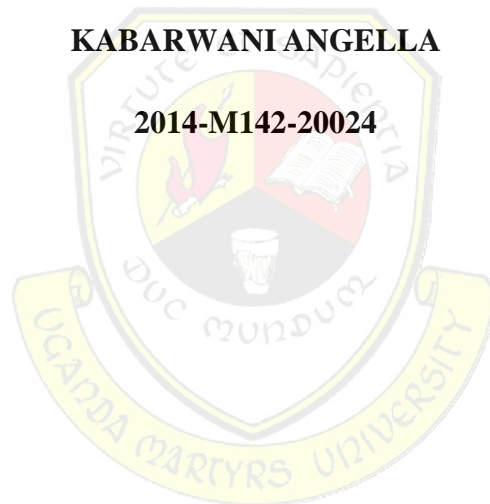


**FRAMEWORK FOR EVALUATION OF EFFECTIVE UTILIZATION OF ICT IN  
VOCATIONAL TRAINING INSTITUTIONS**

**A CASE STUDY OF YMCA COMPREHENSIVE INSTITUTE KAMPALA**

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**2014-M142-20024**



**UGANDA MARTYRS UNIVERSITY**

**DECEMBER, 2016**

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**A CASE STUDY OF YMCA COMPREHENSIVE INSTITUTE KAMPALA**

**A POSTGRADUATE DISSERTATION PRESENTED TO THE DEPARTMENT OF SCIENCE IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE MASTER OF SCIENCE  
IN INFORMATION COMMUNICATION TECHNOLOGY POLICY AND ARCHITECTURAL DESIGN**

**UGANDA MARTYRS UNIVERSITY**

**KABARWANI ANGELLA**

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**DECEMBER 2016**

## **DEDICATION**

This book is dedicated to my beloved Uncle Dr.Fr Mukidi Christopher Acaali and my daughter Basiima Lynette Robinah Amooti for having been so helpful spiritually, financially and morally towards my studies. Thank you very much uncle, may the good lord bless you abundantly.

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## LIST OF ACRONYMS

<b>ICT</b>	Information Communication Technology
<b>IT</b>	Information Technology
<b>ISTE</b>	International Society for Technology in Educational
<b>YMCA</b>	Young Men Christian Association
<b>MoES</b>	Ministry of Educational and Sports
<b>UCC</b>	Uganda Communication Commission
<b>MoICT</b>	Ministry of Information Communications and Technology
<b>ITES</b>	Information Technology Enabled Services
<b>CIS</b>	Community Information System
<b>EFTS</b>	Electronic Funds Transfer System
<b>ISP</b>	Internet Service Provider
<b>MOICT</b>	Ministry of Information and Communications Technology
<b>NITA-U</b>	National Information Technology Authority-Uganda
<b>TVET</b>	Technical and Vocational Education and Training
<b>EMIS</b>	Education Management Information System
<b>CAI</b>	Computer Aided Instruction (CAI)
<b>ICTML</b>	Information and Communication Technology Mediated Learning
<b>ESD</b>	Education for Sustainable Development
<b>EFA</b>	Education For All
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>NVTI</b>	National Vocational Training Institute
<b>SITE</b>	Strengthening Informal Training and Enterprise
<b>TEVETA</b>	Technical Education, Vocational and Entrepreneurship Training
<b>SETAs</b>	Sector Education and Training Authorities
<b>IIEP</b>	International Institute for Educational Planning

## **ABSTRACT**

The impact of ICT in education is often difficult to establish. Critical to evaluating ICT impact in teaching and learning are issues such as: the environment in which teaching and learning will take place, the status of technology integration in the learning environment, the students' and teachers' technology proficiencies, their disposition towards technology, teachers' teaching methodology, and students' learning approach. Currently they have focused on each of these issues to determine if the adoption of technology in teaching and learning produces the desired and maximum impact. Thus this study aimed at proposing the Frame work for evaluation of effective utilization of ICT in vocational training institution a case of YMCA comprehensive institute. The study was cross-sectional and descriptive. The result shows that there is fair utilization of ICT in teaching and learning in YMCA however, there is no framework to direct effective utilization of ICT. Therefore evaluation of ICT utilization is paramount which is the reason of this study.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Adeyemo *et al*, 2015 described ICT as the term which stands for Information Communication and Technology and it is defined as an electronic means of capturing, processing, storing and communicating information. The use of ICT in the classroom teaching-learning is very important for it provides opportunities for teachers and students to operate, store, manipulate, and retrieve information, encourage independent and active learning, and self-responsibility for learning such as distance learning, motivate teachers and students to continue using learning outside school hours, plan and prepare lessons and design materials such as course content delivery and facilitate sharing of resources, expertise and advice.

Looking at the present age and time that the society is in, it is evident that the world has become a global village at a very fast rate, due to the daily development in ICT, which is particular to the developed countries. The key instrument in this world globalization process can be associated to the “computer”. “In the developed countries, ICT have influenced the way people learn, play, work and live” (Adeyemo *et al*, 2015). The advancement in ICT is taking place at a rapid rate; this influences diverse aspects of human life and sectors of the country like the economy sector, health, industry, entertainment and most importantly the educational sector of the country are not exempted of this dynamic change. The potentials of ICT have been greatly exploited by most developed countries of the world as a tool of transformation of their education landscape at every level of education, especially the instructional process (Adeyemo *et al* 2015).

“Countries all over the world have identified the significant role of information and communication technology in improving education” (Kozma & Anderson, *et al* 2002) “and have invested heavily in increasing the number of computers in schools and in the networking of classrooms” (Pelgrum, 2001). “The awareness of higher education school student’s is the linkage between ICT and the way they learn within the situation of a school that has been particularly successful in integrating ICT into the curriculum”. “Incorporating teachers into the research design has the advantage of aiding the recall of particular learning episodes which, with children of this age, are a fertile ground for insights into the teaching and learning dynamic” (Goodison, 2002). “The teachers mainly focus on the development of technical ICT skills, whereas the ICT curriculum centers on the integrated use of ICT within the learning and teaching process”.

Many Researchers in the World have found that the use of Information Communication Technology (computers) enhance teaching and learning by providing opportunities to learners to practice and to

analyze, giving teachers and learners better access to relevant articles teaching and learning materials. “Every classroom teacher should use learning technologies to enhance their students’ learning in every subject - because ICT can engage the thinking, decision making, problem solving and reasoning behaviors of students” (Grabe&Grabe, 2001).” In fact, innovative use of ICT can facilitate student-centered learning “(Drent, 2005), “engage students in constructivist classrooms and enhance their social interaction” (Dodge, *et al*2003). “It has been shown to improve their cognitive development” (Nir-Gal *et al*, 2004), increase creativity (O’Hara, 2008), and the use of ICT can help in problem solving skills (Sarama *et al* 2001).

The International Society for Technology in Educational (ISTE) “emphasizes that teachers of today should prepare to provide technology-based learning opportunities for their students” (Hamidi, *et al*. 2011). “ICT use has increased dramatically over the last few years. In the developed regions, the percentage remains much higher than in the developing world” (MDG Report 2010). On the other hand, “adoption and usage of ICT are not restricted to the developed countries, and several developing countries have adopted technology in their educational systems” (Ihmeideh, 2009). For instance, in 2007, the Minister of Higher Education in Lebanon announced the distribution of 400 computers for public schools, connected to the Web through broadband<sup>1</sup>(Nasser, 2008). In Kenya, Wims *et al* 2008 “examined the impact of ICT projects in educational institutions, and found tangible benefits to students from exposure to ICT”.

In Uganda like any other developing countries is still in the initial stages of integrating ICT in teaching-learning process. Though it is limited by a number of barriers, there are many factors influencing the use of ICT to make teaching learning effective in higher institutions of learning in Uganda. They are, three objectives distinguished for the use of ICT in education (Brummelhuis, *et al* 1996): the use of ICT as object of study, the use of ICT as aspect of a discipline or profession; and the use of ICT as medium for teaching and learning. The use of ICT in education as object refers to learning about ICT, which enables students to use ICT in their daily life. The use of ICT as aspect refers to the development of ICT skills for professional or vocational purposes. The use of ICT as medium focuses on the use of ICT for the enhancement of the teaching and learning process (Drent, *et al* 2007). It is a fact that teachers are at the center of curriculum change and they control the teaching and learning process. Therefore, they must be able to prepare students for the knowledge society in which the competency to use ICT to acquire and process information is very important (Plomp *et al* 1996).

Despite of the ICT Policy of Education sector being in place, there is still a big gap of an introduction of ICT without a realistic understanding of what ICT can do and what it cannot do. And this is mainly because of lack of ICT knowledge and skills in teachers. Most teachers in higher educational institutions they do ICT as a module or course unit and they do not have much knowledge about ICT and the ones who are brought to teach it are ICT professional but they do not have teaching methodologies. In order to make ICT effective and more utilized in schools, Policy makers should invest in teachers' professional development in order to increase the number of digitally confident and positive teachers throughout the country. Effective professional development can transform positive attitudes and sufficiency in ICT provision into effective and sustained classroom practice.

## **1.2 Statement of the Problem**

A survey conducted by Pelgrum (2001) on nationally representative samples of schools from 26 countries found that teachers' lack of knowledge and skills is a serious obstacle to using ICT in many higher education institutions. The results of the study conducted by Balamskat *et al* (2006) have also shown that in Denmark "many teachers still chose not to use ICT and Media in teaching situations because of their lack of skills." According to Balamskat *et al* (2006), untrained and ill equipped teachers in computer skills fall short of carrying out "full integration of ICT in the classroom. Sicillia (2005) found that some teachers in urban areas want to learn how to use new technologies in their classrooms but the lack of opportunities for professional development hindered them from integrating technology in certain subjects such as science or math. Therefore accessibility and usage of ICT remain a problem in educational Institutions including Vocational Training Institution compound more other challenges include high cost of internet and other computer software that make it hard for ICT to be accessed and fully utilized. Yet when the ICT policy for higher education institute was enacted by Parliament in 2001, the expectations were that the impact of ICT accessibility and utilization in the country and particularly in schools would be greatly felt. Ten years plus since the enactment, ICT accessibility and utilization is still a challenge for many of the rural institutions and to some extent even urban institutions. The researcher interest therefore is to propose a framework for evaluation of effective utilization of ICT particularly in vocational training institutions with reference to YMCA Comprehensive Institute.

## **1.3 Objectives**

### **1.3.1 General objective**

The general objective of this research was to propose the Framework for evaluation of effective utilization of ICT in vocational training institution.

### 1.3 2 Specific Objectives

1. To review the frameworks for evaluating ICT utilization and determine requirements for the framework.
2. To propose a framework that can be used for effective utilization of ICT
3. To validate a proposed framework that can be used for effective utilization of ICT

### 1.4 Research Questions

1. What are the requirements for evaluating effective utilization of ICT in VTC?
2. What frameworks would effectively evaluate the use of ICT in VTC?
3. How can this framework be validated?

### 1.5 Significance of the study

According to (Younie, 2006) in his study he found that Government policy on ICT in education faces implementation problems of management, funding, technology procurement, ICT training and impact on pedagogy. Therefore my study will assist policy makers in the formulation of by-laws that will enable higher institutions not only access ICT but as also use it in influencing learning in higher Institutions.

The study will help to fill the gaps that the current policy has so far not addressed especially in the area of ICT accessibility and usage.

The study will guide other researchers in the advancement of knowledge in the same area of research and consequently contribute to the already existing body of knowledge.

### 1.6 Scope

The study was conducted in YMCA Comprehensive Institute, Kampala District, Uganda. Kampala District is bordered by Bombo District in the north, Wakiso District in the south, Kamuli district in the East and Mubende district in the West.

The research was limited to the study of the framework for evaluation of effective utilization of ICT and also determine the requirements for the framework in vocational training institution with particular reference to YMCA. Other factors will also be examined but only in so far as they will shed light on the framework for evaluation of effective utilization of ICT in YMCA.

### 1.8 Definition of Key Terms

**Evaluation** is the measurement of something to get out its value and importance.

**Learning** Is the process of obtaining knowledge and skills through other people. For example it can be through experience, studying or even taught in class by teachers, parents or friends.

**ICT** is the term which stands for Information Communication Technology which describes the storage, retrieval, manipulation and transmission of digital data and how these different uses can work with each other.

**ICT Usage** is how different people, corporation employ the ICT use in their daily work.

**E-learning** refers to any type of learning using electronic means of any kind for instance TV, radio, CD-ROM, DVD, mobile phone, personal organizer, Internet, etc.

**A vocational school**, sometimes called a trade school or vocational college, is a post-secondary educational institution designed to provide vocational education, or technical skills required to perform the tasks of a particular and specific job.

**ICT in Education:** this is a situation where teaching and learning is done with ICT.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter discusses and reviews similar or related researches and literature published by other authors' articles, books, journals, reports and previous dissertations related to the topic in question in order to give an insight into the study as well as expressing the need for this study.

#### **2.1 Review of Frameworks for evaluating ICT utilization**

The impact of ICT in education is often difficult to establish especially when other factors that can affect achievement are isolated. Critical to evaluating ICT impact in teaching and learning are issues such as: the environment in which teaching and learning will take place, the status of technology integration in the learning environment, the students' and teachers' technology proficiencies, their disposition towards technology, access to technology and training facilities, teachers' teaching methodology, and students' learning approach. Currently they have focused on each of these issues to determine if the adoption of technology in teaching and learning produces the desired and maximum impact (Adedokun, *et al.* 2011).

Technology impact in teaching and learning can be generated through examining teachers' and students' perception of technology use in teaching and learning, assessing their level of technology integration, determining the motivating factors that propel them and ascertaining the challenges that restrain them. This is supported by the suggestions given by (Kankaanranta 2005) on technology evaluation in schools such as justifying investment returns by examining if the desired impacts are achieved, assessing technology infusion in the curriculum to analyze whether the intended curriculum is implemented and ultimately attained and determining if the pedagogical uses of ICT emphasize how it is employed in the class by the teachers and how it is received by the students.

Some of the perception of technology in teaching and learning held by the lecturers and students include; technology changes the nature of student/lecturer interaction, improves higher-order and critical thinking, improves quality education, transforms the learning environment into a learner-centered one, increases students' motivation and engagement, increases students' positive effects on learning, enhances students' assessment and independent learning, reduces both students and lecturers' burden, facilitates learning and enhances performance. It is also seen as a tool for increased access to resourceful information, improved research output, resource sharing and student/lecturer collaboration (Adedokun, *et al* 2013).

Evaluating both lecturers' and students' perception in this context has thus confirmed that they believe technology has positive effects on their teaching and learning. Researchers (e.g., Adedokun, *et al.* 2013) have also found ICT as a way to promote educational change, improve learners' skills and prepare them

for the global economy and the information society. However, these positive effects do not magically occur without proper policy considerations on how to integrate technology in the learning environment. As such, it is practically crucial to establish how technology is implemented in the learning institution, while conducting technology impact studies (Adedokun, *et al.* 2011).

The second factor identified is integration. Among the technology integration aspects evaluated in vocational institutions are technology use in classroom teaching and learning, its alignment with the curriculum and students' assessment and its blend with the existing traditional teaching and learning practices. Technology integration in teaching and learning across these dimensions has not fully materialized in this university. The regression analysis employed in one study revealed that integration has a negative correlation with the value of technology in this learning environment. This implies that the level of technology integration in the university is still at an unprecedented level such that its value could not be attached to established technology impact in teaching and learning. This is in support of (Adegun's 2007) finding that technology integration in Nigerian education is still at a rudimentary stage. As a form of recommendation, (Kozma, 2005) suggests some policy considerations for ICT integration in education that can help in generating the desired outcome. He recommends that the technology plan should describe how technology will be coordinated with changes in curriculum, pedagogy, assessment, teacher professional development and school restructuring.

In the above framework they looked at ICT usage in schools like environment in which teaching and learning will take place, the status of technology integration in the learning environment, the students' and teachers' technology proficiencies, their disposition towards technology, access to technology and training facilities, teachers' teaching methodology, and students' learning approach but when take consideration into ICT utilization you have to look if there is an ICT policy to provide guidelines and procedures. Again you have to take a look if the organizations have a vision and ICT strategy which gives streamline to plan for the future.

## **2.2. Evaluation framework for the use of ICT in education**

This framework was developed as part of the P2P and P2V project. Its aim is to bring together standards and indicators as used by several education inspectorates throughout Europe, revise and reorder these criteria and present them as one shared model. Although the framework is developed by the inspectorates involved, its application is in our view not limited to those inspectorates, nor to inspecting authorities only. It could also be used by individual schools to self-assess their ICT use and by groups of schools to carry out peer evaluations.

P2P-Inspectorates was a cooperation between Ofsted (Office for Standards in Education, England), Skolverket (Swedish National Agency for Education , Sweden), HMIE (Her Majesty's Inspectorate of Education, Scotland), Department of Education and Science (Ireland), IGEN (Inspection Générale del'Éducation Nationale, France) and Inspectie van het Onderwijs (The Netherlands).

The framework consists of three main themes: Conditions, Use and Outcomes. There are a number of quality areas (eight in total) within each theme. Within each quality area, Quality indicators with corresponding evidence pointers are identified.

**Conditions:**

- C1. Leadership,
- C2. Infrastructure and access,
- C3. Curriculum planning,
- C4. Quality assurance and improvement

**Use:**

- U1. Pupil use,
- U2. The teaching process,
- U3. Administrative use

**Outcomes:**

- O1. Impact on learning and standards

## **Conditions**

### **C1. Leadership**

This area is concerned with the extent to which leadership can be identified at all levels in the school to develop and realize a vision for ICT.

