphold
- An integrated approach must be adopted that integrates all aspects of the value chain in the education process.

The policy further outlines the MOE's commitment to promote collaboration between the private sector and education institutions and to establish appropriate structures to facilitate the integration of ICTs in the education system (Ministry of Education, 2007). Nevertheless, lack of a clear implementation framework and strategy seem to be seriously thwarting government's

effort in developing concrete programmes for turning the policy into reality. To set one of the starting points in ensuring sustainability and on-the-ground effectiveness of ICT especially in the teaching processes, Isaacs (2007: 3) reported that:

The penetration levels of ICTs in Zambia's educational institutions remains low, with those schools that are equipped mostly utilizing second-hand and refurbished computers. The integration of ICTs in learning and teaching practice has been limited, although the introduction of computer studies as a school subject has begun to change this. The recent adoption of a national ICT policy for education and an associated implementation framework provides an enabling policy environment to promote far greater access and use of ICTs across all sectors of Zambia's education system, including a system for enhancing education management, administration, and teaching and learning.

While the goals and targets set in these policy frameworks seem realistic, realizing them within the established time frames remains a challenge. Although Isaacs (2007), argued that "the recent adoption of a national ICT policy for education and an associated implementation framework provides an enabling policy environment to promote far greater access and use of ICTs across all sectors of Zambia's education system, this research proved that such enabling environments are still farfetched and that CEs barely have an enabling environment for integration of ICT in the teaching process.

The Zambian Government had recognized the importance of ICT as an enabler for growth, development and competitiveness. This was clearly demonstrated by government's resolve and initiative to develop and launch the National ICT policy and the inclusion of ICT as a priority sector in the FNDP 2006-2010. At the National ICT policy launch, the then Republican President, Levy P. Mwanawasa, emphasized the creation of an innovative, market responsive, highly competitive, co-coordinated and well-regulated ICT industry. The National ICT policy was designed on thirteen pillars one of which was ICT education, research and development (Ministry of Communications and Transport, 2006).

In her address to delegates during the 5th e-Learning conference held in Zambia from 26th to 28th May 2010, the then Education Minister, Dora Siliya, stressed the achievements Zambia had made in education. She stressed that a grade 1-9 computer studies syllabus had been developed whilst at grade 10-12 level, Zambia is still using an international syllabus. ICT is now used at the Interactive Radio Instructions (IRI) or learning at Taonga Market to capture learners from distant and various places of Zambia. The University of Zambia has introduced the ICT training facilities; e-libraries, online registration, use of some ICT facilities during teaching/learning sessions and others. Examination Council of Zambia (ECZ) has embarked on developing online registration for all the levels of examination, Mulungushi University has been connected to Pan African E-network project that has been classified to provide e-services with priority on tele-education and tele-medicine services (Pers.com/Dora Siliya, 26th May, 2010).

Much as we appreciate what Zambia and particularly the education sector are doing in integrating ICT in various teaching/learning processes, the effectiveness of all such ICT developments have not been carefully assessed. This research seeks to set a starting point in assessing the extent and effectiveness of such ICT developments in the context of learning processes among CEs. This would help identify areas that need attention in order to ensure effectiveness of ICT as one of the means mediating learning and teaching processes.

According to Ministry of Education (2007), all the 14 government CEs have now acquired computers with internet connectivity. This is in addition to other ICT tools. However, their use in the teaching and learning process differs from institution to institution. “The tertiary level (colleges and universities) has institutional initiatives to acquire ICTs with own and/or donated resources for purposes of training IT human resource, manage information systems, and general use in daily academic activities”. The Table two below presents the state of ICTs in CEs according to the QUEST Project’s Survey conducted in 2005:

Table 2: ICT Equipment in colleges of education (in percentages)

| | Secondary Teachers' College | | | Primary Teachers' College | | |
|----------------|-----------------------------|-----------|--------------|---------------------------|-----------|--------------|
| | Have | For Admin | For training | Have | For Admin | For Training |
| PC without CD | 100 | 100 | 0 | 10 | 10 | 0 |
| PC with CD | 100 | 100 | 60 | 90 | 90 | 0 |
| PC with DVD | 100 | 100 | 30 | 30 | 30 | 0 |
| Printer | 100 | 100 | 30 | 60 | 60 | 0 |
| Copier | 100 | 100 | 100 | 50 | 50 | 30 |
| TVs | 100 | 100 | 100 | 60 | 60 | 60 |
| VCRs | 100 | 100 | 100 | 50 | 50 | 50 |
| Video Player | 100 | 100 | 100 | 0 | 0 | 0 |
| DVD Player | 30 | 30 | 30 | 0 | 0 | 0 |
| Video Camera | 30 | 30 | 0 | 70 | 70 | 70 |
| Digital Camera | 60 | 60 | 0 | 30 | 30 | 30 |
| CD Camera | 60 | 60 | 30 | 20 | 20 | 20 |
| Audio Cassette | 60 | 60 | 30 | 50 | 50 | 50 |
| MP3 Player | 30 | 30 | 0 | 10 | 10 | 0 |
| Radio | 100 | 100 | 100 | 10 | 10 | 10 |
| Telephone | 100 | 100 | 0 | 80 | 80 | 0 |

Source: QUESTT Project's Survey on ICT in Teachers' Colleges (2005)

The survey revealed that ICTs were used more for administrative purposes than for training. None of the CEs at both primary and secondary levels used PCs without CD-ROM, MP3 players and telephone for training purposes. Additionally, none of the primary CEs used PC with CD-

ROM, PC with DVD, printer, video player and DVD player for training. More than half of the primary CEs, used video camera and TV for training while half of the CE used VCR and audio cassette for training. Less than half the number of these CEs used radio, copier, digital and CD cameras for training purposes. On the other hand all the secondary CEs used the copier, TV, Radio, VCR and video player for both administration and training. More than half of these colleges used PC with CD for training while less than half used the printer, PC with DVD, CD camera and audio cassettes for training. None of these colleges used digital and video cameras for training purposes.

Kelso and D'Souza (2004) argue that having access to the technologies does not necessarily mean that they are used, and using does not necessarily mean they are used effectively. Balanskat, Blamire and Kefala (2006:235) add that "although educators do acknowledge the value of ICTs in schools, difficulties continue to be encountered during the process of adopting these technologies." The survey by the QUEST (2005) seemed to give an impression that CEs especially those involved in training secondary school teachers had fairly enough ICT facilities. However, this may be far from it if such facilities were to be distributed among individual colleges of education which were studied by QUEST. Reflecting back on the UNESCO's framework of effective integration of ICT, multiplicity of technological equipment is one of the means to determine the effectiveness of integration and vice versa. This research also revealed a critical deficit in terms of technological equipment which affirmed that the integration of ICT in the teaching process was still yet to reach acceptable standards in CEs studied.

In another survey, a baseline study on ICT in twelve CEs was conducted in 2008 by the Flemish Association for Development Organisation (VVOB); lack of qualified personnel, acquisition of computers, internet access and students' lack of computers were found to be the major problems (VVOB, 2008). The study also revealed huge discrepancies between colleges in the acquisition of computers. The colleges with more computers were mostly those that received support from donors. In the CEs studied, the average number of computers was 18 with the number of active computers ranging from 2 to 64. For printers the differences were less pronounced with active printers ranging from 1 to 8 and an average of less than 5. While for staff, the availability of computers ranged from 7 per cent to 98 per cent, for students, none of the colleges had a

computer ratio lower than 1 computer per 10 students. The average of 1 computer for over 25 students is not a good indicator for ICT in education just as the computer to teacher ratio of one to 13 in one CE. The study also revealed that between 2004 and 2007, only four out of the 12 CEs had taken some initiative on ICT:

- Charles Lwanga CE installed an internet connection and a local network
- Mansa CE secured a room for the computer lab and secured the PTDDL FPP room
- NISTCOL had a website designed and organized ICT technician training
- ZAMISE worked on ICT modules as learning materials

Whilst the research by the VVOB focused mainly on the factors influencing the integration of ICT, this research went further to look at the effects and the role of ICT so as to provide a more spectrum for assessing the extent and effectiveness of integrating ICT in CEs.

In a nutshell, there seemed to be variations and similarities in the extents of integration of ICT in the teaching process. It has been reviewed that developed countries have a more advanced integration of ICT into various sectors of education. This has been precipitated by various factors such as good policy framework, socio-economic and political aspects. In Africa, most of the countries with exception of South Africa were found to be into the implementation strategies and others were still struggling to initiate the implementation processes. Although Zambia did not really have very substantial information of this topic, the literature showed that we had started evolving into the world of ICT especially in our teaching/learning processes. Having reviewed some literature for this research, the next chapter presents the methodology used to obtain raw data from the field.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the research methodology used to collect data. It will start by first explaining the main research design used in this study and the reasons for adopting it. Thereafter, particular emphasis will be placed on target population, sample and sampling method. It will also show the processes of primary and secondary data collection used just before the subsection that will show the method of data analysis as well as some limitations of the study.

3.2 Research design

This research employed both quantitative and qualitative survey research approaches. According to Sidhu (2009:109) “survey may be qualitative or quantitative” depending on the nature of data to be collected and how they are intended to be collected. This research combined both aspects. The quantitative approaches were employed mainly during analysis of data through Statistical Package for Social Scientists (SPSS). The qualitative aspects were employed during face to face interviews and interpretation of data that were qualitative in nature. Through the use of survey research, the researcher came into direct contact with selected teachers’ educators in four Colleges of Education. Moreover, a survey enabled capturing just a representative fraction of a whole, much as a camera takes a single frame photograph to represent larger landscapes. A survey approach also facilitated the use of both qualitative and quantitative techniques simultaneously. The next section shows the targeted population.

