THE RELEVANCE OF INFOMATION AND COMMUNICATION TECHNOLOGY TRAINING IN MEETING THE INDUSTRY NEEDS: A SURVEY OF TERTIARY COLLEGES IN NAIROBI

BY

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DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

Signed.....Date.....

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D61/76856/2009

This research project has been submitted for examination with my approval as a University supervisor

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DEDICATION

This project is dedicated to my grandmother Phoebe Nelima Nasiuma and my parents Mr and Mrs.Mutende. You are the best.

ABSTRACT

The purpose of the study was to determine the relevance of ICT training provided by Kenya's tertiary colleges in meeting the industry needs. The objectives were: To determine the ICT skills provided by tertiary colleges in Kenya, to establish the ICT skills required by the industry and to determine the relevance of ICT training provided by tertiary colleges in meeting the industry needs.

A survey was used in the study. Data was collected using questionnaires. The respondents were ICT students and lectures from public and private colleges that offer ICT training and ICT managers from telecommunication, banking, insurance, construction, and manufacturing companies in Nairobi. Data were analyzed using descriptive and factor analysis and results presented in tables and graphs.

The study revealed that the industry expects ICT professionals to have both business and technical ICT skills. The business skills that were rated as important to ICT professionals include human relations, interpersonal, leadership, management, consultancy, problem solving, understanding of business needs, communication, organization and customer service. Regarding the technical skills, computer skills, networking, telecommunication, computer hardware, e-business, programming and database were rated as important to ICT professionals. Although these skills are considered important they have not been fully incorporated in ICT training by many tertiary colleges.

There is a need for tertiary colleges to review their ICT training to ensure that they impart students with the skills required by the industry. In addition, the industry should be more involved in ICT training process by participating in curriculum development process and also partnering with tertiary institutions to give ICT students hands on experience.

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LIST OF ACRONYMS AND ABBREVIATIONS

ICT	Information Communication and Technology
IT	Information Technology
OECD	Organization for Economic Cooperation and Development
CCNA	Cisco Certified Network Associate
MOHEST	Ministry of Higher Education Science and Technology
N+	Network Support Specialist
A+	User Support Professional
ACS	Australian Computer Society
MCSE	Microsoft Certified Systems Engineer Certification
CNE	Certified Novell Engineer Certification
ICDL	International Computer Driving License
PPP	Professional Partner Program

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The business environment is becoming more complex and dynamic day by day. This is evident when we consider key issues such as technology, globalization, mobile telephony, and the internet. As a result, there is an increase in demand for labor with Information and Communication Technology (ICT) skills (Marshall, Taylor & Huo, 2006). ICT skills are necessary because without such skills, the technologies can neither be maintained nor adapted to local use (Mutula, Stephen & Van, 2007). The public and private sectors appear to increasingly require a mixture of skills. Thus, it is no longer enough to have only specialized skills. Instead, a combination of technical and business skills such as project management, business, sales, and marketing are demanded (OECD. 2004).

Although these business skills are identified as important by industry, educators may struggle to include them in the ICT curricula. In addition, there are growing concerns that universities are not responding fast enough to the business and technology changes that have redefined the role of information systems in today's businesses and organizations (Khalid & Badie, 2008). Institutions of higher learning are not only required to keep up with technological changes but to also bridge the gap between the ICT training and the industry needs. In Kenya, the arrival of fiber optic cable, digital broadcasting, rapid mobile telephony and the adoption of e-commerce, has led to a shortage of ICT personnel with the right skills. Many institutions of higher learning are therefore offering ICT courses in a bid to meet the ICT market demand. Unfortunately, the training offered by these institutions is unregulated thus students graduate from these institutions without the essential skills that can be applied directly in the market. According to Ministry of Education, Science and Technology, more than 200 colleges are currently registered to offer ICT training.

1.2 ICT Training

According to Elston (2007), ICT stands for Information and Communication Technology and is not dissimilar to Information Technology (IT). The communication part was added recently and has been adopted by educational establishments. ICT has been defined as consisting of the whole range of technologies designed to access, process and transmit information. These include hardware, software, networks, and media for collection, storage, processing transmission and presentation of information (Detschew, 2007). Evidence linking advances in ICTs with improved economic performance is widespread. According to Qiang, Clarke and Halewood (2006), a good communication and information infrastructure can be used to improve connectivity between firms, suppliers and clients as well as provide business opportunities, especially for companies that are physically distant from urban centers.

With each successful use of ICT to solve business problems, management is becoming more and more dependent on the ICT function for the purpose of making decisions and for routine operations. As a result of this dependence on the IT function, there has been an increase in the need for more ICT professionals (Koong & Liu, 2007). The ICT profession has been evolving over time and new positions and names are emerging almost each day. This evolution has made it difficult to create a unique profile of skills and competences required for ICT professionals. According to Earland Skyrme (1992 in Lowry et al, 2007), ICT professionals are required to be trained in both technical and business skills, a concept referred to as "hybrid skill'.

Training has been defined as the act of teaching someone how to do something, such as a job, or teaching them the skills and attitudes that will have a direct impact on job performance, such as operations, management and leadership (Nielson, 2009). To train ICT professionals adequately for the labor market, a wide variety of training methods have been developed. These methods include blended learning, computer based training,

instructor led, self study materials, training providers, certification vendors, and vendor-sponsored IT academies (OECD, 2006).

According to Stein, Hawking and McCarthy (2007), ICT training can be divided into five main programs namely Industry body certification which include certifications in ACS and PPP programs, Proprietary certification programs in MCSE, CNE and CISCO, Industry generalized certification programs in A+, I-NET, and NETWORK (N+), Specific purpose certification for example in SAP professional, and Academic certification which include certifications in Degree, Diploma, Certificate & Short Course in ICT programs. Industry body, Proprietary, industry generalized and specific purpose certifications which are sometimes referred to as professional courses have gained popularity over the years as they are considered to be adding value to degree programs, offer students work experience and are more practical rather than just theoretical. They are thus considered to be very relevant to employers, a concept that many academic certifications seem to lack. This study will focus on academic certifications given that most professional courses are accredited and maintained by international bodies. In Kenya, the academic certifications are offered by private universities, public universities and tertiary institutions.

1.3 Tertiary Institutions

Over and above the universalization of secondary education, in almost all countries educational participation at the tertiary level has strongly grown (Stefan, 2010). Tertiary institutions which have also been referred to as Third level or Middle level colleges refers to the educational level following the completion of secondary school education. Admission is offered to secondary school leavers who do not proceed to university directly. They may choose to join the tertiary colleges and graduate with Certificates, Diplomas and Higher Diplomas, depending on the length of the training. Tertiary colleges in Kenya include National Polytechnics, Technical Teachers Colleges, Institutes of Technology, Technical Training Institutes, Industrial Training Centers, Youth

Polytechnics, Vocational Training Centers and other Private Commercial Colleges. They form the Technical, Vocational and Educational Training (TIVET). TIVET represents a sub-sector that provides parallel opportunities either as alternatives to the general education or after-school training geared towards preparing students for either self-employment or the world of work. The objectives of TIVET include: providing increased training opportunities for school leavers that enable them to be self-supporting; developing practical skills and attitudes which lead to income-generating activities in urban and rural areas through salaried or self-employment; providing technical knowledge and vocational skills and producing people who can apply scientific knowledge to the solution of industry problems (Ngware, Onsumu & Manda, 2005).

In recent years, the number of tertiary institutions offering ICT training has increasingly gone up. However, the training offered in most of these colleges has not been regulated by the government. The colleges that are currently registered by the ministry of education, science and technology include 5 University Colleges, 2 National Polytechnics, 1 Technical Teachers College, 14 Institutes of Technology and 26 Technical Training Institutes. Some additional 537 Tertiary Institutions are privately owned and most of them offer Business and Information Technology (IT) Courses (Hooker et al, 2011)

Tertiary colleges face a lot of challenges in their quest to offer ICT training. First, they have to respond quickly in a rapidly moving area. The two main concerns regarding IT students are: 1) ensuring that graduates have acquired the right balance of theoretical and more applied skills; and 2) incorporating the teaching of business/management skills into the technical degrees (Yull & Rodgers, 2011). Other challenges include non–relevance of some of the content covered, lack of well trained instructors and lack of facilities/ equipment needed to facilitate ICT training (Saitoti, 2004).

1.4 Industry

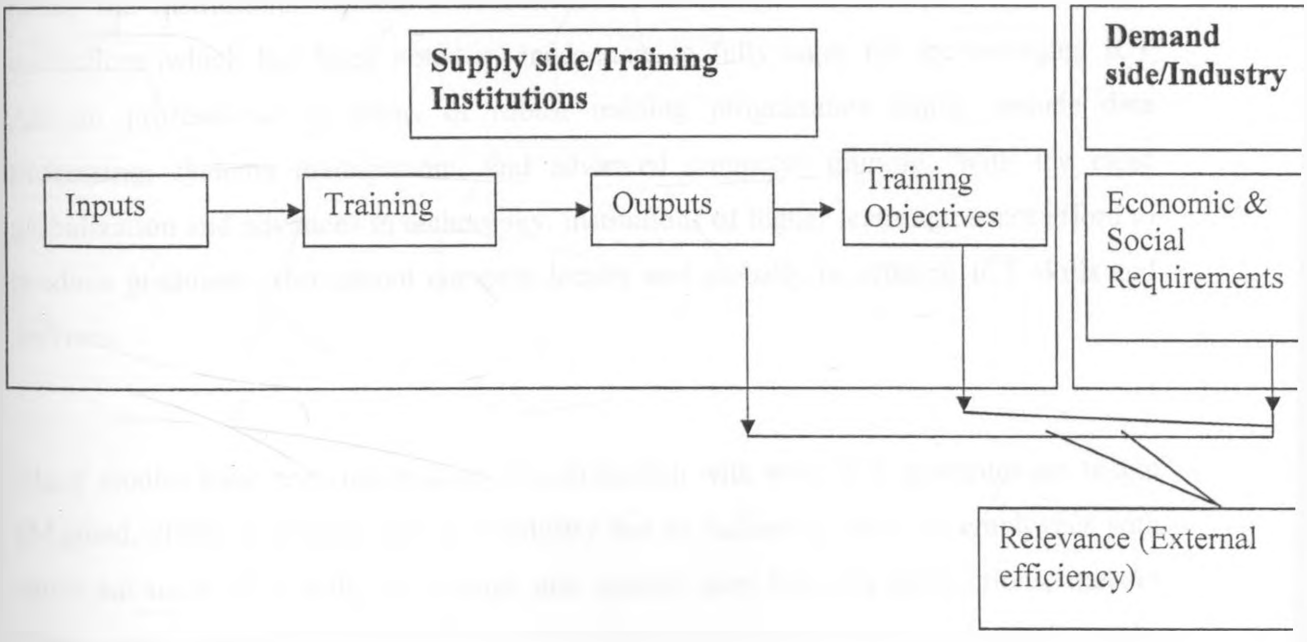
The use of ICT throughout the value chain has contributed a lot to improved business performance, and trends suggest that ICT will continue to be a driver of economic growth (Lowry, Turner & Fisher, 2007). This has spurred the growth of ICT in many industries. These industries can be classified into ICT and USER industries (Kattel & Kalvet 2006). The ICT industry include those firms that produce products or provide services related to the input, process or output of information. The User industry on the other hand refers to those companies that use ICT tools in general workplace situations that are not related to the ICT sector, such as banking, manufacturing, commerce, insurance, communications and business services. According to a report by ICT Skills Monitoring Group for the European Commission (2002), The ICT services (telecommunications, computer services) and the financial sector (credit and leasing institutes and insurance companies) report the highest demand for ICT professionals.

OECD (2006) has classified ICT professionals into three categories namely the ICT specialists, advanced users and basic users. ICT specialists have the ability to develop, operate and maintain ICT systems. ICTs constitute the main part of their jobs. The main ICT specialist skills expected to be in demand over the next few years are in the areas of enterprise architects, business analysts, relationship managers, security, web services, open source programming, business intelligence, and business process modeling. Advanced users are competent users of advanced and often sector-specific software tools such as SPSS and Basic users are competent users of generic tools such as excel outlook and word needed for information society, e-government and working life. The first category covers those who supply ICT tools (hardware and software) and thus work in the ICT industry. The second and third categories involve those who use ICT and therefore work in the User Industry.

1.5 Relevance of ICT training to Industry needs

The English Dictionary defines relevance as "having a bearing on or connection with the matter at hand". In this study, relevance refers to whether the objectives and outputs of a training system meet a county's economic and social requirements (World Bank, 2004). More narrowly, this can be referred to as the external efficiency of a training system. A good training program should ensure relevance of the information or concepts delivered in training to the needs of the trainee, demonstration of knowledge and skills, creation of opportunities for trainees to practice the skills and provision of feedback to trainees during and after training (Schumaker, 2004). If training is to be relevant, it is extremely important that the criteria used in the classroom situation resemble as closely as possible to the working environment. This means that ICT training should not differ from the practices and activities required in the real life environments for which students are supposed to be prepared.