<b>Quality indicators</b>	<b>evidence</b>
There is a clear vision for the use of ICT	<p>The vision identifies the place of ICT in achieving the school's aims and aspirations</p> <p>The vision identifies the relationship between the use of ICT and the school's vision on pedagogy, teaching and learning</p> <p>The vision is informed by developments in technology and education practice in the wider world</p> <p>The school's vision has been formulated through a process of collaboration with the school's stakeholders</p>

	<p>The vision is formulated in an official document</p>
<p>There is a strategy to realize the vision</p>	<p>The vision on ICT is reflected in general school planning (staffing, professional development, ICT resources and curriculum planning)</p> <p>The strategy makes best use of the talents that are available throughout the school</p> <p>Responsibilities are clearly formulated and shared throughout the school</p>
<p><b>Infrastructure and resources</b></p>	
<p>The available resources reflect the needs and vision of the school</p>	<p>Quality and quantity of hardware reflect learners' and teachers' needs</p> <p>Learning resources (software, internet resources) reflect learners' and teachers' needs</p> <p>A wide range of ICT tools is available Resources support different pedagogies (e.g. instruction, group work, project work)</p> <p>There are arrangements (audits, needs assessments) to identify resource requirements</p> <p>Hardware and connectivity</p> <p>Replacement issues</p> <p>Learning resource needs</p>
<p>The deployment of ICT resources enables efficient use of them</p>	<p>The design of teaching and learning environments supports learning</p> <p>ICT resources are located where learners and teaching staff need them</p> <p>Learning environments (also online) are safe and stimulating</p> <p>Resources are available for learners and teaching staff throughout the day Learning and teaching materials Administrative resources</p> <p>Resources are available from several locations (also outside school) Learning and teaching materials</p>

	<p>Administrative resources</p> <p>Assistive technologies (which support pupils with special needs) are used where appropriate</p> <p>All connected devices are protected from virus, spam etc.</p>
Support systems optimize the use of ICT	Staff and learners can access technical support so that the flow of learning and teaching can be maintained when problems with ICT occur
<b>Curriculum Planning</b>	
Meeting local, regional and national requirements	<p>Planning for the ICT curriculum – or ICT in the curriculum – reflects the school's own intentions</p> <p>Where there is a national curriculum or local/regional requirements, curriculum planning takes these into account.</p>
Coherence, balance and consistency	<p>ICT skills development is coherent throughout the curriculum – across years and subjects</p> <p>The ICT curriculum makes demands on pupils appropriate to their age, ability and previous learning</p> <p>The ICT curriculum ensures a broad range and balance of ICT applications and contexts</p>
New developments in ICT and pedagogy	<p>New developments (technological, tools, competences) in ICT are reflected in the curriculum</p> <p>Use of appropriate pedagogy is reflected in the curriculum</p>
<b>Quality assurance and improvement</b>	
<b>Review and self-evaluation</b> of ICT policy and practice	<p>Regular reviews of ICT policy and practice and self evaluation activities are planned</p> <p>Reviews lead to priority areas for improvement</p> <p>Lines of responsibility for review and self evaluation are clear and shared at all levels in the school</p> <p>Results of review and self evaluation are recorded</p>

	<p>ICT quality review is integrated with other quality assurance arrangements</p> <p>Formative and summative assessment across the school/team are consistent and reliable</p>
Action planning and implementation	<p>Action planning documents are available</p> <p>The results of self evaluation are reflected in the action planning</p> <p>Action plans specify actions for improvement Implementation documents contain timescales, responsibilities and intended outcomes</p> <p>The impact of actions is monitored and evaluated</p> <p>When it is clear that aims are not met, appropriate action is taken</p>
<b>Learner use</b>	
Development of ICT skills	<p>There are structured opportunities for the development of ICT skills</p> <p>Learners are reflective and confident about their ICT skills</p> <p>Learners are able to appropriately select ICT tools to complete tasks and projects</p> <p>Learners show development in their critical thinking about the reliability of (online) information and sources</p> <p>Learners become more autonomous in their use of ICT as they progress through the school</p> <p>Learners are aware of issues concerning plagiarism and intellectual property</p> <p>Learners show that they can make safe use of the internet</p> <p>Learners know how to use a wide range of (connected) devices and sources</p> <p>Learners know how to edit and share digital materials and data</p> <p>Learners know how to access and use regional,</p>

	<p>national and European online sources and tools</p> <p>Development of ICT skills is facilitated through peer support</p>
Enhancement of learning	<p>Learners use ICT to work in teams</p> <p>Learners use ICT to work with others in order to acquire expert knowledge</p> <p>ICT supports independent learning</p> <p>Learners are engaged and motivated by the use of ICT</p> <p>The use of ICT increases the pace of learning</p> <p>The use of ICT presents additional learning challenges for pupils</p> <p>ICT supports creativity</p> <p>ICT enables students to show and share their performance and outputs with others (inside and outside the establishment)</p> <p>ICT enables learners to connect learning inside and outside school</p> <p>Learners use subject specific ICT applications and devices</p>
<b>The teaching process</b>	
<b>Developing pupils' ICT capabilities</b>	<p>Teaching staff stimulate pupils to develop their ICT skills</p> <p>Teaching staff ensure that the ICT curriculum is covered</p> <p>Teaching staff ensure that learning opportunities are coherent and balanced</p> <p>Teaching staff support learners' critical thinking to develop appropriate attitudes towards</p> <ul style="list-style-type: none"> <li>• Plagiarism and intellectual property</li> <li>• Safe use of internet</li> </ul>

<p>use of ICT to enhance teaching</p>	<p>ICT is used across all subjects</p> <p>Teaching staff use a wide range of ICT applications and devices in their teaching</p> <p>ICT is integrated in a variety of pedagogies</p> <p>ICT is used to increase authenticity and interactivity of teaching</p> <p>Teaching staff use ICT to introduce multiple views, media and sources</p> <p>ICT is used to enable different learning styles and preferences</p> <p>ICT is used to remediate weaknesses and offer additional materials</p> <p>ICT is used to support more able learners and offer additional materials</p> <p>Teaching staff use online communication to support learners</p> <p>Teaching staff use the network, VLEs and intranets to show and share materials</p>
<p><b>Administrative use</b></p>	
<p>Identifying issues impacting learning and teaching</p>	<p>ICT is used to monitor attendance and track absenteeism</p> <p>ICT is used to monitor achievement and attainment</p> <p>ICT is used for assessment: diagnostic, formative, summative</p> <p>ICT is used to identify both more able learners and learners who need additional attention</p> <p>ICT is used to identify actions to improve learning and teaching</p> <p>ICT is used to monitor and record learner performance and progress</p>
<p>Communication is supported.</p>	<p>There is a school website, containing information for stakeholders (profile, strengths and weaknesses)</p> <p>The school uses ICT to communicate with others (schools, community)</p>



	<p>Materials, time tables, and resources are available for pupils and staff from home</p> <p>Internal policy briefs, newsletters etc. are available online</p>
<b>Impact on learning and standards</b>	
Gains in broad learner achievement	<p>Teachers and pupils indicate that there is improvement in:</p> <p>Level of pupils' engagement in their studies</p> <p>Level of motivation of pupils</p> <p>Pupils use ICT to enhance the presentation and delivery of their work</p> <p>The school has reflected on the impact of ICT on:</p> <p>Learning practice Learner achievement Dropout rates</p>
Effects of ICT use on pupil attainment	<p>Where attainment has improved, the school has evaluated the contribution of ICT</p> <p>When new ICTs are introduced, the school is monitoring its intended impact on attainment</p>

The above framework was done from Europe with the aim to bring together standards and indicators as used by several education inspectorates throughout Europe, revise and reorder these criteria and present them as one shared model. However for the case of developing countries like Uganda we are not practical to come up with such framework because of the following challenges: most vocational training institutions in Uganda do not have ICT visions, no good strategy to realize vision, limited resources for ICT, no ICT policies and practices, no funds for ICT, lack of knowledge and skills of ICT in most lecturers and administrative staff and so many others.

### **2.3. A Framework to examine the effectiveness of ICTs in TVET**

Two key elements must be taken into account when considering the effectiveness of learning technologies, namely instructional effectiveness and instructional efficiency. Instructional effectiveness and efficiency are two elusive terms for which no accurate definitions can readily be found in the literature. The difficulty in defining these terms is probably due to the number of factors extraneous to the material itself, which confounds measurement related to the quality of Instruction.

In previous studies the efficiency and effectiveness of an instructional product have been used as dependent variables. (Nathenson, *et al.* 1980) note that research has had a very narrow focus with regards to the effectiveness of instructional materials. In many studies effectiveness has been viewed only in terms of learning gains on post-tests. The authors argued that although improved student performance is an important element, it should not be the only indicator of instructional material effectiveness. (Chinien, 1990) suggests that instructional material effectiveness should be viewed within a framework, which encapsulates three major elements, achievement, study time, and the students' attitude toward the material. After reviewing the research on distance education, Institute for Higher Education Policy (1999) identified three broad measures of effectiveness that were most commonly used, namely student achievement, student attitude, and student satisfaction.

#### **Achievement**

Several studies (Chinien, *et al.* 1994) have demonstrated that the quality of instructional material can help significantly improve students' achievement on post-tests. Two indicators of instructional material effectiveness are used with respect to achievement. The first relates to the ability of the material to help a predetermined percentage of students reach a designated level of mastery on post-tests. The criterial level of effectiveness could specify that 90% of the test subjects should score at least 90% on post-tests (Romiszowski, 1986). Setting the criterial level for number of students and for level of mastery is arbitrary, and the decision can be made on the basis on the consequences of inadequate performance or mastery of content. The gain in learning is a second indicator of effectiveness related to achievement. Learning gain is usually expressed as the difference between post-test and pre-test scores (learning gain equals post-test score minus pre-test score, (Romiszowski, 1986).

#### **Study time**

The amount of time that students spend interacting with an instructional product is another critical element of instructional material effectiveness. Nathenson and Henderson (1980) cite many research studies that have reported achievement at the expense of increased study time. These authors quote Faw

and Waller (1976) to emphasize the critical relationship between study time and the achievement component of instructional material effectiveness: (Since) the single most important determinant of how much is learned is probably total study time... it is hardly surprising that the manipulations which tend to extend the period of time spent in study... are in general accompanied by superior levels of learning. There are also some studies demonstrating improved student performances on post-tests while keeping study time constant. Study time is also commonly referred to as a measure of efficiency (Davis,*et al.*1974).

### **Attitude**

A third dimension of instructional material effectiveness is the student's attitude toward the material (Chinien, *et al.* 1994). Studies conducted by (Aberdor, *et al* 1972), indicate that effective in structional materials generate more positive student attitudes. On the other hand, (Berthelot, *et al.* 1978) found no significant differences in students' attitude related to the quality of instructional material. (Romiszowski 1986) cautions that the novelty effects may confound measures of student attitudes. He argues that the novelty may not only inspire negative attitudes that diminish over time, but may also generate excessive praise and enthusiasm that may also disappear.

Although research on time-on-task indicates that a positive correlation between achievement and time engaged in learning tasks, time is not generally used as an independent variable in research on distance education. The effectiveness of an instructional material can be conceptualized within a framework of three major elements: student achievement, study time, and student attitudes. All three elements are important and need to be considered collectively when assessing instructional material. Any investment in ICTs is a waste if not accompanied with investment in high quality, relevant curriculum material, since ICTs will not compensate for poor content (Bates, 1995).

While a general consensus is emerging regarding the need to integrate ICTs in teaching and learning, there is little empirical evidence to support the decision-making process. In fact, over 350 research projects conducted during the past 70 years have failed to establish a significant difference in effectiveness between ICTs and traditional methods (Baalen, *et al.* 2001). While these findings tend to suggest that ICTs do not considerably improve teaching and learning, the fundamental question that remains unanswered is: were the researchers assessing the effectiveness of ICTs or were they simply assessing the effectiveness of instructional products that were less than perfect?

Howe ever in this framework they talked about only three elements which is achievement, study time and students attitude, yet they are many other elements which are very vital in relation to ICT utilization in schools. For example they did not talk about ICT infrastructure, ICT funds, ICT policy, ICT integration into teaching and learning, ICT management, ICT workshops and Trainings. In order to obtain achievements in ICT utilization many things should be in place such as ICT infrastructure such as computers, laptops, internet, printers, projectors and many other ICT tools.

## 2.4. The UNESCO ICT Competency Framework for Teachers

UNESCO’s Framework emphasizes that it is not enough for teachers to have ICT competencies and be able to teach them to their students. Teachers need to be able to help the students become collaborative, problem solving, creative learners through using ICT so they will be effective citizens and members of the workforce. The Framework therefore addresses all aspects of a teacher’s work:

The Framework is arranged in three different approaches to teaching (three successive stages of a teacher’s development). The first is Technology Literacy, enabling students to use ICT in order to learn more efficiently. The second is Knowledge Deepening, enabling students to acquire in-depth knowledge of their school subjects and apply it to complex, real-world problems. The third is Knowledge Creation, enabling students, citizens and the workforce they become, to create the new knowledge required for more harmonious, fulfilling and prosperous societies.

		Technology literacy	Knowledge deepening	Knowledge creation
Understanding ICT in Education		Policy awareness	Policy understanding	Policy innovation
Curriculum and assessment		Basic knowledge	Knowledge Application	Knowledge and

			society skills
pedagogy	Integrate Technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
Organization and administration	Standard classroom	Collaborative groups	Learning organisations
Teacher professional learning	Digital literacy	Manage and guide	Teacher as model

The Framework is intended to inform educational policy makers, teacher educators, providers of professional learning and working teachers on the role of ICT in educational reform.

The Framework argues that teachers need to use teaching methods which are appropriate for evolving knowledge societies. Students need to be enabled not only to acquire an in-depth knowledge of their school subjects but also to understand how they themselves can generate new knowledge, using ICT as a tool. For some teachers, perhaps for many teachers, these will be novel and challenging ideas, and it will take time for teachers to understand these new approaches to teaching. It will also require strong leadership from the government, from those responsible for the education and professional learning of teachers, and from headteachers and school principals.

## 2.5. Analytical Framework

Despite substantial funding for technology in schools and its stated importance in achieving national and European targets, there is a lack of reliable comparative data and indicators to support evidence-based policies (Pelgrum, 2009); The Survey of Schools: *ICT in Education* was

designed to provide a more solid evidence base on the topic.

Across a range of international studies and reports a broad consensus is emerging on the domains for which indicators on the provision, use and impact of learning technologies and ICT policy initiatives in schools are needed. This work and the priorities formulated by the European Commission in the terms of reference for the Survey were used to define the following areas where indicators would be produced:

Schools' ICT infrastructure (desktop computer; mobile devices such as laptops, notebooks, tablets, Smartphone's, etc.; broadband; school website, email addresses, virtual learning environment, etc.; deployment of equipment in classrooms, computer labs, libraries, etc.; maintenance). Infrastructure features in all definitions of the areas for which indicators on ICT in education are needed (Scheuermann, *et al.* 2009); it is a basic condition, necessary but not sufficient, for any use to happen.

Teachers' and students' access to ICT at school (years of experience using ICT at school, % of time, frequency) and ICT-based activities organized by teachers and performed by students during lessons (frequency; type of activities; digital resources used). The case for the introduction of these two areas is made by Johannessen (in Scheuermann, *et al.* 2009) and has been integrated in the Survey to better identify and quantify basic components that are more related to outputs not in terms of achievement or competence (out of the scope of the present Survey) but of access, organization, frequency and context of use, as well as the nature of ICT-based activities;

Teachers' and students' declared confidence in their digital competences (operational skills, social media skills, safe and responsible Internet use) and training (participation, content and modalities). Although measuring digital competence was outside the scope of the investigation, an indicator of it was brought into the Survey by looking at the above areas in relation to the plea for ICT indicators to focus on outcomes and achievements (Erstad, *et al.* 2009);

School strategy and leadership (policies about ICT use in teaching and learning and in subjects; discussion about ICT use at whole school level; time for teachers to collaborate and network; incentives to reward ICT use; innovation policy, etc.); the inclusion of this area also reflects recent work by the experts mentioned above which underlines the importance of school leadership for ICT to be adopted and fully used in teaching and learning by the whole school community (Erstad, *et al.* 2009);

Opinions and attitudes of school heads, teachers and students (ICT relevance for different learning processes; impact on learning, achievement and motivation).

However this study was carried out from European countries but when we look into Ugandan context we are not competent enough to come up with such framework because not every teacher or student here in Uganda will be able to have laptops, notebooks, tablets, Smartphone's for use in ICT class. In addition this framework is talking about time access to ICT but its not the case in Uganda, most of the times students are given limited time on the access of ICT equipments. Again this framework is talking about policies about ICT use in teaching and learning, but in Uganda most schools lack ICT policies to guide them in teaching and learning and most people in Uganda have negative attitude towards ICT usage. In this framework they have only talked about few elements like ICT infrastructure, ICT access time, ICT policies and attitudes and opinions of heads, teachers and students towards ICT usage.

## **2.6 Towards a framework for the use of ICT in teacher training in Africa**

The above account has emphasized the challenges that exist in seeking to implement ICT for teacher training initiatives in Africa. However, the benefits of overcoming these challenges are enormous. This final section outlines a framework whereby these principles can be delivered practically in Africa. For such programmes to be successful, they have to be tailored to the local needs and particularities of specific countries and scales of implementation, but the following elements would seem to be essential in order to overcome many of the problems associated with ICT use in Africa.

### **1. Strategic leadership.**

For any ICT for teacher training programme to be successful, it needs to be owned at a national level by the Government as a whole and led by the relevant Ministry of Education. The precise mechanisms through which teacher training and curriculum development are delivered vary across Africa, and it is therefore not desirable for an over-prescriptive formula to be applied to such a process. Two of the most damaging features of current initiatives to implement ICT for teacher training programmes in Africa are the duplication of effort and the lack of integration in many ongoing activities. People in different parts of a single Ministry can be unaware of what their colleagues elsewhere are doing. Presidential initiatives can cut completely across the ongoing work of a Ministry of Education, and offers of hardware and software to educational institutions from the private sector, donors or civil society organisation are hard to turn down. A small, focused team therefore needs to have the overall leadership of the ICT for teacher training strategy, and the willingness and power to decline offers of assistance from well intentioned, but misplaced, supply-driven initiatives. The capacity of some African Ministries of

Education is undoubtedly weak in this field, but given their overall responsibility for teacher training in most African countries, they would seem to be the most logical places for such teams to be located. Civil Society organisations and donors can have a core role to play here in helping to train relevant government officials in the skills necessary to take on such tasks and responsibilities.

## 2. Ownership and the involvement of stakeholders in the development of coherent strategies and implementation plans

Strong leadership is insufficient by itself to ensure the success of ICT for teacher training programmes. It is crucial that the process of development of such a strategy must involve the relevant stakeholders and potential partners at an early stage. These would include at least representatives of the teachers themselves (such as Teachers Unions), those involved in teacher education, higher education institutions, the curriculum developers, and the providers of hardware and software. All need to understand the importance of developing a coherent and logical programme to be implemented in a staged fashion over a number of years. Far too often, supply-led external initiatives can put in place inappropriate systems that are then incompatible with the roll out of new initiatives.

## 3. Integration with overall national ICT strategies

Many African governments are now shaping and seeking to implement national ICT policies and strategies but in many instances they have been led primarily by telecommunications interests, and have not paid sufficiently detailed attention to the real potential for ICT to deliver on development agendas. Furthermore, whilst policies may be in place, detailed implementation strategies have often not yet been developed. The key point to note in the present context is that education has sometimes been surprisingly ignored in the development of such strategies, as was the case in early drafts of Kenya's emerging strategy in 2003. It is therefore of great importance that all such policies and strategies give a very high priority to education, and its use in and for teacher education needs to be prioritized within this overall approach.

## 4. Shaping implementation strategies within the context of infrastructure provision.

The level of infrastructure provision varies enormously across Africa. This must be taken into consideration when developing programmes to use ICT in teacher training. What can be done in parts of South Africa, or in capital cities elsewhere, is very different from what is feasible across much of the continent. Indeed, the digital divide is very much expressing itself across Africa as a bandwidth divide. While good Broadband connectivity, for example, is now taken for granted in many of the richer countries of the world, and educational software is increasingly being developed to take advantage of



this, such access to the internet is rare and expensive in Africa. Two-way satellite connectivity is indeed now available across most of Africa, but the costs of using this for educational purposes remain prohibitively high to be a sustainable choice for teacher training in the short- to medium-term.