3.3 Population

The target population comprised of college principals and lecturers as well as ICT coordinators of CEs, MoE National ICT coordinator and the ICT coordinator from the Curriculum Development Centre (CDC). The reason for including various informants in the target population was to ensure trustworthiness and to avoid biasness of data. The total population was 580.

3.4 Sample Size and sampling technique

Four government-run Teacher Training Colleges were included in this study namely: National In-Service Teachers’ College (NISTCOL), Kitwe College of Education (KICE), Chipata College of Education (CHCE), and Solwezi College of Education (SOCE). The institutions were

purposively selected to ensure that CEs in urban areas, peri-urban areas and rural areas were represented. The sample consisted of 70 lecturers, purposively sampled (through homogenous type of purposive sampling) from the four colleges of education. The same (purposive) sampling technique was used to select an ICT coordinator and a principal from each of the four CEs. One MoE National ICT coordinator was also selected as an informant. From CDC, one ICT coordinator was also purposively selected to be part of the sample. This brought the total sample size to 80. Since the members of the sample were required to possess a special expertise in teacher education, purposive sampling was very appropriate. As the name suggests purposive sampling is used to select a sample for a particular purpose.

Purposive sampling, also known as *judgmental*, *selective* or *subjective* sampling, is a type of *non-probability sampling* technique (Kumar, 1999). Non-probability sampling focuses on sampling techniques where the units that are investigated are based on the judgment of the researcher. Moreover, the precise quantitative figures of the target population in CEs were not known so non-probability purposive sampling proved more appropriate as it did not require rigorous rules and rigidity in terms of the figurative target population as strictly required in random sampling techniques. Usually, the sample being investigated is quite small, especially when compared with *probability sampling* techniques. Homogeneous sampling is a purposive sampling technique that aims to achieve a homogeneous sample; that is, a sample whose *units* (for example, people, cases, and others) share the same (or very similar) *characteristics* or *traits* (for example, a group of people that are similar in terms of background, occupation, among others.). In this respect, homogeneous sampling is the opposite of *maximum variation sampling* (Leedy and Ormrod, 2001). A homogeneous sample is often chosen when the *research question* that is being addressed is specific to the characteristics of the particular group of interest, which is subsequently examined in detail, in this case the college lecturers, principals, ICT coordinators were regarded to have such unique characteristics.

3.5 Tools and process of primary and secondary data collection

To achieve the aim and objectives of this study the researcher mainly used semi-structured interview schedule shown in appendix one to collect data from the principals, CDC ICT coordinator, and national ICT coordinator at MoE headquarters. An administered questionnaire

was used to collect data from college lecturers. During the data collection process through semi-structured interview schedule, the respondents were allowed to express themselves as widely as possible on one theme of research before proceeding to the other. As the respondents expressed their views, the researcher was alert to capture subtle, meaningful cues and phrases in respondents' expressions and articulations. As respondents did a lot of talking, the researcher did a lot of listening, note taking, simple unstructured observations and some follow-up questions where necessary. The views the researcher held about ICT integration in the teaching process did not interfere in any way during interviews with principals and ICT coordinators. Thus, the researcher took note of important words and phrases of the respondents as uttered without any personal twisting. Suspension of researcher's academic notions enabled gaining of understanding of the typical experiences on ICT integration in the teaching process. Each respondent was interviewed for about 40 to 60 minutes.

The use of semi-structured interview facilitated follow-up questions to obtain deeper insight on certain issues that were raised by the respondents during the direct interviews. Moreover, semi-structured rather than fully structured interview schedule offered sufficient flexibility to approach different respondents differently while still covering the same areas of data collection. The researcher also used simple observations of respondents' non verbal cues during interviews and surroundings so as to confirm whether some of the issues they claimed to have been happening were existent or not. Being a face to face interview, discussion was also automatically incorporated and note taking was used to record respondents' words and phrases related to research. The questions were administered to selected lecturers. A questionnaire is described by Gillham (2008:16) as a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents. Peterson (2006) notes that a questionnaire enables quantitative data to be collected in a standardized way so that the data are internally consistent and coherent for analysis. Mugenda and Mugenda (2003), state that an interview is an oral administration of a questionnaire. They add that interviews provide in-depth information about a particular research issue or question. Peterson (2006) notes that the observational method of research concerns the planned watching, recording, and analysis of observed behaviour as it occurs in a natural setting. He further adds that the observational

method's key feature is a standardised, planned, and systematic approach to objectively observe and record behaviour so as to generate all-important data upon which to base any conclusions. The combination of these methods of data collection helped in ensuring validity and trustworthiness of data through the process called triangulation (Sidhu, 2009).

In this research, some secondary data were obtained from documentary sources, reports, print and electronic media and some dissertations, books, among others from the University of Zambia library and other sources. The process involved reading, reviewing, critiquing where necessary and comparing of different findings already done by different scholars in the context of ICT integration.

3.5.1 Ethical considerations during primary data collection

The researcher got permission from relevant authorities of each visited CE. Researcher's letter of introduction together with a consent letter (shown in appendix one) for the research participants were revealed for approval and signing by each participant prior to being interviewed. The respondents were not allowed to disclose their names except their signature to show consent for interviews and none of them were photographed without their consent. When undertaking any research, it is important to consider ethical issues. Mugenda and Mugenda (2003), note that awareness of ethical issues will protect the integrity of the people involved in the research, some of whom may not be able to represent themselves in the event of being misrepresented, and also protecting the integrity of the researcher and ensure authentic results.

3.6 Analysis and processing of collected primary data

In the analysis of data, descriptive statistics were used. Descriptive statistics involved manual coding of data and subsequent tabulation into frequencies and percentages. For open ended questions, the coding of data involved classification of words and phrases that related to the same content into major themes (Leedy and Ormrod, 2001). The idea was to allow the actual existing pattern, themes and phrases of the research results to emerge from the data. After the summary of the results from the interview questions, main emerging themes and ideas were manually coded, synthesized and quantified into percentages and presented in form of tables of frequencies and percentages. After obtaining the final overall portraits of the crude data, the data was then discussed and conclusions drawn. The limitations of the study were as follows:

3.7 Limitations of the study

A large scale survey would have been better, but due to limited financial resources and time, the researcher undertook a small scale survey of only 80 respondents. However, substantial information was still gathered because respondents provided a lot of answers for each of the main questions. Purposive samples, irrespective of the type of purposive sampling used, can be highly prone to researcher bias. The idea that a purposive sample has been created based on the *judgment* of the researcher is not a good defence when it comes to alleviating possible researcher biases, especially when compared with probability sampling techniques that are designed to reduce such biases. However, the researcher ensured that judgments about the sample composition were properly-conceived or carefully considered by eliciting experts and experienced teachers' educators. The researcher could not access the precise figurative target population which made somehow challenging to determine the sample size. Therefore, the researcher had to adopt a purposive non-probability sampling which could have brought in some biases. Moreover, during the review of literature in the Zambian context, it was noted that there was generally little on ICT integration arguably due to ICT being new to the Education system in Zambia. This limited comprehensiveness of reviews in Zambian context.

CHAPTER FOUR: PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents results in the context of the specific objectives. Respondents' demographic data will be presented first and thereafter the data on ICT equipments available in CEs just prior to their uses. Afterwards, the results on the factors that influenced the use of ICT in the teaching process as well as the effectiveness of ICT integration. Because of the homogeneity of the sample characteristics, the data were presented as a combined whole. Moreover, some demographic data such as gender and age were also included because of their indirect influence on the use of ICT in the teaching process. Literacy in ICT and availability of ICT equipment are critical in evaluating the extent of ICT integration in the teaching process in colleges of education.

4.2 Demographic characteristics of respondents

This section presents findings on the demographic background characteristics of the respondents in the study. Table three below shows that the majority (75 per cent) of the respondents were between the age of 30 and 50. Only a few (five per cent) were below the age of 30. The table further shows that the majority (62.5 per cent) of the respondents were males. Whilst the sample sizes in all four learning institutions were almost equally distributed, slight variations were notable with NISTCOL and Chipata College of Education being the highest (25 per cent each). Only one respondent was selected from MoE and so it was from CDC.

Table 3: Distribution of respondents by Age, Gender and Institution

| A. Background Characteristics | Number | Percentage (%) |
|---------------------------------------|---------------|-----------------------|
| <i>Age</i> | | |
| Below 30 | 4 | 5 |
| 30-50 | 60 | 75 |
| Over 50 | 16 | 20 |
| TOTAL | 80 | 100 |
| B. Gender | | |
| Male | 50 | 62.5 |
| Female | 30 | 37.5 |
| TOTAL | 80 | 100 |
| C. Institutions | | |
| National In-Service Teachers' College | 20 | 25 |
| Kitwe College of Education | 19 | 23.75 |
| Chipata College of Education | 20 | 25 |
| Solwezi College of Education | 19 | 23.75 |
| MoE | 1 | 1.3 |
| CDC | 1 | 1.3 |
| TOTAL | 80 | 100 |

Table four below shows that most of the respondents (71.3 per cent) had first degree as their highest academic qualification whereas, 12.4 per cent were holding masters degrees. The least qualified (five per cent) were holding a diploma.

Table 4: Distribution of respondents by professional/academic qualifications

| Professional Characteristics | Number | Percent |
|-------------------------------------|---------------|----------------|
| Master's | 10 | 12.4 |
| First Degree | 57 | 71.3 |
| Advanced Diploma | 9 | 11.3 |
| Diploma | 4 | 5 |
| Total | 80 | 100 |

4.3 ICT equipment(s) used in the teaching process among Colleges of Education

This section presents results on ICT equipments used in teaching process among Colleges of Education. Table five below shows that the most commonly used (42 per cent) ICT equipment among CEs was a desktop computer and the least used (8 per cent) being LCD. Although the TV is such popular ICT equipment, it only scored 21 per cent of all ICT equipments that were in use.

