# Framework for Effective Deployment and Utilization of ICTs in Secondary Schools in Hoima Municipality

## Case Study: Mandela Secondary School and St. Andrea Kaahwa's College in Hoima Municipality

**BY**

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# Dedication

This work is dedicated to my late mum Kiiza Zainabu, my guardian Katusabe Sauya for their dedicated support and sacrifice throughout my childhood and education, I also appreciate my wife and Son for their endurance and support through the research. Thank you.

## List Of Abbreviations

| | | |
|---|---|---|
| CSTS | : | Cyber-schools technology solutions |
| ICT | : | Information Communication Technology |
| IDI | : | ICT Development Index |
| NGOs | : | None Governmental Organizations |
| SPSS | : | Statistical Package for Social Sciences |
| SSA | : | Sub- Saharan Africa |
| UNCST | : | Uganda National Council for Science and Technology |
| UNESCO: | | United Nations Educational, Scientific and Cultural Organization |

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# ABSTRACT

This study aimed at developing a framework for effective deployment and utilization of ICTs in secondary schools in Hoima Municipality with focus on Mandela Secondary School and St. Andrea Kaahwa's College. The study was guided by specific objectives of reviewing the existing ICT frameworks to determine the requirements for the proposed framework, proposing the framework for effective deployment and utilization of ICTs and validating the proposed framework. Upon review of identified ICT frameworks of *Edinburgh (2012), NCCA (2007), UNESCO (2014), InfoDev (2010), Ndidde et al (2009)* and *Ndawula (2013),* the common elements required were identified. They included the participation of the government, donors, business institutions, school administration, teachers, parents and students in fostering ICT use in schools. Using a case study research design, information was collected from 192 respondents comprising of head teachers, their deputies, Administrators, teachers and Students. Respondents were selected using purposive and systematic sampling techniques. Data was collected using questionnaires, interviews and Focus group discussions. The study used qualitatively and quantitative methods of data analysis, with the help of SPSS (version 16.0).

The findings revealed weaknesses in the implementation of aspects in the existing frameworks. The government is still limited in monitoring and evaluation of ICT programs in schools. The government has also failed to employ enough professional ICT teachers and connect internet to all schools. The government has also failed to provide enough quality computers to schools. The donors and business institutions have not had any input in fostering ICT in these schools. School administration has failed to monitor and evaluate ICT programs. Not all teachers have computers and internet skills and they don't assign students to conduct research using computers internet. Teachers have also not developed a database to store retrieval learning materials. Parents have negative perception on computer and internet use and have not provided computers at schools and homes. Students have limited skills on computer and internet use.

A framework for effective deployment and utilization ICTs was then developed considering the shortfalls in the implementation of items in the existing frameworks. The framework comprised of stakeholders who ought to reinforce their support of ICT availability, accessibility and user-ability in schools. The study recommended that the government through its ministries of education and ICT strengthens ICT facilitation and use at schools by equitably providing enough ICT equipment, posting ICT knowledgeable teachers and connecting internet to schools. Donors and business institutions also need to reach all schools by facilitating ICT infrastructures and training ICT teachers. They also need to sensitive teachers, students and parents on the importance of computer use. School administration needs to continue lobbying for more ICT equipment, internet connection and ICT teachers. They need to frequently oversee the repair of broken equipment as well sensitizing parents and students on the necessity of computer use. They need to develop favourable policies and procedures for ICT use in their schools. They also need to monitor ICT lessons and conduct regular assessment of ICT progress in their schools. Teachers need to take initiative to study deep and to have enough ICT knowledge and Various ICT seminars and workshops should be conducted in order to change the attitude of teachers towards ICT use in teaching and learning. They need to apply learner - centred approach of teaching and store information on computers in a manner accessible by students. Students need regularly attend classes and learn how to use computer programs. They need to reduce social networking and use internet for class work. Lastly, schools should set up ICT steering committees that would be in charge of planning, maintaining, monitoring and evaluation of ICT and ensure improvement of facilities and tracking of usage by students and teachers.

# CHAPTER ONE

# GENERAL INTRODUCTION

## 1.0 Introduction

This chapter presents the background of the study, statement of the problem, major and specific objectives, scope of the study, significance of the study, justification of the study and definition of key terms.

## 1.1 Background to the study

The rapid development in Information and Communication Technologies (ICTs) have made tremendous changes in the twenty-first century, as well as affected the demands of modern societies (Odiya, 2009). Recognizing the impact of new technologies on the workplace and everyday life, today's educational institutions try to restructure their educational programs and classroom facilities in order to minimize the teaching and learning technology gap between developed and the developing countries (Nickel, 2014). This restructuring process requires effective diffusion of technologies into existing context in order to provide learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2010). The use of Information and Communication Technology (ICTs) in Ugandan schools and African countries is generally increasing and dramatically growing (Tella & Adeyinka, 2009).

The use of Information and Communication Technology (ICTs) in well-established countries' schools and emerging countries is generally increasing and dramatically growing (Tomei, 2005). It is thus not surprising to find increasing interest, attention and investment being put into the use of ICT in education all over the world (Allan & Yuen, 2003). The desire of countries to be globally competitive, grow economically and improve social conditions is often used. At the global level, the Millennium Development Goals (MDGs) which have been adopted by the United Nations as the key development targets for the 21st Century, mentions achievement of basic education as one of the prominent goals ( Sekaran, 2003).