Figure 1: Relevance of a Training System (World Bank, 2004)



1.6 Statement of the Problem

Alexandra and Jennifer (2006) argue that the ICT industry is constantly developing and introducing new products and technologies to the market. These technologies require existing workers to continuously upgrade their skills and new workers to seek out training to keep up with new technologies. Institutions of higher learning together with tertiary colleges have been mandated to equip their students with the necessary skills in ICT. Hence, questions have been raised as to whether the right type of education is being provided for future ICT professionals (Loh, 2003).

Ochilo (1999 as cited in Nga'mbi 2006) did a research on ICT skills training in Eastern Africa and he revealed that a total of 57.8 percent of professionals coming out of institutions of higher learning rated their institutions as being "less professionally capable of dealing fully with ICT training needs" with only "28.1" percent of the professionals rating the institutions capable". Of concern is the content and curriculum of these institutions which has been noted as inadequate to fully cater for the emerging ICT African professional in terms of robust training programmes which include data processing, systems management, and advanced computer training. With the rapid globalization and advances in technology, institutions of higher learning cannot afford to produce graduates who cannot compete locally and globally in offering ICT skills and services.

Many studies have reported industry dissatisfaction with what ICT graduates are taught (Magued, 2008). Currently, the ICT industry has an increasing need for employees with more advanced ICT skills to manage and operate new business applications, transfer theory and knowledge into practice, use previous experience and skills learned, and be able to relate the knowledge and skills from one workplace to another (Lowry, 2007). ICT training, on the other hand, has been accused of focusing more on theory instead of

practical skills. Additionally, Ross and Ruhleder (1993) note that ICT education is often seen as concentrating too much on a narrow set of technical skills, and suggest that the ICT training should concentrate on developing both technical and business skills. Lack of trained ICT professionals with the required skills has forced many companies to retrain their staff in specialized technology areas. Unfortunately, this takes up time and resources that would have been utilized in other areas. Furthermore, employers are reluctant in employing graduates who do not have the right skills.

According to a study by Boris, Rajko and James(2007) on Croatian ICT skills gap, the gap between ICT training and industry needs can be bridged by ensuring that the ICT curriculum is continually harmonized with the actual needs of the industry, develop e-learning courses, modernize the resources and capabilities of the institutions, improve education using external resources to address financial challenges and developing partnerships with universities in developed countries that have state-of –the art programs to train faculty and establish innovation centers.

Wacuka (2007) did a research on Employer's Perception of tertiary training and its relevance to the labor market (A case study of Kenya Polytechnic). She concluded by saying that the role of tertiary institutions in providing training to the Kenya labor market cannot be underestimated. This is indicated by the number of employees who obtain their training at these institutions.

Despite the major role played by tertiary institutions in the labor market, no known study has looked at the relevance of ICT training provided by tertiary institutions in Kenya in meeting the industry needs. Furthermore, the rising trend of private colleges offering ICT Diplomas and Certificates of varying quality has been a major concern. It is because of this reason that this study is aimed at addressing the following question: Is the ICT training provided by tertiary colleges in Kenya meeting the industry needs?

1.6 Objective of the Study

Overall Objectives

The overall objective of the study was to determine the relevance of ICT training in Kenya's Tertiary Colleges in meeting the industry needs.

Specific Objectives:

The specific objectives were:

1) To determine ICT skills provided by tertiary colleges in Kenya.
2) To establish the ICT skills required by the industry.
3) To determine the relevance of ICT training provided by tertiary colleges in meeting the needs of the ICT industry.

1.7 Value of the Study to Theory and Practice

This study seeks to understand and gain a greater insight into the ICT training process, and therefore refute the theory that ICT education is incapable of producing qualified, employable professionals (Khalid et al, 2008). The findings of the study will also contribute to research by highlighting the ICT skills required in the Kenyan Market. In addition, the findings of the research will be useful to tertiary college's stakeholders in designing an appropriate ICT training that will meet the needs and demands of the industry. Moreover, the findings of the study will offer a reference material to researchers who will be researching on a related topic.

CHAPTER TWO: LITERATURE REVIEW

2.1 ICT Industry Skills

The role, of ICT within organizations has been changing over time. This is evident when looking at the evolution of Enterprise Information Systems including Transaction Processing Systems (TPS), Management Information Systems (MIS), Decision Support Systems (DSS), Executive Support Systems (ESS), Supply Chain Management Systems (SCM), Customer Relationship Management Systems (CRM) and Knowledge Management Systems (KMS) (Mazzeo et al, 2008). This has made ICT skills to be more important for innovation and growth. The promotion of ICT education is therefore essential for achieving the long-term objectives of information societies (OECD, 2002).

There are currently no commonly adopted definition of ICT skills and no internationally agreed list of ICT-related occupations. The new skills required by the ICT companies, additionally to certain educational degree, are often qualities of personal nature. Factors like communication, organizational, customer service, interpersonal, human relations, management, consultancy, problem solving, understanding of business needs, marketing, sales and project management are more important than before when companies are recruiting new staff. In addition, willingness and ability to learn new things and commitment to goals is important (Penny & Kai, 2006).

The ICT industry is also growing towards service business. In service business, ICT professionals require different leadership skills to face customers in addition to the technical skills that enable them to effectively apply technology in seeking business solutions. The technical skills required include skills in Graphic Design, Information Security, Website Design, Multimedia, Database, Programming, E-commerce, E-business, Computer Hardware, Telecommunication, Business Intelligence, Networking, Internet, Operating Systems and Computer Packages (Lowry et al 2007; Janey & Vranes, 2010; Loh, 2010; Kelegai et al, 2001; Khalid et al, 2008; OECD, 2002; Penny & Kai, 2006).

2.2 ICT Curriculum

Commission of Higher Education (2008) has defined Curriculum as an organized program of study for a given Degree, Diploma, Certificate award incorporating all matters such as academic staff requirements, duration of academic program, admission requirements, content requirements and assessment process requirements. According to the commission, the design of every curriculum shall ensure that the program: is broad-based and integrated, is practical oriented, diversified, enhances standards set by the commission and contributes to the overall national human resource development and requirements.

Determining those skills sought by employers of new ICT graduates is important for educators in designing curricula and advising students (Lowry et al, 2007). According to Loh (2003), ICT curriculum is seen as having three components namely knowledge, skills and abilities. Knowledge is a basic core of ICT curriculum. Basic concepts and various principles form the fundamental building blocks of ICT education. Concepts such as data independence, lifecycle development methodology, prototyping, and user satisfaction fall within this category. Skills are the specific psychomotor processes necessary to meet the current requirements of a specific job, which are usually manifested through behaviors. Examples of skills would be programming in a fourth language, user communication skills and database query formulation. Abilities refer to the cognitive factors that represent capabilities or achievements levels. Thus abilities could be regarded as a form of experience which deals with the application of knowledge and skills to practical situation. Students learn by working on programming projects, system analysis, and design and implementation projects. Such experience integrates the curriculum in a meaningful way for students and prepares them for real world situations.

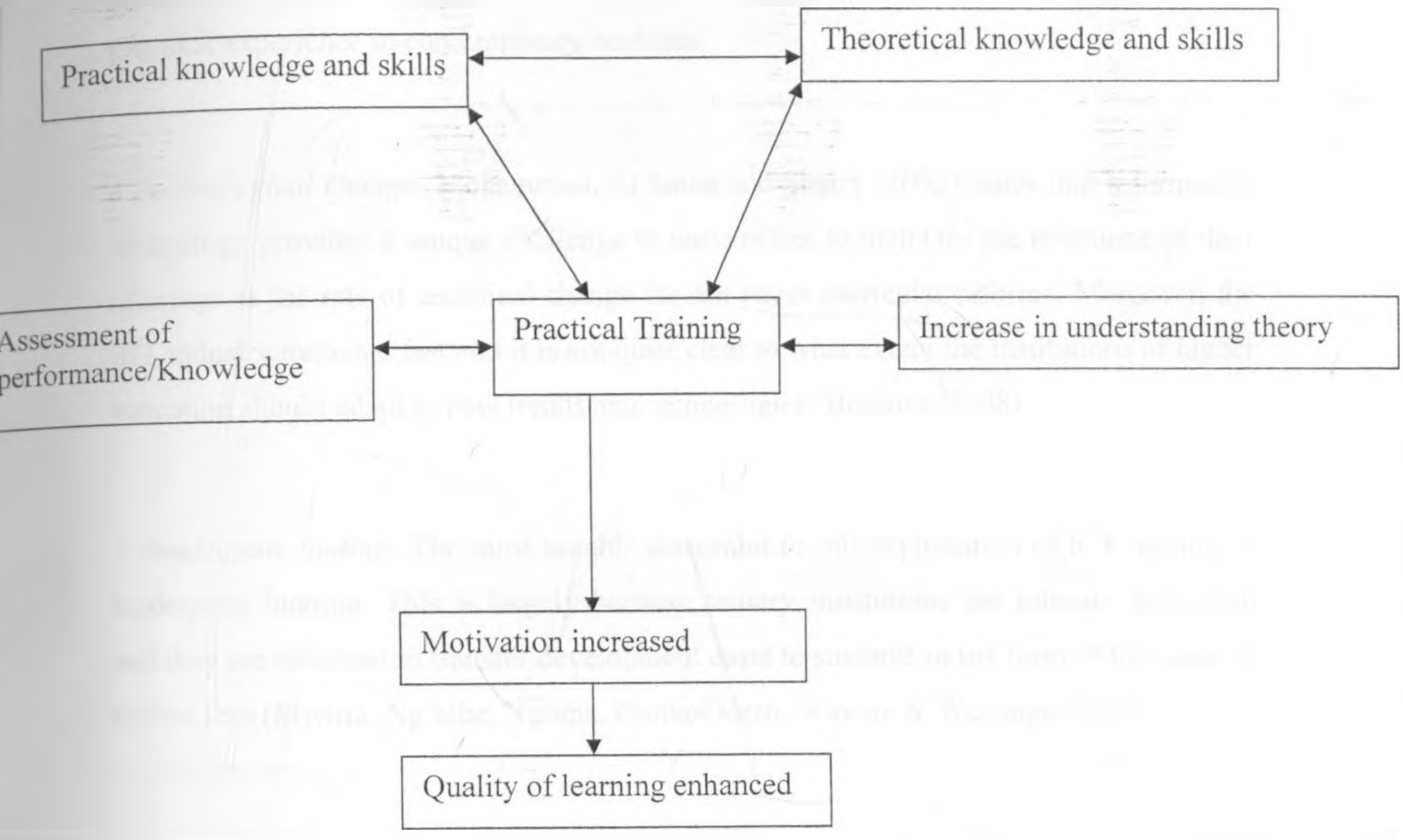
Kattel et al (2006) argue that as far as the ICT curriculum is concerned, it is advisable to observe that a curriculum should comprise the creation of a scientific base of (30%), technological base of (30%), an application base and systems thinking of (25%) and a personal and business skills element of (15%). In addition, it should provide areas of specialization for students. For example students can specialize in systems development, database systems and infrastructure.

In Kenya, the curricula in use in public owned tertiary colleges, are approved through the Kenya Institute of Education (KIE) and final examinations prepared by the Kenya National Examinations Council, while the curricula offered in private institutions are not regulated by the Government (Hooker et al, 2011). According to Kelegai et al (2001), the people who should be involved in the designing of an ICT curriculum are students who enroll in the program, potential employers of graduates of the program, educators who deliver courses for the program, administrators who manage all aspects of program delivery, citizens who impact or are impacted by the program and accredited bodies that evaluate and certify the program.

The teaching of ICT requires the incorporation of both theoretical and practical knowledge. Unfortunately, the norms of higher education tend to favor scientific knowledge and skills rather than professional knowledge. However, the challenges in working life, for which the students during the higher education should be prepared, cannot be accomplished by using theoretical knowledge alone. Working life requires practical and situational knowledge, professional experience and judgment. For these reasons, educational practices should not differ from the practices and activities required in the real life expert environments for which the students are supposed to be prepared. To foster student learning and the understanding of theoretical knowledge, the training period must be adjusted to meet the needs of the ICT training. According to **Figure 2**, theoretical knowledge should be tested in work context. Through reflection, it is possible to assess one's performance and one's knowledge. By reflecting and practicing, students come to realize the significance of theoretical knowledge and the importance of

developing one's performance in practical situations. This, in turn, increases the motivation to study more (Katajavuori, Lindblom & Horvonen, 2006)

Figure 2.Description of learning during the training period



2.3 Challenges facing ICT Training

Tertiary colleges face several challenges in their quest to offer ICT training. These challenges include:

1.Technical issues- Hartley, Woods and Pill (2005) asserts that Change is rapid within the ICT industry, new products appear, others become obsolete and many are incompatible with one another. Often lecturers are nervous as they begin to use new technology in their teaching. Institutions must recognize and budget for the ongoing cost of providing technical support along with maintenance and upgrading of equipment and facilities.