Table 5: Distribution of responses by type of ICT equipment used in CE

| ICT equipments | Frequency of response | Percentage of responses |
|-----------------------|------------------------------|--------------------------------|
| Desktop computer | 63 | 42 |
| TV | 32 | 21 |
| Radio | 22 | 15 |
| Laptop computer | 21 | 14 |
| LCD | 12 | 8 |
| Total | 150 | 100 |

Figure two below shows that NISTCOL had the highest number of desktops, seconded by Chipata College of Education and the least being Solwezi College of Education. For laptops, Chipata College of Education had the highest number and the least being Solwezi. Furthermore, NISTCOL had the highest (seven) number of LCDs. Figure two further shows that ICT equipment such as video camera, TV and radios were the least used for teaching.

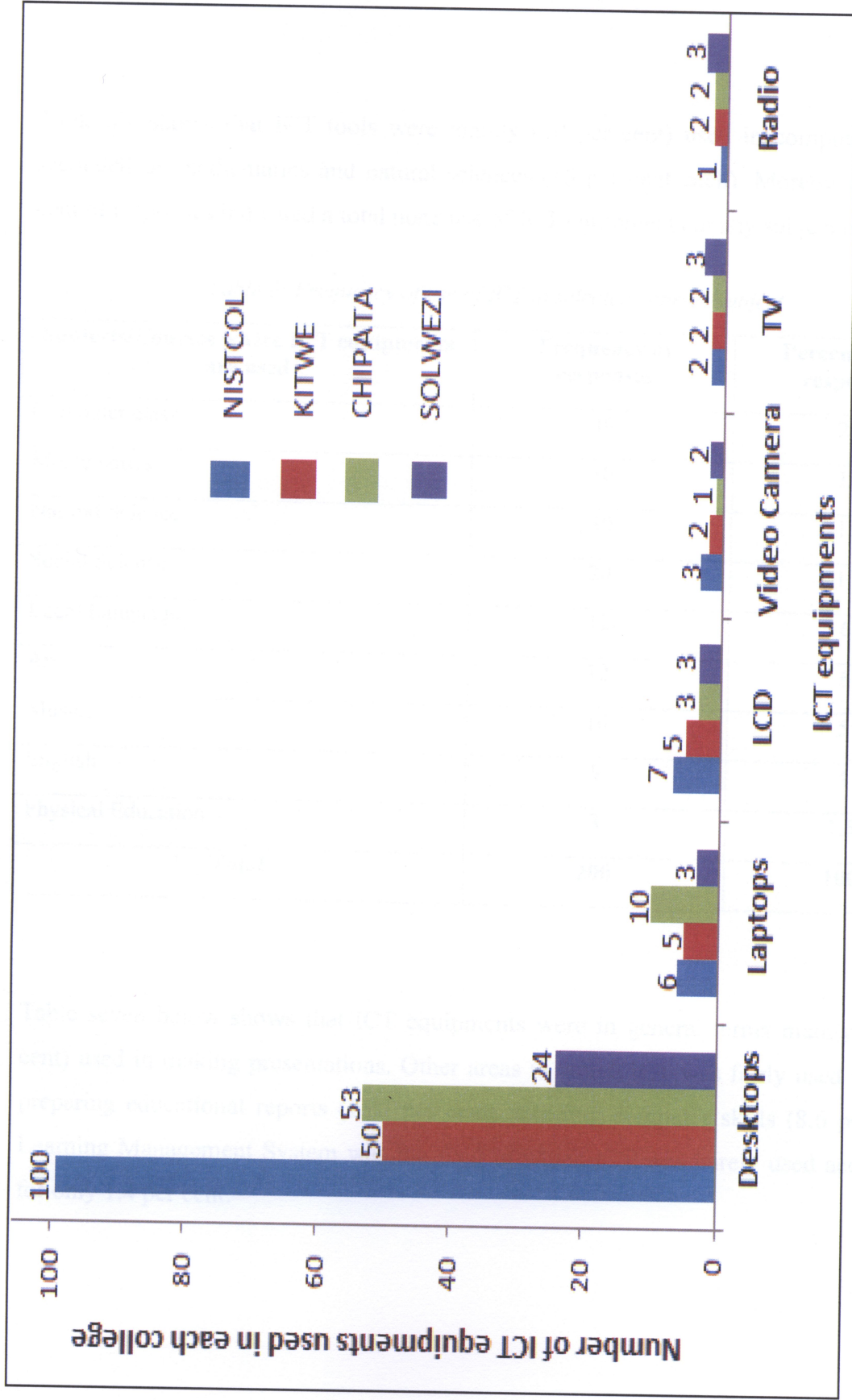


Figure 2: Number of ICT equipment by each College of Education in Zambia

Table six shows that ICT tools were mainly (20 per cent) used in computer classes, seconded by mathematics and natural sciences (15 per cent each). Moreover, 17.5 per cent of responses indicated a total none use of ICT equipments in any subject or course.

Table 6: Frequency of use of ICT in selected courses/subject

| Subjects/Courses where ICT equipments are used | Frequency of responses | Percentage of responses |
|---|-------------------------------|--------------------------------|
| Computer class | 40 | 20 |
| Mathematics | 30 | 15 |
| Natural Science | 30 | 15 |
| Social Science | 20 | 10 |
| Local Language | 12 | 6 |
| Art | 12 | 6 |
| Music | 10 | 5 |
| English | 8 | 4 |
| Physical Education | 3 | 1.5 |
| Total | 200 | 100 |

Table seven below shows that ICT equipments were in general terms mainly (30 per cent) used in making presentations. Other areas in which ICT was fairly used included preparing educational reports (15.7 per cent), teaching computer skills (8.6 per cent). Learning Management System was the field in which ICT was barely used accounting for only 1.4 per cent.

Table 7: General use of ICT by lecturers in CE

| General use of ICT equipments | Frequency | Percentage |
|--|------------------|-------------------|
| Making presentations | 21 | 30 |
| Preparing Educational Reports | 11 | 15.7 |
| Monitoring and Evaluating students' progress | 7 | 10 |
| Teaching computer skills | 6 | 8.6 |
| Finding/Accessing educational information | 6 | 8.6 |
| Communicating with students | 5 | 7.1 |
| Administrative tasks | 3 | 4.3 |
| For personal development | 2 | 2.9 |
| Teaching specific lessons | 2 | 2.9 |
| Preparing lessons | 2 | 2.9 |
| As a Learning Management System e.g. Moodle | 1 | 1.4 |
| Networking | 1 | 1.4 |
| Total | 70 | 100 |

4.4 Factors that influence the use of ICT in the teaching process

This section shows results on factors that influenced the use of ICT in the teaching process among selected Colleges of Education in Zambia. Figure three of all the lecturers interviewed among Colleges of Education revealed that only 43 per cent were already literate and 26 per cent were still undertaking ICT training. Thirty-one per cent of them were not yet literate in ICT.

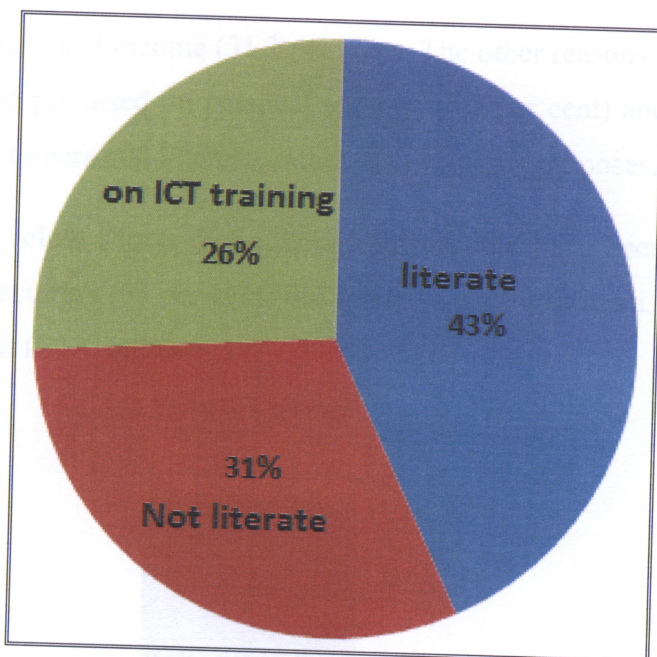


Figure 3: Distribution of respondents (lecturers) by literacy in ICT

Table eight below shows various reasons why lectures among Colleges of Education went for ICT training.

Table 8: Reasons for attending/undergoing ICT training

| Reasons for attending ICT training | Frequency of responses | Percentage of responses |
|------------------------------------|------------------------|-------------------------|
| Earn additional income | 20 | 31.2 |
| Necessary in teaching | 20 | 31.2 |
| Career enhancement | 16 | 25 |
| Prestige | 4 | 6.3 |
| Personal growth | 4 | 6.3 |
| Total | 64 | 100 |

Based on table eight above, the lecturers who were literate and those undergoing literacy in ICT went for it because it was necessary in teaching (31.2 per cent) and it could be a

means of additional income (31.2 per cent). The other reasons given for undertaking ICT training were premised on personal prestige (6.3 per cent) and personal growth both of which point to personal interests rather than teaching purposes.

Figure four below shows that although there could have been some ICT equipment in CEs, most lecturers (62 per cent) did not have access to them. Only 38 per cent of them had access to ICT facilities.