However, while there is a great deal of knowledge about how ICTs are being used in high schools in developed countries, there is not much information on how ICTs are being used by teachers in schools. There is also an assumption that there are wide gaps in the use of ICTs

between rural and urban schools (Aduwa-Ogiegbaen & Iyamu, 2011). According to the National ICT in Education Strategy of 2009, "most secondary schools in Kenya have some computer equipment" but "only a small fraction is equipped with basic ICT infrastructure" necessary for teaching and learning. The same document estimates that computer learner ratio at one to one hundred fifty (1:150). The situation is further aggravated by the fact that "most schools use less than 40% of the available ICT infrastructure" and furthermore, very few schools are using ICT as an alternative method for the delivery of the education curriculum (Spiro, Jehng, 1990).

It is evidenced that the main barriers to achieving quality education are issues such as lack of proper transport facilities, lack of adequate teachers and gender sensitive education, but the introduction of ICTs can improve education provision. The usage and impact of ICTs needs to be carefully monitored to ensure that they are used effectively. There is also a growing need for cross-nationally comparable indicators in the area of Information and Communication Technologies (ICTs) in education. The Plan of Action that was decided at the Geneva phase of the World Summit on the Information Society (WSIS) identified two targets which are directly related to education (Farrell, 2007).

Mbah, (2010) also articulates numerous perspectives in which technology is important in education. (Mbah, 2010) further argues that; (i) ICT enhances teaching and learning process in such a way that 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; (ii) ICT enhances the quality and accessibility of education in a way that ICT increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere through use of computers and internet; (iii) ICT enhances learning environment in a way that ICT presence in schools creates an entirely new learning environment that challenges students to adopt different skills so as to be successful. Critical thinking, research, and evaluation skills are growing in importance as students have increasing volumes of information from a variety of sources to sort through; (iv) ICT enhances learning motivation in such a way that 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 in education motivates learning through provisions of devises such as videos, television and multimedia computer software (Anguyo, 2013).

In Africa, most governments in the Sub- Saharan Africa (SSA) took initiative to install computer and other technology resources to enhance teaching and learning in schools (Mangesi, 2007). Until now, most Sub- Saharan Africa (SSA) countries including; Botswana, Mauritius, Nigeria, Senegal and Ghana have to some extent developed their national ICT policies. These policies provide the foundation upon which ICT both at the national level and at the educational sector level is set. In East Africa, all of the five countries namely, Kenya, Tanzania, Uganda, Burundi, Rwanda and South Sudan have developed a national ICT strategy at different times (Hennessy, 2010).

Due to its perceived importance in enhancing teaching and learning that can improve academic performance, studies have from time to time recommended methodology needed for effective utilization of ICT in education. UNESCO (2014) in its articulation of e-readiness as a framework for quantifying ICT in education across Asia, views e-readiness as involving: policy development, curriculum development, physical infrastructures, ICT infrastructures and teacher preparedness. Similarly, Bartlett et al (2013) proposed six innovative areas that are essential for the utilization of ICT in secondary schools. These are: Physical Infrastructure, ICT infrastructure, Teacher ICT and Pedagogical Skills and Knowledge, Open Source Teaching and Learning Resources, Student ICT Participation and Knowledge and -Public-Private Partnership Implementation (Kaahwa, 2013).

Some frameworks to guide the utilization and deployment of ICT have also been proposed. InfoDev (2010) in a research entitled ICT in School Education (Primary and Secondary) in India and South Asia proposes a framework. According to InfoDev (2010), in order to more effectively prepare students to participate in ICT-driven education, greater commitments and willingness to share and adopt innovative solutions are needed from all aspects of society. ICT driven education involves commitment and support from government, the private sector, the communities, donors, teachers, parents, and students. Besides InfoDev, Ndidde et al, (2014) in Uganda-Pan Africa Report proposed a framework recommending the participation of the government, administrators in schools, parents, teachers, learners, NGOs and CBOs, business community and cultural Institution in ICT provision and implementation of utilization. And lastly, Ndawula (2013) in a research on Information and Communication Technology in Secondary Schools of Uganda: Examining the Trends and Hurdles proposed a framework recommending participation of key stakeholders students, teachers, parents, international

agents and donors, government and school administrators in implementing the utilization of ICT in secondary schools.

In Uganda, the birth of ICT policies was in 1998 when a number of international organizations from USA, Norway, Germany, Ireland and Sweden approached the Uganda National Council for Science and Technology (UNCST) to be given an opportunity to develop ICT policies based on different sectors (Uganda. MoES 2005: Draft Policy for ICT). In 1999, UNESCO and UNCST agreed to initiate a process leading to the development of sectoral policies which they presented to parliament for approval into a policy in 2003. The policy is based on the premise that ICT use is a key skill required for a rapidly increasing range of jobs, and developing good ICT skills in young people can help them find employment. Furthermore, the presence of a workforce with good ICT skills can help in attracting a growing industry and increasing employment (Farrell, 2007).

## 1.2 Statement of the Problem

Cognitive flexibility theory developed by Rand Spiro (Nickel, 2014) contends that learners' intellect can be stimulated by computer technology to spontaneously comprehend multiple concepts in response to the situational demand. This theory teaches that a learning environment that has computer technology facilitates learners to assimilate, retain, articulate, transfer and apply knowledge in areas of work (Obira, 2006).

Although effective utilization of ICT enhances teaching and learning, and improves student academic performance and also the fact that Ugandan government has promoted the use of ICT in secondary schools by introducing ICT in school curriculum and facilitating the provision of ICT equipment, the utilization of ICT was still low (Ndidde et al, 2014). Various frameworks for ICT integration and adoption have been advanced by schools but limitations still prevail over their implementation. This study therefore focused on creation of a framework for effective deployment and utilization of ICTs in secondary schools.

## 1.3 Objectives of the Study

### 1.3.1 General Objective

The general objective of the study was to develop a framework for effective deployment and utilization of ICTs in secondary schools.