2. Relation of ICT to other fields- ICT relation to other fields of business is extremely faint, or if it exists, it's on a very primitive level. The study programmes and subjects are too specific to the field of ICT, which often means that they are out of date from the business perspective. Moreover, Kattel (2006) argues that many teachers do not have practical experience in contemporary business.

3.Technological change- Mohammad, Al Saber and Sherry (2002) states that Information technology provides a unique challenge to universities to maintain the relevance of their offerings as the rate of technical change far out paces curricular reforms. Moreover, the ICT industry innovate fast and it is not quite clear to what extent the institutions of higher education should adapt to new trends and technologies (Borzovs, 2008).

4. Inadequate finding- The most notable constraint to full exploitation of ICT training is inadequate funding. This is largely because tertiary institutions are tuition– dependant and they are reluctant to transfer development costs to students in the form of increases in tuition fees (Mwiria, Ng'ethe, Ngome, Ouma-Odero, Wawire & Wesonga, 2007).

5. Time Availability- Few institutions recognize the time needed either for development or managing virtual learning within the allocation of contact hours for their academic staff (Hartley et al, 2005). Furthermore, a large number of teachers are earning extra income from training and teaching in other schools due to their low salary, which in turn may put them in a situation where they often lack time for self-education and adequately prepare for their classes (Kattel et al, 2006).

6. Practical Training system- The greatest shortcoming of the education provided today in the fields of ICT consists in the weakness of the practical training system. According to Kattel et al (2006), cooperation with companies is very important in giving students hands on experience. Towards this end, Knowledge for Life project has partnered with the University of Nairobi, Strathmore University, Kenyatta University and Jomo

Kenyatta University of Agriculture and Technology to offer free training to students to equip them with the necessary skills being demanded by industry. Safaricom has also partnered with Vodafone to build a technological capacity at Strathmore University to meet the needs of the first-growing telecommunications industry. Tertiary institutions should also seek to have the same kind of collaborations with recognized organizations.

7.Lack of ICT Training Policies- Ramata (2003) claims that Countries like Senegal, Kenya and Uganda have no ICT policy and particularly no training policy on ICTs. The recent announcement by the government that the International Computer Driving License (ICDL) is the most basic IT qualification is a step in the right direction but more needs to be done.

In summary, Westfall (1998, as cited in Lowry et al.2007) argues that "information technology literacy must include (but is not limited to)":knowledge that covers the breadth of the field at the current point in time, practical hands on experience, learning and using new information technologies, an understanding of what makes specific new information technologies more important than others, knowledge of economic factors and trends that will lead to new information technologies and to obsolescence of existing technologies, an understanding of the relationship between career choices and specific information technologies, knowledge of the critical importance of continuous learning, and skills for maintaining and extending knowledge in this field on a self-service basis and to supplement continuing formal education and training.

2.4 Theoretical Framework

1 Expectancy–value theory

The theoretical framework that supports this study is based upon the expectancy–value theory. According to Koontz and Weihrich (2008), expectancy-value theory looks at behavior as being guided by the belief that people will be motivated to do things to reach a goal if they believe in the worth of that goal and if they can see that what they do will help in achieving it. Expectancy – value theories think of people as goal-oriented beings. If expectancy – value theory is used in looking at ICT training, then the decision to incorporate new technology in the curriculum will depend on how high the teachers value the technology and how much they will expect the costs of the implementation to be in addition to the support given to them by the institution and the time available for them to prepare for their classes.

Venkatesh et al (2003 as cited by Sipila, 2011) has listed four predictors in regard to expectancy–value theory; effort expectancy, social influence, facilitating and performance conditions. The study will focus on the first three predictors. First, effort expectancy which expresses the ease or difficulty associated with the use of technology. This will determine the willingness of lecturers to incorporate a given technology into the curriculum. Secondly, facilitating conditions which determine the resources required to support ICT training and also the technical support required by the lecturers in using the new technology. Thirdly, social influence which deals with the degree to which peers influence the use of technology whether positive or negative. The industry should be involved in ICT training to determine what should be taught to avoid sending out graduates to the market without the necessary ICT skills.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Research design

A survey was used in the study with questionnaires as the instrument of collecting data. This method was thought effective as it enabled the researcher to reach out to several respondents and get their views on the research problem under study.

3.2 Population and Sampling

The survey was conducted in Nairobi. This area was selected because out of the 584 colleges registered by the Ministry of Higher education, Science and Technology, 243 colleges are located in Nairobi and a good number of them offer ICT training. In addition, most companies have their headquarters in Nairobi. The respondents in the survey were ICT students and lecturers from private and public colleges offering ICT training in Nairobi. Included in the respondents were also ICT managers. They were selected from telecommunication, banking, insurance, investment and manufacturing industries. The rationale of selecting these respondents was that lecturers and students would provide knowledge sought on ICT training as ICT Manager would provide knowledge sought on ICT skills required by the industry. 45 colleges were used in the study. One student and lecturer were picked from each of the colleges making the total number of ICT lecturers and students who participated in the study to be 90. In addition, 100 organizations also participated in the study with one ICT managers being selected from each of the organizations. This made the total number of managers who participated in the study to be 100.

3.2 Data collection

Data was collected using questionnaires. The questionnaires were dropped and picked later. Three sets of questionnaires were administered. Each of the questionnaires had two sections. The first questionnaire was filled by ICT managers. Section A was used to collect background information of the respondent while Section B was used to collect data on ICT skills required by the industry. The second and third questionnaires were filled by ICT lecturers and students respectively. Section A was used to collect background information of the respondent while Section B was used to collect data on ICT skills and training provided by the tertiary institutions.

3.5 Data Analysis

Data collected was analyzed using descriptive statistical tools of analysis (percentages, frequencies, mean scores and standard deviation). Data relating to section A of the questionnaires was analyzed using Frequency Distribution, mean and Percentages, while data relating to Section B of the questionnaires was analyzed using mean scores, standard deviations, descriptive and factor analysis.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.0 Introduction

The data for this research was collected from Nairobi region. A sample of 60 colleges was targeted from which responses were obtained from 45 colleges representing a response rate of 75%. Regarding to managers, 120 organizations were targeted in the study from which responses were obtained from 100 organizations representing a response rate of 83.3%. The response rates were adequate to enable the researcher meet the objectives of the study.

4.1 Student Questionnaires

4.1.1: Background Data

This section deals with the demographic and educational factors of the respondents. The factors considered include gender, age, level of ICT training and the duration of the course studying.

4.1.1.1: Gender

Table 4.1: Gender

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Female	18	40.0	40.0	40.0
Male	27	60.0	60.0	100.0
Total	45	100.0	100.0	

The majority of the respondents (60.0%) were male while the rest (40.0%) were female. From the findings, both male and female were fairly represented in the study.

4.1.1.2: Age

Table 4.2: Age

Age	Frequency	Percent	Valid Percent	Cumulative Percent
Below 20 years	27	60	60	60
20-25 years	9	20	20	80
26-30 years	6	13.3	13.3	93.3
31-35 years	3	6.7	6.7	100
Total	45	100.0	100.0	100

On the issue of age, 60% of the respondents were aged below 20 years, 20% were aged between 20-25 years, 13.3% were aged between 26-30 years while 6.7% were aged between 31-35 years. From the findings, the majority of the respondents were below 25 years of age.

4.1.1.3: Level of ICT Training

Table 4.3: Level of ICT Training

Level of ICT training	Frequency	Percent	Valid Percent	Cumulative Percent
Certificate	12	26.7	26.7	26.7
Diploma	27	60.0	60.0	86.7
Degree(Bachelor)	3	6.7	6.7	93.3
Other	3	6.7	6.7	100.0
Total	45	100.0	100.0	

From the respondents, 26.7% were pursuing Certificate training in ICT, 60% were pursuing Diploma in ICT, 6.7% were pursuing Bachelors degree in ICT and the

remaining 6.7% were pursuing other certifications in ICT. From the findings, the majority of the respondents were pursuing Diploma in ICT.

4.1.1.4: Duration of Course Studying

Table 4.4: Duration of Course Studying

Duration of course	N	Minimum	Maximum	Mean	Std. Deviation
Duration of Course Studying	45	.5	4.0	1.653	.9368

The courses studied ranges from 6 months to 4 years. These include Certificate, Diploma, and Degree courses in ICT. Averagely many courses take more than one year which is shown by the mean of 1.653 and since the standard deviation is 0.9368, this is very small indicating that many courses done by the respondents take almost the same duration.

4.1.2: ICT Training

4.1.2.1: ICT Training provided by tertiary institutions

4.1: ICT Training provided by tertiary institutions

Mean	2.00
Std. Error of Mean	.168
Std. Deviation	1.128
Minimum	1
Maximum	5

According to Table 4.1, ICT training provided by tertiary institutions had a mean of 2.00. This means that respondents rated the training they received in ICT as being above average.

4.1.2.2: The Extent to which business skills have been incorporated in the ICT curriculum

Table 4.2.1: The Extent to which business skills have been incorporated in the ICT curriculum

Business Skills	N	Mean	Std. Deviation	Std. Error Mean
Communication Skills	45	4.02	.753	.112
Organization Skills	45	3.91	.668	.100
Customer Service	45	3.93	1.321	.197
Interpersonal Skills	45	4.09	1.240	.185
Human Relations	45	3.73	1.286	.192
Leadership Skills	45	4.00	.853	.127
Management Skills	45	3.91	.668	.100
Consultancy Skills	45	3.24	1.228	.183
Problem Solving	45	3.98	.965	.144
Understanding of Business Skills	45	3.62	1.154	.172
Marketing	45	3.16	1.278	.191
Sales	45	3.07	1.388	.207
Project Management	45	3.71	1.141	.170

The respondents were asked to respond on the extent to which business skills were incorporated in ICT training. Communication, interpersonal and leadership skills had means ranging from 4.00 to 4.99. This means that these skills have been incorporated in ICT training by many tertiary institutions to a great extent. Organizations, customer service, human relations, management, consultancy, problem solving, understanding business needs, marketing, sales and project management had means ranging from 3.00 to 3.99. This means that these skills have been integrated in ICT training to a moderate extent by many tertiary institutions.

Table 4.2.2: Table of significance showing the extent to which business skills have been incorporated in the ICT curriculum

Business Skills	t	df	p-values
Communication Skills	35.811	44	.000
Organization Skills	39.266	44	.000
Customer Service	19.972	44	.000
Interpersonal Skills	22.122	44	.000
Human Relations	19.470	44	.000
Leadership Skills	31.464	44	.000
Management Skills	39.266	44	.000
Consultancy Skills	17.729	44	.000
Problem Solving	27.650	44	.000
Understanding of Business Skills	21.059	44	.000
Marketing	16.558	44	.000
Sales	14.818	44	.000
Project Management	21.826	44	.000
Other Specify	8.513	44	.000

Table 4.2.2 indicates that all the skills are significant since their P-values=0.00 i.e p-value<0.05 and hence they ought to be incorporated in ICT training to large extent.

4.1.2.3: The extent to which technical skills have been incorporated in the ICT curriculum

As indicated in Table 4.3.1, computer skills, operation system, internet, intranet, website design, programming and computer hardware had means ranging from 4.00 to 4.99. This means that these skills have been integrated in ICT training by many tertiary institutions to a large extent. Telecommunication, computer hardware, business intelligence, e-business, e-commerce, programming and database had means ranging from 3.00 to 3.99. This means that these skills have been incorporated in ICT training by many tertiary institutions to a moderate extent.

Table 4.3.1: The extent to which technical skills have been incorporated in the ICT curriculum

Technical Skills	N	Mean	Std. Deviation
Computer Skills	45	4.58	.499
Operating Systems	45	4.58	.499
Networking	45	4.24	.857
Inernet, intranet, Extranet	45	4.29	1.079
Business Intelligence	45	3.09	.763
Telecommunication	45	3.87	1.079
Computer Hardware	45	4.53	.505
E-Business	45	3.42	1.305
E-Commerce	45	3.47	1.358
Programming Skills	45	4.38	.614
Database	45	3.96	1.065
Multimedia	37	3.35	1.006
Website Design	37	4.24	.760
Information Security	41	3.93	.932
Graphic Design	41	3.98	1.440

4.1.2.4: Balance between technical and business skills, practicability of course content and integration of new technology in ICT training

Table 4.4: Balance between technical and business skills, practicability of course content and the integration of new technology in ICT training

	N	Minimum	Maximum	Mean	Std. Deviation
Techs and Bus	45	2	5	3.84	.824
Practical Approach	45	3	5	3.91	.668
New Technology	45	2	5	3.93	1.031

From the findings, the balance between technical and business skills, practicability of the course content and integration of new technology in ICT training received means ranging from 3.00 to 3.93. This means they received a rating of moderate extent.