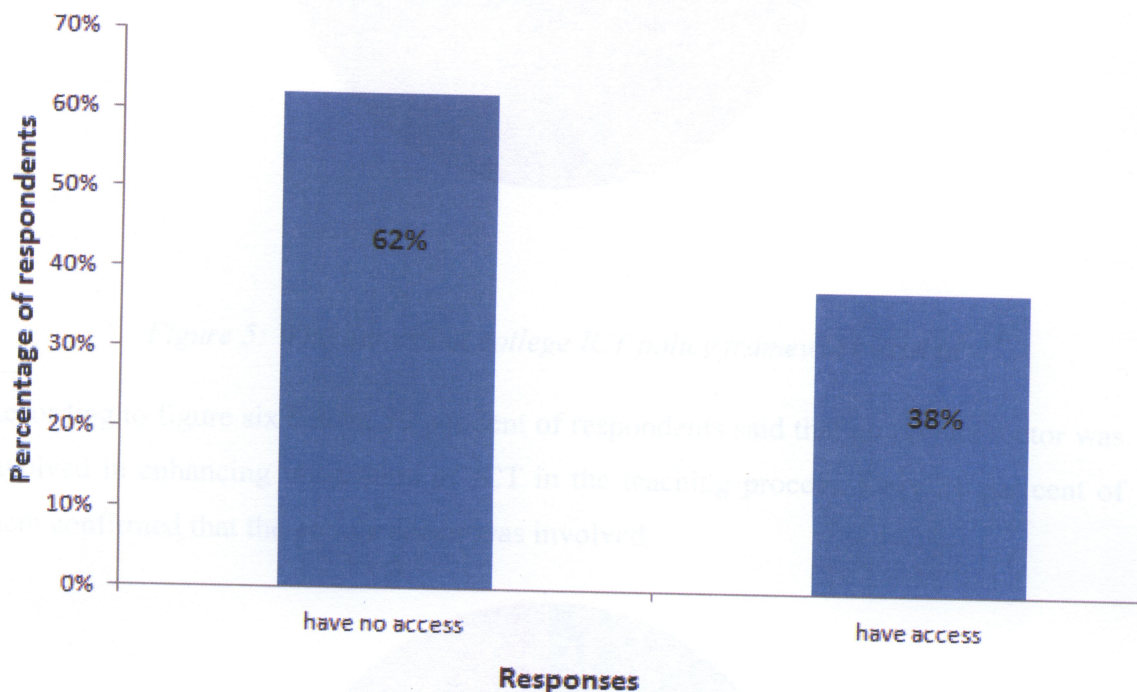


Figure 4: Whether or not respondents had access to ICT facilities in the colleges

Referring to figure five below, most respondents (50 per cent) reported that their colleges did not have ICT policy framework, whereas, 29 per cent reported that ICT policy frameworks existed in their institutions. Only 21 per cent reported that they were not sure as to whether ICT policy frameworks existed in their institutions.

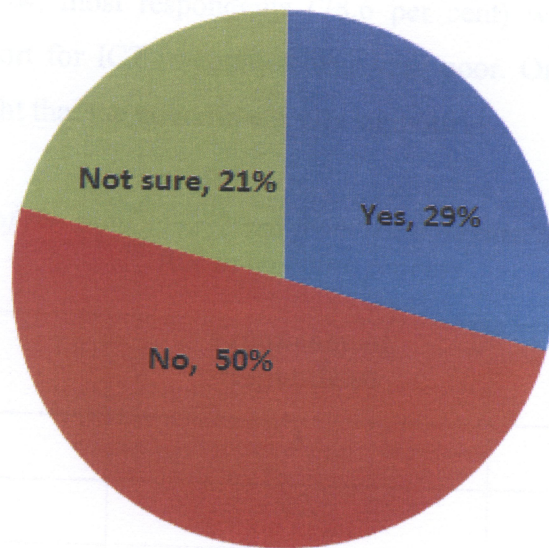


Figure 5: Whether or not college ICT policy framework existed

According to figure six below, 79 per cent of respondents said that no private sector was involved in enhancing integration of ICT in the teaching process. Only 21 per cent of them confirmed that the private sector was involved.

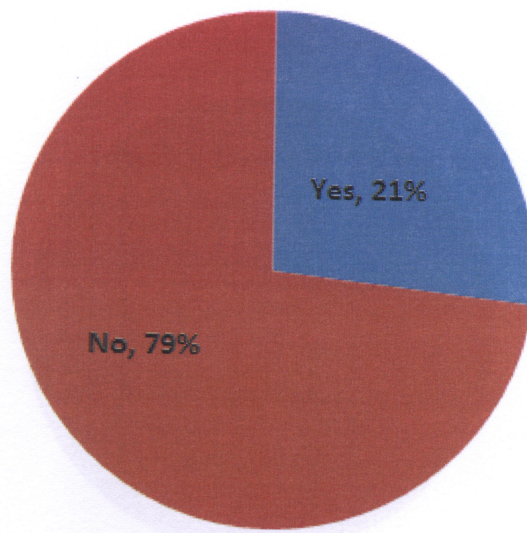


Figure 6: Whether or not private sectors were involved in supporting integration of ICT in teaching process

In table nine below, most respondents (78.6 per cent) were of the opinion that Government support for ICT integration was very poor. Only a few (4.3 per cent) respondents thought that the government was supportive.

Table 9: Rating of the support received from the government (MoE) in integrating ICT in teaching process

| Rating | Frequency of respondents | Percentage of respondents |
|---------------|---------------------------------|----------------------------------|
| Very good | 3 | 4.3 |
| Good | 12 | 17.1 |
| Very poor | 55 | 78.6 |
| Total | 70 | 100 |

In figure seven below, 80 per cent of respondents were of the opinion that the ICT environment and resources were not suitable for integrating ICT in the teaching process. Only 20 per cent of them thought that the environment and resources were suitable for integration of ICT in the teaching process. Table 10 on the next page shows the reasons for their responses.

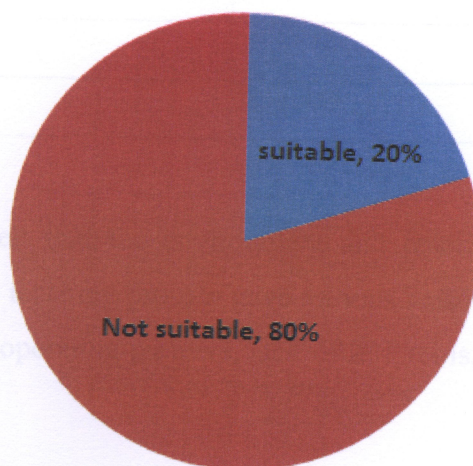


Figure 7: Suitability of the resources and environment to integrate ICT into teaching process

As shown in table 10 below, the availability of ICT equipment, good infrastructure and others influenced some respondents to think that the environment was suitable for integration of ICT equipment.

Table 10: Frequency of responses on reasons for suitability or unsuitability of ICT environments/resources

| Reasons for being suitable | Frequency | Percentage |
|-------------------------------------|------------------|-------------------|
| Availability of ICT equipment | 11 | 36.6 |
| Good target for the learners | 8 | 26.7 |
| Good ICT infrastructure | 6 | 20 |
| College ICT policy | 5 | 16.7 |
| Total | 30 | 100 |
| Reasons for being unsuitable | | |
| Reasons for being unsuitable | Frequency | Percentage |
| Poor ICT infrastructure | 40 | 26.6 |
| Lack of ICT tools | 35 | 23 |
| No ICT funding | 30 | 20 |
| Lack of ICT skills | 20 | 13 |
| Lack of cooperating partners | 13 | 8.6 |
| Poor ICT policy | 12 | 8 |
| Total | 150 | 100 |

Moreover, those who felt that the environment and resources were not suitable for integration of ICT in the teaching process gave various reasons among which were poor infrastructure, lack of cooperating partners, lack of ICT tools, among others as shown in table 10 above.

4.5 Effectiveness of ICT in the teaching process among colleges of education.

This discusses the effectiveness of ICT integration in teaching process among CEs in Zambia. Table 11 below shows some of the effects of ICT in teaching process among selected colleges of education.

Table 11: Distribution of responses on the effects of ICT integration in teaching process

| Effects of ICT in teaching process | Frequency | Percentage |
|---|------------------|-------------------|
| POSITIVE | | |
| Teaching is now easier | 20 | 25 |
| Good storage of students' assessment record | 18 | 22.5 |
| Information sharing has been easier | 16 | 20 |
| Help quick access to updated information | 14 | 17.5 |
| Easy networking with other lecturers | 12 | 15 |
| Total | 80 | 100 |
| NEGATIVE | | |
| Disadvantages those who do not know yet | 42 | 46.7 |
| Teaching through ICT is not easy for beginners | 19 | 21.1 |
| Risk of losing data when ICT systems crush | 17 | 18.9 |
| Over reliance on internet data by both students and lecturers | 12 | 13.3 |
| Total | 90 | 100 |

Table 11 above shows that ICT had made teaching to be easier (25 per cent) and that it was a good system of storing or keeping records (22.5 per cent) and easy networking. On the other hand, most (46.7%) of the responses on the negative side of ICT showed that ICT integration disadvantaged those who were not yet literate. Moreover, 18.9 per cent of responses evinced that there was a risk of losing data when the ICT system crushes.

In figure eight, most (62 per cent) of the respondents were very convinced that the integration of ICT in teaching process was not effective whereas, 38 per cent of them argued that it was effective.