### 1.3.2 Specific Objectives

This study was guided by the following specific objectives.

i. To review existing frameworks for effective utilization of ICTs in secondary Schools and determine the requirements for the proposed framework.
ii. To propose the framework for effective deployment and utilization of ICTs in secondary schools.
iii. To validate the framework for effective deployment and Utilization of ICTs in the selected secondary schools.

### 1.4 Research Questions

The following study questions guided this study

1. What are the requirements for the proposed framework?
2. What framework would enhance ICT deployment and utilization in secondary schools?
3. How can this framework be validated?

### 1.5 Scope of the study

The study was carried out in Hoima Municipality using Mandela S.S and St. Andrea's Kaahwa College as a case study because these schools where accessible by the researcher and are using computers. The study focussed on a framework for effective deployment and utilization of ICTs in the selected secondary schools between the periods of 2011 to 2015 because for qualitative research to yield valid conclusions it should study a phenomenon for a period between 4-5 years.

### 1.6 Significance of the Study

ICT utilization in Secondary Schools is still a change which needs to be investigated for the benefit of ICT to be derived hence this study.

The information on how ICT can be used to improve students' academic performance in secondary schools may be used by head teachers, board of directors in orchestrating methodologies for effective utilization of ICT resources to enable the schools improve their student's academic performance.

The findings of this study particularly the newly developed framework for effective deployment and utilization of ICTs for improving students' academic performance may also be used by none education institutions such as hospitals to know how effective utilization of ICT

resources can affect their performances. In this way, these institutions may also assess their ICT use so as to develop relevant frameworks.

Academicians and future researchers may also use this study report to further their study on the assessment of utilization, integration and adoption of computer resources and performance not only of academic institutions but other institutions as well.

### 1.7 Definition of Key Terms

The following key terms appeared in the study and their definitions were as follow

**ICT Use in Education**: This alludes to the application information and communication technological devises in teaching and learning.

**Students' Academic Performance:** Performance refers to the standard of success that someone or something achieves (Byrd, & Megginson, 2009). Students' academic performance is therefore the standard of success that secondary school students achieve in terms of grades and ability to apply assimilated knowledge in examinations, home and other place in the society.

### 1.8 Conceptual framework

The study focussed on the following tasks to this conceptual framework; existing literature and the findings from the field

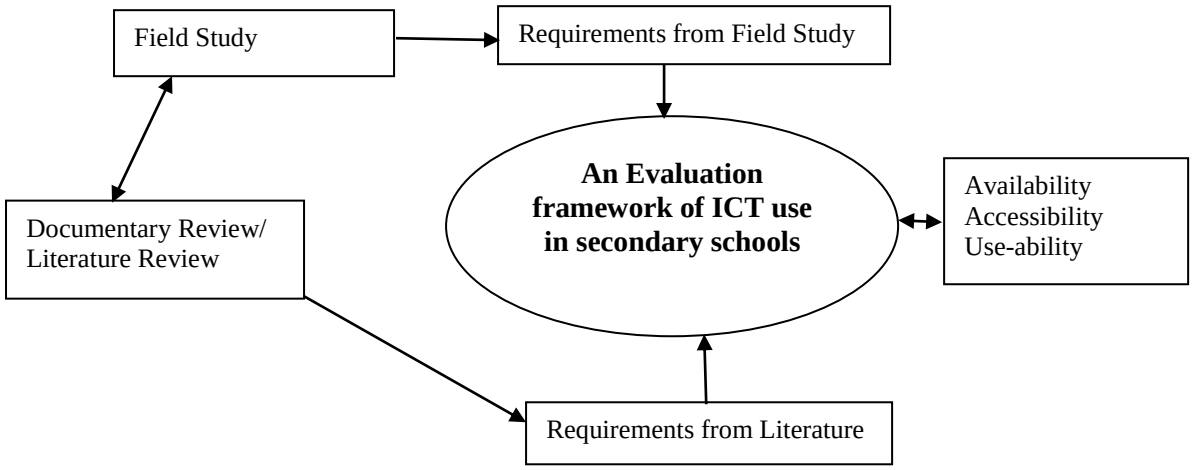


***Figure 1: Researcher's conceptualization***

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 Introduction

This chapter presents the state of the art and state of practice on ICT utilization and deployment framework: section 2.1 presents Usage level ICT skills by students and teachers in schools; section 2.2 Teaching and Learning through ICT section 2.3 Theoretical Link of ICT Utilization to Enhancement of Learning and Performance; section 2.4; Problems hindering ICT utilization in secondary schools; section 2.5 Review of frameworks on ICT use. section 2.5.1; The Edinburgh ICT Self Evaluation Framework; section 2.5.2 The UNESCO Framework for ICT Use; section 2.5.3 Info Dev Framework for ICT Use in Primary and Secondary Education; section 2.5.4 Ndawula Framework for ICT Use in Secondary Schools. Section 2.6: Common ground among frameworks reviewed that form the basis of the requirements for the new framework

## 2.1 The usage level of ICT skills by students and teachers

The use of ICT is making major differences in the learning of students and teaching approaches. Schools in the Western World invested a lot for ICT infrastructures over the last twenty years, and students use computers more often and for a much larger range of applications (Mikre, 2012). Studies reveal that students using ICT facilities mostly show higher learning gains than those who do not use (Kulik, 2009). Though the chalkboard, textbooks, radio/television and film have been used for educational purpose over the years, none has quite impacted on the educational process like the computer. The computer is capable of activating the senses of sight, hearing and touch of the users. ICT has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability. The main purpose of ICT consists of the development of human mental resources, which allow people to both successfully apply the existing knowledge and produce new knowledge (Farrel, 2007). Compared to the traditional methods of teaching and learning for example using textbooks and class notes, ICT enhances students' academic performance in the following ways:

ICT in education promotes active learning in such a way that ICT in education helps in mobilizing tools for examination, calculation and analysis of information in order to provide a platform for student inquiry, analysis and construction of new information. The learners therefore, learn as they do and, whenever appropriate work on real-life problems in-depth. Moreover, ICT makes learning less abstract and more relevant to their life situations. ICT in learning also promotes increased learner engagement (Mikre, 2009).