4.1.2.5: Industrial attachment and involvement of students in ICT curriculum development process

Table 4.5: Industrial attachment and involvement of students in ICT curriculum development process

	N	Minimum	Maximum	Mean	Std. Deviation
Industrial Attachment	45	1	4	1.53	1.160
Student Involvement in ICT	45	2	5	3.60	1.053

Table 4.5 show the average period for industrial attachment is 1.53 months. The Table also indicates that student's involvement in ICT curriculum development process had a mean of 3.60. This means that students are involved in the process to a moderate extent.

4.1.2.6: Delivery methods

Table 4.6: Delivery methods

Delivery Methods		Frequency	Percent	Cumulative Percent
Lecture	Yes	45	100.0	100.0
Group Discussions	Yes	21	46.7	100.0
	No	24	53.3	
Individual Presentation	Yes	25	55.6	100.0
	No	20	44.4	
Workshop	Yes	3	6.7	100.0
	No	42	93.3	
Brainstorming	Yes	10	22.2	100.0
	No	35	77.8	
Role Play	Yes	3	6.7	100.0
	No	42	93.3	
Case study	Yes	14	31.1	100.0
	No	31	68.9	

As indicated in Table 4.6, 100% of the colleges participated in the study use lecture as the method of delivery in ICT training. 46.5% of the colleges use group discussions and 53.3% did not use group discussions as the method of delivery in ICT training. 55.6% of the colleges use individual presentations and 44.4% did not use individual presentations. 22.2% of the colleges used brainstorming and 77.8% did not use brainstorming. 6.7% of the colleges used role play and 93.3 % did not use role play. 31.1% of the colleges used case study and 68.9% did not use case study. This means that lecturing is the delivery method used extensively by most tertiary institutions. Group discussions and individual presentations are also used to a moderate extent while brainstorming, role play and case study are used to a little extent.

4.1.2.7: Areas requiring extra training

Table 4.7: Areas requiring extra training

Areas requiring extra training	Frequency	Percent	Cumulative Percent
Database	4	8.9	26.7
E-Business	4	8.9	35.6
IT Security	7	15.6	51.1
Mobile Application Programming	4	8.9	60.0
Networking	4	8.9	68.9
Security	3	6.7	75.6
Multimedia	4	8.9	84.4
Software Development and SAD	7	15.6	100.0
Total	45	100.0	

From Table 4.7, students indicated that they needed extra training in areas of database, e-business, mobile application, programming, networking, security, multimedia, software development and IT security.

4.2 Managers Questionnaire

4.2.1: Background Data

This section deals with the demographic and educational factors of the respondents. The factors considered include gender, age, level of education, professional certifications, length of time worked and the company's business operation.

4.2.1.1: Gender

Table 4.1: Gender

Gender	Frequency	Percent	Cumulative Percent
Female	28	28.0	28.0
Male	72	72.0	100.0
Total	100	100.0	

The majority of the respondents (72.0%) were male while the rest (28.0%) were female. From the findings, both male and female were represented in the study.

4.2.1.2: Age

Table 4.2: Age

Age	Frequency	Percent	Cumulative Percent
21-25 years	6	6.0	6.0
26-30 years	25	25.0	31.0
31-35 years	30	30.0	61.0
36-40 years	39	39.0	100.0
Total	100	100.0	

Table 4.2 indicates that, 6% of the respondents were aged between 21-25 years, 25% were aged between 26-30 years, 30% were aged between 31-35 years and the remaining 39% were between the ages of 36-40 years. From the findings, the majority of the respondents were between 31-40 years.

4.2.1.3: Level of ICT Training

Table 4.3: Level of ICT Training

Level of ICT Training	Frequency	Percent	Cumulative Percent
Diploma	20	20.0	20.0
Degree(Bachelor)	60	60.0	80.0
Masters	20	20.0	100.0
Total	100	100.0	

From the sampled respondents, 20% of the managers had Diploma, 60% had Bachelors Degree, and 20% had Masters Degree.

4.2.1.4: Professional Certificates for Managers

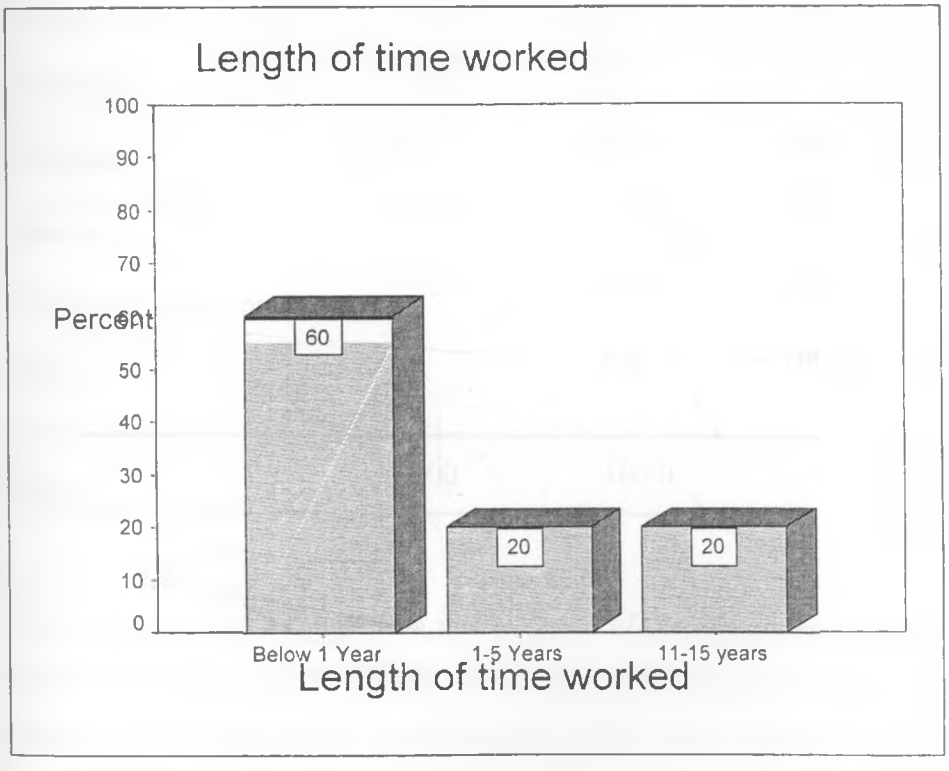
Table 4.4: Professional Certificates for Managers

ICT Professional Certifications		Frequency	Percent	Valid Percent	Cumulative Percent
Linux	No	23	51.1	51.1	51.1
	Yes	22	48.9	48.9	100.0
ComPTIA	No	30	66.7	66.7	66.7
	Yes	15	33.3	33.3	100.0
MCSE	No	30	66.7	66.7	66.7
	Yes	15	33.3	33.3	100.0
MCITP	No	31	68.9	68.9	68.9
	Yes	14	31.1	31.1	100.0
CCNA	No	23	51.1	51.1	51.1
	Yes	22	48.9	48.9	100.0
NONE	No	29	64.4	64.4	64.4
	Yes	16	35.6	35.6	100.0

From Table 4.4, 48.9% of the managers who responded had professional certification in Linux and 51.1% had no professional qualification in Linux. 33.3% of the managers had professional certification in ComPTIA security and 66.7% had no professional qualification in ComPTIA security. 33.3% of the managers had professional certification in MCSE and 66.7% had no professional qualification in MCSE. 31.1% of the managers had professional certification in MCITP and 68.9 had no professional qualification in MCITP. 48.9% of the managers had professional qualifications in CCNA and 51.1 % had no professional qualification in CCNA while 35.6% had no ICT professional qualification and 64.4% had ICT professional qualifications.

4.2.1.5: Length of time worked

Graph 4.5: Length of time worked



With regard to how long the respondents had worked as ICT managers, the majority (60%) had worked for less than 1 year, 20% had worked for between 1-5 years and the remaining 20% had worked for 11-15 years. This was a good mix to get information from those who had worked for long and those who had not worked for long. This brought good and balanced responses on the subject of study.

4.2.1.6: Business Operations

Table 4.6: Business Operations

Business Operations	Frequency	Percent	Cumulative Percent
Manufacturing	5	5.0	5.0
Construction	1	1.0	6.0
Investment	3	3.0	9.0
Insurance	5	5.0	14.0
Banking	40	40.0	54.0
Telecommunication	40	40.0	94.0
Other	6	6.0	100.0
Total	100	100.0	

The study in Table 4.6 indicates that majority of the respondents were from the banking and telecommunication industries with each of these sectors having a 40% representation. Manufacturing, investment, insurance and others had a representation of less than 10% each. This indicates that most of the respondents targeted were from telecommunication and banking sectors as these sectors report the highest demand for ICT professionals.

4.2.2: ICT Skills

4.2.2.1: Soft skills expected of an ICT Professional

Table 4.1.1: Soft skills expected of an ICT Professional

Business Skills	N	Mean	Std. Deviation	Std. Error Mean
Human Relations	100	4.00	.899	.090
Leadership Skills	100	3.60	1.025	.102
Management Skills	100	3.80	1.172	.117
Consultancy Skills	100	3.60	.804	.080
Problem Solving	100	4.00	.636	.064
Understanding of Business Skills	100	3.40	1.206	.121
Marketing	100	3.40	.804	.080
Sales	100	3.40	1.025	.102
Project Management	100	3.80	.985	.098
Communication Skills	100	3.80	.752	.075
Organization Skills	100	3.80	.752	.075
Customer Service	100	3.60	1.025	.102
Interpersonal Skills	100	4.20	.752	.075

Table 4.1.1 show human relations, problem solving and interpersonal skills had means ranging from 4.00 to 4.20. This means that these skills are important to ICT professionals. Leadership, management, consultancy, understanding of business needs, marketing, sales, management, communication, organization and customer service had means ranging from 3.00 to 3.90. This means that these skills are important to ICT professionals to a moderate extent.

Table 4.1.2: Table of significance showing soft skills expected of an ICT professional

Business Skills	t	df	P-values
Communication Skills	119.398	99	.000
Organization Skills	119.398	99	.000
Customer Service	93.426	99	.000
Interpersonal Skills	89.364	99	.000
Human Relations	104.474	99	.000
Leadership Skills	119.398	99	.000
Management Skills	93.426	99	.000
Consultancy Skills	54.724	99	.000
Marketing	33.173	99	.000
Sales	32.421	99	.000
Project Management	119.398	99	.000

Table 4.1.2 show the soft skills expected of an ICT professional. All the skills have a p-value <0.05 (p-v=0.00) hence they are significant skills and they are required by ICT professionals in industries.

4.1.3: Discriminant Table of Soft Skills expected of an ICT professional.

Business Skills	Coefficient
Organization Skills	.314
Leadership Skills	.578
Management Skill	.612
Customer Service	.612
Interpersonal Skills	.408
Consultancy Skills	-.375
Sales	.343
Marketing	-.294
Communication Skills	-.250
Project Management	-.250
Human Relations	.250

Table 4.1.2 indicates that consultancy skills, communication, project management and marketing are very important since their coefficients are negative, while organization, leadership, management, customer services, interpersonal, sales and human relations are

not very important or their importance varies depending on the industries since their coefficients are positive.

4.2.2.2: Extent to which ICT graduates from tertiary institutions possess business skills

Table 4.2.1: Extent to which ICT graduates from tertiary institutions possess business skills

Business Skills	N	Mean	Std. Deviation	Std. Error Mean
Human Relations	100	4.90	.899	.090
Leadership Skills	100	3.89	1.025	.102
Management Skills	100	3.71	1.172	.117
Consultancy Skills	100	3.15	.804	.080
Problem Solving	100	3.20	.636	.064
Understanding of Business Skills	100	3.40	1.206	.121
Marketing	100	3.00	.804	.080
Sales	100	3.20	1.025	.102
Project Management	100	3.80	.985	.098
Communication Skills	100	3.92	.752	.075
Organization Skills	100	4.00	.752	.075
Customer Service	100	3.60	1.025	.102
Interpersonal Skills	100	4.20	.752	.075

According to Table 4.2.1, organization, human relation and interpersonal skills had means ranging from 4.00 to 4.90. This shows that students from tertiary institutions possess these skills to a large extent. Leadership, management, consultancy, understanding of business needs, marketing, sales, project management, communication and customer service had means ranging from 3.00 to 3.99 This shows that students from tertiary colleges possess these skills to a moderate extent.

Table 4.2.2: Discriminant Table showing the extent to which ICT professionals possess business skills

Business Skills	Coefficient
Interpersonal Skills	.956
Customer Service	.795
Human Relations	-.791
Project Management	.548
Consultancy Skills	.548
Organization Skills	.245
Sales	.245
Communication skills	.245
Problem Solving	-.239
Management Skills	-.239
Leadership Skills	.194
Marketing	-.079
Understanding of Business Skills	.048

Table 4.2.2 show that management, problem solving, and human relations have a negative coefficient hence students from tertiary colleges possess these skills to a very large extent. The rest of the skills in Table 4.2.2 that have a positive coefficient show the skills that ICT students possess to a less extent.