Variability in infrastructure provision means in practice that blended solutions for the use of ICT in teacher training will need to be thought through carefully in specific national contexts so that teachers can have access to similar training in different media depending on the infrastructure available to them. A comprehensive ICT in teacher training programme will thus make optimal blended use of print, audio/radio, video, television, computers, the internet, peer-group face-to-face (f2f) contact, and more traditional forms of classroom based learning if it is to be successful. Many African countries already have an existing framework of teacher training colleges in place, and given limited connectivity and resources, it may often be most logical for the provision of computers and the use of the internet for teacher training to begin in these institutions, with subsequent links being established to other educational institutions.

#### 5. Awareness raising workshops

Despite the plethora of global initiatives aimed at introducing ICTs into education systems in Africa, there remains considerable misunderstanding across the continent about the real potential of ICTs to transform the processes of learning. It is crucial at an early stage in the development of strategies for the use of ICT in teacher training, for workshops to be run to provide hands on experience of the use of audio, video, the internet, CD ROMs, DVDs, and other new ICTs, so that administrators, heads of teacher training colleges, government officials and teachers' leaders can grasp the true significance of the transformations possible, and can thereby contribute effectively to the development of such strategies. Once sufficient people have participated in such workshops, some of them can themselves become trainers, thereby enabling the process to cascade downwards through the education system.

#### 6. Beginning with pre-service training

In logistical terms it is generally much easier to begin with the provision of infrastructure (computers and internet access) in teacher training colleges, most of which already have electricity, than it is to provide such access scattered more widely across a country. Furthermore, most pre-service trainee teachers are also young, and more open to the use of new technologies than are many, but by no means all, older teachers. Computers and the internet can be used in a wealth of ways to enhance teacher education as part of a blended programme for the use of ICT across the pre service curriculum (SITE, 2002). Considering both activities that can be undertaken Within the colleges, and at a distance, and drawing on

established examples of good practice elsewhere in the world (UNESCO, *et al* 2002b;), the following are some of the ways in which such technologies can best be used in an African context:

#### Within African Teacher Training Colleges

Acquisition of basic ICT skills;

Self-paced learning through access to resources on servers, CDs, or where available, on-line;

Group discussion of audio and video training materials available on Videos, CDs, DVDs or even on-line;

Filming of practice teaching sessions, followed by individual review and group discussion (as is currently taking place in some parts of rural China);

Training in use of educational management information systems (EMIS);

At a more advanced level, training in the development of Learning

Management Systems (LMS) and Content Management Systems (CMS);

Group development of learning resources shared collectively;

Formative and summative assessment, which can also be undertaken at own pace; and

Introduction to the use of ICT in support of young people with disabilities in the classroom

#### **At a distance during teaching practice**

Use of e-mail (and mobile telephony) to discuss issues encountered on teaching practice with tutor – to be done effectively this can require considerable amounts of tutorial support;

Use of e-mail to share lesson plans, information, ideas and content with peers working elsewhere;

Use of the internet as a personal support mechanism for people working in rural and isolated areas, enabling them to retain contact with communities and activities in their home regions.

Whilst e-mail is not yet widely available in Africa, particularly in rural areas, many towns across the continent are now beginning to gain increasingly reliable internet connectivity, and teachers are often to be found in the growing number of internet cafés that have blossomed. Mobile telephony may also well have potentials for teacher learning in Africa.

#### 7. In-service training

The use of new ICTs to support blended solutions to in-service training needs, can best be seen as a combination of the existing use of distance based methods of support to teachers, with elements of the use of ICTs discussed above in the context of pre-service training. In-service delivery of training for teachers varies considerably across Africa (Lewin and Stuart, 2003), and it is important that any attempts to use new ICTs in support thereof should build on local practices and experiences. Nevertheless, the following uses of multimedia computers and the internet can be envisaged as being particularly important in the delivery of African in-service teacher training programmes in the future:

Provision of in-service training resources in digital format at relevant centres, be they teacher training colleges, secondary schools, or district education offices;

Use of self-testing, both formative and summative;

Use of multimedia (video and audio) in discussions of classroom practice, both individually and in groups;

Tutorial feedback and support at a distance; and

Peer sharing of lesson plans, content and experiences through web-based or e-mail.

#### 8. Sustainability through community-led agendas

It is not possible to incorporate new ICTs in teacher education in Africa effectively and sustainably without community involvement. The commitment of the private sector, alongside governments and civil society organizations at a macro-scale in global initiatives is already one form of such participation. However, at a more local scale it is essential to secure community support for such initiatives to ensure that they are appropriately designed, implemented, maintained and resourced. Moreover, the hardware and connectivity are too expensive at present for these initiatives to be self-sustaining without there being a commitment to their wider use by communities for gaining access to information relating to health, agricultural, enterprise, lifelong learning and governance issues. All too often, support is garnered from the international community for but one sector, be it health or education, with there being little attempt truly to integrate the programmes and initiatives. If such initiatives focused more on using ICTs to respond appropriately to the integrated needs of poor communities, rather than on supplying ready made technical solutions from elsewhere, they would be more likely to succeed and to be sustainable.

## A Framework for an ICT-based Development Program for Science Teachers in State Universities and Colleges in Region VI

Goals/Objectives	Intended	Key	Responsibility
<p><b>LEADERSHIP/ADMINISTRATION</b></p> <p>1. To develop the ICT Strategic Plan to ensure that is aligned with views of the school community and is referenced by the appropriate National, State and SUC's policies.</p> <p>2. To establish clear criteria for evaluating the effects of integrating ICT within teaching, learning and administration.</p> <p>To submit annual reports that document the progress towards the goals within the ICT Plan</p> <p>4. To create ICT Integration team</p> <p>5. Appropriate level of funding to achieve the goals for the integration of ICT.</p> <p>6. To continue current budget planning to ensure a steady spending pattern that will achieve the school's goals for ICT integration</p>	<p>1. The school has a clearly articulated shared vision for ICT in teaching, learning and administration, as a result of collaboratively consulting with key stakeholders and makes reference to the appropriate National, State and SUC's policies</p> <p>To develop the ICT Strategic Plan to ensure that is aligned with views of the school community and is referenced by the appropriate National, State and SUC's policies.</p> <p>To establish clear criteria for evaluating the effects of integrating ICT within teaching, learning and administration.</p> <p>To submit annual reports that document the progress towards the goals within the ICT Plan</p>	<p>4. Complete ICT Review Tool – survey of School Administrator s, Director/chair man of ICT and all teachers</p> <p>5. Reference to National, State and SUC's policies</p> <p>6. Discuss criteria with Curriculum Committee</p> <p>7. Establish reliable methods of collecting data evaluating the effects of ICT within teaching, learning and administratio</p>	<p>ICT Direct ors/ Chair men</p> <p>SUC's Integration Team/ Committee</p>

ICT PROFESSIONAL LEARNING	There is a high priority of professional learning with	1. Use TNA survey from the basis for	ICT Directors/Chairmen
1. Prioritization of professional learning with ICT and about ICT:	ICT and about ICT for science teachers.	understanding ICT PD needs of teachers	VP- Administration
and to assist in		setting goals	VP-Acad. Affairs
To develop to a high priority within total Professional Learning program for Science Teachers	1. Professional learning with and about ICT allows teachers to:	2. Include ICT skill development report	Curriculum Planning Officers
To establish a formal process for developing and recording ICT skill development for the use of ICT and for the integration of ICT within teaching and learning.	Explore, understand and utilize ICT in teaching, communication, management and administration	from TNA survey in Annual Review Meeting with the Administrators and Stakeholders	Prof. Dev't. Coordinator SUC's Planning Officers
To ensure that course writing includes specific integration of ICT for science teachers and for student use.	Integrate ICT in ways that produce more effective and more efficient teaching and learning	3. Set specific dates for ICT in-services and pre-service training for science teachers.	
To provide more time and access for professional learning with ICT and about ICT	Evaluate, create and share online learning resources with colleagues and students	4. Develop a database for recording all professional learning	
To maintain flexible delivery of ICT professional learning through face-to-face and online activities provided by in-house or pre-service trainings of colleagues or external experts	locally and globally To develop to a high priority within total Professional Learning program	5. Establish a train-the-trainer model with time given to trainers to work with others	
To provide time for more staff to support others in professional learning with ICT and about ICT	To establish a formal process for recording ICT skill development and for the integration of ICT within teaching, learning and administration	6. Employ ICT Coaches to assist integrate ICT in the classroom	
2. To develop Professional Learning Plans that:		7. Utilize emergency	
Are regularly audited	To ensure that course	to cover teachers	

	<p>To develop an online database to enable teachers and administrative staff record achievement of individual, school and system targets for the use of ICT</p> <p>3. Teachers use ICT tools to plan, access and share professional learning online within the school network and globally in timely, focused and practical ways.</p> <p>To share innovative practice Maintenance of KLA based sharing</p> <p>Publishing of innovative</p>		
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ICT INFRASTRUCTURE	1. The ICT	1. Infrastructure	ICT
1. Network	infrastructure provides an integrated, efficient system for the full range of	Audit	Directors/Chairmen
To integrate and expand wireless access to cover all areas of the school to achieve successful implementation of ICT integration	teaching, learning and administrative requirements	2. Upgrade wireless controller to 802.11n and purchase of more access points	VP- Administration VP-Acad. Affairs Curriculum Planning Officers
To development and implement a Content Management System for 24/7 availability of resources	To integrate and expand wireless access to cover all areas of the school to achieve successful implementation of ICT integration	3. Install access points as required throughout school	Prof. Development. Coordinator
To improve internet connection for Science Teachers and students to achieve successful implementation of Integration.	To development and implement a Content Management System for 24/7 availability of resources	4. Plans developed as part of library, classroom and laboratory redevelopment Submission to College Board	SUC's Planning Officers
To improve power supply and secure charging stations and storage to achieve successful implementation of Integration	To improve internet connection for science teachers and students to achieve successful	5. Purchase a mixture of laptops on trolleys and computer desktop systems	
2. Hardware Delivery	implementation of ICT		
To purchase computers and other ICT			

To complete data projector system installations to all classrooms, and laboratory rooms.	To complete data projector system installations to all classrooms and laboratories		
To install some Interactive White Boards if criteria for use are met	To install some Interactive White Boards if criteria for use are met		
To develop video conferencing systems	To develop video conferencing systems		
3. Software Delivery			
To continue current arrangements with software delivery	3. Technical support is readily available to minimize disruptions to learning, teaching and administration		
Technical Support			
4. To continue current arrangements with technical support	4. ICT budgeting provides for continual upgrading to allow the school to rapidly take advantage of future improvements in ICT		
5. Budgeting of Resources			
To continue current arrangements with	delivery and infrastructure.		

The above framework was carried from State Universities and Colleges in Region VI, with its remarkable achievement of a high literacy rate in a few decades, the next step is bringing its resources to bear on providing a quality education so that Filipino science professors and students may take places in the global labor force.

This study was carried in State Universities and Colleges in Region VI, which the concerns was the integration of information and communications technologies (ICT) into the science curriculum of Higher Education. Institutions in State Universities and Colleges in the Philippines particularly in Region VI, and the training and development requirements of science professors in this regard. The Authors of this Framework used a mixed methodology which where employed to obtain qualitative data from 11 policy makers as represented by the Vice



President of Academic Affairs of the SUC's in region VI, and quantitative data from a questionnaire for which 139 replies were received from SUC's science professors in Region VI.

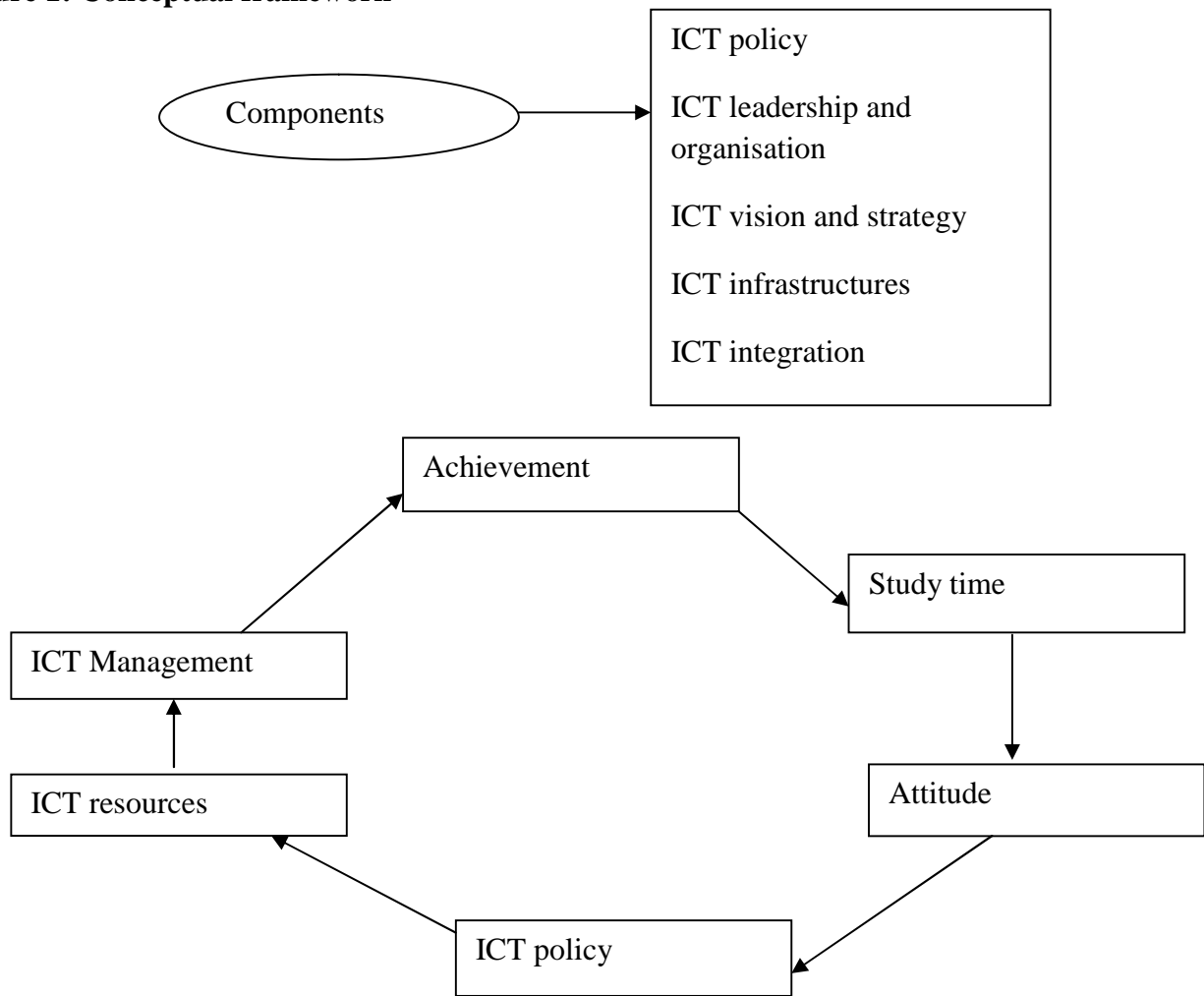
However this framework for an ICT-based Development Program for Science Teachers in State Universities and Colleges in Region VI was done from Philippines and it was taking about three elements namely leadership and Administration, ICT professional learning and ICT infrastructure. But when you look into Uganda's context we are not capable enough to come up or follow such framework because standards in Philippines are higher compared to the ones in Uganda. Again in this framework they only addressed leadership and Administration, ICT professional learning and ICT infrastructure but ICT management, Funds, Vision and strategy where not spelled out in this framework.

## 2.7. SUMMARY OF THE REVIEWED FRAMEWORKS

Framework	Components	Relevance	Weakness	comments
Evaluation framework for the use of ICT in education	Leadership, Infrastructure and access, Curriculum planning, Quality assurance and improvement Pupil use, The teaching process, Administrative use Impact on learning and standards	It can be used by individual schools to self-assess their ICT use and by groups of schools to carry out peer evaluations.	They did not consider ICT policy, management and source of funds. Developing countries were not considered in this framework	More trainings and workshops are needed.  Source of funds should be considered
Framework to examine the effectiveness of ICTs in TVET	Achievement Attitude Study time	It clearly shows how effectiveness of using ICT can be measured in schools.	Many elements were missing in this frame namely: policy, resources,funds,management, skilled teachers etc	Emphasis should be put on ICT resources, funds, management , policy etc
The UNESCO ICT competency framework for teachers	Technology literacy Knowledge deepening Knowledge creation	This Framework is relevant in that it informs teachers on roles of ICT in education.	No ICT vision and strategy, source of funds, management,	ICT funds, management , vision and strategy and ICT resources should be emphasized
Analytical Framework	School ICT infrastructure  Access to ICT at school  School strategy and leadership  Opinion and attitude	Its relevant because its taking about ICT use and impact in schools	No ICT policy, management, funds	ICT policy, management and source of funds should be considered

<p>Towards a framework for the use of ICT in teacher training in Africa</p>	<p>Strategic leadership</p> <p>Ownership and involvement of stakeholders</p> <p>Integration with overall national ICT strategies</p> <p>Shaping implementation strategies within the context of infrastructure provision</p> <p>Awareness raising workshops</p>		<p>No Policy for ICT use, no ICT management, no ICT funds, and training of teachers not spelled out.</p>	<p>Policy for ICT use, ICT management , ICT funds, and training of teachers should be considered</p>
<p>A Framework for an ICT-based Development Program for Science Teachers in State Universities and Colleges in Region VI</p>	<p>Leadership and Administration</p> <p>ICT professionals learning</p> <p>ICT Infrastructure</p>	<p>Its concern was the integration of information and communications technologies (ICT) into the science curriculum of Higher Education.</p>	<p>ICT management, funds, Vision and strategy not spelled out</p>	<p>ICT management , funds, vision and strategy should be addressed.</p>

**Figure 1: Conceptual framework**



## **2.8 Evaluation**

Evaluation is a systematic and objective assessment of an ongoing or completed project, programme or policy, its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, efficiency, effectiveness, impact and sustainability - as set out in the Evaluation Policy (UNEG, 2005). An evaluation should be structured so that there is some thought and intent as to what is to be captured, how best to capture it, and what the analysis of the captured data will tell us about the project. Evaluations fall into one of two broad categories: formative and summative. Formative evaluations are conducted during program development and implementation and are useful if you want direction on how to best achieve your goals or improve your program. Summative evaluations should be completed once your programs are well established and will tell you to what extent the program is achieving its goals (Patton, 1987). Evaluation is normally conducted for the purposes of decision making, judgements, conclusion, findings, new knowledge, organizational development and capacity building in response to the needs of identified stakeholders leading to improvement, decisions about future programming, and accountability ultimately informing social action ameliorating social problems and contributing to organizational or social value (Yarbrough *et al*, 2011).