ICT in Education promotes collaborative learning in a way that ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of where they are. Apart from modelling real world interactions, ICT-supported learning provides opportunity to work with students from different cultures, thereby helping to enhance learners teaming and communication skills as well as their global awareness. It models learning done throughout the learner's lifetime by expanding the learning pace to include not just peers but also mentors and experts from different fields (Youssef & Dahmani, 2010).

ICT in education promotes creative learning in such a way that ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the duplication of received information (Kabir, 2013). ICT in education promotes integrative learning in a way that ICT-enhanced learning promotes a thematic integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice, which characterizes the traditional approach (Youssef & Dahmani, 2010).

ICT in Education promotes evaluative learning in a way that ICT-enhanced learning is student-directed and diagnostic. Unlike static, text or print-based education, ICT-enhanced learning recognizes the presence of different learning pathways to explore and discover rather than merely listen and remember (Mikre, 2011). ICT in education motivates students in a way that 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 in education motivates learning through provisions of devices such as videos, television and multimedia computer software. Becker (2000) found that ICT increases student engagement, which leads to increased amount of time students spend working outside class time.

## 2.2 Teaching and learning through ICT

According to MOEST (2005) ICTs in Education Options, ICTs have the potential to play a powerful role in enhancing the tools and environment of learning and preparing students to acquire skills, competencies, and social skills fundamental for competing in the emerging global "knowledge" economy. The literature on ICT in education covers many conceptual frameworks. Figure 2.1 below provides an example of a common framework for ICT in education. Law, Pelgrum and Plomp (2008) have noted that SITES 2006 was based on the concept that using ICT forms part of the pedagogical practices of the teacher.

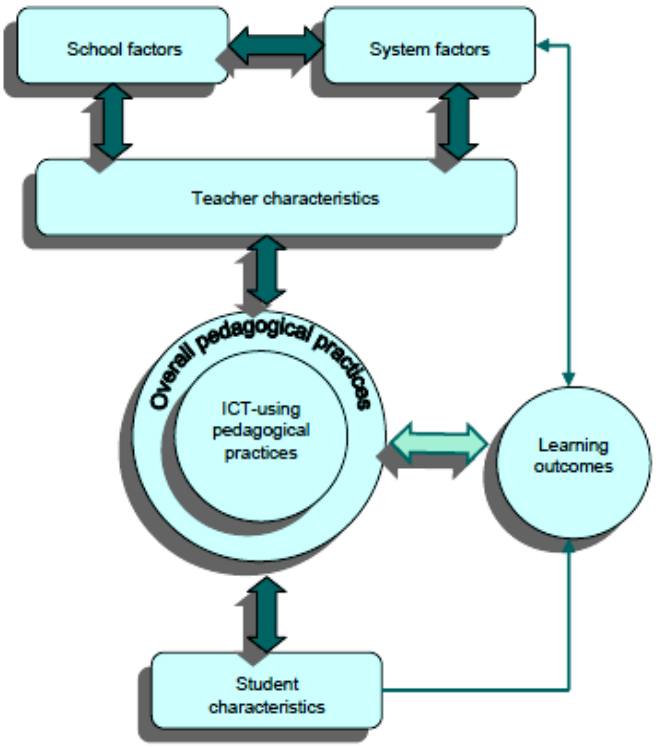


***Figure 2 : Framework for ICT in Education (Law, Pelgrum and Plomp, 2008)***

From an operational perspective, a classic approach to an ICT in education framework comprises "policy/strategy-input-process-output/outcomes. Before ICT integration into school education systems can be effective, an adequate mix of the following policy and operational measures are needed:

- Clear goals and a policy environment enabled by the school authorities that support the use of ICT in education

- Support and/or incentives for public educational institutions to purchase ICT facilities including a budget for maintenance services, ICT hardware and software for educational institutions
- Adaptation of curricula to ICT integration and development or acquisition of standardized digital educational contents and software
- Deliberate mass teacher training programmes on teaching ICT subjects or using ICT to teach other subjects more effectively

### 2.3 Theoretical Link of ICT Utilization to Enhancement of Learning and Performance

This study makes use of the teaching of Cognitive flexibility theory developed by Rand Spiro (Nickel, 2014). Spiro (2014) argued that learners' intellect can be stimulated by computer technology to spontaneously comprehend multiple concepts in response to the situational demand. This theory teaches that a learning environment that has computer technology facilitates learners to assimilate, retain, articulate, transfer and apply knowledge in areas of work (Obira, 2006). This theory is built on four principles; (i) learning activities must provide multiple representations of content; (ii) instructional materials should avoid oversimplifying the content domain and support context-dependent knowledge; (iii), instruction should be case-based and emphasize knowledge construction, not transmission of information; and (iv), knowledge sources should be highly interconnected rather than compartmentalized (Kearsley, 2000).

According to Obira, (2006) the theory largely concerns itself with transfer of knowledge and skills beyond their initial learning situation because behavioral change would likely occur for learners who learn the material presented in training and desire to apply that new knowledge or skills to work activities. The researcher chooses this theory because just as ICT in teaching and learning can stimulate learner's mind to grasp complex concepts and then apply at work place, in the same way, the same transfer of knowledge can be applied in examination which determines students' academic performance.