4.2.2.3: Technical skills expected of an ICT Professional

Table 4.3.1: Technical skills expected of an ICT professional

Technical Skills	N	Mean	Std. Deviation	Std. Error Mean
Computer Skills	45	4.53	.757	.113
Operating Systems	45	3.69	1.145	.171
Networking	45	4.18	.684	.102
Internet,intranet,Extranet	45	3.84	.706	.105
Business Intelligence	45	3.69	.763	.114
Telecommunication	45	4.18	.387	.058
Computer Hardware	45	4.00	1.044	.156
E-Business	45	4.00	.826	.123
E-Commerce	45	3.84	.903	.135
Programming Skills	45	4.02	1.158	.173
Database	45	4.18	.912	.136
Multimedia	45	3.67	.477	.071
Website Design	45	3.69	.763	.114
Information Security	45	3.84	.706	.105
Graphic Design	45	3.84	1.065	.159

Table 4.3.1 indicates that computer, networking, telecommunication, computer hardware, e-business, programming and database had a rating of 4.00 to 4.90. This means that these skills are important to ICT professionals. Graphic design, information security, website design, multimedia, e-commerce, business intelligence, internet, intranet, extranet and operating systems had a mean of 3.00 to 3.90. This means that these skills are important to ICT professionals to a moderate extent.

Table 4.3.2: Table of significance showing technical skills expected of an ICT professional

Technical Skills	t	df	P-values
Computer Skills	39.799	99	.000
Operating Systems	51.000	99	.000
Networking	51.000	99	.000
Internet,intranet,Extranet	109.147	99	.000
Business Intelligence	97.658	99	.000
telecommunication	56.285	99	.000
Computer Hardware	109.147	99	.000
E-Business	89.549	99	.000
E-Commerce	89.549	99	.000
Programming Skills	56.285	99	.000
Database	97.658	99	.000
Multimedia	86.168	99	.000
Website Design	86.168	99	.000
Information Security	109.147	99	.000
Graphic Design	40.212	99	.000

Table 4.3.1, shows the technical skills expected of an ICT professional. All the skills have a p-value <0.05(p-v=0.00) this shows that they are significant skills and they are required by ICT professionals in industries.

4.3.3: Discriminant Table of Technical Skills expected of an ICT professional.

Technical Skills	Coefficients
Operating Systems	.949
Networking	.949
Internet,intranet,Extranet	.949
Computer Hardware	-.949
Programming Skills	-.949
Database	-.949
Multimedia	-.949
Website Design	-.949
Information Security	-.949
Graphic Design	-.949
Telecommunication	-.894
Business Intelligence	.316

Table 4.1.2 indicates that computer hardware, programming, database, multimedia, website design, information security, graphic design, and telecommunication are very important since their coefficients are negative. Operating systems, networking, intent, intranet, extranet and business intelligence are not very important or their importance varies depending on the industry since their coefficients are positive.

4.2.2.4: The extent to which ICT graduates from tertiary institutions possess Technical/Hard skills.

According to Table 4.4.1, computer skills had a mean of 4.00. This means that most ICT students from tertiary colleges possess this skill to a large extent. Operating systems, networking, internet, intranet, extranet, computer hardware, e-business, e-commerce, programming, database, website design had means ranging from 3.00 to 3.90. This means that ICT students from tertiary colleges possess these skills to a moderate extent. Graphic design, information security, telecommunication and business intelligence had means ranging from 2.00 to 2.90. This means that majority of ICT students from tertiary institutions possess these skills to a little extent.

Table 4.4.1: The extent to which ICT graduates from tertiary institutions possess Technical/Hard skills

Technical Skills	N	Mean	Std. Deviation
Computer Skills	45	4.00	.000
Operating Systems	45	3.25	.833
Networking	45	3.50	.503
Internet,intranet,Extranet	45	3.25	.435
Business Intelligence	45	2.50	.503
Telecommunication	45	2.75	.435
Computer Hardware	45	3.25	.833
E-Business	45	3.75	.435
E-Commerce	45	3.50	.503
Programming Skills	45	3.50	.503
Database	45	3.25	.435
Multimedia	45	2.00	.000
Website Design	45	3.00	.711
Information Security	45	2.25	.435
Graphic Design	45	2.00	.711

4.4.2: Discriminant Table showing the extent to which ICT graduates from tertiary institutions possess Technical/Hard

Technical Skills	Coefficients
Internet,intranet,Extranet	1.000
E-Commerce	1.000
Graphic Design	1.000
Operating Systems	.500
Computer Hardware	.500
E-Business	.500
Business Intelligence	.500
Telecommunication	.500
Programming Skills	-.500
Database	-.500
Website Design	-.500
Information Security	-.500
Networking	.500

Table 4.4.2 indicates that programming skills, database, website design, information security are skills that ICT students from tertiary colleges possess to a very great extent since their coefficients are negative. Networking, business intelligence, e-business, computer hardware, operating systems, graphic design, e-commerce, internet, intranet and extranet are skills that ICT students from tertiary colleges possess to a little extent since their coefficients are negative.

4.2.2.5: The adequacy and relevance of academic and professional courses

Table 4.5: The adequacy and relevance of academic and professional courses

	N	Mean	Std. Deviation	Std. Error Mean
Relevance of Professional Courses	100	2.50	.503	.050
Adequacy of Professional Courses	100	2.50	.503	.050
Relevance of ICT academic programs	100	2.25	.435	.044
Adequacy of ICT academic programs	100	2.00	.711	.071

According to Table 4.5, ICT professional courses had a mean of 2.50 in both relevance and adequacy while ICT academic programs had a mean of 2.25 and 2.00 in relevance and adequacy respectively. This means that both courses are to a large extent adequate and relevant.

4.2.2.6: Practicability of ICT course content

Table 4.6: Practicability of ICT course content

Mean	3.75
Std. Error of Mean	0.0833
Std. Deviation	0.833
Minimum	1
Maximum	5

When the respondents were asked to rate the extent to which course content provided by tertiary institutions in ICT is related to practical approach, most respondents gave a rating of moderate extent.

4.3 Lecturers Questionnaire

4.3.1: Background Data

This section deals with the demographic and educational factors of the respondents. The factors are gender, age, length of time worked, level of education, professional qualifications and the time of college in operation.

4.3.1.1 Gender

Table 4.1 Gender

Gender	Frequency	Percent	Cumulative Percent
Female	15	33.3	33.3
Male	30	66.7	100.0
Total	45	100.0	

Table 4.1 indicates that 33.3% of the lecturers who participated in the study were female and 66.7% were male.

4.3.1.2: Age

Table 4.2: Age

Age	Frequency	Percent	Cumulative Percent
Below 20 years	6	13.3	13.3
21-25 years	7	15.6	28.9
26-30 years	15	33.3	62.2
31-35 years	13	28.9	91.1
36-40 years	4	8.9	100.0
Total	45	100.0	

The results from Table 4.2 indicate that 13.3% of the respondents were aged up to 20 years. 15.6% were aged between 21-25, 33.3% were aged between 26-30 years, 28.9% were aged between 31-35 years while the remaining 4% were aged between 36-40 years.

4.3.1.3: Years of Experience

Table 4.3: Years of Experience

Years of Experience	Frequency	Percent	Cumulative Percent
Below 1 Year	16	35.6	35.6
1-5 Years	13	28.9	64.4
6-10 years	16	35.6	100.0
Total	45	100.0	

According to Table 4.3, 35.6% of the ICT lecturers who participated in the study had worked for less than one year, 28.9% had worked for between 1-5 years. The remainder 35.6% had worked for between 6-10 years. This was a good mix to get information from those who had worked for long and those who had not worked for long.

4.3.1.4: Level of ICT Training

Table 4.4: Level of ICT Training

Level of ICT training	Frequency	Percent	Cumulative Percent
Degree(Bachelor)	29	64.4	64.4
Masters	16	35.6	100.0
Total	45	100.0	

From the sampled respondents, 64.4% of the ICT lecturers were university graduates and 35.6% had masters' degree. From the findings, the majority of the ICT lecturers were university graduates. They were instrumental in the study since they had much knowledge about the topic of study.

4.3.1.5: Professional Certification

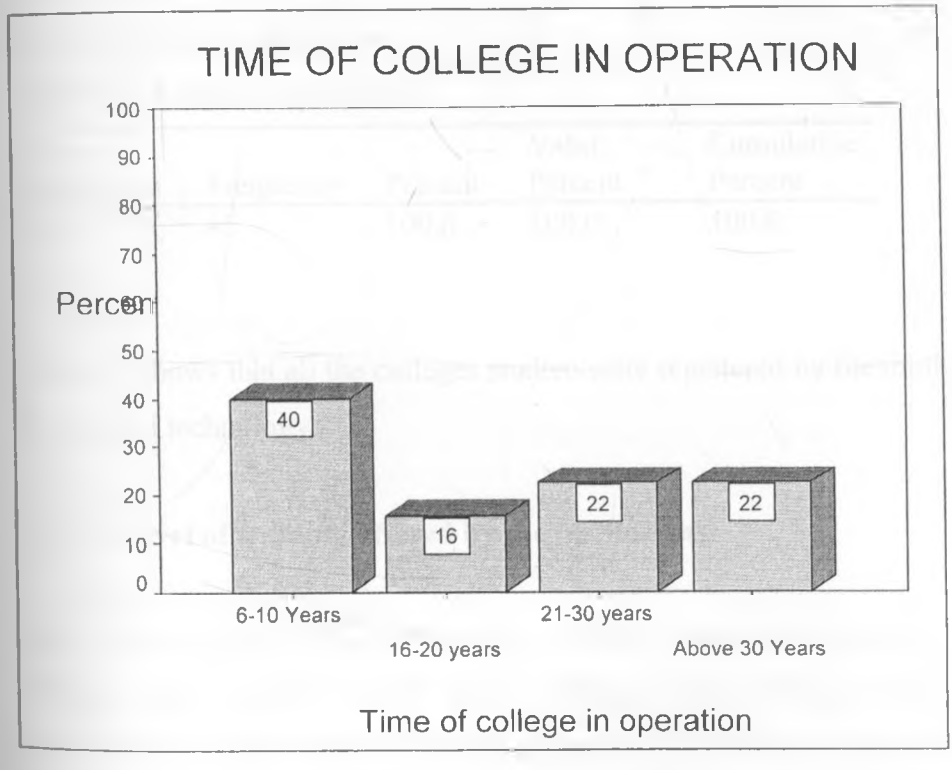
Table 4.5: Professional Certification

ICT Professional Certifications		Frequency	Percent	Valid Percent	Cumulative Percent
Linux	No	15	33.3	33.3	33.3
	Yes	30	66.7	66.7	100.0
ComPTIA	No	18	40.0	40.0	40.0
	Yes	27	60.0	40.0	60.0
MCSE	No	23	51.1	51.1	51.1
	Yes	22	48.9	48.9	100.0
MCITP	No	10	22.2	22.2	22.2
	Yes	35	77.8	77.8	100.0
CCNA	No	17	37.8	37.8	37.8
	Yes	28	62.2	62.2	100.0
NONE	No	38	84.4	84.4	84.4
	Yes	7	15.6	15.6	100.0
Others	No	30	82.2	82.2	82.2
	Yes	8	17.8	17.8	100.0

Table 4.5 indicates that 66.7% of the ICT lecturers in tertiary colleges who responded participated in the study had professional certification in Linux and 33.3% had no professional qualification in Linux. 60% of the ICT lecturers had professional certifications in ComPTIA security and 40% had no professional certification in ComPTIA security. 48.9% of the ICT lecturers had professional certification in MCSE and 51.1% of the ICT lecturers had no professional certification in MCSE. 22.2% had professional certification in MCITP and 77.8% had no professional certification in MCITP. 62.2% had professional certification in CCNA and 37.8% had no professional certification in CCNA. 15.6% of the ICT lecturers had no professional certifications and 84.4% had ICT professional certifications. 17.8% of ICT lecturers had other ICT professional certifications and 82.2% had no other ICT professionals.

4.3.1.5: Time of college in operation

Table 4.5: Time of college in operation



The research established that 40% of the colleges had been in operation for between 6-10 years, 16% had been in operation for 16-20 years, 22% had been in operation for 21-30 years and 22% had been operation for above 30 years.

4.3.2: ICT Training

4.3.2.1: College Ownership

Table 4.1: College Ownership

College Ownership	Frequency	Percent	Valid Percent	Cumulative Percent
Private(Local)	40	88.9	88.9	88.9
Government	5	11.1	11.1	100.0
Total	45	100.0	100.0	

According to Table 4.1, 88.9% of the colleges used in the study were privately owned and 11.1% were government owned.

4.3.2.2: College Registration

Table 4.2: College Registration

College Registration	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	45	100.0	100.0	100.0

Table 4.2 shows that all the colleges studied were registered by the ministry of education, science and technology.