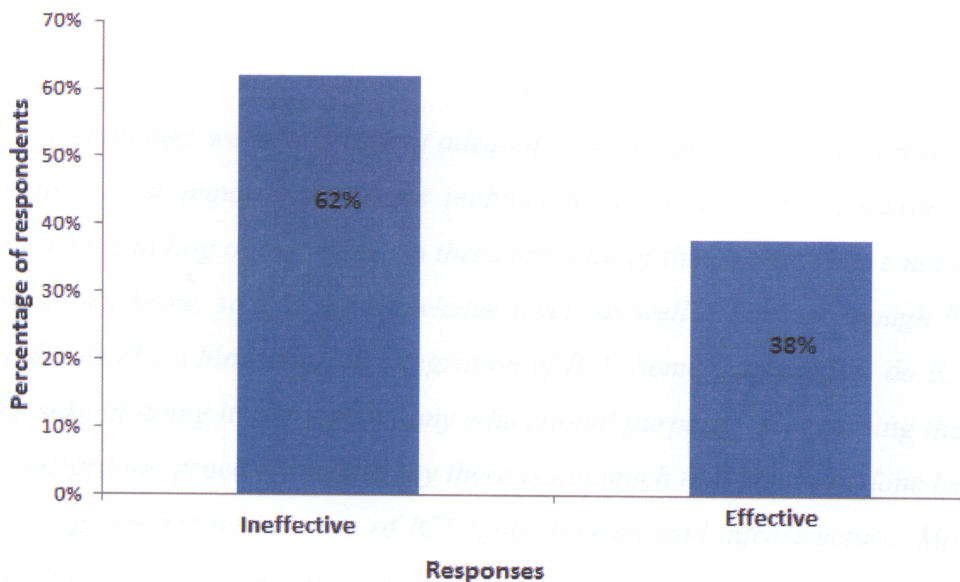


Figure 8: Effectiveness of ICT integration in teaching process among CEs

The proceeding section presents results from the interviews with the college principals ICT coordinators in Colleges of Education, at MoE and CDC.

4.6 Interview results on effectiveness of ICT integration in the teaching process among coordinators and principals in CE and officials from MoE and CDC

Generally the impression from the interviews with these respondents showed that there were inherent weaknesses in the ICT policy frameworks both at national and college levels. Stumbling blocks lay ahead unavoidably unless concerted efforts are put in place to redress them.

4.6.1 Factors influencing the use of ICT in the teaching process and effectiveness of ICT integration

The study revealed that despite more than half of the respondents being computer literate and having undergone or were undergoing training in ICT related programmes; they lacked adequate knowledge on how to use ICT in the classroom. Of the various training programmes that the respondents had done, none of them was on how to use ICT for teaching and learning. The ICT coordinators and principals provided the following responses on the factors influencing the use of ICT in the teaching process:

Coordinator 1:

“One challenge we face is lack of adequate knowledge on ICT integration in our subject areas. Most importantly, is the inability to use ICTs in the classroom and lack of capacity building of ourselves. So there are a lot of things that we are not doing because we do not know, so it is the knowledge levels as well”. Lack of enough ICT equipment could also be a hindrance on integration of ICT. Some teachers just do ICT training for the sake of doing it, but without any educational purpose. “Concerning the effectiveness of integration process, I would say there is not much that has been done because we are still lagging behind in terms of ICT tools, literacy and infrastructure. Moreover we do not have enough funds to ensure the effectiveness of ICT integration into teaching process”

Coordinator 2:

“There are several web tools that are available for people to use, but may be what we need as tutors is education on how to use them. We need more trainers if we are to increase the rate of ICT use in teaching process. Lack of proper policy measure has also led to poor integration of ICT in teaching. Overall I can say the integration of ICT into teaching process has not been that effective”

Coordinator 3:

“One inhibiting factor is the knowledge to use ICTs, it makes people stick to the traditional methods but if given enough knowledge, people would use ICTs more in their teaching”. “I don’t think we can effectively implement the ICT into teaching if things continue to be the way they are at the moment. “We do not have enough resources to fully implement it. Resources such as trainers, ICT modules, equipments, laboratories and others are lacking”.

Coordinator 4:

“There is little or no access to ICT equipment because they are not enough for everyone. I think we need more cooperating partners to help improve. At the same time we need to be oriented through continuous CPD and workshops on the use of these ICTs because new programmes are coming and ICTs are changing every now and then “we can only effectively implement ICT if appropriate ICT training is offered in the context of teaching and not for the sake of it. Otherwise we are still very behind.”

Principal 1:

“I feel that we need to be well informed of what we really mean by ICT, what equipment belongs to that category because for me, I believe even a mobile phone is ICT, but are we able to use it...I do not know, we do not use phones as part of electronic media and yet it is the most common and easy to maintain and use. We need the skill to use the mobile phone and other ICT devices like TV, and DVD players which are common, but most times if we are talking about ICTs, it is just computers” “In addition we also need training at least in the area where lecturers are able to produce their own teaching materials like videos, editing and so on, so if these areas can be looked in, it can also enhance ICT”. I cannot precisely tell you that we have effectively implemented ICT in the teaching process because we do not even have firm ICT policy or clear curriculum to guide us. Nevertheless one good thing I have noticed is members of staff’s material production is no longer in ink, but is now printed and technophobia has reduced including the Born Before Computers (BBC) syndrome.

Principal 2:

“The only thing that is problematic about us is that a good number of us would want to use the ICT equipment at the same time which is not enough especially the LCDs. What is disappointing is that you have prepared a lesson, and then you cannot access a certain facility, not because your friend is cleverer than you, but because the equipment is inadequate. So it is not a matter of non usability, but inadequacy of the so much desired facilities. We have appetite to use them.”| “The availability, the numbers, the ratios of the equipment in relation to the lecturers and the students and even the attitude of the lecturers in the use of ICT are hindering us from effective integration of ICT in the

teaching process. But on a good note, a slight integration of ICT has started giving an impetus for staff to research. Previously, we never used to have a lot of staff researching in the library, but with introduction of ICT, more people are encouraged to research. People have now shifted from paper based information to electronic based. Most lecturers have bought themselves flash disks, so that they can get information that they want for teaching from the internet. So the research part of it is enhanced. Lecturers are up to date now and for your own information, we have almost every office connected to internet so that it is just a matter of sitting on the computer and they are able to prepare”

Principal 3:

“If each department could have a computer, an LCD, and a printer we would effectively implement ICT in the teaching process. I wouldn’t like a situation when I am ready to start teaching at 07 30hrs, but the person who keeps those things is reporting at 08 00hrs, then it means I have to wait up to 08 00hrs with my flash disk to get an LCD. But if it was in my department, there will be no delay. But since the equipment is inadequate, it is not easily accessed” “We have 12 classes and that means every class should have an LCD, then that would be full use of the new technology, but as at now, there is a high limitation” “However, through the use of ICT, students are able to present quality information as a result of research that they do on the internet, they are not only limited to few and old books that are found in the library, on the internet information is there, you could even see how they express themselves when they are given work to do. But that also is not to every student but to those who have seen the necessity and importance of using ICT, but it is still a challenge as we have pointed out that only few lecturers are able to do that, what more students? Then on the part of lecturers, those few who are able to lay hands on these few equipment are able to get rid of chalk dust, they are able to beam their work, unlike where someone is forced to write on the board and cruise and some students are left to wonder. It is seen that material presentation is enhanced”

Principal 4:

“We need to have like a lecture theatre where we can at least combine students and use such kind of facilities to a greater group just like we have in universities because of the inadequate number of facilities, but if you are in a lecture theatre, you can use even one facility for so many students” We are also lacking support even among lecturers who claim to be trained in ICT because they only use their skill for personal interests. I think private institutions involved in training should help us improve the ICT facilities. If MoE was to affirmatively implement the ICT policy in education, we would effectively implement the use of ICT in the teaching process. “Despite all the short comings, I think it has made an impact especially when students are given access to computers, there has been an improvement in the way they have written assignments especially that they have access to the latest information from the internet unlike going to the library which is poorly stocked and most of the books are outdated. Even in our studies those of us who are upgrading to Masters or Doctorate, there has been an improvement in access to up to date information”.

4.6.2 Effectiveness of ICT integration in the teaching process (responses from ICTcoordinators at MoE and CDC)

MoE ICT Coordinator

The study revealed that though the National ICT in Zambia was launched by the then Republican President Levy P. Mwanawasa in March 2007 and Zambia hosted the 5th African e Learning conference in May 2010, at the time of data collection, the MOE ICT policy on Education, was still not approved. It was learnt from one CDC officer that as regards the ICT policy on education, the draft copy was being revised to be competence based and thereafter it would be sent to cabinet for approval. The study further revealed that in the absence of an approved policy by MoE on integration of ICT in the teaching and learning process, and lack of common curriculum, CEs were only using institutional initiatives on integration of ICT in the teaching and learning process. An official at MOE headquarters noted:

“Currently, there is an absence of a firm ICT policy that governs all educational institutions in the country on how to integrate ICT in education and ICT is not embedded

in the college curriculum” There has been concerted effort to ensure a practical implementation of ICT in CEs“ MOE headquarters should look into ICT more than the way it is now. It is just the donor who has an interest in this. So the government should give us direction and leadership in this area with a formation of a Directorate in ICT to specifically look at organization of ICTs in colleges and schools. In fact I wonder if the policy has been approved, it has been a draft policy since 2007 or somewhere there, it is still a draft, why?” Indeed, in 1998, the MoE started an initiative to introduce computer studies in selected secondary schools. But up to now there are very few public schools with ICT subjects because of weak and slow implementation of ICT in CEs and even in Universities. This has largely contributed to over dependency on international syllabi when it comes to secondary school examinations. However, as MoE we are doing everything possible in terms of improving ICT integration in the teaching process. For example we are sponsoring some college lecturers to go for further studies which expose them to advanced ICT skills that they can share in their respective colleges afterwards.