Take an example of how cognitive flexibility theory can apply in student's learning in history class. Basing on the four principles presented above, firstly, by encouraging students to use several sources to examine common themes that emerge from different perspectives of a

history subject, there are multiple representations of content minus oversimplifying the content domain. Students can use multiple types of educational technologies, such as the internet, software packages, and communication tools, to search for multiple representations of the content. Secondly, students can be urged to construct knowledge through research, collaboration, and conversation among groups. This can be greatly enhanced by the use of various educational technologies. Thirdly, such a history unit allows students to revisit the historical content from many different perspectives and academic areas. Finally, the unit incorporates several subject areas and asks students to recognize the connection between the disciplines within the larger context of history. By doing this, students make the connection between information they learn in school and real life and can recognize that they are powerful elements in the learning environment. Again, students can use various types of educational technologies (multimedia presentations, videos, web pages, etc.) to present their newly discovered connections related to the content (Spiro & Jehng, 1990).

## 2.4 Problems Hindering ICT Utilization in Secondary Schools in Uganda

### Lack of ICT Skills

Knezek and Christensen (2002) stated that teachers' competence with computer technology is a key factor of effective use of ICT in teaching. So, the teachers who do not have ICT competence could not integrate the ICT tools in their teaching. Some other research studies such as Albalat & Tarrago (1995); Braak (2001); Chu (2000); Hodgson (1995); Vanderlinde, Braak & Hermans (2009); Venezky (2004) also agreed that effective use of computers is reliant on the teachers' ICT skills as well as their intentions towards ICT use (Divaharan and Ping, 2010). Divaharan and Koh (2010) also claimed that teachers' professional development has to concentrate on both ICT skills training and appropriate ICT integration strategies in the curriculum. Therefore, the teachers need knowledge of appropriate ICT integration approaches and ICT skills to successfully incorporate the ICT tools into their lessons.

According to Jones (2012), inappropriate training styles that lack pedagogical aspects are likely to be unsuccessful, so that high levels of ICT use by teachers are not achieved. A case study done by Unal and Ozturk (2012) was interested in social studies teachers in Turkey and aimed to investigate the barriers to ICT integration into their classroom practices. The authors found that only 6 teachers out of a total of 18 reported that they had received in-service ICT training. These 6 teachers also stated that the ICT training that they received was ineffective due to the

absence of the pedagogical aspects. Unal and Ozturk (2012) (p. 942-943) therefore concluded that: *"Another related problem is that the training given about ICT is mostly for general knowledge and skills. Interviewed teachers state that the in-service training they received did not include generally ICT- based methods and approaches for teaching social studies. Within the scope of in-service training only general skills of using ICT equipment were emphasized, without relating them to teaching methods and content knowledge."*

The demand for ICT learning has been tremendous and the number of teachers who are trained to teach ICT cannot meet these demands. There are more students willing to be taught computing skills than there are teachers to transfer the skills. Besides the limited number of teachers, the ones available lack necessary ICT skills to impart to students (Ndidde, 2009).

**Inaccessibility or unavailability of ICT**,

Computers are still very expensive and despite spirited efforts by the government agencies, NGO, corporate organizations and individuals to donate computers to as many schools as possible, there still remain a big percentage of the schools unable to purchase computers for use by their students (Ndawula, 2013). This is once more worsened by low income among the parents, teachers and students who cannot afford computer hardware, software and internet (Kaahwa, 2013). Hennessy et al (2010), asserts that "to many teachers and students in Uganda, the computer and the Internet are still a mystery. This situation is even worse in the rural areas, where the majority of Ugandans (about 80 per cent) live without electricity and connectivity to the global information network. These communities are unable to reap the numerous benefits of ICT."

Alev, (2013) believes that offering plenty of resources can lure and persuade teachers to use them whilst teaching. "Limited resources within schools are a great impediment to the take-up of ICT. Lack of computers and software in the classroom can seriously limit what teachers are able to do with ICT." In 2002, the British Department for Education and Skills launched the "Laptops for Teachers" initiative that aimed to provide laptops to selected teachers on long term loan. This initiative's main goal was to increase teachers and head teachers' access to computers.

The evaluation of the first year of this initiative showed that since receiving their laptops, the teachers had become more likely to integrate ICT in their teaching and guide students' ICT use. Furthermore, the teachers highlighted that they had become more confident when using

ICT and they also became familiar with new software packages. In the 2013 report for Becta by Cox et al called 'ICT and pedagogy: A review of the literature', it was emphasised that most teachers were less likely to buy their own ICT tools; instead, they would prefer to use the technological tools that were made available for them (Mumtaz, 2009).

**Teaching Experiences and Age**

Several studies found that teaching experiences and age influence the successful use of ICT in classrooms (Wong & Li, 2008; Giordano, 2007; Hernandez-Ramos, 2005). Similar findings can be found in research carried out by (Gorder, 2008), which reported that teacher experience is significantly correlated with the actual use of technology. She discovered that effective use of computers was related to technological comfort levels and the liberty to shape instruction to teacher-perceived student needs. Accordingly, 3 teachers (25%) indicated that their age and teaching experiences were the barriers to adapt to the ICT integration into their lessons. The older teachers with more experience in teaching did not prefer to use ICT tools in their English classes.

Preston et al. (2015) asserted the need for training in specific ICT skills, especially skills in solving technical problems and understanding the basic workings of the technology, and they provide evidence that the breakdown of equipment prevents teachers from using ICT. It is also found that teachers who were ICT beginners were more likely to prefer to learn ICT basics first and then later to be involved in pedagogical training. Moreover, Cunningham et al (2004), in their research on the ‘Laptops for Teachers’ initiative indicated that the teachers who received a laptop would need to be trained to use it properly, especially with regard to the other ICT tools.