4.3.2.3: Level of training offered by the institutions

Table 4.3 indicates that 15.6% of the colleges which participated in the study were offering degree in ICT. 66.7% of the colleges were offering higher diploma in ICT. 84.4% of the colleges were offering diploma in ICT. 66.7% of the colleges were offering certificate in ICT and 8% were offering other certifications in ICT.

Table 4.3: Level of training offered by the institutions

Level of training		Frequency	Percent	Valid Percent	Cumulative Percent
Certificate	No	15	33.3	33.3	33.3
	Yes	30	66.7	66.7	100.0
Diploma	No	7	15.6	15.6	15.6
	Yes	38	84.4	84.4	100.0
Higher Diploma	No	15	33.3	33.3	33.3
	Yes	30	66.7	66.7	100.0
Degree(Bachelor)	No	38	84.4	84.4	84.4
	Yes	7	15.6	15.6	100.0
Other specify	No	30	66.7	66.7	66.7
	?	7	15.6	15.6	82.2
	Yes	8	17.8	17.8	100.0

4.3.2.4: ICT Professional Certifications

Table 4.4: ICT Professional Certifications

ICT Professional Certifications		Frequency	Percent	Valid Percent	Cumulative Percent
Linux	No	23	51.1	51.1	51.1
	Yes	22	48.9	48.9	100.0
ComPTIA	No	30	66.7	66.7	66.7
	Yes	15	33.3	33.3	100.0
MCSE	No	30	66.7	66.7	66.7
	Yes	15	33.3	33.3	100.0
MCITP	No	31	68.9	68.9	68.9
	Yes	14	31.1	31..1	100
NONE	No	29	64.4	64.4	64.4
	Yes	16	35.6	35.6	100.0
Others	No	37	82.2	82.2	82.2
	Oracle	8	17.8	17.8	100.0

From Table 4.4, 48.9% of the colleges were offering Linux certifications and 51.1% of the colleges did not offer Linux certifications. 66.7% of the colleges were offering ComPTIA certification and 33.3% of the colleges did not offer ComPTIA certifications. 33.3% of the colleges were offering MCSE certification and 66.7% did not offer MCSE certification. 31.1% of the colleges were offering MCITP certification and 68.9 were did

not offer MCITP certification. 35.6% of the colleges were not offering any of the ICT professional courses and 64.4% of the colleges were offering professional certification in ICT. 17.8% of the colleges studied were offering certification in Oracle and 37% were not offering any other ICT professional certifications.

4.3.2.5: Soft skills expected of an ICT professional

Table 4.5.1: Soft skills expected of an ICT professional

Business Skills	N	Mean	Std. Deviation	Std. Error Mean
Communication skills	45	4.67	.477	.071
Organization Skills	45	4.33	.739	.110
Customer Service	45	4.31	.468	.070
Interpersonal Skills	45	4.67	.477	.071
Human Relations	45	4.18	.684	.102
Leadership Skills	45	4.51	.506	.075
Management Skills	45	4.67	.477	.071
Consultancy Skills	45	4.31	.763	.114
Problem Solving	45	4.64	.484	.072
Understanding of Business Skills	45	4.18	.387	.058
Marketing	45	3.51	.787	.117
Sales	45	3.67	.769	.115
Project Management	45	4.49	.506	.075

According to Table 4.5.1, sales and marketing had means ranging from of 3.00 to 3.90. This means that these skills received a rating of moderately important. Communication, organizations, customer service, interpersonal, human relations, leadership, management, consultancy, problem solving, understanding of business needs and project management had means ranging from 4.00 to 4.90. This means that these skills were rated as important to ICT professional.

Table 4.5.2: Table of significance of Soft Skills expected by an ICT Professional

Business Skills	t	df	P-Value
Communication Skills	65.666	44	.000
Organization Skills	39.359	44	.000
Customer Service	61.771	44	.000
Interpersonal Skills	65.666	44	.000
Human Relations	40.981	44	.000
Leadership Skills	59.861	44	.000
Management Skills	65.666	44	.000
Consultancy Skills	37.881	44	.000
Problem Solving	64.360	44	.000
Understanding of Business Skills	72.483	44	.000
Marketing	29.932	44	.000
Sales	31.998	44	.000
Project Management	59.567	44	.000

According to Table 4.5.2, all the skills are significant since their P-values=0.00 i.e p-value<0.05 and hence they should be incorporated in ICT training in tertiary institutions.

Table 4.5.3: Discriminant Table of Soft Skills expected of an ICT professional.

Business Skills	Coefficients
Leadership Skills	.786
Problem Solving	.592
Sales	.504
Consultancy Skills	.504
Management Skills	.459
Customer Service	.459
Marketing	.392
Interpersonal Skills	-.202
Communication skills	-.202
Human Relations	-.148
Organization Skills	.128
Project Management	.012
Understanding of Business Skills	.000

Table 4.5.3 show soft skills expected of an ICT professional. Interpersonal, communication and human relations have a negative coefficient hence they are very important skills to ICT professionals. The remaining skills in the table that have positive

coefficient are not important to ICT professionals or their importance varies depending on the industry.

4.3.2.6: Extent to which soft skills have been incorporated in ICT training

Table 4.6.1: Extent to which soft skills have been incorporated in ICT training

Business Skills	N	Mean	Std. Deviation
Communication Skills	46	3.87	.909
Organization Skills	46	4.00	.843
Customer Service	46	3.67	1.136
Interpersonal Skills	46	3.98	1.183
Human Relations	46	3.48	.781
Leadership Skills	46	3.50	.506
Management Skills	46	3.70	.756
Consultancy Skills	46	3.52	1.130
Problem Solving	46	4.15	1.095
Understanding of Business Skills	39	4.03	.903
Marketing	39	3.41	1.044
Sales	39	3.64	1.367
Project Management	39	3.85	1.479

Table 4.6.1 shows, communication, customer service, interpersonal, human relations, leadership, management, consultancy, marketing, sales and project management had means ranging from 3.00 to 3.90. This shows that these skills have been incorporated in ICT training to a moderate extent. Organizations, problem solving, understanding of business needs had means ranging from 4.00 to 4.90 hence they have been incorporated to a great extent in many tertiary institutions.

Table 4.6.2: Table of significance showing the extent to which soft skills have been incorporated in ICT training

Business Skills	t	df	P- values
Communication Skills	28.859	45	.000
Organization Skills	32.171	45	.000
Customer Service	21.928	45	.000
Interpersonal Skills	22.808	45	.000
Human Relations	30.189	45	.000
Leadership Skills	46.957	45	.000
Management Skills	33.142	45	.000
Consultancy Skills	21.134	45	.000
Problem Solving	25.723	45	.000
Understanding of Business Skills	27.846	38	.000
Marketing	20.395	38	.000
Sales	16.638	38	.000
Project Management	16.245	38	.000

According to Table 4.6.2, all the skills are significant since their P-values=0.00 i.e p-value<0.05 and thus should be incorporated in ICT training in the tertiary institutions.

4.6.3: Discriminant Table showing the extent to which soft skills have been incorporated in ICT training

Technical Skills	Coefficients
E-Business	.799
Business Intelligence	.642
Computer Hardware	-.631
E-Commerce	.578
Website Design	.535
Telecommunication	.421
Database	.409
Operating Systems	.402
Networking	.332
Internet,intranet,Extranet	.321
Programming Skills	-.198
Multimedia	.154
Graphic Design	-.139
Information Security	-.107
Computer Skills	.094

Table 4.6.3 indicates the extent to which hard skills have been incorporated in ICT training. Graphic design, information security, computer hardware and programming skills had negative coefficients hence they have been incorporated in ICT training to a very great extent. The remaining skills in the table that have positive coefficient have been incorporated to a little extent.

4.3.2.7: Technical skills expected of an ICT professional

Table 4.7: Technical skills expected of an ICT professional

Technical Skills	N	Mean	Std. Deviation
Computer Skills	45	4.53	.757
Operating Systems	45	3.69	1.145
Networking	45	4.18	.684
Internet,intranet,Extranet	45	3.84	.706
Business Intelligence	45	3.69	.763
Telecommunication	45	4.18	.387
Computer Hardware	45	4.00	1.044
E-Business	45	4.00	.826
E-Commerce	45	3.84	.903
Programming Skills	45	4.02	1.158
Database	45	4.18	.912
Multimedia	45	3.67	.477
Website Design	45	3.69	.763
Information Security	45	3.84	.706
Graphic Design	45	3.84	1.065

Table 4.7 indicates that computer skills, networking, telecommunication, computer hardware, e-business, programming and databases were rated as important by majority of the respondents since they had means ranging from 4.00 to 4.90. Operating systems, internet, intranet, extranet, business intelligence, e-commerce and multimedia were rated as moderately important since they had means ranging from 3.00 to 3.90.

4.3.2.8: Technical skills incorporated in ICT curriculum

Table 4.8.1: Table of significance showing the extent to which technical skills have been incorporated in ICT curriculum

Technical Skills	t	df	P-Values	Mean Difference
Computer Skills	40.184	44	.000	4.53
Operating Systems	21.620	44	.000	3.69
Networking	40.981	44	.000	4.18
Internet,intranet,Extranet	36.546	44	.000	3.84
Business Intelligence	32.414	44	.000	3.69
Telecommunication	72.483	44	.000	4.18
Computer Hardware	25.690	44	.000	4.00
E-Business	32.496	44	.000	4.00
E-Commerce	28.546	44	.000	3.84
Programming Skills	23.305	44	.000	4.02
Database	30.738	44	.000	4.18
Multimedia	51.595	44	.000	3.67
Website Design	32.414	44	.000	3.69
Information Security	36.546	44	.000	3.84
Graphic Design	24.214	44	.000	3.84

According to Table 4.8.1, all the skills are significant since their P-values=0.00 i.e p-value<0.05 and hence they should be incorporated in ICT training in the tertiary institutions. In addition, computer skills, networking, telecommunication, computer hardware, e-business, programming and databases are well incorporated in the ICT training. Therefore, students graduating from tertiary colleges possess these skills to a great extent. Operating systems, internet, intranet, extranet, business intelligence, e-commerce, multimedia, website design, information security and graphic design received a rating of moderate extent.

Table 4.8.2: Discriminant Table showing the extent to which technical skills have been incorporated in ICT training

Technical Skills	Coefficients
Computer Skills	-.422
Operating Systems	-.772
Networking	-.138
Internet,intranet,Extranet	-1.864
Business Intelligence	-1.998

Table 4.8.2 shows soft skills with negative coefficients. This means that these are the areas that have been incorporated in ICT training to a large extent by majority of the tertiary colleges that participated in the study.

4.3.2.9: Balance between technical and business skills and practicability of the course content

Table 4.9: Balance between technical and business skills and practicability of the course content

	Mean	Std. Deviation	Std. Error Mean
Technical and Business skills	3.00	.000	.000
Practical Approach	3.51	.506	.075

Balance between technical and business skills had a mean of 3.00. This shows that most tertiary colleges have appreciated the need of ICT students having business skills and hence integrating them into ICT training to a moderate extent. Practicability of the course content had a mean of 3.51. This means the course content is practical to a moderate extent.

4.3.2.10: Delivery Methods

Table 4.10: Delivery Methods

Delivery Methods	Mean	Std. Deviation	Std. Error Mean
Lecture	1.00	.000	.000
Group Discussions	2.50	.000	.000
Individual Presentation	2.00	.000	.000
Workshop	.	.	.
Brainstorming	1.00	.000	.000
Role Play	.	.	.
Case Study	4.00	.000	.000

Table 4.10 indicates that lecture and brainstorming methods had a mean of 1.00. This means that these delivery methods are used extensively in ICT training by many tertiary colleges. Group discussions and individual presentation had a mean of 2.50 and 2.00 respectively. This means that these two methods are used to a great extent by the tertiary colleges which participated in the study. Case study had a mean of 4.00 meaning it is being used to a little extent while role play and workshop did not receive any ratings hence they are not used at all in ICT training.

4.3.2.11: Training to upgrade ICT skills and organizations the institutions has partnered with to offer students ICT practical skills

Table 4.11: Training Upgrade and number of organizations the institutions has partnered with to offer ICT practical approach

	Mean	Std. Deviation	Std. Error Mean
Training Upgrade	1.49	.506	.075
Partners	1.00	.000	.000

According to Table 4.11, ICT Lecturers undertook training after every one year to upgrade their knowledge in ICT. Concerning the organizations that tertiary institutions have partnered with to give students hands on experience in ICT, the study revealed that most colleges have partnered with at least one organization.

4.3.2.12: ICT Curriculum development process

Table 4.12: ICT Curriculum development process

	Mean	Std. Deviation	Std. Error Mean
Duration to Review	4.00	.000	.000
Stakeholders(Lecturer)	5.00	.000	.000
Industries	3.00	.000	.000
curriculum Developers	3.00	.000	.000
Students	2.85	.000	.000
Accredited Bodies	2.90	.000	.000
Practitioners	2.50	.000	.000

Table 4.12 indicates the ICT curriculum is reviewed after every 4 years. Regarding the stakeholders who participate in the review process, lecturers received a mean of 5.00 hence they participate in the process to a very great extent. Industry and curriculum developers had a mean of 3.00 hence they are involved in the process to a moderate extent while students, accredited bodies and practitioners had means ranging from 2.00 to 2.90 meaning they are involved in ICT development process to a little extent.