ICT Coordinator at CDC

The CDC developed a syllabus for grades 1-9 in 2002 in computer studies which is yet to be implemented. The few schools offering computer studies in grades 10-12 are using international syllabuses. On the reasons for such scenarios and what was being done the following were the responses from the CDC ICT coordinator:

“We are in the process of finalizing a full ICT curriculum, otherwise there are some frameworks that we are trying to adapt to our Zambian context, but it is not yet finalized”. “Several challenges have marred this process, among these are lack of public interest, others look at ICT as a challenge, they do not want to reach out to something that is challenging, the new technologies” “I think one of them is just attitude. If your attitude towards ICT is negative then you won’t. Change of attitude may make a difference; of course it is not all the lecturers, but some of them” “Others it could be lack of interest and training”. We are working towards ICT sensitization among colleges to ensure publicity of ICT in the teaching process.

CHAPTER FIVE: DISCUSSION OF FINDINGS

5.1 Introduction

This chapter discusses research findings as presented in the previous chapter. In this study whose purpose was to assess the effectiveness of ICT integration in the teaching process in Colleges of Education in Zambia, the specific objectives were to: establish the ICT equipment used in the teaching process, to establish the role of ICT in the teaching process, to determine the factors that influence the use of ICTs in the teaching process and to assess the effectiveness of ICT integration in the teaching process. The findings are going to be discussed in the context and order of the research objectives. But before that, the demographic and professional background will be discussed first.

5.2 Demographic and professional background

With reference to table three (page 34), the majority (75 per cent) of the respondents were between the ages of 30 and 50. Only a few (five per cent) were below the age of 30. The table further shows that the majority (62.5 per cent) of respondents were males and only 37.5 per cent were females. This indicated that overall, tertiary education institutions studied were still lagging behind in terms of gender balance. Whilst the sample sizes in all four learning institutions were almost equally distributed, slight variations were notable with NISTCOL and Chipata College of Education being the highest (25 per cent each). Kitwe and Solwezi Colleges of Education accounted for 23.75 per cent of the sample each. From MoE only a respondent was interviewed and so it was the same with CDC. Moreover, table four showed that most of the respondents (71.3 per cent) had a first degree as their highest academic qualification whereas, 12.4 per cent were holding a masters degree. Whilst 11.3 per cent of the respondents had earned advanced diplomas, the least qualified (5 per cent) were holding a diploma. Given such a trend especially in CEs, we can safely deduce that majority of the teacher trainers had not yet upgraded their education levels to make them more qualified as

trainers' trainers. Having provided the general background, the following section discusses the results on the types of ICT equipment found in CEs.

5.3 ICT equipments used in Colleges of Education

From the results presented in table five (page 35), the most commonly used (42 per cent) ICT equipment among CEs was a desktop computer and the least (8 per cent) used being LCD. Although the TV is such popular ICT equipment, it only scored 21 per cent of all ICT equipments that were in use. Besides the radio which scored 15 per cent, 14 per cent of the responses showed that laptops were also used in the teaching process. Whilst the desktop computer was the most commonly used ICT equipment figure two (page 36) shows that NISTCOL had the highest number (100) of desktops computers, seconded by Chipata College of Education whose number of desktop computers was 53. The least being Solwezi College of Education given that Kitwe College of Education had 50 of them.

In terms of laptop computer possession, Chipata College of Education had the highest number and the least being Solwezi. Furthermore, NISTCOL had the highest (seven) number of LCD. Figure two further showed that ICT equipment such as video camera, TV and radios were the most uncommonly used ICT equipment in CEs. Although the desktop computer was the most commonly used ICT equipment, it was not very convenient in terms of portability. Whilst laptops could be more portable, user friendly and more advanced when it comes to the teaching process, the quantity per CE was very low compared to desktop computer. Much as we appreciate the advantage of one ICT equipment over the other, there is no one single ICT equipment be it the newly invented iPads or other sophisticated ICT tools that could offer all the requirements. The best would be a combination of all types of ICT equipments because where one fails to offer the best services the other one would be able to. For example, some laptops could help capture photographs but not as good as a video camera itself. Therefore, all the ICT tools suggested by the respondents were very appropriate in the teaching process in spite of some wide variations in terms of distribution by school especially if they were to be used in a combined way. It was noted that though there is currently a variety of ICT

equipments, the CE were just using a limited types of ICT equipments. The following are the ways in which the above mentioned ICT equipments were used among selected CEs in Zambia.

5.4. The use of ICT equipment in teaching process

There were variations in the ICT use for teaching by lecturers and the variations were as a result of levels of access to computers, institutional rules and regulations and the level of ICT skills by the lecturers. In terms of ICT use by course or subject, most responses (20 per cent) showed that they were mainly in computer classes, seconded by mathematics and natural sciences (15 per cent each) given that 17.7 per cent of responses indicated total none use of ICT equipments in any subject or course. Other courses in which ICT was used included social sciences (10 per cent), Local Languages (six per cent), Music (five per cent), English Language (four per cent), Art (six per cent) and Physical Education which accounted for 1.5 per cent. The above picture is showing us that there were inter subject variations when it comes to integration of ICT in the teaching process. Computer course was found to be more advanced in use of ICT equipment possibly because it was the source of ICT and lecturers were specifically trained into such field. The differences in terms of integration were already showing the different levels of accessibility and literacy in ICT skills. Hence, there could be a need to emphasise different teacher educators to consider advancing their literacy in ICT and to increase accessibility by subject.

It was established that laptops, desktops, LCDs and others as indicated in figure two (page 36) and tables six and seven, (pages 37 and 38 respectively), were used during power point presentations of lessons. Desktops were also widely used for administrative tasks, such as printing, typing, producing materials such as handouts, assignments, test, examination papers and modules. Video cameras were used to record events during a workshop and not necessarily with a view to be used in the teaching and learning process. There were a few instances when pictures were taken and used as learning and teaching aids. Radios and TV sets were usually put in staffrooms and used as sources of news. For the TV sets that were in staffrooms, it was observed that despite the Digital Satellite (DSTV) having an educational channel on 319, this channel was hardly used as

a teaching resource as the most popular channels were those that broadcast news, European football and Nigerian movies. It was probably for this reason that it was barely mentioned among the ICT equipments because teachers' trainers regarded it as just but a source of entertainment rather than a learning tool. Furthermore, ICT equipments were used in teaching computer skills, searching for educational information, making presentations as well as monitoring and evaluating students' progress. Generally, it was noted that other than computer classes, the use of ICT equipment and skills was more biased towards certain subjects such as Mathematics and Science unlike being uniformly distributed among other subjects. Moreover, it was also observed that some uses to which ICT skills were used might not have been for the purpose of enhancing the teaching process as they were used for personal interests.

5.5 Factors influencing the use of ICTs in the teaching process in Colleges of Education

From the findings presented in chapter four, various factors were isolated to have been influencing the use of ICT in the teaching process among CEs. Among these factors were the following:

With reference to figure three (page 39), of all the lecturers interviewed among Colleges of Education, 43 per cent were already literate and 26 per cent were still undertaking ICT training which inherently implied that there would be more ICT literate lecturers in colleges. Thirty-one per cent of them were not yet literate in ICT. Despite the majority of the lecturers having undergone training in ICT in various programmes, it was observed that there was general lack of knowledge on how to use ICT for subject integration. Most lecturers were competent in Microsoft Word and use of internet to search for information but generally expressed lack of adequate knowledge even in the use of Excel, an application that is essential for teachers in analyzing students' results, drawing graphs, carrying out routine calculations and others. They attributed this to the fact that they had not undertaken any training that was specifically tailored for integration of ICT for the teaching process. It was also noted that even among ICT coordinators, there was a belief that integration of ICT in the teaching process just meant presenting lessons using Power Point. Without adequately trained teachers in ICT and computer skills, the utilization and integration into the curriculum might be minimal. Pelgrum (2002)

contends that teachers who do not have adequate skills in ICT might not use ICT for curriculum integration. A good number of lecturers who did ICT training did not undertake it to enhance teaching but for various reasons such as earning additional income (31.2 per cent), prestige (6.3 per cent), personal growth (6.3 per cent), and career enhancement (25 per cent), which were not precisely aligned to the teaching process.

Educators are warned not to abuse IT and to reflect on added value of applying ICT in their daily teaching practice. Teachers and trainers are encouraged to design slideshow lessons, e-lectures and lesson plans on a computer. A database and e-learning library has to be developed including electronic curriculum and textbooks, tests, virtual experiments, multimedia materials, lectures, slideshows and teachers' lesson plans unlike just bragging about for prestige's (Peeraer and Van Petegem, 2009). Therefore, there is need to carefully tailor the ICT training towards the teaching process unlike doing for the sake of it otherwise we may end up having a lot of ICT-trained teacher educators and yet who cannot deliver lesson using ICT. It was also unfortunate that some lecturers were completely not literate in ICT and such circumstances needed prompt attention in order to redress the situation.

Figure four (page 40) showed that although there could have been some ICT equipments in CEs, most lecturers (62 per cent) did not have access to them. Only 38 per cent of them had access to ICT facilities and as earlier mentioned we could not precisely tell how those who had access to ICT equipment made use of them since they had different motives for doing ICT training. The ICT coordinators in all the four colleges complained that the inadequacy of the desktops was felt when a task required students to use the desktops since the lowest student to computer ratio was at 20: 1 and the highest at 25: 1. The students to computer ratios in the CEs were not very conducive for effective use of these gadgets for teaching. "Studies show that the U.S.' student to computer ratio of 5 : 1 is tied for the first in the world, along with Australia and Latvia, with New Zealand and Norway a close second at 6 : 1" (Tearle, 2004). So if such giant countries have not yet made it we have a long way to go in order to attain the most desirable student to computer ratio.