**Lack of Electricity**

Many schools are still not yet connected to electricity; Uganda being a developing country, the government has not been able to connect all parts of the country to the national electricity grid. Consequently those schools that fall under such areas are left handicapped and are not be able to offer computer studies (Ndawula, 2013; Hennessy et al, 2010).

**Regular Computer Break Down**

While a good number of schools have benefited from donated used computers, they have not been adequately equipped with the same on maintenance and repair, hence its very common to

see a schools computer lab full of broken down computers, some repairable and some not. Due to limited updates on software and antivirus, computers are often broken down by viruses (Opira, 2009).

**Fear by the Administration**

There is still a strong perception especially by the older generation that computers require highly skilled personnel to operate them, while this may not be the case, some school administrators also fear that their students will be exposed to adult sites and other undesired sites, through the use of the internet. Some also fear the infection of viruses to their computers leading to data loss, while this may be true to some extent, proper education on the safe use of computers and help alleviate some of these fears (Opira, 2009).

**Lack of Internet or Slow Connectivity**

Most schools are not able to connect to the World Wide Web, due to the high costs involved in the connectivity in Uganda (Kaahwa, 2013). Schools connected to the internet often experience slow network connectivity.

**Limited Interest in Research by Students**

Students mostly tends to show much more enthusiasm for using ICT, and are as a result quick to pick up skills in using the machines. Students are however often seen in the ICT labs between classes, using the computers to play games or, on occasion, use social networking sites like Facebook. Students are on limited accessions observed using the computers for class related activities or assignments assigned by their teachers. Students do not tend to focus on educational benefits without teacher guidance (Barlett et al, 2013).

**Workload**

The teachers stressed that workload is a major barrier for them to integrate ICT tools in the English language classrooms as highlighted by Abuhmaid (2011) in his study. He found that teachers were already overloaded and they could not cope with the pressure to prepare and practice ICT integration into lessons. Moreover, the transformation and innovation of national educational system and the independent school's syllabus increases the teachers' workload. They have to prepare different assessment and worksheets for students in their midst of busy working schedule. According to the respondents, few of them emphasized the new assessment

system which is called School- Based Assessment (SBA). SBA is a holistic form of assessment which evaluates the cognitive, effective and psychomotor domains, encompassing the intellectual, emotional, spiritual and physical aspects of the learners (Malaysian Education Ministry: 2012).

**Cultural beliefs**

Researchers believe that teacher's beliefs play a critical role in defining behavior and organizing knowledge and information in classroom activities. Tabachnick and Zeichner (1984) differentiated between teachers beliefs, as the construct had been used by early researchers, and teacher perspectives, a combination of beliefs, intentions, interpretations, and behaviors that interact continually (Clark & Peterson, 2006). They also argue that teacher's beliefs can be classified as some kind of thinking processes of teachers. Teachers have both constructivist and traditional beliefs about teaching and learning (Braak & Van, 2007; Ertmer, 2005). Teachers with the most constructivist beliefs are highly active computer users. However, teachers with traditional beliefs are less likely to use computers as advocated.

Regular assessment of performance linked to defined competencies was seen as an important motivation for building and enhancing ICT knowledge and practice (Marcinkiewicz, 2015). Maintaining sufficient levels of motivation among teachers was also seen to be related to the school culture and the role of technology within this culture (Marcinkiewicz, 2015).

**Teachers' hesitancy in integrating ICT**

According to Jones (2001), the attitudes of teachers towards technology greatly influence their adoption and integration of computers into their teaching. He also stated that, the teachers prefer to use the traditional method for teaching English language in their classroom because of their lack of motivation, acceptance and readiness towards ICT integration and adoption in teaching and learning process.

The study conducted by Hennessy et al. (2010) also indicated that teachers' attitudes, expertise, lack of autonomy, and lack of knowledge to evaluate the use and role of ICT in teaching (technophobia in teachers) are the prominent factors hindering teachers' readiness and confidence in using ICT support. Some of the teachers were enthusiastic to integrate IT tools in English teaching and learning but during the implementation stage their keenness decreases and they fall back to their traditional mode of teaching.

A strong relationship between computer related attitudes and computer use in education has been emphasized in many studies. Positive computer attitudes are expected to foster computer integration in the classroom (Braak & Van, 2013). Attitudes toward computers influence teachers acceptance of the usefulness of technology, and also influence whether teachers integrate ICT into their teaching activities. In order for there to be effective use of ICTs in public secondary schools in Uganda, there has to be proper planning not only at the National level but also at the institutional level. ICT performance indicators should also be set in place to ensure that the extent to which ICTs are used in these schools can really be measured or quantified. This has not been possible so far and this has raised questions as to whether ICT is viewed as a subject or a tool to learn other subjects.

**ICT Policies and Plans**

ICT policy development for education is a long and complicated process. In many instances the policies that have been recently promulgated are the result of several years of consultation with stakeholder groups. Most ICT education policies are comprehensive and include all the sub-sectors of the education system. However, a few countries such as South Africa and Uganda are specifically focused on the school subsector. All ICT policies stress enhancing access, some go further to emphasize the importance of enhancing access to ICT tools and Internet connectivity, developing ICT skills among young people and the general population, and the importance of teacher training. Clear it is that the policies of some countries are even more comprehensive in that they also stress on the need for the development of digital content, education portals, and the need for content in indigenous languages (Trucano, 2013).

ICT education plans aren't always implemented. The development of plans doesn't necessarily equate with implementation and results on the ground. In most cases implementation remains very dependent on the support of partners from the donor community and the private sector. Indeed, some countries have set up mechanisms specifically to attract investment in the development of ICT in education and through which to involve stakeholders in setting priorities and allocating resources. The Kenya ICT Trust is an example (Trucano, 2015).