### **8.1 Methodologies used in designing effective evaluation.**

A method is an ad hoc procedure, specially constructed for a given evaluation. The term method is similar to design. In the American literature evaluation design is applied to the way in which a given evaluation is constructed. The terms approach and procedure are similar. They apply to a given method and to the spirit in which this method has been constructed (European Commission, 1999).

#### **2.8.2 Types of Evaluation**

There are four major types of evaluation (European Commission, 1999)

##### **Experimental Approaches**

Experimental approaches treat phenomena of causality without analyzing them directly. The effects of the programs are demonstrated by comparing a treatment group with a control group.

Evaluations carried out in this framework are typical of American practice in the 1960s and 1970s. These evaluations are long, cumbersome and not always conclusive.

### **Economic Approaches**

Economic approaches are based on an individualistic view of society, inspired by welfare economics. From this point of view, the value of a public action is the sum of the benefits it provides to individuals. All individuals are supposed to have a system of references and it is assumed that these systems of reference can be aggregated. These hypotheses are used to give an objective character to evaluations carried out by economic techniques. Despite their elegance, economic techniques have been strongly criticized, in both practical and theoretical terms.

### **Naturalistic or Pluralistic Approaches**

Naturalistic or pluralistic approaches are based on the idea that the political and social world is a collective construction. This construction results from the interaction of differing social groups that have their own interpretations of the same phenomena and issues. Consequently public programs are seen as temporary compromises between groups and actors. By means of appropriate techniques, based to a large extent on group work, evaluation acts as a mediator between the different points of view. It is a tool for promoting conciliation between the stakeholders, and its conclusions are all the most robust when they are a product of consensus.

### **Pragmatic Approaches**

Pragmatic Approaches adopt simplified views of the processes that they have to describe. Theoretical references are less pure and more eclectic. Evaluation objectives are of any essentially managerial rather than scientific nature. Evaluations carried out in this spirit, using techniques inspired by management approaches, are oriented more or less important than in other forms of evaluation.

### **2.8.3 Methodological Approaches in Evaluation**

#### **Quantitative & Qualitative approaches**

Quantitative analyses focus on testing hypotheses and use structured designs and statistical methods to analyze data. This type of information needs standardization, precision, objectives and reliability of measurement (internet). Qualitative approaches, in contrast, gather data in a more open-ended fashion. Data collection usually occurs in natural settings, and focuses more on experiential or subjective aspects of a program. These data can include narrative accounts and may employ multiple data collection techniques (Worthen, Sanders & Fitzpatrick, 1997). Evaluators use qualitative designs to help them understand and describe program implementation, rather than to demonstrate statistically significant effects (internet).

#### **Content & Inductive approaches**

Content approaches involve identifying coherent and important themes and patterns in the data. The analyst looks for quotations or observations that go together. Practically, that means pulling together all the data that address a particular evaluation question and then, subdividing that data into coherent categories, patterns and themes (Patton, 1987).

Labeling the data and establishing a data index are the first steps in the Content Approaches. Then it is critical to have a classification system for the contents of the data. Organizing and simplifying the complexity of data into some meaningful and manageable themes or categories is the basic purpose of the Content Approaches (Patton, 1995). Generating useful and credible qualitative evaluation data through observation and interviewing, in the frame of content approaches, requires discipline, knowledge, training, practice and hard work (Patton, 1987).

In contrast with the Content Approaches, Inductive Approaches mean that the patterns, themes and categories of analysis come from the data. They emerge out of the data rather than being decided prior to data collection and analysis. The analyst looks for natural variation in the data.

For evaluators, the study of natural variations will involve particular attention to variations in program processes and the ways in which participants respond to and are affected by programs (Patton, 1995).

## **2.8.4 Program Evaluation Methodologies**

### **Efficiency Analysis**

Knowledge of the extent to which programs have been implemented successfully and the degree to which they have the desired outcomes is indispensable to program managers, stakeholders and policymakers. In almost all cases, however, it is just as critical to be informed about how program outcomes compare to their costs (Rossi & Freeman, 1993).

### **Cost – Benefit Analysis**

Cost-Benefit Analysis estimates and totals up the equivalent money value of the benefits and costs of projects to the community, in order to establish whether they are worthwhile.

In order to reach a conclusion, as to the desirability of a project, all aspects of the project, positive and negative, must be expressed in terms of a common unit. The most convenient common unit is money. This means that all benefits and costs of a project should be measured in terms of their equivalent money value. A program may provide benefits which are not directly expressed in terms of Euros but there is some amount of money the recipients of the benefits would consider just as good as the project's benefits.

Not only do the benefits and costs of a project have to be expressed in terms of equivalent money value, but they have to be expressed in terms of Euros of a particular time. This is not just due to the differences in the value of Euros at different times because of inflation. A euro available five years from now is not as good as a euro available now. This is because a euro available now can be invested and earn interest for five year and would be worth more than a euro in five years. If the interest rate is there then a euro invested for  $t$  years will grow to be  $(1+r)^t$ . Therefore the amount of money that would have to be deposited now so that it would grow to be one euro  $t$  years in the future is  $(1+r)^{-t}$ . This is called the “discounted value” or “present value” of a euro available  $t$  years in the future.



When the euro value of benefits at some time in the future is multiplied by the discounted value of one euro at that time in the future the result is discounted present value of that benefit of the project. The same thing applies to costs. The net benefit of the projects is just the sum of the present value of the benefits less the present value of the costs. The choice of the appropriate interest rate to use for the discounting is a separate issue.

If the discounted present value of the benefits exceeds the discounted present value of costs then the project is worthwhile. This is equivalent to the condition that the net benefit must be positive. Another equivalent condition is that the ratio of the present value of the benefits to the present value of the costs must be greater than one.

If there are more than one mutually exclusive project that have positive net present values then there has to be further analysis. From the set of mutually exclusive projects the one that should be selected is the one with the highest net present value.

Costs are either one-off, or they may be ongoing. Benefits are most often received over time. We build this effect of time into our analysis by calculating a pay-back period. This is the time it takes for the benefits of a change to repay its costs.

The impact of a project in the Cost-Benefit Analysis is the difference between what the situation in the study area would be with and without the project. This means that when a project is being evaluated the analysis must estimate not only what the situation would be with the project but also what it would be without the project. In other words, the alternative to the project must be explicitly specified and considered in the evaluation of the project. Note that the with-and-without comparison (ex ante evaluation) is not the same the before-and-after comparison (ex post evaluation).

### **Cost Effectiveness Analysis**

In contrast to Cost Benefit Analysis, Cost Effectiveness Analysis does not require the benefits and costs to be reduced to a common denominator. Instead, the effectiveness of a program in reaching given substantive goals is related to the monetary value of the costs (Levin, 1975).

In Cost Effectiveness Analysis, programs with similar goals are evaluated and the costs compared. Cost Effectiveness Analysis, thus, allows comparison and rank ordering of programs

in terms of their costs for reaching given goals, or the various outputs required for different degrees of goal achievement (Rossi & Freeman, 1993).

Cost Effectiveness Analysis is based on the same principles and utilizes the same methods as Cost Benefit Analysis. The assumptions of the method, as well as the procedures required for measuring costs and discounting, for example, are the same for both. Therefore, the concepts and methodology introduced previously with regard to Cost Benefit Analysis can also be regarded to as a basis for understanding the Cost Effectiveness Analysis (Rossi & Freeman, 1993).

### **Impact Analysis**

All impact assessments are comparative. Determining impact requires comparing, with as much rigor as it is practicable, the conditions of targets that have experienced an intervention with those of equivalent targets who have experienced something else (Rossi & Freeman, 1993).

Full coverage programs present special difficulties to evaluators attempting impact assessments, since there are no un-served targets available to use as controls. The only comparisons available to the researcher are between the same targets before and after exposure to the intervention, who are called reflexive controls (Rossi & Freeman, 1993).

Although few evaluation designs have as much intuitive appeal as simple before and after studies, they are among the least valid of assessments. The essential feature of this assessment is a comparison of the same targets at two points in time, separated by a period of participation in a program. The differences of the two measurements are taken as an estimate of the net effects of the intervention (Rossi & Freeman, 1993).

Another applicable design in the course of impact assessments is the Time Series Analysis. The Time Series Analysis involves many repeated measures. The measures are taken on an aggregate unit with many data points preceding and following the point in time at which a new full-coverage intervention was introduced or an old program was substantially modified. By “aggregate” statistical series, we mean periodic measures taken on a relatively large population (or parallel samples of it) as, for example, vital statistical series (births, deaths, migrations) (Rossi & Freeman, 1993).

Time Series Analysis is especially important for estimating the net impacts of changes in full coverage programs, particularly those that are delivered uniformly. For example, social security retirement payments are uniform for all persons with the same pre-retirement employment records. If retirement payments or sanctions for convicted felons are changed at some point of time, the impact of those changes can be studied through Time Series Analysis (Rossi & Freeman, 1993).

### **Planning Balanced Sheet**

Planning Balanced Sheet Analysis uses monetary units for the measurements. Time dimension and physical scales are added in the assessment, while equity principles are incorporated (KEPE, 1997). This analysis entitles the goals to be measured as a mirage of the preferences of the agents being surveyed. A main disadvantage is that a person is assumed to belong in only one group, while his other attributes may be omitted (KEPE, 1997).

### **Goal Achievement Matrix**

Goal Achievement Matrix is evaluating a program by appointing the extent of the objective goal's achievement. Likewise Planning Balance Sheet, Goal Achievement Matrix uses monetary units for the measurements. The novelty in this assessment is that the evaluator delectates the suppleness to examine each goal by several points of view, due to the form of the Matrix (KEPE, 1997).

### **Multicriteria Analysis**

Multicriteria Analysis takes into account the conflicts and reconciliations between refuted teams of interests (KEPE, 1997). According to (Nijkamp 1997) in his study Multicriteria Analysis inducts the Concordance Analysis, a three phase's process, for the confrontation of problems in Regional Planning. The process is summarized in the following steps: Some criteria are determined, grouped and compared per two. Then they are presented in a matrix in order to be calculated indicators of concordance or discordance. Nijkamp considers that, thereafter, Cost Benefit Analysis may be used in the calculating part of the assessment (KEPE, 1997).

Holmes (1972) proposes a process of ranking. The ranks of goals and criteria are determined in advance. The innovations that gather more ranks are the most prospective to be chosen. The

major disadvantage of Ordinal Ranking methods is that they comprise subjective elements (KAPE, 1997).

### **Triangulation**

Triangulation is referred to the use of different data collection techniques and different research strategies to study the same program. According to Patton (1995), the term Triangulation is derived from the geometric shape triangle. The triangle is the strongest of all the geometric shapes and triangulated evaluation designs are aiming at increasing the strength of any evaluation. It is in data analysis that this strategy of triangulation really pays off, but in this paper we will discuss about using multiple methods to study a program.

Triangulation is a powerful solution to the problem of relying too much on any single method and thereby undermining the validity and credibility of findings because of the weaknesses of any single method. Triangulation is the recognition that the evaluator needs to be open to more than one way of looking at the program (Patton, 1995).

Triangulation may be an ideal approach for evaluating a program. However, it is also very expensive. Most evaluation research involves quite limited budgets, short time frames and political constraints. In the reality of limited resources, attempts at triangulation may mean a series of poorly implemented methods rather than one approach well executed.

Besides, in the case of operational programs, (Economou 1997) reports that a “synergy of the evaluations” is necessary. Indeed, since the evaluation of a specific programme cannot include all related programmes, there are obvious limits to the autonomy of every single evaluation. This leads to the conclusion that the evaluations of the different programmes, even if they could follow a distinct time-table from an internal point of view, they have to obey to an overall co-ordination that will create the necessary inputs and outputs from/to the complementary interventions (Economou, 1997).

### **Mixing Analysis Approaches**

Triangulation is one way of increasing methodological power, while a second one is to borrow and combine parts from pure methodologies, thus creating mixed methodological approaches (Patton, 1995). We do believe that there are strengths and virtues in the ideal of pure

implementation of each approach. But there are also some important benefits to be gained by mixing methods and approaches. For example when dealing with a program in which some of the variables to be examined are unclear. It is possible to design an experimental design for collecting some qualitative open-ended data from the program participants.

The analyst may superimpose quantitative scales and dimensions onto qualitative data. Thus in the data analysis phase of a project the evaluator may decide to convert qualitative descriptions into quantitative scales that can be statistically manipulated.

A variety of mixes, then, may be done, mixes of data type, inquiry mode and analysis methods. In order to make the choices available more clearly, we list below some possible combinations for the creation of a flexible evaluation design (Patton, 1995):

1. Experimental Design – Qualitative Data Collection – Content Analysis
2. Experimental Design – Qualitative Data Collection – Statistical Analysis
3. Naturalistic Inquiry-Qualitative Data Collection – Statistical Analysis
4. Naturalistic Inquiry-Quantitative Measurement– Statistical Analysis

It should be mentioned that it is not possible to combine all the methodological approaches in a program. Certain designs pose constraints that exclude other possibilities. For instance, as mentioned above, it is possible to convert detailed qualitative descriptions into quantitative scales for the purposes of statistical analysis. However, it is not possible to work the opposite way, to convert purely quantitative methods into detailed, qualitative descriptions (Patton, 1995).

The choice of the appropriate methodological combination for the evaluation of a program depends on several factors, such as the purpose of the evaluation, what the stakeholders want to know, the funds available and the skills of the evaluator. It is certain that different methods produce quite different information. The challenge for the evaluator is to find out which information is most needed and most useful in a given situation, and then to employ those methods best suited to producing the needed information (Patton, 1995).

## **2.9 Domain and Utilization of ICT in Education**

The use of ICT in education lends itself to more student-centred learning settings. But with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the future. According to (Daniels, 2002) ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. (Pelgrum *et al* 2003) state that near the end of the 1980s, the term ‘computers’ was replaced by ‘IT’ (information technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the introduction of the term ‘ICT’ (information and communication technology) around 1992, when e-mail started to become available to the general public (Pelgrum, *et al* 2003). According to a United Nations report (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities.

According to (UNESCO, 2002) information and communication technology (ICT) may be regarded as the combination of ‘Informatics technology’ with other related technology, specifically communication technology. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs etc have been used in education for different purposes (Sharma, *et al* 2003).

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research (Yusuf, 2005). A great deal of research has proven the benefits to the quality of education (Al-Ansari, 2006). ICTs have the potential to innovate, accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Davis and Tearle, 1999). As (Jhurree, 2005) states, much has been said and reported about the impact of technology, especially computers, in education. Initially

computers were used to teach computer programming but the development of the microprocessor in the early 1970s saw the introduction of affordable microcomputers into schools at a rapid rate. Computers and applications of technology became more pervasive in society which led to a concern about the need for computing skills in everyday life. Technology in Schools: Education, ICT and the Knowledge Society” that ICTs have been utilized in education ever since their inception, but they have not always been massively present. Although at that time computers have not been fully integrated in the learning of traditional subject matter, the commonly accepted rhetoric that education systems would need to prepare citizens for lifelong learning in an information society boosted interest in ICTs (Pelgrum, *et al* 2003).

The 1990s was the decade of computer communications and information access, particularly with the popularity and accessibility of internet-based services such as electronic mail and the World Wide Web (WWW). At the same time the CD-ROM became the standard for distributing packaged software (replacing the floppy disk). As a result educators became more focused on the use of the technology to improve student learning as a rationale for investment. Any discussion about the use of computer systems in schools is built upon an understanding of the link between schools, learning and computer technology. When the potential use of computers in schools was first mooted, the predominant conception was that students would be ‘taught’ by computers (Mevarech & Light, 1992). In a sense it was considered that the computer would ‘take over’ the teacher’s job in much the same way as a robot computer may take over a welder’s job. (Collis 1989) refers to this as “a rather grim image” where “a small child sits alone with a computer”. However, the use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in education involves the adoption of general components of information and communication technologies in the teaching learning process.

ICT originally is applied to serve as a means of improving efficiency in the educational process (Jones and Knezek, 1993). Furthermore, it has been shown that the use of ICT in education can

help improve memory retention, increase motivation and generally deepens understanding (Dede, 1998). ICT can also be used to promote collaborative learning, including role playing, group problem solving activities and articulated projects (Forcheri, *et al* 2000). Generally, ICT is promoting new approaches to working and learning, and new ways of interacting (Balacheff, 1993). Whetston in his study noted that Majority of faculty members are major catalyst to promote the necessary changes (Whetston, 2001) and to equip students with the skills they are expected to have upon graduation (Brandi, 2004).

In higher education systems, there has been a significant shift in enterprise training policy in recent years (Bruce, *et al* 2002). In the other words, ICT learning and utilization is one of the most concerns of educational issues around the world and for a number of years there has been evidence in the training and development area (Edwards, *et al*, 2006). It is essential that the pedagogy of ICT becomes the main focus of staff development and this will have to build upon in a constructive manner in order to allow instructors to achieve the full benefits of using ICT in their daily tasks (McCarney, 2004). It is generally understood that university teaching and learning refers to both the contents (skills, understandings and values) and the processes of teaching in higher education. In the case of an institution's internationalization efforts, this may apply to both the 'what' and the 'how' of teaching and learning, usually with reference to educational borrowing or lending from international sources. Iranian universities like other higher education institutes in the region are in the process of internationalizing their respective curricula.

The recent century has been characterized with some new and outstanding technologies impacting human life, the most important of them is Information Technology. Researchers conducted in both developed and developing countries prove that the educational authorities in these countries among their other activities have given the priority of "ICT Literacy" through developing various educational programs (Tapscott, 1998; Currier, 2001). In the other words, ICT learning and utilization is one of the most concerns of educational authorities around the World and for a number of years there has been evidence that a training and development area, which may be labeled information literacy is being formed (Edwards, *et al.*, 2006). A variety of authors have surveyed the literature of educational technology in information skills teaching (e.g.



Joint *et al.* 2001). Broadly speaking, the literature reveals the importance of using ICT in teaching and learning purposes (Ayers, *et al.*, 2002).

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning and research (Yusuf, 2005). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Yusuf, 2005). In a rapidly changing world, basic education is essential for an individual be able to access and apply information. Such ability must find include ICTs in the global village.

Conventional teaching has emphasized content. For many years course have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies (Oliver, 2000).

The integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. In order to achieve such objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to (Zhao *et al.*, 2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential

quite significantly (Smeets, 2005). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. (Harris 2002) concludes that the benefits of ICT will be gained “when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001). Changed pool of teachers will come changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (Littlejohn *et al.*, 2002).

According to (Cabero, 2001), "the flexibilization time-space accounted for by the integration of ICT into teaching and learning processes contributes to increase the interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaborative learning". The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves & Jonassen, 1996), the influence of the technology on supporting how students learn will continue to increase. In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition.