Referring to figure five in chapter four, most respondents (50 per cent) stated that their colleges did not have ICT policy frameworks whereas, 29 per cent of them said that it existed. Only 21 per cent were not sure as to whether it existed or not. The denial and uncertainty that policy frameworks did not exist by the majority of the respondents inherently pointed to the weaker and unpragmatic ICT policy framework. So even if they existed, lecturers would doubt their existence because of lack of impact on the ground. Even the officials from MoE and CDC also confirmed that Government support and policy frame work had generally been poor and we therefore needed to re-strategise in order to meet the goals. As earlier mentioned, in literature review, countries such as USA and South Africa had successfully integrated ICT in Colleges of Education partly due to good policy framework and government support.

The study established that there was an absence of a national policy that governed all educational institutions in the country on how to integrate ICT in education. Two colleges did not have well written out ICT integration plans; what the researcher found at institutional level were the expressed views and ideas of the ICT committee. Furthermore, it was established that all the institutions did not have written down strategic plans to sustain the ICT they had acquired. The non approval of a MoE national ICT policy contributed to the CEs not taking the policy seriously. An ICT policy is very essential in setting up rules and regulations to ensure the smooth execution of ICT integration into the curriculum. A good policy can play a role in building a rich, lively and attractive ICT environment. It is conceptualized as a tool that can effectively support the implementation of teaching and learning, contribute to improve efficiency and quality of education through use of ICT (Department of Education, 2010).

There was also lack of private sector involvement in the implementation of ICT integration in CEs in Zambia. For example, in figure six (page 41), 79 per cent of respondents said that no private sector was involved in enhancing integration of ICT in the teaching process. Only 21 per cent of them confirmed that the private sector had been involved. Similarly, most respondents (81.4 per cent) were convinced that

government support for ICT integration was very poor. Only a few (4.3 per cent) respondents thought that the government was supportive. If various sectors were to be involved they would provide technical support to ensure that ICT was integrated in the teaching process. Zambia's Colleges of Education and the MoE had a lot of lessons to derive from South African case. Good policy, technological advancement and solidarity towards a common goal would also bring about the intended purpose of ICT in the teaching process as it was in South Africa (Department of Education, 2010).

According to evidence provided in figure seven (page 42) and table 10 (page 43), the environment and resources were found to be very unsuitable for ICT integration into the teaching process. Eighty per cent of respondents were convinced that the ICT environment and resources were not suitable for integrating ICT in the teaching process. Only 20 per cent of them thought that the environment and resources were suitable for integration of ICT in the teaching process. There was a claim by those who believed that it was conducive to integrate ICT into teaching process that there were good targets set for the learner and that ICT equipments, ICT infrastructure were good enough in addition to a good environment. But if we refer back to figure two (page 36), we can safely conclude that the ICT equipments were not as good as claimed. On the contrary, the majority who argued that the environment and resources were not conducive for integration provided their own reasons such as poor ICT tools (23 per cent), poor ICT literacy (eight per cent), lack of good ICT policy (eight per cent) and lack of cooperating partners (8.6 per cent). Other reasons cited to prove that ICT integration environment was not ripe were lack of adequate funding (20 per cent) and poor ICT infrastructure (26.6 per cent). Based on the observations, each college had only one computer laboratory with the sitting capacity ranging from 14 to 30, in a rare situation that all computers were functional. All the four rooms, as shown in appendix three, were initially ordinary classrooms and with the advent of ICT, they were converted to computer laboratories. This, in addition to limited sitting capacity posed several challenges where when moving from one place to another, a person would easily step on a cable and disturb the connection.

Furthermore, the computers were arranged in a manner that supported the traditional teacher-centered approach as opposed to constructivist theory. Due to insufficient infrastructure, lecturers were compelled to conduct some ICT aided lessons in ordinary classrooms, which had its own challenges such as: missing electric sockets, insufficient space to mount a screen and poor lighting. As reported in the findings, considerable time would be lost in the process of moving equipment. In the affected colleges, some lecturers were reluctant to prepare ICT lessons for fear of being stuck in case of power failure. They maintained that they would rather stick to the conventional method rather than have the additional task of preparing a backup for every ICT enhanced lesson. Electricity is a basic requirement for ICT use indeed; infrastructure should be in place to provide a conducive environment. Moreover, most of the refurbished desktop computers were of poor quality and were taking long to log on according to observations. A follow up interview with coordinators and principals revealed that all the four colleges did not have full time maintenance officers but three colleges had hired personnel under the board to maintain the equipment. Although hired personnel had done some courses in trouble shooting, none of them had undertaken formal training specifically in ICT equipment maintenance thus, the quality of maintenance was not guaranteed. It was further established that hiring fully qualified personnel was very expensive. In fact one of the colleges depended on members of the ICT committee to undertake simple repairs and where need be, personnel from outside was hired. But this was also not good enough for sustainable implementation of ICT in the teaching process. Principals, coordinators at CEs, MoE and CDC bemoaned this lack of technical know in creating an enabling environment for ICT integration.

According to UNESCO (2004), most educational managers stress the importance of access to ICT, but also the necessity to maximize the potentials of available equipment. To meet standards for integration of ICT in teaching and learning there needs to be sufficient equipment, installed in computer multimedia rooms. But also the classrooms have to be sufficiently equipped. Teachers and learners should all get access to ICT for their work and study. Managers and administrators need ICT for improved education management. Faculties and departments need to effectively manage and optimize the

potential of available equipment by categorizing and allocating equipment appropriately. Favorable conditions have to be created for learners to be able to study in any place, at any time and to be able to access appropriate content.

Moreover, Tinio (2004) noted that poor funding could deter integration of ICT into the teaching process. As such, funding for ICT development should consider the long term costs of purchasing, deploying and maintaining ICTs such as costs for replacements, disposal or even operating costs for refresher course training, maintenance and technical support. Colleges of education were failing because of poor and myopic funding strategies.

The general impression of the discussed findings inherently revealed the importance of administrative will, school governance and leadership in managing ICT integration. College Principals were in a position to develop and reinforce good practices and attitudes and help create interest in members of staff who did not show interest in ICT initially. Baylor and Ritchie (2002: 412) are of the view that leadership is a critical predictor of ICT integration since it focuses on promoting the use of ICT at a strategic and action level. Principals alluded to the fact that they supported their staff in ICT integration by ensuring that the equipment was well maintained, and committing the meager resources in colleges to buy the necessary equipment.

In a nutshell concerning factors influencing integration of ICT in the teaching process, we have established that several factors were involved. Among these were poor ICT policy framework, poor ICT literacy, poor partnership with government and the private sector, poor ICT equipment, poor technological skill, unsuitable environment and resources to mention but a few. Having discussed the factors influencing ICT integration, the following and final subsection discusses the effectiveness of integrating ICT in the teaching process among CEs in Zambia.

5.6 Effectiveness of ICT integration in the teaching process

The effect of ICT in colleges of education has been both positive and negative. On the positive side table 11 (page 44) showed that ICT had made teaching to be easier (25 per cent) and that it was a good system of storing or keeping records (22.5 per cent) and easy networking. This is against the background that most libraries in CEs in the country were poorly stocked and mostly did not have up to date books. The ease to access up to date information via internet has been phenomenal. Lecturers were no longer restricted to present their work through “chalk and talk” but could use a variety of methods that included Power Point, animations, simulation and videos. Equally, students were able to present quality information as a result of research that they did on the internet. The use of ICT also facilitated quick information sharing (20 per cent) and easy networking with lecturers.

The results from among college principles also attested that despite some limitations and challenges, ICT had had a positive side. One of the college principals argued that some members of staff’s material production were no longer hand written, but was now printed and technophobia (fear to use new technology) had reduced including the Born Before Computers (BBC) syndrome. Moreover, a slight integration of ICT had started giving an impetus for staff to research. Previously, they never used to have a lot of staff researching in the library, but with introduction of ICT, more people got encouraged to research. *“Most lecturers have bought themselves flash disks, so that they can get information that they want for teaching from internet. So the research part of it is enhanced. Lecturers are up to date now and for your own information, we have almost every office connected to internet so that it is just a matter of sitting on the computer and they are able to prepare.”* Emphasised one of the principals. On the part of lecturers, ICT integration was thought to be a blessing on health grounds because those few who were able to lay hands on these few equipment were able to get rid of chalk dust which usually affected the respiratory system negatively. The unfortunate part was that it was only a few lecturers who would enjoy the health benefits of using ICT in the teaching process. Moreover, ICT equipment enabled beaming of lecture notes, unlike where

someone was forced to write on the board and cruise at the expense of students' understanding.

On the other hand, most (46.7 per cent) of the responses on the negative side of ICT showed that ICT integration disadvantaged those who were not yet literate. Moreover, 18.9 per cent of responses stated that there was a risk of losing data in case the ICT system crashed and that both lecturers and students over relied on internet data much of which was not up to academic standards. Earlier on it was indicated that even if enough computers were available in some colleges, their efficiency was far from any accolade as they were not apt to log on very fast. The copy-and-paste syndrome had also increased among students when it came to writing their assignments because they just downloaded information from the internet without thinking through it. This had started to compromise their academic critical thinking skills unlike the other claim that ICT had improved the quality of work and research activity. Poorly done work strains the evaluators and if this state of affairs remained unchecked lecturers would be overworking themselves in attempting to make sense out of poorly done academic work. It was also noted that teaching through the use of ICT was not easier for the beginners as certain ICT equipment are very advanced as compared to their initial training.