Other problems existing in the use of ICT use in secondary schools include weak support of the school administration and management, socio-cultural barriers, limited time for practice school time tables, congested computer labs, limited skills in ICT for most learners, absence of

printing services, absence of other ICT gadgets like projectors, scanners, flash discs and recorders.

## 2.5 A Review of Frameworks on ICT Use in Education

There are ICT frameworks proposed in the field of education. These include: The Edinburgh ICT Self-Evaluation Framework, NCCA ICT Framework: a structured approach to ICT in curriculum and assessment, UNESCO ICT Competency Framework for teachers, InfoDev Framework for ICT Use in Primary and Secondary Education, Ndidde framework for ICT use in Education, Bartlett Framework ICT in education and Ndawula framework on ICT Sustainability and Use in Sec Schools in Uganda.

### 2.5.1 The Edinburgh ICT Self Evaluation Framework

According to the Edinburgh ICT Self Evaluation Framework (2012), the effective and appropriate use of ICT, both in the classroom and beyond, can enhance the learning experience. By including ICT in all curricular areas, learners will benefit from greater personalization and choice, resulting in improved learner engagement and outcomes. The Edinburgh ICT Self-Evaluation Framework was thus created to provide a structure for reviewing establishment's on use of ICT and its impact on school improvement. By using this framework schools are able to engage in a reflective professional process that helps identify the way forward in embedding ICT throughout the curriculum, in forming overall strategy and improving their plans.

The Edinburgh ICT Self Evaluation Framework has five areas of evaluation: Leadership and Management, Planning, Learning and Professional Development, Resources. Regarding leadership and management, this framework evaluates ICT and the school vision, the strategy to achieve the vision (strategic leadership of ICT across the whole school, the quality of the strategy, safeguarding) and management of information i.e. communication strategy. Regarding planning, the framework evaluates whole school planning (planning the use of ICT to support learning and teaching and planning for ICT as a means of promoting inclusion). The framework also evaluates curriculum leadership in relation to learning and teaching with ICT.

Regarding learning, this framework evaluates teaching and the learning process (the extent of ICT use for learning and teaching, quality of use of ICT for learning and teaching, learning

with ICT beyond the school and ongoing critical evaluation). It also evaluates pupils' learning experiences in relation to pupils' progress more widely, effective and safe use of digital resources and learning skills.

Regarding professional development, this framework evaluates planning for professional development (identifying whole school and ICT development needs, identifying individual staff skills and needs), implementation (meeting school and individual ICT needs, developing and sharing ICT practices, and review (impact of professional development activities). Regarding resources provision, this framework evaluates (sufficiency, suitability and availability of hardware) and management of ICT resources more so the technical Support.

### 2.5.2 The Framework for ICT in curriculum and Assessment

National Council for curriculum and assessment (NCCA, 2007) developed a framework that aimed at helping schools to develop students' ICT literacy by promoting the use of ICT that will enrich teaching and learning in lower education. The framework emphasized four sets of activities teachers have to undertake to make students effective learners and users of ICT. The areas include: (i) creating, communicating and collaborating to organize and produce information, (ii) understanding and applying knowledge of the function of ICT including safe practice and maintenance, (iii) using ICT for thinking and learning including managing enquiry, assessing information, solving problems and expressing ideas across a range of curriculum areas and (iv) developing a critical appreciation of the role of ICT in society and habits which reflect ethical and responsible use of ICT.

### 2.5.3 The UNESCO Framework for ICT Use

United Nations Educational, Scientific and Cultural Organization *(*UNESCO) Institute Statistics (UIS) is a United Nation's repository for statistics on education, science and technology, culture and communication. In executing its mandate of administering international data collections on the availability, use and impact of ICT in education, in 2014, it conducted a comparative study on ICT integration and E-Readiness in Schools in Asia. The analysis aimed at looking at four specific types of data: i) use of ICT in policy and key curricular areas; ii) ICT infrastructure and its importance to integrating ICT-assisted instruction; iii) participation in programs offering ICT; and iv) teaching and learning as they relate to ICT in education.

According to UNESCO (2014), since policymakers are in a unique position to bring about change, they should make an explicit connection between the innovation and national policies that promoted the use of ICT. These policies must not only be formulated but fully implemented. Policymakers should not make policies that can fail to succeed particularly when: i) they are viewed as mere symbolic gestures; ii) teachers actively resist policy-based change that they see as imposed from the outside without their input or participation; iii) they do not have explicit connections to instructional practice (e.g. focus on hardware rather than their relationship to pedagogy); iv) they do not provide teachers with an opportunity to learn the policies and their instructional implications; and v) there is a lack of program and resource alignment to the policies' intentions. According to UNESCO (2014), there is also need for early integration of ICT into primary and secondary curricula through formal recommendations to ensure the introduction and implementation of ICT into educational institutions and classrooms.

According to UNESCO (2014), to support teaching and learning, as well as improve overall education management, a variety of ICT-assisted instructional approaches may be implemented, ranging from the use of radio or television to computers, internet and newly-emerging mobile devices. While newer battery-operated ICTs are emerging, in addition to mobile devices that may be recharged off-site, the majority of ICTs including television, computers and the Internet continue to require a more stable energy source. To summarize, the integration of ICT into schools requires electricity (e.g. grid/mains connection, wind, water, solar or fuel-powered generator, etc.) that is regularly and readily available. These are supported by well-built ICT laboratories.