4.4: Summary of findings

Firstly, the study revealed that most tertiary colleges have appreciated the need to provide ICT students with business skills. To this end, majority of tertiary colleges have incorporated business skills in ICT training. The business skills that have been incorporated to a great extent by majority of the tertiary institutions include communication, interpersonal and leadership skills. Organization, customer service, human relations, management, consultancy, problem solving, understanding business needs, marketing, sales and project management have been integrated in ICT training to a moderate extent. Regarding the technical skills, computer, operation system, internet, intranet, website design and computer hardware have been incorporated in ICT training to a large extent. Telecommunication, computer hardware, business intelligence, e-

business, e-commerce, programming and database have been incorporated in ICT training to a moderate extent.

Secondly, the industry expects ICT professionals to have both business and technical skills. The business skills deemed important to ICT professionals include human relations, problem solving and interpersonal skills. leadership, management, consultancy skills, problem solving, understanding of business needs, marketing, sales, management, communication, organization and customer service are considered to be important to ICT professionals to a moderate extent. The technical skills that were rated important to ICT professionals by the industry include computer skills, networking, telecommunication, computer hardware, e-business, programming and database. Graphic design, information security, website design, multimedia, e-commerce, business intelligence, internet, intranet, extranet and operating systems were rated as important to ICT professionals to a moderate extent.

Thirdly, to ensure the relevance of ICT training, tertiary intuitions have incorporating new technology to a moderate extent in their training. They have also ensured the practicability of the ICT course content to a moderate extent. Furthermore, majority of the tertiary institutions have appreciated the need of including the industry in curriculum development process with majority of the institutions involving the industry to a moderate extent. Lastly, ICT professional courses are gaining popularity in Kenya. This was attributed to the fact that majority of the respondents had professional certifications in Linux, Oracle, MCSE and MCITP.

CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter consists of a summary of the findings of the research, conclusions relating to the research objectives and suggestions on how to improve ICT training to meet the needs of the industry.

5.2 Summary

Firstly, the study revealed that tertiary colleges have incorporated both business and technical skills in ICT training. The business skills that have been incorporated to a great extent by majority of the tertiary institutions include communication skills, interpersonal skills and leadership skills. Organizations skills, customer service, human relations, management skills, consultancy skills, problem solving, understanding business skills, marketing, sales and project management have been integrated in ICT training to a moderate extent. The technical skills that have so far been integrated in ICT training to a great extent include computer skills, operation system, internet, intranet, website design, and computer hardware. Telecommunication, computer hardware, business intelligence, e-business, e-commerce, programming and database have been incorporated in ICT training to a moderate extent.

Secondly, it is evident from the research that the industry expects ICT professionals to have both business and technical skills. The business skills deemed important to ICT professionals include human relations, problem solving and interpersonal. Leadership, management, consultancy, problem solving, understanding of business needs, marketing, sales, management, communication, organization and customer service are considered to

be important to ICT professionals to a moderate extent. The technical skills that rated important to ICT professionals by the industry include computer skills, networking, telecommunication, computer hardware, e-business, programming and database. Graphic design, information security, website design, multimedia, e-commerce, business intelligence, internet, intranet, extranet and operating systems were rated as moderately important.

Thirdly, the skills that are deemed important by the industry have not been fully incorporated in ICT training. The same sentiments were echoed by the ICT students who indicated that they required extra training in the areas of software development, database, e-business, IT security, mobile application, programming, networking, security and multimedia before being fully incorporated into the workforce. This shows that ICT training provided by tertiary colleges is meeting the industry needs to a moderate extent. Therefore, a lot has to be done to ensure that the needs of the students and industry are fully met.

5.2 Conclusions

Based on the research findings a gap exists between ICT training provided by tertiary institutions and what the industry expects from ICT professionals. The skills deemed important by the industry have not been fully incorporated in ICT training provided by tertiary colleges. This can be attributed to the fact that the industry is not completely involved in ICT training process. Therefore, it is the responsibility of both the tertiary institutions and the industry to make sure that the gap is eliminated.

5.3 Recommendations

The main objective of the study was to determine whether the ICT training provided by tertiary colleges is meeting the industry needs. The tertiary colleges should therefore include the skills that the industry rated as important in their ICT training in order to produce graduates who will be absorbed by the industry without requiring extra training. In addition, the industry should be more involved in ICT training process by providing funding, being involved in curriculum development process and also by partnering with

tertiary institutions to give ICT students hands on experience. Furthermore, technology is changing so fast and therefore it is the responsibility of tertiary institutions to ensure that new technology is incorporated in ICT training to a great extent.

5.4 Limitations

Firstly, the time available for data collection was inadequate making it difficult for the researcher to carry out an in depth research concerning the area of study. Secondly, the busy nature of the respondents made it difficult to get the questionnaires back on time. Thirdly, it was not easy to get access to some of the premises and this made the data collection process a difficult task. However, the above limitations did not affect the overall quality of the study's results and findings.

5.5 Recommendations for further studies

Since the research was focused on ICT training provided by tertiary institutions, a research covering other institutions of higher learning such as universities could be done to determine whether the ICT training offered by these institutions meets the industry needs. In addition, given that not all industrial sectors were targeted in this study, further research focusing on all (or other) sectors can be carried out to unearth additional ICT skills. Since different ICT jobs require different skills, an extensive research can be done to determine the various skills required by the different ICT positions/jobs in the industry.

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APPENDICES

Appendix 1.1: Questionnaire to be filled by ICT Managers

Section A: General Information

1) Please specify your gender

a. Male ..... [ ]

b. Female..... [ ]

2) Please specify your age

a. Below 20 year..... [ ]

b. 21- 25 years ..... [ ]

c. 26-30 years..... [ ]

d. 31-35 years..... [ ]

e. 36-40 years ..... [ ]

f. 41-50 years..... [ ]

g. 51-55 years..... [ ]

h. Above 55 years..... [ ]

3) What is your highest level of your education?

a. Diploma ..... [ ]

b. Degree (Bachelors).... [ ]

c. Masters..... [ ]

d. Others (Please Specify).....

4) Which professional certification(s) do you have?

a. Linux..... [ ]

b. CompTIA SECURITY..... [ ]

c. Microsoft Certified Systems Engineer (MCSE) ..... [ ]

d. Microsoft Certified IT professional (MCITP) ..... [ ]

e. CISCO Certified Network Associate (CCNA) ..... [ ]

f. None ..... [ ]

g. Others (Please specify).....

5) How long have you been working as an ICT Manager with the organization which you are currently employed? (Please tick as appropriate).

a. Below 1 year..... [ ]
b. 1- 5 years ..... [ ]
c. 6-10 years..... [ ]
d. 11-15 years..... [ ]
e. 16-20 years ..... [ ]
f. 21-25 years..... [ ]
g. 26-30 years..... [ ]
h. Over 30 years..... [ ]

6) What business operation does your company engage in?

a. Manufacturing..... [ ]
b. Construction..... [ ]
c. Investment ..... [ ]
d. Insurance..... [ ]
e. Banking..... [ ]
f. Telecommunication... [ ]
g. Others (Please specify).....

Section B: ICT skills

1) The following are Business/Soft skills as expected of an ICT professional. Tick to indicate the degree of importance to which you attach to each of the skills.

Business/Soft skills	1.Not important	2.Less important	3.Moderately important	4.Important	5.Very important
Communication Skills					
Organizational Skills					
Customer Service					
Interpersonal Skills					
Human Relations					
Leadership Skills					
Management Skills					
Consultancy Skills					
Problem Solving Skills					
Understanding of business needs					
Marketing					
Sales					
Project Management					
Others, Please specify and rate appropriately.					

2) Please tick in the appropriate boxes, to indicate the extent to which ICT graduates from tertiary institutions possess Business/Soft skills listed in the following table

Business/Soft skills	1.No extent	2.To a little extent	3.To a moderate extent	4.To great extent	5.To a very great extent
Communication Skills					
Organizational Skills					
Customer Service					
Interpersonal Skills					
Human Relations					
Leadership Skills					
Management Skills					
Consultancy Skills					
Problem Solving Skills					
Understanding of business needs					
Marketing					
Sales					
Project Management					
Others, Please specify and rate appropriately.					

3) The following are Technical/Hard skills as expected of an ICT professional. Tick to indicate the degree of importance to which you attach to each of the skills.

Technical/Hard skills	1. Not important	2. Less important	3. Moderately important	4. Important	5.Very important
Computer Packages					
Operating Systems					
Networking					
Internet, Intranet, Extranet					
Business Intelligence					
Telecommunication					
Computer Hardware					
E-business					
E-commerce					
Programming Skills					
Database					
Multimedia					
Website Design					
Information Security					
Graphic Design					
Others, Please specify and rate appropriately					

4) Please tick in the appropriate boxes, to indicate the extent to which ICT graduates from tertiary institutions possess the Technical/Hard skills listed in the following table.

Technical/Hard skills	1.No extent	2.To a little extent	3.To a moderate extent	4.To great extent	5.To a very extent
Computer Packages					
Operating Systems					
Networking					
Internet, Intranet, Extranet					
Business Intelligence					
Telecommunication					
Computer Hardware					
E-business					
E-commerce					
Programming Skills					
Database					
Multimedia					
Website Design					
Information Security					
Graphic Design					
Others, Please specify and rate appropriately					

5) To what extent would you rate the relevance of Professional Courses (e.g. MCSE, CCNA) in meeting the industry needs?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent ..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

6) To what extent would you rate the adequacy of Professional Courses (e.g. MCSE, CCNA) in meeting the industry needs?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent ..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

7) To what extent would you rate the relevance of ICT Academic Programs (e.g. Certificate, Diploma) offered by tertiary institutions in meeting the industry needs?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent ..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

8) To what extent would you rate the adequacy of ICT Academic Programs (e.g. Certificate, Diploma) offered by tertiary institutions in meeting industry needs?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

9) Please rate the extent to which course content provided by tertiary institutions in ICT is related to practical approach?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

10) How many organization(s) has your organization partnered with in relation to giving students hands on experience in ICT?

.....
.....
.....

Thank you for your assistance

Appendix1.2: Questionnaire to be filled by ICT Lecturers

Section A: General Information

1) Please specify your gender

a. Male ..... [ ]

b. Female..... [ ]

2) Please specify your age

a. Below 20 years..... [ ]
b. 21- 25 years ..... [ ]
c. 26-30 years..... [ ]
d. 31-35 years..... [ ]
e. 36-40 years ..... [ ]
f. 41-50 years..... [ ]
g. 51-55 years..... [ ]
h. Above 55 years..... .[ ]

3) How long have you been working as an ICT Lecturer with the institution which you are currently employed? (Please tick as appropriate).

a) Below 1 year..... [ ]
b) 1- 5 years ..... [ ]
c) 6-10 years..... [ ]
d) 11-15 years..... [ ]
e) 16-20 years ..... [ ]
f) 21-25 years..... [ ]
g) 26-30 years..... [ ]
h) Over 30 years..... [ ]

4) What is your highest level of education?

a. Diploma ..... [ ]

b. Degree (Bachelors)..... [ ]

c. Masters..... [ ]

d. Others (Please Specify).....

5) Which professional certification(s) do you have?

a. Linux..... [ ]

b. CompTIA SECURITY..... [ ]

c. Microsoft Certified Systems Engineer (MCSE) ..... [ ]

d. Microsoft Certified IT professional (MCITP) ..... [ ]

e. CISCO Certified Network Associate (CCNA) ..... [ ]

f. None ..... [ ]

g. Others (Please specify).....

6) How long has the college been in operation?

a. Below 1 year..... [ ]

b. 1- 5 years ..... [ ]

c. 6-10 years..... [ ]

d. 11-15 years..... [ ]

e. 16-20 years..... [ ]

f. 21-30 years..... [ ]

g. Above 30 years..... [ ]

Section B: Specific Information (ICT Training)

1) Specify the Ownership of the college
   a. Private (Local)..... [ ]
   b. Private (Foreign)..... [ ]
   c. Government ..... [ ]

2) Is the college registered with the Ministry of Education, Science and Technology?
   a. Yes..... [ ]
   b. No ..... [ ]

3) Specify the level(s) of training offered by your college in regard to ICT training
   a. Certificate ..... [ ]
   b. Diploma ..... [ ]
   c. Higher Diploma ..... [ ]
   d. Degree (Bachelors) ..... [ ]
   e. Others(Please specify).....