As earlier mentioned in the theoretical framework, the integration of ICT in teaching process has been studied by the UNESCO (2005) during which it developed the criteria for assessing the effectiveness of integration of ICT into teaching process. It indicated that where the ICT has been effectively integrated, teacher educators set high targets for their students with clear descriptions of the objectives and how ICTs will help them achieve those goals. Moreover, a variety of technological and assessment tools must be well developed. There must be also effective learning environment that extends beyond the classroom to home-based study as well as effective training in practical integration of technology into classroom activities and not only basic computer functions. Other requirements include a supportive infrastructure for ICT, quality contents and materials, enabling policies and strategies (including legal and ethical guidelines for use of ICT), practice informed by evaluation and research, vision and leadership, student-centered approaches to learning, and relevant assessment tools (UNESCO, 2005). Screening all

the studied CEs through the UNESCO framework and in the context of the evidence provided in this research, it can safely be concluded that the integration of ICT in teaching process has not been effective in all the CEs which were studied. The exact opposite of the UNESCO standards and parameters were the most common cases among the CEs. Therefore, Zambia and particularly the MoE need to quicken up the process of effective implementation of ICT into the teaching process. We cannot always rely on draft policy document if we are to meet the criteria as set by the UNESCO. All the objectives set for this research were met and the following were the conclusions and recommendations in the context of the objectives and research questions.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents conclusions and recommendations drawn from the findings of the study. The study was conducted to evaluate the extent of ICT integration in the teaching process in colleges of education in Zambia. Below are the broad conclusions and recommendations drawn from the study. It is hoped that these would provide a framework for action by the MoE and other stake holders with a view to enhance the potential for national development in ICT integration in the teaching process.

6.2 Conclusions

In this research, all research objectives were met. On objective one, it was generally concluded that the CEs had limited number of ICT equipment, the most common being the desktop computer, which were also not in good state according to observations. On objective number two, it was concluded that there was no uniformity in terms of use of ICT equipment in various courses. ICT was mainly used in Computer-related courses or subjects, Natural Sciences and Mathematics unlike other subjects such as Physical Education. From a broader spectrum, the use of most of the ICT equipments was not tailored towards the teaching process except for some simple activities such as preparing lesson notes and record keeping among others. Most of the lecturers accessed computers connected to the internet in the computer laboratory. However, internet was rarely used for the purpose of teaching and learning, but to conduct general searches and for communication and therefore fell short of innovative ways that were possible with this facility.

The conclusion on objective three was that several factors influenced the use of ICT in the teaching process. Whilst there were positive aspects that influenced the use of ICT, it was overall noted that negative aspects were more prominent. Among these were lack of clear national ICT policy framework, lack of collaboration with the private sector and the government, poor access to ICT equipment, poor funding, lack of administrative and political will, ineffective environment and resources for ICT integration and others.

The majority of lecturers were only competent in a few applications like Word, PowerPoint, Internet and Email. Despite having these skills, lecturers lacked conducive attitudes and motivation to fully integrate ICT in their training of teachers. This was due to inadequate knowledge of pedagogical integration of ICT, limited ICT equipment, lack of incentives from both institutions and government to encourage use of ICT, and the design of the teacher training curriculum. Some lecturers had a desire to integrate ICT into education but encountered many barriers. The major barriers were lack of policy, lack of confidence, lack of competence, insufficient equipment and lack of access to resources. The lack of an ICT policy at both MoE and college level did not inspire lecturers in the use of ICT for teaching optimally. While some ICT gadgets were available in colleges, skill upgrading for lecturers as well as sound educational theory and philosophy supporting the teaching with ICT had not moved at the same pace as the inflow of the technology. In as much as lecturers had a positive attitude appreciating ICT capabilities in teaching, they lacked adequate knowledge to use the technology effectively in the teaching process.

It was noted that all such factors deterred effective integration of ICT into the teaching process and that they did not meet the theoretical framework of the UNESCO on ICT integration in the teaching process. Although the National ICT Policy in Zambia was launched by the then Republican President Levy P. Mwanawasa in March, 2007, the MoE ICT policy on Education was still not approved. In fact, interviews with the MoE official also confirmed that it was still in draft form. In summary and in the context of objective four and overall purpose, the integration of ICT in the teaching processes had not been effective as it had met neither national nor international standards as outlined in the Zambia National ICT policy and the UNESCO framework respectively.

Premised on the above discussed research findings, the following are the recommendations made:

6.3 Recommendations

1. Since confidence, policy, competence, and accessibility, professional development, sufficient time and technical support are critical components of ICT integration in colleges as revealed in this research, they need to be provided in Colleges of Education.
2. MoE should expedite the finalization and approval of the draft National ICT Policy that will address challenges of equipment and infrastructure, training of educators in pedagogical integration of ICT and developing ICT enhanced curricula materials.
3. Lecturers embracing ICT in CEs should not just end at using power point presentations, but should explore other interactive and effective ways of integrating ICT in the teaching process. Lecturers need to be trained on effective use of ICT in education; MoE should introduce a course on ICT in education with emphasis on subject integration for teacher educators
4. There is also need for change of attitude among lecturers concerning the integration of ICT in the teaching process as this was found to be one of the ingredients to successful implementation.
5. Further researches should be done on the impact of ICT on the learners in CEs. This will provide a complete picture as this research mainly focused on the teaching process.

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APPENDIX ONE

1.1 Semi-structured interview schedule on integration of ICT in teaching process (for Principals and ICT coordinators in CE)

Dear interviewee

I am a student at the University of Zambia doing research on integration of information and communication technology (ICT) in the teaching and learning process in selected colleges of education in Zambia. Your cooperation will be highly appreciated

Interviewer:

Age:

Interviewee:

Gender:

Date and Time:

Place:

Guiding questions

1. Explain the factors that influence the integration ICT in teaching.....
2. How would you describe the effectiveness of ICT integration in teaching process.....

Thank you for the responses.

APPENDIX TWO

Questionnaire for lecturers in colleges of education

Dear Respondent,

I am a post graduate student in the School of Education at the University of Zambia conducting a research on the Integration of Information and Communication Technology (ICT) in the teaching and learning process in selected colleges in Zambia. The response you provide will be treated as confidential information and will be used purely for academic purposes only.

A. Demographic Information

1. Gender:

Male

Female

2. Age in years

Below 30 years

Between 30 and 50 years

Over 50 years

3. Highest academic qualification attained

PhD

Masters

First Degree

Advanced Diploma

Diploma

Advanced Certificate

Certificate

B. ICT equipment(s) used in the teaching process among Colleges of Education

4. What ICT equipments do you use in your Teaching process

- Desktop computer
- Laptop computer
- Liquid Cristal Display
- TV
- Radio
- Other(s).....(specify)

5. What is the quantity for each type of ICT equipment used in teaching process.....

C. The use of ICT in the teaching process

6. In which subjects/courses do you use ICT as a teaching tool? (Tick as many as applicable)

- | | |
|--|---|
| <input type="checkbox"/> Computer class | |
| <input type="checkbox"/> Mathematics | <input type="checkbox"/> Natural Science |
| <input type="checkbox"/> Social Science | <input type="checkbox"/> English |
| <input type="checkbox"/> Local Language | <input type="checkbox"/> Art |
| <input type="checkbox"/> Music | <input type="checkbox"/> Physical Education |
| <input type="checkbox"/> Others (Please Specify) | <input type="checkbox"/> None |

7. Apart from the courses/subjects what else do you use ICT for?

| USE | TICK |
|--|------|
| Teaching computer skills | |
| Finding/Accessing educational information | |
| Making presentations | |
| Communicating with students | |
| Communicating with Lecturers | |
| As a Learning Management System (LMS), e.g. Moodle | |
| Monitoring and Evaluating students' progress | |
| Preparing Educational Reports | |
| For personal development | |
| Teaching specific lessons | |
| Communicating with students | |
| Preparing lessons | |
| others (please Specify) | |

D. Factors that influence the use of ICT in the teaching process

8. Classify your literacy in ICT: literate not literate on ICT training
9. What were your main reasons for attending/undergoing ICT training? (Tick as many as applicable)
- | | |
|---|--|
| <input type="checkbox"/> Financial | <input type="checkbox"/> Prestige |
| <input type="checkbox"/> Career enhancement | <input type="checkbox"/> Personal growth |
| <input type="checkbox"/> Training is required | <input type="checkbox"/> Others (Please specify) |
10. Do you have access to ICT facilities in the college? Yes No
11. Do you have a policy framework to integrate ICT into teaching process? Yes No
12. Are there any private sectors involved in supporting integration of ICT in teaching process?
- Yes No
13. How do you rate the support that you receive from the government (MoE) in integrating ICT in teaching process? Very Good Good Very poor
14. How suitable are the resources and environment to integrate ICT into teaching process? Suitable Not suitable
15. If suitable provide evidence.
.....

E. Effectiveness of ICT in teaching process among colleges of education.

16. What are the general effects of ICT integration?
17. Based on your overall experience of ICT integration in teaching process how do you rate its effectiveness? Effective Not effective

THE END

Thank you for your cooperation and for sparing your variable time to participate in this research

APPENDIX THREE



Figure 3.1: A computer laboratory at College of Education A



Figure 3.2 *A computer laboratory at College of Education B*



Figure 3.3 A computer laboratory at College of Education



Figure 3.4: A computer laboratory at College of Education D