Contemporary learning theory is based on the notion that learning is an active process of Constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy *et al*, 1996). In this domain learning is viewed as the construction of meaning rather than as the memorisation of facts (Lebow *et al*, 1993). Learning approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to

practice (Berge, 1998; Barron, 1998). As mentioned previously, any use of ICT in learning settings can act to support various aspects of knowledge construction and as more and more students employ ICTs in their learning processes, the more pronounced the impact of this will become. Teachers generate meaningful and engaging learning experiences for their students, strategically using ICT to enhance learning. Students enjoy learning, and the independent enquiry which innovative and appropriate use of ICT can foster. They begin to acquire the important 21st century skills which they will need in their future lives.

ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to improve the quality of learning. In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs (Moore & Kearsley, 1996). Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace.

One of the most vital contributions of ICT in the field of education is- Easy Access to Learning. With the help of ICT, students can now browse through e-books, sample examination papers, previous year papers etc. and can also have an easy access to resource persons, mentors, experts, researchers, professionals, and peers-all over the world. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002). Wider availability of best practices and best course material in education, which can be shared by means of ICT, can foster better teaching. ICT also allows the academic institutions to reach disadvantaged groups and new international educational markets. As well as learning at anytime, teachers are also finding the capabilities of teaching at any time to be opportunistic and able to be used to advantage. Mobile technologies and seamless communications technologies support 24x7 teaching and learning. Choosing how much time will be used within the 24x7 envelope and what periods of time are challenges that will face the educators of the future (Young, 2002). Thus, ICT enabled education will ultimately lead to the democratization of education. Especially in

developing countries like India, effective use of ICT for the purpose of education has the potential to bridge the digital divide.

People have to access knowledge via ICT to keep pace with the latest developments (Plomp, *et al* 2007). ICT can be used to remove communication barriers such as that of space and time (Lim and Chai, 2004). ICTs also allow for the creation of digital resources like digital libraries where the students, teachers and professionals can access research material and course material from any place at any time (Bhattacharya *et al* 2007). Such facilities allow the networking of academics and researchers and hence sharing of scholarly material. This avoids duplication of work (Cholin, 2005). ICT eliminating time barriers in education for learners as well as teacher. It eliminates geographical barriers as learners can log on from any place (UNESCO, 2002;).

ICT provides new educational approaches (Sanyal, 2001). It can provide speedy dissemination of education to target disadvantaged groups (UNESCO, *et al* 2002). ICT enhances the international dimension of educational services (UNESCO, 2002). It can also be used for non-formal education like health campaigns and literacy campaigns (UNESCO, 2002). Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems (Bottino, *et al* 2003). It improves the perception and understanding of the world of the student. Thus, ICT can be used to prepare the workforce for the information society and the new global economy (Kozma, 2005). According to (Plomp *et al* 2007) in his study he carried out he stated that the experience of many teachers, who are early innovators, is that the use of ICT is motivating for the students as well as for the teachers themselves. (Bottino 2003) in his study he founded that the use of ICT can improve performance, teaching, administration, and develop relevant skills in the disadvantaged communities. It also improves the quality of education by facilitating learning by doing, real time conversation, delayed time conversation, directed instruction, self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn (Yuen *et al*, 2003). A great deal of research has proven the benefits to the quality of education (Al-Ansari *et al* 2006). (Hepp, *et al*. 2004) state that the literature contains many unsubstantiated claims about the revolutionary potential of ICTs to improve the quality of education. They also

note that some claims are now deferred to a near future when hardware will be presumably more affordable and software will become, at last, an effective learning tool.

ICT provides opportunities to access an abundance of information using multiple information resources and viewing information from multiple perspectives, thus fostering the authenticity of learning environments. ICT may also make complex processes easier to understand through simulations that, again, contribute to authentic learning environments. Thus, ICT may function as a facilitator of active learning and higher-order thinking (Alexander, 1999). The use of ICT may foster co-operative learning and reflection about the content (Susman, 1998). Furthermore, ICT may serve as a tool to curriculum differentiation, providing opportunities for adapting the learning content and tasks to the needs and capabilities of each individual pupil and by providing tailored feedback (Mooij, *et al* 1999). As (Niederhauser *et al*, 1993) point out, ICT may fit into a spectrum of instructional approaches, varying from traditional to innovative. Another aspect which may of course influence the use of ICT is access to technology (Kennewell, *et al* 2000). This refers not only to the number of computers, but also to the placement of the equipment, e.g. in the classroom or in a computer room. Kennewell *et al.* (2000) feel it is essential that computers be placed in the classroom, in order to maximize the opportunities for curriculum activity. ICT environment improves the experience of the students and teachers and to use intensively the learning time for better results. The ICT environment has been developed by using different software and also the extended experience in developing web based and multimedia materials. ICTs have an important role to play in changing and modernizing educational systems and ways of learning.

ICTs can enhance the quality of education in several ways, by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner centered environment. ICTs, especially computers and Internet technologies, enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way. ICT has an impact not only on what students should learn, but it also plays a major role on how the students should learn. Along with a shift of curricula from “content-centered” to “competence-based”, the mode of curricula delivery has now shifted from

“teacher centered” forms of delivery to “student-centered” forms of delivery. ICT provides Motivation to Learn. ICTs such as videos, television and multimedia computer software that combine text, sound, and colourful moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become more involved in the lessons being delivered. Some of the parents of the respondents where this research was carried from opined that their children are feeling more motivated than before in such type of teaching in the classroom rather than the stereotype 45 minutes lecture. They were of the view that this type of learning process is much more effective than the monotonous monologue classroom situation where the teacher just lectures from a raised platform and the students just listen to the teacher.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

The chapter spells out the research design, area of study, sampling procedures, Data Collection Methods and Instruments and quality control methods. The students, teachers and administrators of YMCA comprehensive institute were the main target of data collection; this chapter also included the techniques for data analysis and interpretation.

#### **3.1 Research Design**

Research design is a detailed outline of how an investigation took place and it typically include how data was collected, what instruments was employed, how the instruments was used and the intended means for analyzing data collected.

The study was carried out using both qualitative and quantitative methods of data collection. A qualitative approach was employed because it allows one to use a general context and apply it to specific circumstances. On the other hand, this approach allows the researcher to focus “on a broad range of interconnected processes and causes.” But more pertinently to this study, a qualitative approach was used as it allows one to ask questions that cannot easily be put into numbers (Jasonhopper, 2011 Why do qualitative research?).

A quantitative approach was used because it provided information that can be expressed in numbers. But even more importantly, the approach allows one to use the data with statistical precision (Madrigal and McClain, 2012). An intervening approach was used to bridge the deficiencies that exist in one method employed in data collection.

Alexander (as quoted by Yeasmin and Rahman) has rightly observed that by combining different approaches, the researcher is able to “overcome the weakness or intrinsic biases and the problems that come from single-method, single-observer, and single-theory studies.”

#### **3.2 Research Strategy**

There are several strategies used in research approach namely: survey, case study, experimental, Action research etc.

### **3.2.1 Survey**

A survey is defined as a brief interview or discussion with individuals about a specific topic (Kowalczyk, 2015). It can also be defined as a collection of information. Survey can be carried in two ways namely: Questionnaires it is a series of written questions a participant answers. This method gathers responses to questions that are essay or agree/neutral/disagree style. Interviews are questions posed to an individual to obtain information about him or her. This type of survey is like a job interview, with one person asking another a load of questions (Kowalczyk, 2015).

In this study a survey strategy was employed where the researcher collected data using questionnaires. In this study the researcher used both quantitative and qualitative methods. Qualitative method was employed through open-ended questions and quantitative method was used by selecting sample of respondents from a selected population through the administration of questionnaire. There after the data collected was analyzed with software called spss. This research strategy was applied to my study because it allowed the researcher to use both questionnaires and interviews which eased her work.

### **3.2.2 Case study**

Case study is the method which enables a researcher to closely examine the data within a specific context. In most cases, a case study method selects a small geographical area or a very limited number of individuals as the subjects of study. Case studies, in their true essence, explore and investigate contemporary real-life phenomenon through detailed contextual analysis of a limited number of events or conditions, and their relationships (Yin 1984) case study can also be defined as a situation in which the researcher concentrates on an individual, small group or an organization and it's normally called descriptive research. In this case study data is normally collected by observation, participation and a range of other methods including examining existing records, interviews and tests. In this study this strategy was used where the researcher reviewed the existing records in literature review and tests were done at the end as validation. A number of interviews were carried on individual and group basis and a case study was selected which helped the research to concentrate on one unit or organization.



### **3.3 Area of Study**

The study was carried out in vocational training institutions particularly YMCA comprehensive institute Kampala.

### **3.4 Study Population**

The populations that the study targeted were Learners, the Teachers and the Administrators of ICT department in YMCA comprehensive institution Kampala. The population included 132 respondents from different levels of education from within ICT department of YMCA comprehensive institution.

### **3.5 Sampling Procedures**

It is the process of selecting a number of individuals for a study in such a way that the individuals selected represent the large group from which they were selected (Ogula, 2005). In this case the researcher used purposive sample from ICT department.

The sample population of my study was determined using the scientific table of (Krejcie & Morgan 1970) formula, used when the population size is known, the total number of students registered in the faculty of ICT at YMCA were 190 students and 10 staff members in ICT department which gave a researcher a sample of 132 respondents for the study. The researcher used students who are in second quarter, third and second year on morning session, we did not use students in first quarter because they have little knowledge about ICT utilization. Students and staff members were purposively selected from ICT department.

#### **3.5.2 Sampling Techniques**

A simple purposive technique was employed to select respondents from ICT departments and this involved choosing from students, teachers and administrators of institution who were in ICT department and easily accessible at the time of the study.

### **3.6 Data Collection Methods and Instruments**

Data collection Methods refers to the tools used in the collection of data and how each of the tools was developed. In this section, focus was put to methods used in collecting. Providing details on available sources of how ICT has been used in higher institution, since research was developed on an individual basis interview, Questionnaire and observation methods were used as follows;

### **3.6.1 Questionnaire**

This is a special purpose documents that allowed the researcher to collect information and opinions from respondents. The researcher administered a set of questionnaires to the selected respondents who answered the questions at their own time.

In this study the researcher used both open and close ended questions; Open ended allowed the researcher to freely express someone in his/her own words. And close ended allowed the respondents to choose an alternative that best corresponds to his/her situation. The researcher used Questionnaire as one of the instrument to collect primary data from vocational training institutions particularly YMCA comprehensive institute Kampala. However it had the disadvantages like; the numbers of respondents were often very low.

### **3.6.2 Interview**

Interview is a conversation between two or more people, the interviewer and the interviewee, it involves the interviewer asking questions to the interviewee to obtain information from the interviewee; the exercise helped to obtain details about the current framework in place and identify problems surrounding it. An oral interview was conducted. The researcher selected sample of staff on face to face basis. Both structured and unstructured questionnaires were used and this helped on information clarification. The advantage of this method were that they gave the researcher an opportunity to motivate the interviewee to respond freely and openly to questions and give the researcher an opportunity to observe interviewees on non-verbal communication.

### **3.6.3 Observation**

Observation as a method of data collection, involves the researcher with techniques of seeing directly with their own eyes what is on ground about what they are researching about in the area of their key study. Observation is physically watching what happens instead of relying on what someone reads or hears. This method helped the researcher to fill the gap that an interview and questionnaire processes left out. Data collected by observation method was highly reliable.

## **3.7 Quality Control Methods**

Data quality was controlled by taking into consideration of validity and reliability issues as explained below:

### **3.7.1 Validity**

Validity refers to the extent to which an instrument measures what is set out to measure (Gilbert, 1993). Validity is concerned with whether the findings are really about what they appear to be; whether the results correspond to or adequately capture the actual state of affairs. In practical terms, validity means whether the research results obtained can be generalized from the study group to other populations. To ensure validity, the researcher revised the questionnaire with the help of experts with experience and ensured that the sample size was representative enough of the study population.

### **3.7.2 Reliability**

In simple terms, reliability is the use of different instruments on the same person or group of persons but yielding the same results. Gilbert says that a study is said to be reliable if the results obtained are similar to those got by others using the same questions and the same sampling criteria (Gilbert, 1993). Joppe (2000) defines reliability as “the extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliable; and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.” To ensure that the results obtained in this study were reliable, the researcher did a pre-test in the neighboring vocational training institutions. Reliability was guaranteed if the results obtained in these other higher institutions were similar to those that were done at YMCA comprehensive institute.

### **3.8 Data Analysis**

In data analysis, the researcher utilized the instrument of questionnaires in view of collecting data. The researcher analyzed the data using a computerized data analysis tool SPSS (17.0).

### **3.9 Ethical Considerations**

Some Students at YMCA comprehensive institute according to my area of study were not familiar with the type of research that was conducted in the area. Thus, some of them were reluctant to divulge any information fearing for their privacy. The research clearly explained the purpose and significance of the research and assures the participants that their confidentiality was respected. All effort was put in place to build trust among the people especially by showing them the University’s letter of introduction and university identity card.

To avoid unethical behaviour, White (2002:27-28) presents the following ethical code of practice:

- Only involve people with their consent or knowledge.
- Participants should be given information about the research before the interview;
- Never coerce or persuade people to participate in research;
- Never withhold information on the true nature of the research;
- Tell the truth about the research and never deceive participants in any way;
- Never induce participants to do things which could destroy their self-confidence or self-determination;
- Never expose people to situations which could cause mental or physical stress;
- Respect a participant's right to privacy.

## CHAPTER FOUR PRESENTATION OF THE FINDINGS

### 4.0 Introduction

This chapter contains the results of the data that was gathered from the field. It focuses on the presentations, analysis and interpretation of data collected from the field. The purpose of this study was to propose the Frame work for evaluation of effective utilization of ICT in vocational training institution with specific reference to YMCA comprehensive institute Kampala. The findings are presented in line with the objectives of the research. Statistical tools such as frequency distribution tables and percentages were used to generate the results in this chapter.

### 4.1 Demographic Characteristics of Respondence Gender

The study sought to establish the distribution by gender of the respondents in selection of the sample. The sample population of the study was determined using the scientific table of Krejcie& Morgan (1970) formula, when the population size is known, a population of 200 was selected from YMCA and basing on the table it gave a sample size of 132 respondent including staff and students. Out of 122 questionnaires distributed to students only 108 responded and It was observed that majority (58%) of the respondents were male while 42% of the sample were female. The finding shows that a majority of the respondents were male, this was interpreted to mean that more males than females are admitted in ICT department at YMCA institution.

#### Source; field data

Table 1: What is your gender

	Frequenc y	Percent	Valid Percent	Cumulative Percent
Valid Male	63	58.3	58.3	58.3
Female	45	41.7	41.7	100.0
Total	108	100.0	100.0	

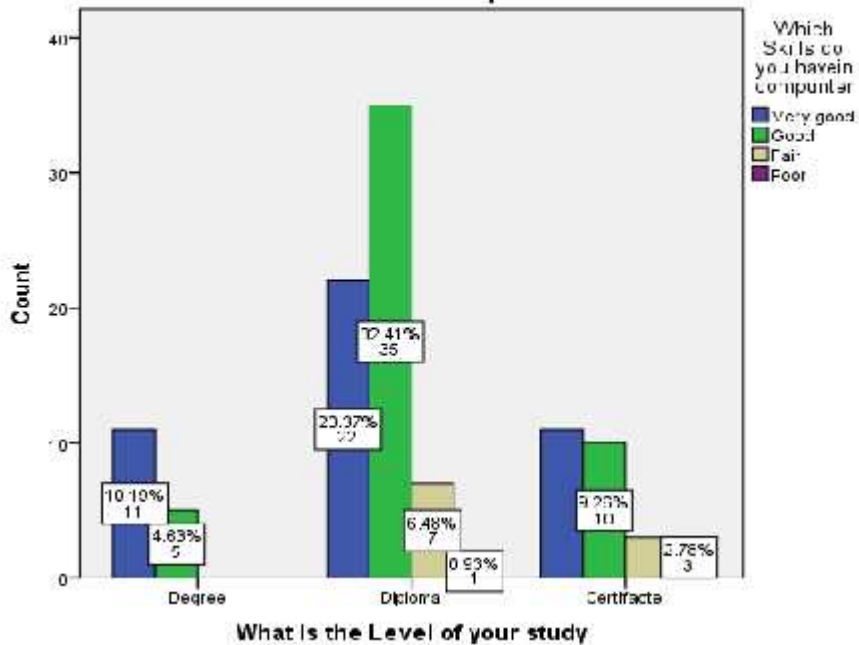
### Respondents Age

The researcher also endeavored to find out the age group which is more involved in ICT usage and the results revealed that the students between 18-25years are actively involved in using ICT

which gave 78 % of the respondents. This implies that ICT is effectively utilized since most students in vocational training institutions lie between that age group.

**Figure 2. Respondents Level of Study in relation with respondent’s computer skills**

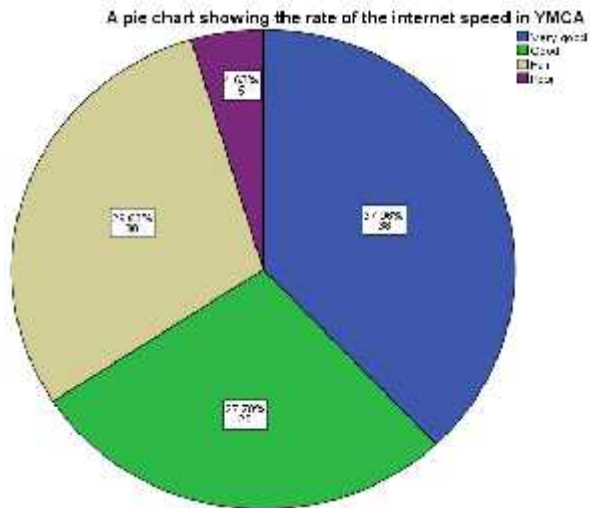
**Bar Chart showing the relationship between the level of study with the variation in the computer skills**



From the questionnaires submitted to different respondents in the study area it was ascertained that the majority of respondents 60% are pursuing a diploma, 20% and 32% have computer skills which constitutes a biggest percentage. By implication this implies that the majority of the respondents can efficiently use ICT tools since most respondents can operate computers. However basing on the bar graph above there is still need to do more training on the use of ict tools because on Diploma students 32 % have skills but there are not very good, 6% they skills are fair and 1% they have poor skills. And on students doing degree 5% they skills about ICT use are not very good and on certificate level most students lack skills on how to use ICT. Hence this implies that there is a need to propose a new framework for effective ICT utilization at YMCA institute.