4) Which of the following ICT professional certification(s) are offered by the institution?
   a. Linux ..... [ ]
   b. CompTIA SECURITY ..... [ ]
   c. Microsoft Certified Systems Engineer (MCSE) ..... [ ]
   d. Microsoft Certified IT professional (MCITP) ..... [ ]
   e. CISCO Certified Network Associate (CCNA) ..... [ ]
   f. None ..... [ ]
   g. Others (Please specify).....

5) The following are Business/Soft skills as expected of an ICT professional. Tick to indicate the degree of importance you attach to each of the skills.

Business/Soft skills	1.Not Important	2.less important	3.Moderately important	4.Important	5.Very Importan
Communication Skills					
Organizational Skills					
Customer Service					
Interpersonal Skills					
Human Relations					
Leadership Skills					
Management Skills					
Consultancy Skills					
Problem Solving Skills					
Understanding of business needs					
Marketing					
Sales					
Project Management					
Others, Please specify and rate appropriately					

6) To what extent has each of the following Business/Soft skills been incorporated in the ICT curriculum in your institution?

Business/Soft skills	1.No extent	2.To a little extent	3.To a moderate extent	4.To a great extent	5.To a very great extent
Communication Skills					
Organizational Skills					
Customer Service					
Interpersonal Skills					
Human Relations					
Leadership Skills					
Management Skills					
Consultancy Skills					
Problem Solving Skills					
Understanding of business needs					
Marketing					
Sales					
Project Management					
Others, Please specify and rate appropriately					

7) The following are Technical/Hard skills as expected of an ICT professional. Tick to indicate the degree of importance to which you attach to each of the skills.

Technical/Hard skills	1Not important	2.Less important	3.Moderately important	4.Important	5.Very important
Computer Packages					
Operating Systems					
Networking					
Internet, Intranet ,Extranet					
Business Intelligence					
Telecommunication					
Computer Hardware					
E-business					
E-commerce					
Programming Skills					
Database					
Multimedia					
Website Design					
Information Security					
Graphic Design					
Others, Please specify and rate appropriately.					

8) To what extent has each of the following Technical/Hard skills been incorporated in the ICT curriculum in your institution? (Tick as appropriate)

Technical/Hard skills	1.No extent	2.To a little extent	3.To a moderate extent	4.To a great extent	5.To a very great extent
Computer Packages					
Operating Systems					
Networking					
Internet, Intranet ,Extranet					
Business Intelligence					
Telecommunication					
Computer Hardware					
E-business					
E-commerce					
Programming Skills					
Database					
Multimedia					
Website Design					
Information Security					
Graphic Design					
Others, Please specify and rate appropriately.					

9) To what extent do you find the balance between 'technical' and 'business' content in ICT programs in your institution?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

10) Please rate the extent to which course content provided by tertiary institutions in ICT is related to practical approach?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

11) Which of the following delivery method(s) are used in your institution?

a. Lecture ..... [ ]
b. Group discussion ..... [ ]
c. Individual presentation..... [ ]
d. Workshop ..... [ ]
e. Brainstorming ..... [ ]
f. Role Play ..... [ ]
g. Case study ..... [ ]
h. Others (Please specify).....

12) On average, how frequently do you go for training to upgrade your knowledge in ICT?

a. 1 year ..... [ ]
b. 2 years ..... [ ]
c. 3 years ..... [ ]
d. Over 3 years ..... [ ]
e. None..... [ ]

13) Does your institution have any feed-back mechanism on the quality of your graduates?

.....

.....

.....

14) Does the institution ever review the ICT curriculum? If yes, after how long?

.....

.....

15) Tick in the appropriate boxes to indicate the extent to which each of the following stakeholders are involved in ICT curriculum development?

Stakeholders	1.No extent	2.To a little extent	3.To a Moderate extent	4.To a great extent	5.To a very great extent
Lecturers					
Industry					
Professional Curriculum developers					
Students					
Accredited bodies					
Practitioners					
Others, please specify and rate appropriately					

16) How many organization(s) has your institution partnered with in relation to giving students hands on experience in ICT?

.....

.....

Thank you for your assistance

Appendix1.3: Questionnaire to be filled by ICT students

Section A: General Information

1) Please specify your gender?
   a. Male …….. [ ]
   b. Female ……. [ ]

2) Please specify your age?
   a. Below 20 years…….. [ ]
   b. 20-25 years …….. [ ]
   c. 26-30 years…….. [ ]
   d. 31-35 years…….. [ ]
   e. 36-40 years…….. [ ]
   f. 40 years and above……. [ ]

3) Which level of ICT training are you pursuing in the institution?
   a. Certificate …….. [ ]
   b. Diploma…….. [ ]
   c. Degree (Bachelors)... [ ]
   d. Others (Please specify)……..

4) What is the duration of the course you are undertaking in the institution?

……

Section B: Specific Information (ICT Training)

1) How would you rate the ICT training that you have received in the institution?
   a. Excellent …….. [ ]
   b. Above average …….. [ ]
   c. Average …….. [ ]
   d. Below average …….. [ ]
   e. Poor …….. [ ]

2) To what extent has each of the following Business/Soft skills been incorporated in the ICT curriculum in your institution? (Tick as appropriate)

Business/Soft skills	1.No extent	2.To a little extent	3.To a moderate extent	4.To a great extent	5.To a very great extent
Communication Skills					
Organizational Skills					
Customer Service					
Interpersonal Skills					
Human Relations					
Leadership Skills					
Management Skills					
Consultancy Skills					
Problem Solving Skills					
Understanding of business needs					
Marketing					
Sales					
Project Management					
Others, Please specify and rate appropriately					

3) To what extent has each of the following areas been incorporated in the ICT curriculum in your institution? (Tick as appropriate)

Technical/Hard Skills	1.No extent	2.To a little extent	3.To a moderate extent	4.To a great extent	5.To a very great extent
Computer Packages					
Operating Systems					
Networking					
Internet, Intranet ,Extranet					
Business Intelligence					
Telecommunication					
Computer Hardware					
E-business					
E-commerce					
Programming Skills					
Database					
Multimedia					
Website Design					
Information Security					
Graphic Design					
Others, Please specify and rate appropriately					

4) To what extent do you find the balance between 'technical' and 'business' content in ICT programs in your institution?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. To a moderate extent..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

5) Please rate the extent in which the course content provided by tertiary institutions in ICT is related to practical approach?

a. A very large extent .....[ ]
b. A large extent ..... [ ]
c. To a moderate extent..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

6) To what extent is new technology incorporated in ICT training in your institution?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. Moderate ..... [ ]
d. Small extent ..... [ ]
e. No extent ..... [ ]

7) Is industrial attachment part of the ICT program you are pursuing? If yes, specify the duration.

a. 1-3 months ..... [ ]
b. 4-6 months ..... [ ]
c. Over 6 months ..... [ ]
d. None ..... [ ]

8) To what extent are students in the institution involved in ICT curriculum development?

a. A very large extent ..... [ ]
b. A large extent ..... [ ]
c. Moderate ..... [ ]
d. A small extent ..... [ ]
e. No extent ..... [ ]

9) Which of the following delivery method(s) are used in the institution?

a. Lecture ..... [ ]
b. Group discussion ..... [ ]
c. Individual presentation..... [ ]
d. Workshop ..... [ ]
e. Brainstorming ..... [ ]
f. Role Play ..... [ ]
g. Case study ..... [ ]
h. Others (Please specify).....

10) In what areas do you feel prepared to be an ICT professional?

a. Software Development ..... [ ]
b. Multimedia ..... [ ]
c. System analysis and design ..... [ ]
d. Data management ..... [ ]
e. ICT solutions ..... [ ]
f. E-business/E-Commerce ..... [ ]
g. ICT security ..... [ ]
h. Others

.....

.....

11) Do you think you require extra training to be fully incorporated into the ICT workforce? If yes, in what areas?

.....

.....

.....

.....

.....

Thank you for your assistance

Appendix1.4: List of Private Colleges

1) Unity Professional college
2) Zetech College
3) Institute of Advanced Technology
4) Computer Ways Training Institute
5) Computer Learning Centre
6) Computer Feed Training Institute
7) Belcom Communications and Training Ltd
8) Basic Communication Institute
9) Augustana College
10) Crossworld Institute of Professional Studies
11) Dimensional Institute of Professional Studies
12) Digital Age Institute Ltd
13) Davis Computer Institute
14) Data Centre Computer Training
15) Dafina Institute
16) East Africa Institute of Information Studies
17) Formax Computer College
18) Format College
19) Floppeeze School of Computer and Secretarial Studies
20) Zenith College
21) Graffins College
22) Global Computer Institute
23) Wiseman Trainers and Consultants Ltd
24) Wamy Vocational College
25) Times Professional Institute
26) Temple College
27) Infotech Training Centre
28) Technical Institute
29) Spring Board Secreterial and Computer Training
30) Skillsoft Training Centre

31) Shepherds Foundation Education and Research Centre
32) School of professional studies
33) Rubicon Computer Training College
34) Rocky Computer College
35) Rolima Training Institute
36) Regional Institute of Science and Technology
37) Oshwal College
38) Micropaq Institute of technology
39) Magan College of Business and Information Technology
40) Lolaz Communications
41) Kenafric College of Professional Studies

Appendix1.5: List of Public Colleges

1) Kabete Technical Training Institute
2) Kenya Technical Teachers College
3) Kenya Water Institute
4) Nairobi Technical Training Institute

Retrieved from http://www.scienceandtechnology.go.ke/index.php?option=com_content&task=view&id=60&Itemid=61 on 21st sept 2011

Appendix1.6: List of Commercial Banks in Kenya

1) Kenya Commercial Bank
2) National Bank of Kenya
3) Housing Finance
4) Barclays Bank
5) Cooperative Bank of Kenya
6) CFC Stanbic Bank
7) Equity Bank
8) Family Bank
9) Commercial Bank of Africa
10) K-Rep Bank
11) Citibank
12) Bank of Africa
13) Fina Bank
14) NIC Bank
15) Jamii Bora Bank
16) Consolidated Bank of Kenya
17) Ecobank
18) Dubai Bank Kenya
19) Fidelity Commercial Bank Limited
20) First Community Bank Limited
21) Fina Bank
22) Giro Commercial Bank
23) Trans National Bank Kenya
24) United Bank for Africa
25) Victoria Commercial Bank
26) I&M Bank
27) Gulf African Bank
28) ABC Bank(Kenya)
29) Bank of India
30) Chase Bank(Kenya)

31) Credit Bank
32) Middle East Bank Kenya
33) Paramount Universal Bank
34) United Bank for Africa
35) Trans National Bank Kenya
36) Standard Chartered Bank
37) Oriental Commercial Bank
38) K-Rep Bank
39) Bank of Baroda
40) Development Bank of Kenya
41) Diamond Trust Bank
42) Equatorial Commercial Bank

Retrieved from http://en.wikipedia.org/wiki/List_of_banks_in_Kenya on 21th sep 2011

Appendix1.7: List of Telecommunication Companies

1) Safaricom
2) Access Kenya
3) Telkom Kenya
4) Kenya Data Networks
5) Airtel Kenya
6) Africa Online
7) Inter-Connect Ltd
8) Jambonet
9) Kenya Internet Exchange
10) Kenya Posts and Telecommunications Corporations
11) Mobitelea Ventures Limited
12) Aiway Africa
13) Essat Telkom
14) Wananchi Online

15) Swift Global

16) MTN Business Kenya

17) Trunking Sytems Ltd.

18) SEACOM Kenya Ltd

19) Sahannet Ltd

20) Tangerine Ltd

21) IGO Wireless

22) Converged Information Services

23) Callkey E.A.Ltd

24) Blue Broadband Access Ltd

25) Communication Solutions Ltd

26) Corporate Technical Services

27) Flashcom Ltd

28) Intersat Africa Ltd

29) Jamii Telecoms Ltd

30) Econet Wireless Ltd

31) Internet Solutions Ltd

32) Karibu Networks Ltd

33) Kenya Educational Networks

34) Kenya Information Network Centre

35) Kenyaweb .Com Ltd

36) MyIsp Limited

37) Nairobi Net Ltd

38) One Communications Ltd

39) Paradigm Shift Logistics Ltd

40) Pwani Telecoms

Retrieved from
http://www.tespok.co.ke/index.php?option=com_content&view=article&id=55&Itemid=74 on 21st sept 2011

Appendix1.8: List of Insurance Companies

1) Jubilee insurance company of Kenya ltd
2) British American insurance
3) UAP Provincial Insurance Co Ltd
4) Pioneer Assurance Co LTD
5) Co-operative Insurance Co of Kenya Ltd

Appendix1.9: List of Manufacturing Companies

1) Mastermind Company
2) Eveready East Africa
3) Kenya Oil
4) Kenya Power
5) Kengen

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA PROGRAMME

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Nairobi, Kenya

DATE 10th October 2011

TO WHOM IT MAY CONCERN

The bearer of this letter... MUTENDE JOSELINE

Registration No... D61/76856/2009

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

JUSTINE MAGUTU
ASSISTANT REGISTRAR
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