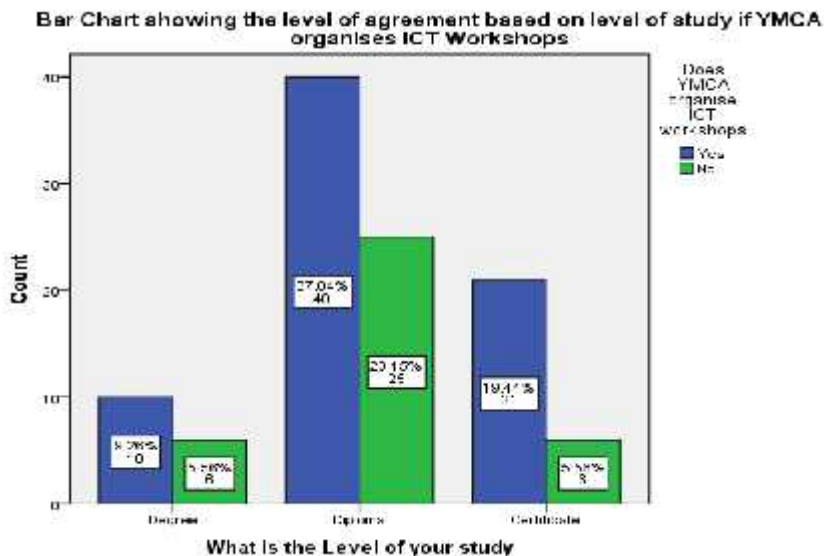
**Source; field data**

**Figure 3: How is the Internet speed?**



The researcher endeavored to find out the speed of internet from the selected area of study, the study findings showed that 65.74% (38 and 28) of the respondents resorted to good internet speed, this implies that ICT can be well utilized since internet is one of the core tools of ICT implementation. However 29.63% indicated that internet speed is fair and 4.63% indicated internet speed is poor; this implies that there is still limited internet speed which can hinder students from using ICT. **Source; field data**

**Figure 4: Does YMCA Organize ICT Workshops**



According to the study results, since the majority of the sample are pursuing a diploma, findings revealed that more than a half 60% of the respondents say in the selected study area there is conduction of ICT workshops. The potentials of ICT have been greatly exploited by most developed countries of the world as a tool of transformation of their education landscape at every level of education, especially the instructional process (Adeyemo1, *et al.* 2015), this means that students at YMCA have a broad chance of mastering ICT usage through attending and participating in the workshops hence leading to effective utilization of ICT resources. However 23% students in Diploma, 6% students in degree and 6% students in certificate indicated that there is no induction of workshops at the institute, this calls YMCA institute to organize more workshops so that ICT can effectively be utilized by both students and staff members.

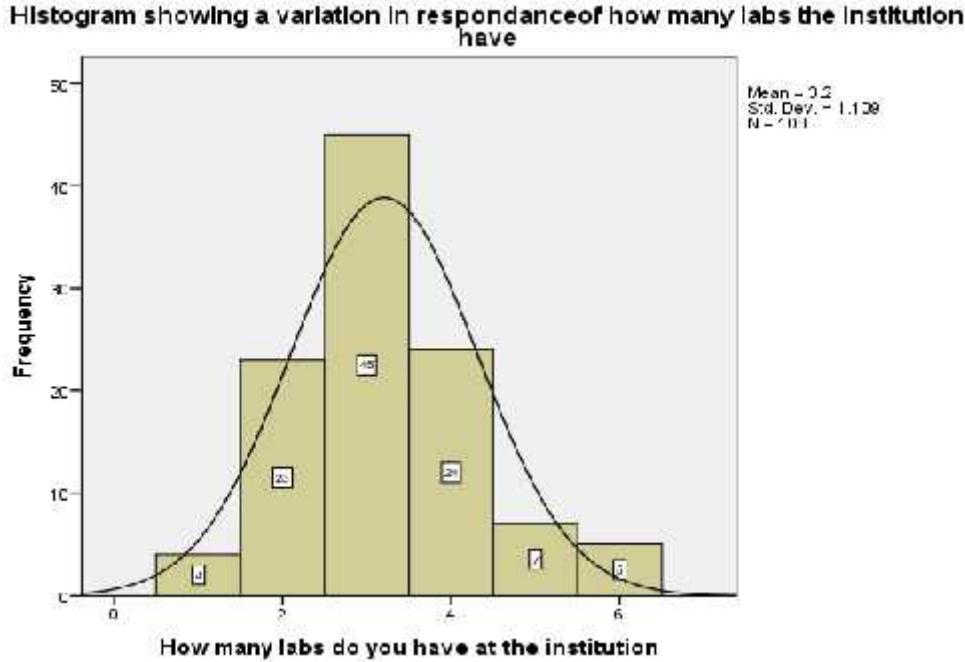
**Table 2: Where does the institution get power from?**

	Frequenc y	Percent	Valid Percent	Cumulative Percent
Valid Solar	11	10.2	10.2	10.2
Umeme	97	89.8	89.8	100.0
Total	108	100.0	100.0	

The topic under investigation required that the respondents to have their say on the type and source of power, in the table above the study findings revealed that all most all the respondents showed Umeme as their primary source of power which constituted 90% of the respondents resulting in a positive usage of computers due to the presence of power hence contributing to the ICT utilization. However in Uganda power is never reliable, most of the time it's on and off which can hinder ICT utilization in schools. Therefore to overcome that problem there is need to come up with other power sources like generator and solar which can be used incase power is off since it's not reliable.

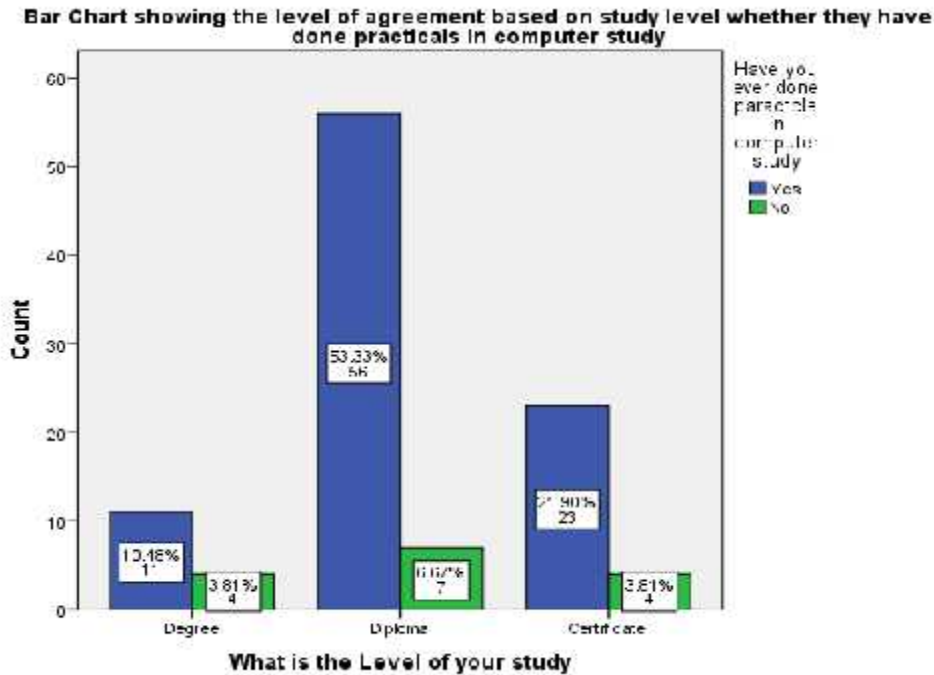


**Figure 5: How many Computer Labs does YMCA have?**



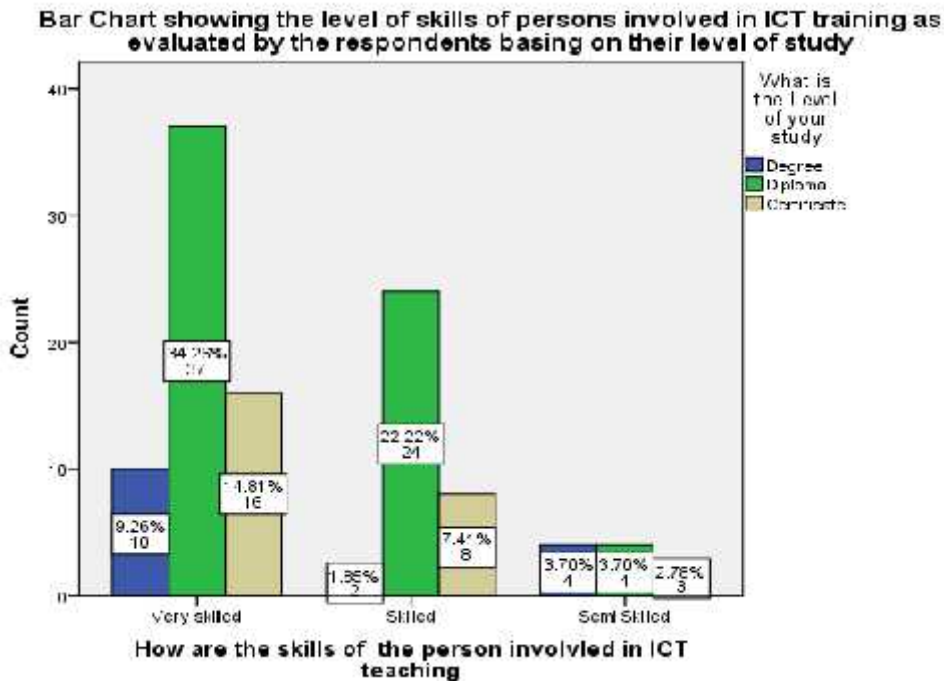
The study sought to establish the number of computer laboratories (45) of respondents from the selected study area revealed that they have 3 labs, 24 said 4labs and 23 said two labs, basing on this analysis it shows that there are at least between two to four computer labs which is an indicator of ICT implementation in the selected area of study. It can therefore be deduced that students under IT department are likely to perform better in terms of ICT implementation because they have space for practice. However those computer labs are still few according to the population at YMCA institute, so there is a need to construct more computer labs so that other students in different departments can also effectively use ICT tools.

**Figure 6: Have you ever done practicals in Computer Study**



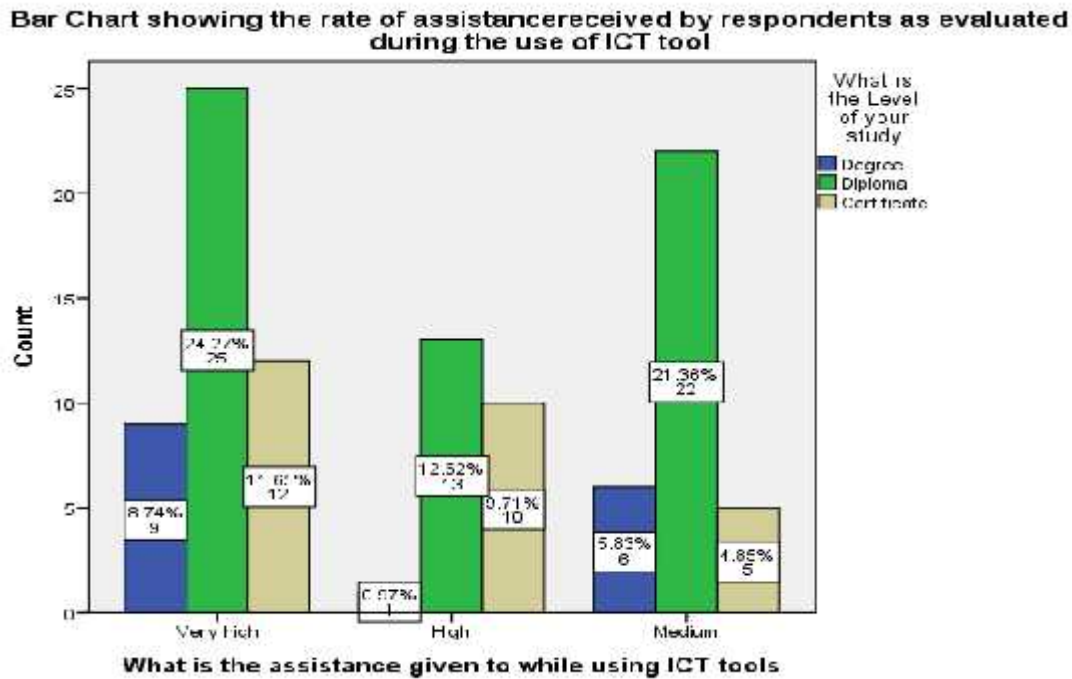
The success of this research could not be reached without investigating whether respondents could have ever done practical's in the selected area of study. Data was collected from the field and recorded as illustrated in the Table above. From all the courses, Majority of the respondents 89 (86%) responded that they have ever done practical's in computer study this by implication shows efforts by the institution towards ensuring ICT effectiveness as such, it is practically crucial to establish how technology is implemented in the learning institution, while conducting technology impact studies (Adedokun, 2011). However some students 7% in Diploma, 4% in degree and 4% in certificate claim that they had never done any practicals. This calls YMCA institute to organize ICT practicals for all students so that ICT can well be utilized at the institute. **Source; field data**

**Figure 7: The level of skills of Persons involved in teaching ICT**



The study sought to establish the level of skills of persons involved in teaching ICT courses in the selected area of study, basing on the bar graph above the findings revealed that 34% of the selected respondents agreed that the persons are very skilled which constituted a big percentage, more so the skilled constituted 22% when combined make a percentage 56%. The International Society for Technology in Educational (ISTE) “emphasizes that teachers of today should prepare to provide technology-based learning opportunities for their students” (Hamidi, et al. 2011). By implication ICT is well facilitated in the selected area of study. However 4% degree students, 4% diploma students and 3% certificate students declared that person in ICT teaching are semi skilled, this implies that there is still need to do more trainings on the person involved in ICT teaching. **Source; field data**

**Figure 8: The Assistance given during the use of Internet**



In the questionnaires submitted to different respondents in the selected area of study it is observed that 24% respondents from diploma reported very highly assisted when it comes to assistance while using internet, 21% diploma respondents reported medium on assistance, according to the analysis this implies users i.e. persons involved in training ICT are not motivated towards assisting because it would create a positive thinking if at least 50% had reported high or very high. Some of the perception of technology in teaching and learning held by the lecturers and students include; technology changes the nature of student/lecturer interaction, improves higher-order and critical thinking, improves quality education, transforms the learning environment into a learner-centered one, increases students' motivation and engagement, increases students' positive effects on learning, enhances students' assessment and independent learning, reduces both students and lecturers' burden, facilitates learning and enhances performance. (Adedokun, *et al.* 2013).

Table 3 The table below shows if there is any framework for evaluation of effective utilization of ICT at YMCA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	20	18.5	18.7	100.0
	No	87	80.6	81.3	81.3
	Total	107	99.1	100.0	
Missing	999	1	.9		
Total		108	100.0		

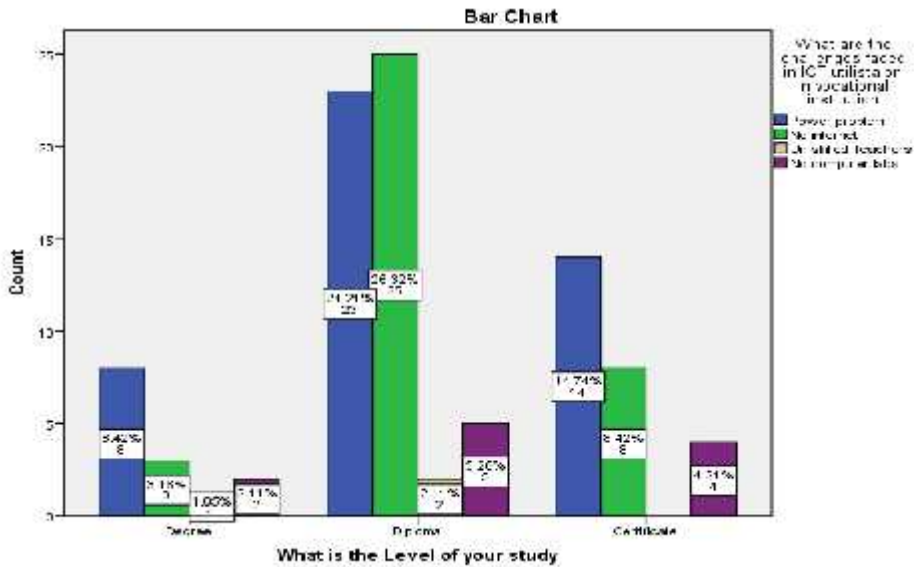
The above illustrates respondent's view about the frame work. Accordingly, majority of the respondents 81% said that no there is no frame work for evaluation of utilization of ICT, only 19% respondents said there is a framework for evaluation, This implies the selected area of study lack clear procedures on how to effectively utilize the available ICT resources **Source; field data**

Table 4:What are the challenges faced in ICT Utilization in vocational Institution Cross tabulation

**What is the Level of your study:**

Count

	What are the challenges faced in ICT utilization in vocational institution				Total
	Power problem	No internet	Un skilled Teachers	No computer labs	
What is the Level of Degree your study	8	3	1	2	14
Diploma	23	25	2	5	55
Certificate	14	8	0	4	26
Total	45	36	3	11	95



**Figure 9: showing the challenges faced by YMCA Institute**

The researcher endeavored to find out whether there are challenges facing the ICT utilization in vocational training institutions in the area of study, the study revealed that 24% reported that there is a power problem, 26% reported no internet for diploma respondents since the majority of respondents are pursuing a diploma, this has a direct impact on the ICT utilization in vocational

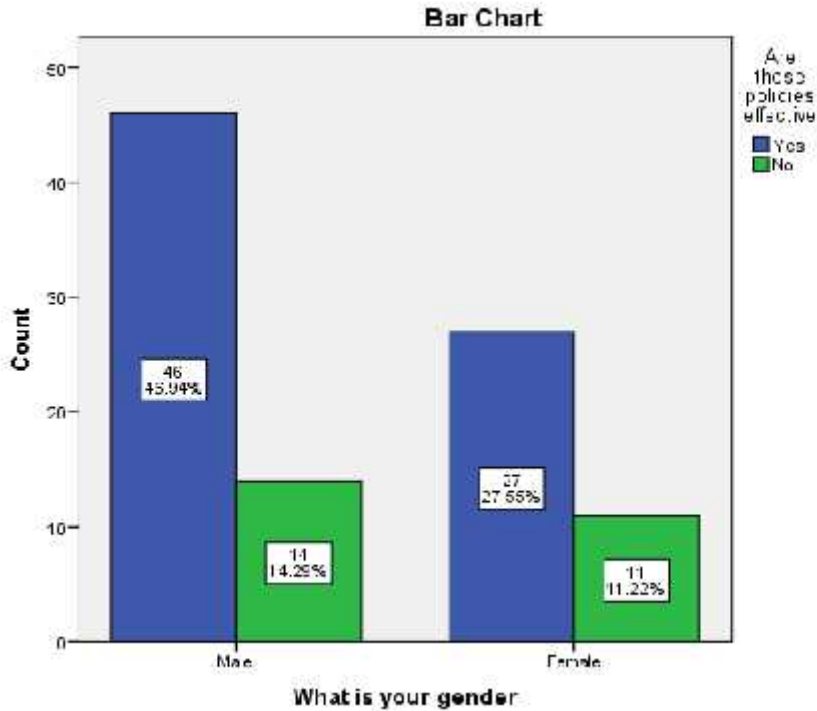
Training institutions especially the selected area of study it is practically crucial to establish how technology is implemented in the learning institution, while conducting technology impact studies (Adedokun, 2011). The results indicate tremendous factors that could be hindering the effective use of ICT in the institute. **Source; field data**

**Table 5 :Are there policies in ensuring effective Utilization of ICT**

	Are there policies in ensuring effective utilization of ICT		Total
	Yes	No	
What is your gender			
Male	48	13	61
Female	30	10	40
Total	78	23	101

According to the study results out of the total sample, more than half 77% respondents reported that there are policies in the selected area of study which constituted a biggest percentage. Kozma (2005) suggests some policy considerations for ICT integration in education can help in generating the desired outcome, by implication ICT resources are utilized effectively since guidelines or policies are in place. However 23% reported that they are no policies for ICT utilization, this implies that there is need for the top management to come up with a clear policy which can be used by both students and staff member to effectively use ICT.

**Figure 10: Are these Policies effective in ensuring utilization of ICT?**



The study sought to establish whether these Policies are effective in ensuring utilization of ICT, in the bar graph above, the findings revealed that more than half 77.49 (46+27) respondents report that the policies are effective in utilization of ICT services in the selected areas. However 14% male and 11% female reported that these policies are not effective in ensuring ICT utilization. Therefore this calls the top management to come up with a clear policy to ensure effective ICT utilization.



The information presented below shows respondents' views from YMCA on whether they do practicals

Table 6 :Do you do practicals as part of your tests?

Count

	Do you do practicals as part of your tests		Total
	Yes	No	
What is the Level of Degree your study	16	0	16
Diploma	63	2	65
Certificate	26	1	27
Total	105	3	108

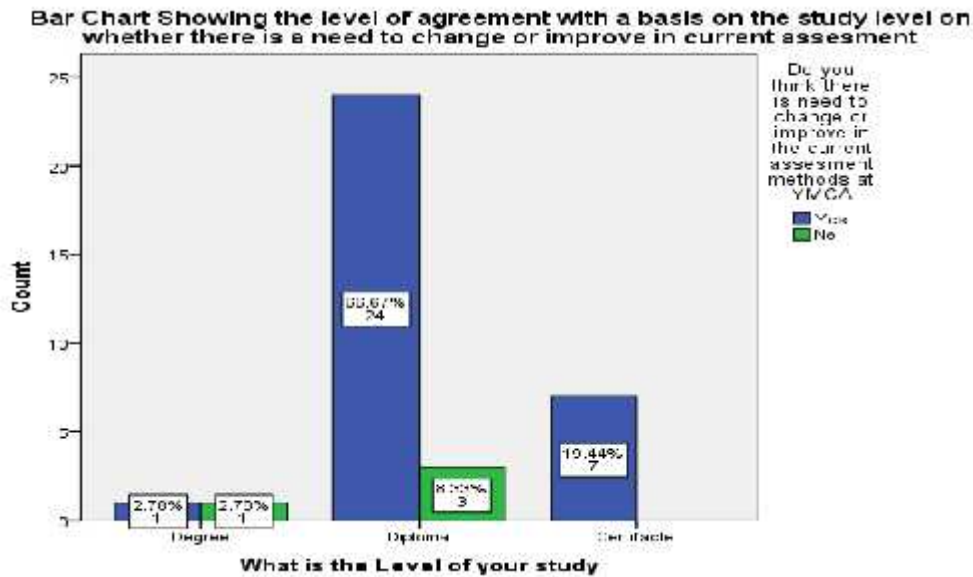
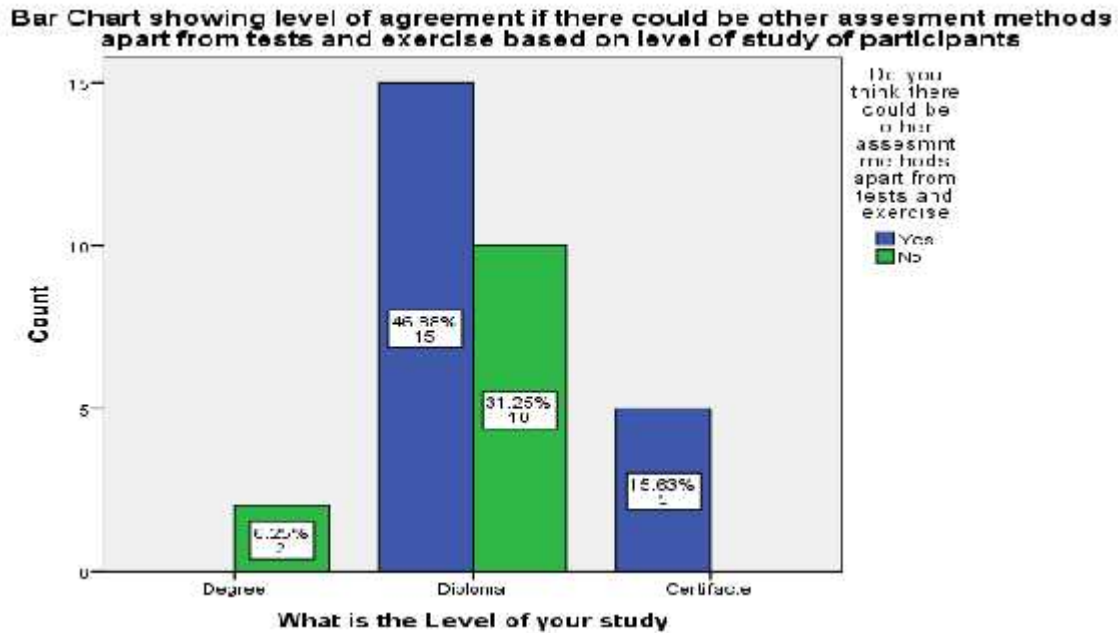


Figure 11: Showing whether there is need to change or improve in the current assessment

The researcher also endeavored to find out whether there is need to change or improve in the current methods of assessment at institute and the majority 67% respondents from diploma class

said yes and 19% respondents from Certificate also said yes. This implies that there is need to come up with new assessment methods which will help the institution to have effective ICT utilisation. **Source:Field Data**

**Figure 12: Shows if there could be other assessment methods**



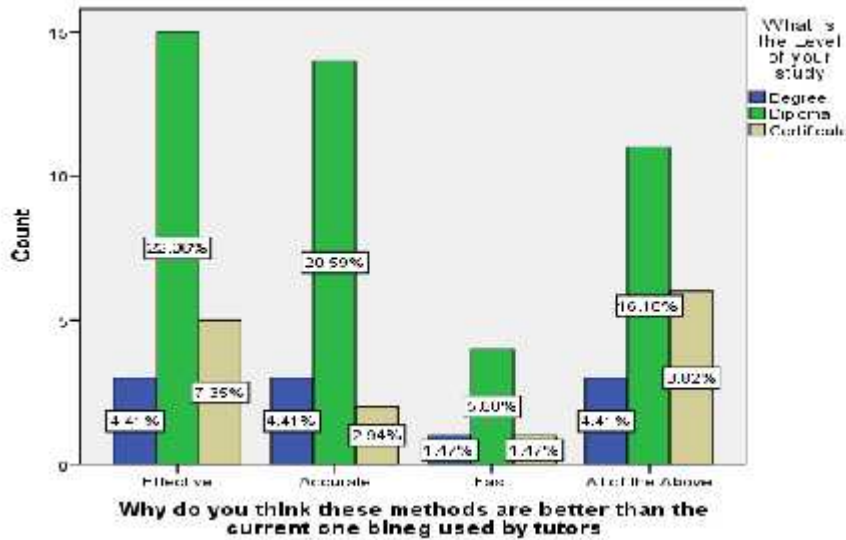
The researcher also endeavored also to find out whether there could be other methods of assessment at institute and the majority 47% respondents from diploma class said yes and 31% respondents from Certificate also said yes. This prompted the researcher to ask respondents about the assessment methods which can be introduced to assess students and several assessment methods were given by students as they are in the table below.

Table 7 : Shows other assessment methods which can be used by YMCA

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	83	76.9	76.9	76.9
After the topic covered	2	1.9	1.9	78.7
Assignments	2	1.9	1.9	80.6
Doing practicals	1	.9	.9	81.5
By doing Course work	1	.9	.9	82.4
online exercise	3	2.8	2.8	85.2
Discussions	3	2.8	2.8	88.0
E-learning	2	1.9	1.9	89.8
Giving assessment tests to students during every ICT practical lecture other than giving students test	2	1.9	1.9	91.7
Giving them exercises	1	.9	.9	92.6
Individual presentations	1	.9	.9	93.5
Monitoring	3	2.8	2.8	96.3
Online studying	1	.9	.9	97.2
Seminars and workshops	1	.9	.9	98.1
Use of group works as in making discussion groups	2	1.9	1.9	100.0
Total	108	100.0	100.0	

The extract from the input of respondents that highlight on the different method that are used in assessment by the teachers from exercises and tests.

**Figure 13: Shows if the proposed methods are better than the current one used**



Of the respondents based on their level of study, there is an agreement that supports the reliability of the different methods.

**Table 8 : showing the tools used by the respondents**

what are some of the tools you use as a person	Others	How many times used	Percentage based on respondents N %	Percentage based on Responses %
Others	0	0	0.0%	0.0%
Modem	3	3	37.5%	12.0%
Satellite	0	0	0.0%	0.0%
Decoder	2	2	25.0%	8.0%
Printer	6	6	75.0%	24.0%
Projector	6	6	75.0%	24.0%
Computer	8	8	100.0%	32.0%
Total	8	8	100.0%	100.0%

- 8 respondents have mentioned at least one tool that they used
- All 8 respondents indicated that computer was an important tool to use.
- At least 6 respondents noted that a projector and printer is so useful tool. That is 75% of all people who responded and it is 24% of all the answers given.
- In total the 8 respondents have ticked  $3+2+6+6+8=25$  tools. So almost everyone did indeed tick two or more options.

Table 9 : showing how ICT tools are used

		How many times was this tool used	Percentage based on respondents N %	Percentage based on Responses %
How do you use the ICT tools	Teaching	5	62.5%	29.4%
	Storing students data	7	87.5%	41.2%
	Searching for teaching materials	3	37.5%	17.6%
	Entertainment	2	25.0%	11.8%
	Others	0	0.0%	0.0%
	Total	8	100.0%	100.0%

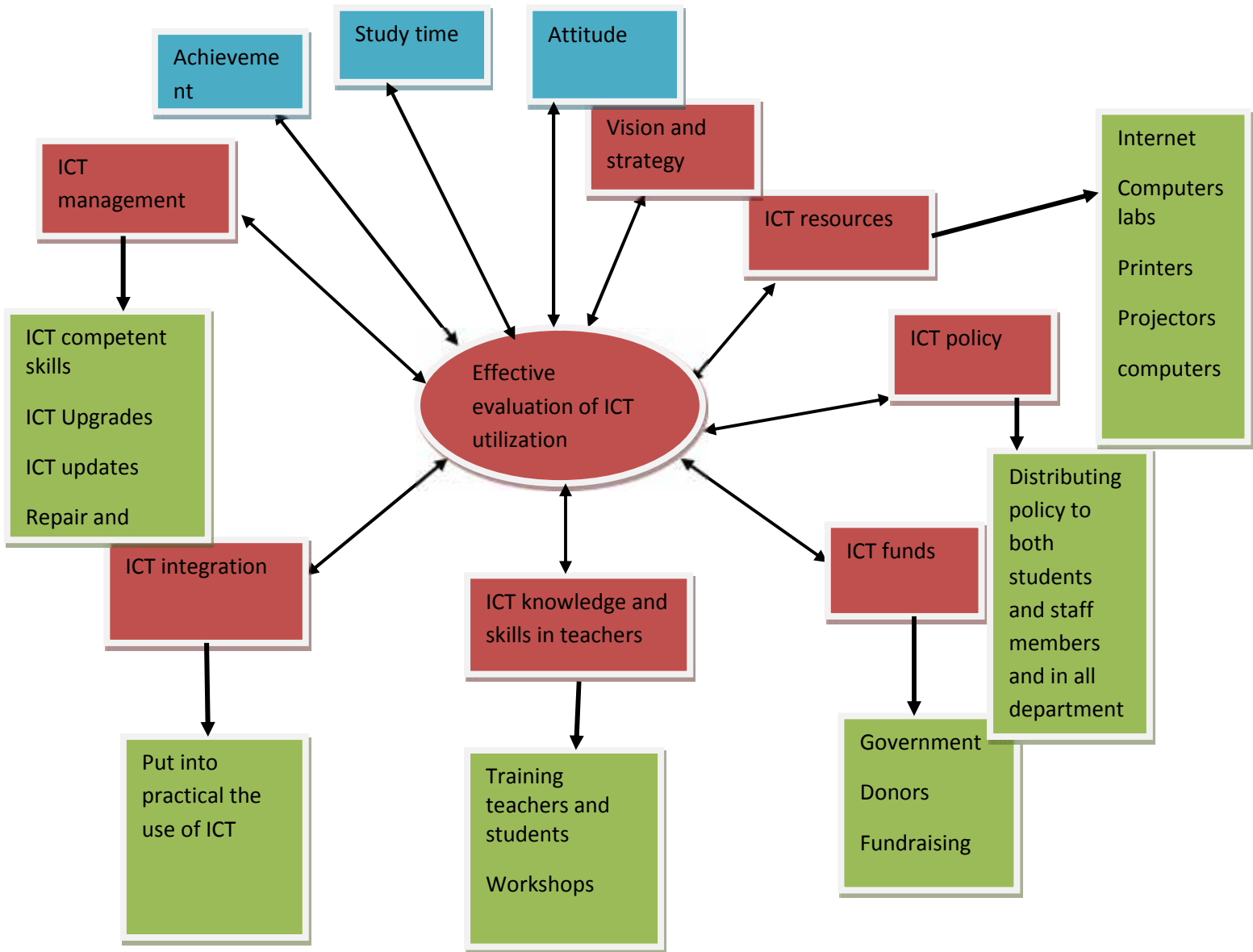
It was noted that the important ICT tools are used for “Storing students data” selected/picked by 7 of the respondents that is 87.5% of all people who responded and it is 41.2% of all the answers given.

**Proposed framework for evaluation of effective utilization of ICT in Vocational training institutions.**

When selecting these evaluation components I was informed by Framework in literature review which is a framework to examine the effectiveness of ICTs in TVET. In this framework they considered only three elements namely: achievement, study time and attitude but when you look deep into effective of ICT utilization they were a big gap in this framework which needed to be

filled, that's why I decided to come up with this new framework to include what was missing. And this new framework addressed such components which were missing in that framework which informed me.

**Figure 14: shows the proposed framework**



For ICT to be effectively used in vocational training institutions in Uganda particularly YMCA comprehensive institution there is a need for YMCA to come up with a clear vision for ICT which can help in strategizing ICT in an institution. A good policy for ICT should be formulated in an institution in order for ICT to be used effectively in YMCA institute. There should be a

provision of funds from government, donors and other well wishers to support ICT at YMCA. The integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. The researcher emphasized that in order ICT to be effectively used in vocational training institution and particularly YMCA teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and lastly teachers should believe that they have control over technology.

### **Validation of the framework**

The researcher wanted to know whether the proposed framework would work for the selected school and to validate that, the study set a number of questions to five experts from ICT Department in which most of the responses were positive towards the new frame work. This proved the validity of the proposed framework.

From the questionnaires distributed to the ICT experts, four of experts said that it's very good to have an ICT policy in vocational training institutions and particularly YMCA comprehensive institution. The institution must have an ICT Policy which can give guidelines and procedures for implementing ICT utilization and strategizing it. To study this implies that the proposed framework is very vital for ICT utilization especially in Vocational training institutions.

The researcher sought also to know whether conduction of workshops and trainings are of important to the institution and the results from ICT experts revealed that 3 from respondents said that it is very good to carry out trainings and workshops, because it helps both staff members and students to get the desired skills and it can help someone to become more competent in using ict. This implies that the proposed framework can work since workshops and trainings are very essential in the evaluation of effective ict utilization.

From the questionnaires submitted to the ICT experts the results from respondents shows that 4 said that it is very good to consider the source of funds when evaluating effective utilization of ict in vocational training institutions. When looking at ict utilization in schools you have to look

where the institution is going to get the funds from. For instance is that institution capable enough to provide for itself, is it from government, donors or by fundraisings. This implies that its very vital to know the source of funds for easy evaluation of ict utilization in schools.

From the five questionnaires distributed to the experts 4 of the respondents said that it's very good to know or consider the ict resources which are available for evaluation of effective ict utilization. In this case you need know the resource available if they are enough for the institution population, for instance labs, computers, internet etc.



## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS**

#### **5.0 Introduction**

This chapter covers summary of the study findings, conclusions and recommendations for possible interventions.

#### **5.1 Summary of findings**

This study was carried from YMCA comprehensive institute and the topic was a framework for evaluation of effective ICT utilization in vocational training institutions. The purpose of this study was to propose a framework for evaluation of effective utilisation of ICT in Vocational Training Institutions and its specific objectives one was to review existing frameworks and determine the requirements of the frameworks, the second was to propose the framework for effective evaluation of ICT in Vocational Training Institutions and the last was to validate the proposed framework.

From the study the first objective which was to review the existing frameworks and determine the requirements of framework was done where the researcher reviewed six frameworks in chapter two and one framework was selected which informed the researcher to come up with new framework. The requirements for frameworks where determined where the research considered ICT policy, Resources, management, vision and strategy and ICT funds as the major requirements for effective evaluation of ICT in schools

The second objective was to propose the framework for effective evaluation of ICT utilization in Vocational Training Institutions and the researcher was able to come up with a frame work basing on the existing framework and this proposed framework is at the end of chapter four.

The third objective was to validate the proposed framework. The researcher validated the framework by setting five questions to top members of YMCA institution which included the principal, academic registrar, ICT department head, system administrator and one lecturer from

ict department who answered the questions for validation and a big number responded positively towards the proposed framework.

### **5.3 Conclusion**

This study aimed at proposing the Frame work for evaluation of effective utilization of ICT in vocational training institution particularly, YMCA comprehensive institute. From the findings, this study came up with the following conclusion: six frameworks were reviewed and requirements of the frameworks were determined namely: ICT policy, vision and strategy, ICT management, ICT funds, ICT infrastructure and resources, ICT integration, ICT trainings and workshops and ICT professional development. Anew framework for evaluation of effective utilization of ICT in vocational training institution was proposed basing on one of the framework the researcher reviewed and it was validated using five members from top staff.

### **5.4. Recommendations**

#### **An ICT policy should be adopted.**

Basing on the frameworks the researcher reviewed, much emphasis was put on ICT policy for ICT to be effectively utilized in schools. So I recommend YMCA institute to have a well defined ICT policy which addresses ICT vision and strategy, ICT Infrastructures, funds, ICT management, ICT trainings and workshops and competent teachers for ICT.

#### **A proposed framework should be adopted**

From the findings majority of the respondents 81% revealed that YMCA institute is lacking a framework for effective ICT utilization. So I recommend YMCA institute to adopt the proposed framework which addresses ICT policy, ICT management, ICT funds, teachers training and workshops and ICT vision and strategy.

#### **Conduct teachers Assessments and students based assessments**

A fairly simple practice to implement at the institute is teacher self assessments to get each teacher's perspective on his or her performance. This is a powerful way to give educators a voice in the evaluation process and help them feel more engaged. Teacher's assessment should be done regularly to encourage teachers to work hard to achieve effective ICT utilization.

Classroom based assessments can be adapted to students' varying needs while maintaining high standards. Assessing extended work, such as research projects, exams, tests and practical's.

### **5.3 Limitations of the study**

The researcher's challenge was to ensure that the results of the study obtained in higher institution at YMCA comprehensive institute Kampala was easily applied in other institution in the country, since the geo-social, economic and political situations is different. This limitation was overcome by ensuring a representative sample size of the population.

The study was carried out mainly in urban setting. The limitation of the study was whether the results obtained in this kind of setting was easily applied to higher institutions in rural settings. This limitation was overcome by making pre-tests with questionnaires and interviews in higher institutions of rural settings.

### **5.4. Suggestions for further study**

A similar study should be carried out to assess the impact of teacher's assessment on effective utilization of ICT at YMCA comprehensive institute.

## REFERENCES

- Albirini, A. (2006). Teachers' Attitudes toward Information and Communication Technologies. *Journal of Computer & Education*, 47, 373-398.
- Almusalam, S. N. (2001). Factors related to the use of computer technologies for professional tasks by business and administration teachers at Saudi technical colleges. (Doctoral Dissertation, the Ohio State University, 2001). ProQuest Digital Dissertations (UMI No. AAT 3011019).
- Anderson, R. E., & Dexter, S.L. (2000). *School Technology Leadership: Incidence and Impact (Teaching, Learning, and Computing: 1998 National Survey Report#6)*. Irvine, CA: Center for Research on Information Technology and Organizations, University of California, Irvine.
- AUU, 2016. *Why So Few? Women in Science, Technology, Engineering, and Mathematics*, retrieved online on 12<sup>th</sup> October 2016 at 5:00pm from <http://www.aauw.org/research/why-so-few/>.
- Barker, P. (1999). Using intranets to support teaching and learning. *Innovations in Education and Training International*, 36(1), 3–10.
- Bauer, J., & Kenton, J. (2005). Technology integration in the schools: Why it isn't happening. *Journal of Technology & Teacher Education*, 13, 519-526.
- Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology using classrooms?. *Computers & Education* 39, 395–414.
- Becker H. J. (2001). How Are Teachers Using Computers for Instruction? Paper presented at the 2001 Annual Meeting of the American Educational Research Association, Seattle, March 2001.
- Benzie, D. (1995). IFIP Working Group 3.5: Using Computers to Support Young Learners. In J.D.Tinsley & T.J. van Weert (Eds.), *World Conference on Computers in Education VI: WCCE' 95 Liberating the Learner* (pp. 35-42). London: Chapman & Hall.
- Bosley, C. & Moon, S. (2003). Review of Existing Literature on the Use of Information and Communication Technology Within an Educational Context. Centre for Guidance Studies, University of Derby.

Brownell, K. (1997). Technology in Teacher Education: Where Are We and Where Do We Go From Here? *Journal of Technology and Teacher Education*, 5 (2/3), 117- 138.

Butler, D. & Sellbom, M. (2002). Barriers to Adopting Technology for Teaching and Learning, *Educase Quarterly*, 25 (2), 22-

28. Demetriadis, S., Barbas, A., Molohides, A., Palaigeorgiou, G., Psillos, D., Vlahavas, I., Tsoukalas, I., & Pombortsis, A. (2003). ‘‘Culture in negotiation’’: teachers’ acceptance/resistance attitudes considering the infusion of technology into schools. *Computers & Education*, 41, 19–37.

Chiller, J. (2003). Working with ICT Perceptions of Australian Principals. *Journal of Educational Administration*, 41(2), 171-185.

Christi Corbert, 2016, *why so few women in science, technology and engineering*, source internet accessed on 1<sup>st</sup> September 2016 at 6:00pm from <http://www.aauw.org/resource/why-so-few-women-in-science-technology-engineering-mathematics/>.

Dillon, A., & Morris, M. G. (1996). User Acceptance of Information Technology: Theories and Models. *Annual Review of Information Science and Technology*, 31, 3-32

Dockstader, J. (1999). Teachers of the 21st century Know the What, Why, and How of Technology Integration. *T.H.E. Journal*, 73-74., January

Dooling, J. O. (2000). What Students Want to Learn about Computers. *Educational Leadership*, 53, 20-24.

Drent, M. (2005). In Transitie: Op Weg Naar Innovatief ICT-gebruik op de PABO [In transition: On the road to innovative use of ICT in teacher education] (doctoral dissertation). Enschede: University of Twente. [20] *Journal of Research on Computing in Education*, 32 (1), pp. 54-72.

Evans, M. (2002). Open Windows: Becoming an e-learning School. National College for School Leadership (NCSL)

Drent, M. (2005). In Transitie: Op Weg Naar Innovatief ICT-gebruik op de PABO

Drent, M., & Meelissen, M. (2007). Which Factors Obstruct or Stimulate Teacher Educators to Use ICT Innovatively? *Journal of Computers & Education*, (ARTICLE IN PRESS)

ECONOMOU D. (1997), The intermediate evaluation of the second Regional Operational Programme of Thessaly, 1997.

Edreform studies, 2001, *Using Technology to Support Education Reform -- September 1993*, src internet accessed on 16<sup>th</sup> September 2016 from [Using Technology to Support Education Reform -- September 1993](#).

Edutopia, 2008, why is assessment important, Src internet, accessed on 23<sup>rd</sup> September 2016 from <https://www.edutopia.org/assessment-guide-importance>.

EUROPEAN COMMISSION (1999), *Evaluating socioeconomic Programs-principal evaluation techniques and tools vol.3*, Office of Official Publications of the European Communities, Luxembourg, 1999.

EUROPEAN COMMISSION (1999), *Evaluating socioeconomic Programs-principal evaluation techniques and tools vol.3*, Office of Official Publications of the European Communities, Luxembourg, 1999.

Free Dictionary, 2016, *definition of utilization* Accessed online on 23<sup>rd</sup> June 2016 at 2:12pm from <http://www.thefreedictionary.com/utilisation>.

Grabe, M., & Grabe, C., (2001), *Integrating Technology for Meaningful Learning*. Houghton Muffin Company. USA.

Grabe, M., & Grabe, C. (2001). *Integrating Technology for Meaningful Learning*.

GRAMLICH E. M. (1990), *A guide to benefit-cost analysis* (2nd ed.), NJ: Prentice Hall, Englewood Cliffs, 1990.

Granger, C. A., & Morbey M. L. (2002). Factors Contributing to Teachers' Successful Implementation of IT. *Journal of Computer Assisted Learning*, 18, 480-488.

- Hamidi, F., M. & Meshkat, et al. (2011) Information technology in education, *Procedia Computer Science* 3: 369-373.
- Harrison, A. W. & Rainer, R. K. (1992). *The Influence of Individual Differences on Skill in End-User Computing*. *Journal of Management*
- HILL, (1968) A Goals Achievement Matrix for Evaluating Alternative Plans, *Journal of the American Institute of Planners*, 34, no 1, 1968, p.p. 19-28.
- HOLMES J. C. (1972), An Ordinal Method of Evaluation, *Urban Studies*, 9, no 2, p.p. 179-191.
- KEPE, Reports 28 (1997). *Assessment Study of the Regional Corporate Programs and the European Structural Fund 1994-1999*, Athens, 1997 (In Greek).
- Hruskocy, C., Cennamo, K. S., Ertmer, P. A. & Johnson, T. (2000). *Creating a* Jonassen, D.H., & Reeves, T.C. (1996). *Learning with Technology: Using Computers as Cognitive Tools*. In D.H Jonassen (Ed.), *Handbook of research for educational communication and technology* (pp. 693-719). New York.:Simon and Schuster.
- Ihmeideh, F. M. (2009). *Barriers to the Use of Technology in Jordanian Pre-School Settings*. *Technology, Pedagogy and Education*, 18(3), 325-341.
- Implementation Strategies in Australia, Canada, Finland and Israel*. Ministry of Education, Luxembourg. Roberts, S. K., Hutchinson, C. J. & Little, M. (2003). *Making the Invisible Visible and Back Again: Highlighting technology in an integrated curriculum for preservice teachers*. *Journal of Computing in Teacher Education*, 19, 73-81.
- Inezek, G. & Christensen, R. (2002). *Impact of New Information Technologies on Teachers and Students*. *Education and Information Technologies*, 7(4), 369–376.
- Innovation platform, 2010, skilled labour, source internet retrieved on 11<sup>th</sup> September 2016 at 2:00pm from <https://www.innovationpolicyplatform.org/content/skilled-labour>.
- Investor's words, 2016, *definition of utilization* Accessed online on 23<sup>rd</sup> June 2016 at 2:00pm from <http://www.investorwords.com/11444/utilisation.html>.
- Kington, A., Harris, S. & Leask, M. (2002). *Innovative Practice Using ICT in Schools : Findings from two Case Studies*. *Management in Education (MIE)*, 16 (1), pp. 31-34.

Kluever, R. C., Lam T. C., Hoffman, E. R., Green, K. E., & Swearingen, D. L. (1994). The Computer Attitude Scale: Assessing Changes in Teachers' Attitudes Toward Computers. *Journal of Educational Computing Research*, 11(3), 251-261.

Kortecamp, K. & Croninger, W. R. (1996). Addressing Barriers to Technology Diffusion. *Journal of Information Technology for Teacher Education*, 5 (1/2), 71-82.

Kozma, R. B. (2003). Technology and classroom practices: An international study. *Journal of Research on Technology in Education*, 36(1), 1-14.

LAGOS D. & LIANOS D., (2000) The scientific approach of Greek Regional Planners Association for the evaluation of developmental programs, in proceedings Evaluation of Operational Programs-Means-Methods-Techniques, Greek Regional Planners Association, Athens, 2000.

LEVIN H. M. (1975), Cost-Effective Analysis in Evaluation Research, in GUTTENTAG M. and STRUENING E. L. (eds.), *Handbook of Evaluation Research*, vol.2, Sage, Beverly Hills, 1975.

LICHFIELD N. et al. (1975), *Evaluation in the Planning Process*, Pergamon Press, Oxford, 1975.

MOHR L. B., (1995) *Impact Analysis for program evaluation* (2nd ed.), Sage, California; London; New Delhi, 1995.

Margo, J., M. Benton, K. Withers and S. Sodha (2008), *Those Who Can?*, Institute for Public Policy Research (IPPR) Publications.

Mojgan Afshari, Kamariah Abu Bakar, Wong Su Luan, Bahaman Abu Samah & Foo Say Fooi  
*International Journal of Instruction* January 2009 Vol.2, No.1 ISSN: 1694-609X www.e-iji.net  
Faculty of Educational Studies, Universiti Putra Malaysia, Malaysia

*Nigerian Journal of Social Studies and Civic Education*, Vol. 2 (1), 2012, *utilization of information and communication technology (ict) in teaching and learning of social studies*  
Accessed online on 10<sup>th</sup> May 2016, at 5:35pm

NIJKAMP P., (1975) A Multicriteria Method of Project Evaluation, *Papers of the Regional Science Association*, 45, 1975, p.p. 87-114.



OECD (2005), *Teachers Matter: Attracting, Developing and Retaining Effective Teachers*, OECD, Paris.

PATTON M. Q., (1987) *How to use qualitative methods in Evaluation*, Sage, Newbury Park; London; New Delhi, 1987.

PATTON M. Q., (1986) *Utilization – Focused Evaluation*, Sage, London, 1986.

Plomp, Tj., ten Brummelhis, A.C.A., & Rapmund, R. (1996). *Teaching and Learning for the Future. Report of the Committee on MultiMedia in Teacher Training (COMMITT)*. Den Haag: SDU.

Pont, B., D. Nusche and H. Moorman (2008), *Improving School Leadership, Volume 1: Policy and Practice*, OECD, Paris.

Reference, 2016, *what is the importance of the Internet to education*, retrieved on internet on 9<sup>th</sup> October 2016 at 6; 00pm from <https://www.reference.com/technology/importance-internet-education-d8d85719d19077c8>.

Rogers, E. M. (1995). *Diffusion of Innovations* (4th Ed.). New York: The Free Press.

Rosenthal, I. G. (1999). *New Teachers and Technology: Are They Prepared?* *Technology and Learning*, 19 (8), 22-24, 29-28.

ROSSI P. H. and FREEMAN H. E., (1993) *Evaluation – A Systematic Approach*, Sage, Newbury Park; London; New Delhi, 1993.

Ruth Oluwatosin Adeyemo<sup>1</sup>, Etal, 2015, *Evaluation of ICT as an Aid to Effective Teaching and Learning in Government Technical Colleges*, *Int J Edu Sci*, 11(3): 263-269 (2015).

Schaffer, S. P., & Richardson, J. C. (2004). *Supporting Technology Integration within a Teacher Education System*. *Educational Computing Research*, 3(4), 423-435.

Schmidt, D. (1998). *Technology and Teacher Education: Pre-service Teachers Can Help Make a Difference*. *Journal of Computing in Teacher Education*, 14(2), 2-3. See, J. (1994). *Technology and Outcome-Based Education: Connections in Concept and Practice*. *The Computing Teacher*, 17(3), 30-31.

Theresa Spanella, 2016, the importance of assessment in education, src internet accessed on 24<sup>th</sup> September 2016 from <http://study.com/academy/lesson/the-importance-of-assessment-in-education.html>

Wims, P., & Lawler, M. (2008). Investing in ICTs in educational institutions in developing countries: An evaluation of their impact in Kenya. International

Devin Kowalczyk, 2015 **What Is Survey Research? - Definition, Methods & Types.**

**APPENDICES**

**APPENDIX I:**

**UGANDA MARTYRS UNIVERSITY FACULTY OF SCIENCE**

**A framework for the evaluation of effective utilization of ICT in Vocational Training Institutions**

**Questionnaire for students**

Dear respondent I am Kabarwani Angella, a master’s research on the frame work for evaluating effective utilization of ict in vocational training institutions at YMCA particularly, this study aims at proposing the Frame work for evaluation of effective utilization of ICT in vocational training institutions.

This research is being carried out as a partial fulfillment for the award of a master of science in ICT management policy and architectural design of Uganda Martyrs University.

I am very hopeful that your assistance in this matter is very much relevant and significant to make this study a success and as well for the good of YMCA as we try to propose the framework for evaluation of effective utilization of ict. Thank you.

**Framework** is the basic structure of something. It can be also defined as an outline of interlinked items which support a particular approach to a specific objective and serve as a guide that can be modified as require by adding or deleting items

What is your Name?

.....

What is your gender?

Male

Female

Which course are you doing?

.....

What is the level of your study course?

- Post
- Degree
- Diploma
- Certificate

Which year was you enrolled?

.....

Where do you stay?

- Hostel
- Renting around campus
- With relatives
- Other (specify)

Which skills do you have in computer?

- Very good
- Good
- Fair
- Poor

How is the internet speed in YMCA comprehensive institute?

- Very good

Good

Fair

Poor

How is your internet speed?

Very good

Good

Fair

Poor

Does YMCA organize training and workshops about ICT learning?

Yes

No

Do you have enough computers?

Yes

No

Does YMCA have operational when there is need?

Yes

No

If yes

Are they fast enough to help you operate on the computer efficiently?

Yes

No

Do you always have power available while using computers in class?

Yes  No

where does institution get its power from?

Solar

Umeme

Generator

Yaka

What happens when your power goes off?

Automatic changeover

No option

How many computer labs do you have at the institution?

One

Two

Three

Four

five and above

Do you have a personal laptop?

Yes  No

Have you been given the merits of Information Communication Technology in your organization?

Yes  No

Have you ever done practical's in computer study?

Yes  No

How are the skills of the personnel involved in ICT teaching?

- Very skilled
- Skilled
- Semiskilled
- Unskilled

What is the assistance given to you while using any ICT tool?

- Very high
- High
- Medium
- Low
- Very low

Is your power reliable 24 hours?

- yes
- No

What is the quality of your power supply

- Stable
- Unstable

Does YMCA institute have a power backup plan?

- Yes
- No

How are the devices used in internet connection

- Very good
- Good
- Fair
- poor

Is there any framework for evaluation of effective utilization of ICT at YMCA comprehensive Institution?

Yes

No

If yes how important is that framework to ICT utilization

Very good

Good

Fair

poor

If yes how effective is that tool to ict utilization

Very good

Good

Fair

poor

Is ict used in your organization ?

Yes

No

If yes how

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

What are the challenges faced in ICT utilization in Vocational training institutions?



- Power problem
- No internet
- un skilled teachers
- No computer labs

Has ICT utilization in schools of importance?

- Yes
- No

If yes how important is it

.....

.....

.....

.....

.....

Are there policies in ensuring effective utilization of ICT?

- Yes
- No

Are these policies effective in ensuring utilization of Ict?

- Yes
- No

If yes how?

.....

.....

How often is ict being used in the department

- 24hrs
- 12hrs
- 6hrs
- not used at all

What are the key factors for the utilization of ict in education system

- Internet
- Computer labs
- Trained Teachers
- All of the above

Does time hinder technology utilization in schools?

- Yes
- No

Why it is that ict utilization has not happened as expected in schools?

- No skilled ict lecturers
- Limited internet/network
- No enough computer labs
- Electricity problem
- All of the above

Do you study computer application in your course of study

Yes

No

Do you normally do exercises/assignments during ICT lessons in class

Yes

No

Do you normally do mid tests in your course ?

Yes

No

Do you normally do end of semester exams for your course?

Yes

No

Do you do practical's as part of your tests?

Yes

No

When do you do practicals ?

At the end of each class

At the end of each topic

At the end of the month

At the end of the quarter

How do tests help you to improve performance

Very Good

Good

Fair

Poor

Do you think tests given to you by your tutors can help you recall what you covered in class?

Yes

No

Do you think the marks you normally get out the test really portray the level of skills one has acquired?

Yes

No

Do you have enough equipment to practice what you learnt in class while preparing for tests?

Yes

No

Do you think there is need to add more facilities or add more equipment for you to practice in your department?

Yes

No

Do you think there is need to change or improve in the current methods of assessment at YMCA

Yes

No

Do you think apart from the exercise and tests you normally do in class there could be other methods of assessment?

Yes

No

If yes above, what are some of those methods?

.....  
.....

Why do you think these methods are better than the current one being used by tutors at YMCA?

Effective

Accurate

Fast

All of the above

How can the proposed methods above help you improve your skills?