Teachers are frequently considered to be the most important influence on classroom learning and, as such, play an invaluable role in ensuring that pupils use ICT effectively inside the school. Teacher training is for example significant in ICT use in education and must be given attention. UNESCO ICT Competency Framework (2011) for teachers developed a framework comprising of (i) technology literacy: which aims at increasing the extent to which new technology is used by students, citizens and the workforce by incorporating technology skills into the school curriculum (Technology Literacy approach); (ii) knowledge deepening which aims at increasing the ability of students, citizens, and the workforce to use knowledge to add value to society and the economy by applying it to solve complex, real-world problems

(Knowledge Deepening approach); (iii) increasing the ability of students, citizens, and the workforce to innovate, produce new knowledge, and benefit from this new knowledge (the Knowledge Creation approach).

Skills and Knowledge involves engaging teachers in ongoing, practical professional development facilitated through partnerships with local universities and/or NGOs, providing capacity-building to teacher trainers from local universities and/or NGOs, observing classrooms regularly to encourage and support increasing use of learner-centred methods and integration of ICT (Bartlett et al, 2013).

Open Source Teaching and Learning Resources involves leading teachers through the exercise of locating relevant online resources and uploading to the Connect To Learn Online Resource Library, expanding the availability of quality online resources for secondary teachers in collaboration with African faculties of education (Bartlett et al, 2013).

Student ICT Participation and Knowledge involves encouraging teachers to assign online research or information presentation assignments that utilize Libre Office software to their students, encourage both students and teachers to use the computers for education-related purposes only in order to conserve airtime (Bartlett et al, 2013). Public-Private Partnership Implementation involves hiring local facilitators in each site to provide ongoing professional development and support to administrators and teachers, Forge partnerships with in country Faculties of Education and Telecommunications Industry leaders to institutionalize the integration of ICT at the tertiary level, Deepen partnerships within the Telecommunications industry to provide infrastructural and program support to the schools (Bartlett et al, 2013).
This framework brings out the need to avail ICT through physical infrastructure, ICT infrastructure, teachers, student and private partners. Although the role of different stakeholder is implicit, the idea is managing education information system that indeed requires availability, accessibly and ability to use. These can be achieved through the elements mentioned by this framework.

### 2.5.4 InfoDev Framework for ICT Use in Primary and Secondary Education

In 2010, *InfoDev* carried out research on *ICT in School Education (Primary and Secondary)* with the intention of providing information on trends and dominant features of the use of ICTs

for school education, identifying challenges in the effective implementation of ICTs in school education and providing suggestions to address these challenges and aid the implementation of ICTs in school education.

*InfoDev* (2010) observed that international trends in application of ICTs in schools indicate that it is directly related to the development of schools and the teaching and learning environment. This study however noted that there are challenges in implementing ICTs effectively in existing schools such as language barrier, limited finance to provide ICT in schools and low teacher skills. Therefore, in order to more effectively prepare students to participate in ICT-driven education, greater commitments and willingness to share and adopt innovative solutions are needed from all aspects. ICT driven education involves commitment and support from government, the private sector, the communities, donors, teacher, parents, and students.

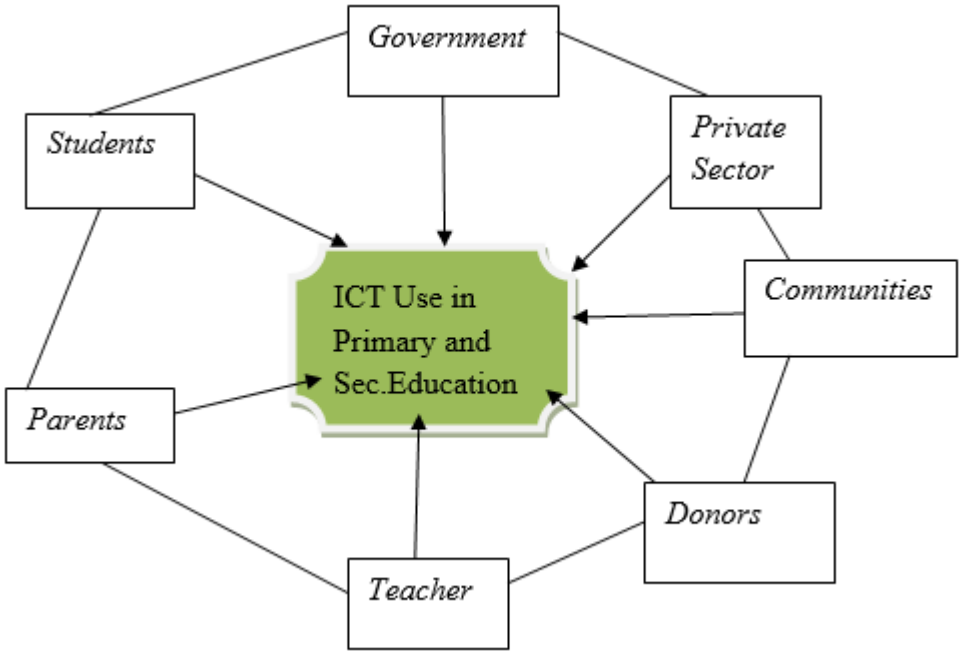


***Figure 3 : InfoDev Framework of ICT use: Source: InfoDev, (2010)***

### 2.5.5 Ndidde et al Framework for ICT Use in Education

In 2009, Ndidde and colleagues published *Uganda-Pan Africa-Report* that provided an in-depth analysis of the results of the first phase of the Pan African Research Agenda on the Pedagogical integration of ICTs in Uganda's sampled education institutions. The Pan African project aims at creating a better understanding of how the pedagogical integration of ICTs can

enhance the quality of teaching and learning in Africa. A survey conducted across five (5) primary schools, four (4) secondary schools and two (2) tertiary institutions; found that although Uganda has put in great efforts to implement ICT integration and use in schools, its use remains low because of high students-computer ratio, low internet connectivity, low teacher skills and restricted access to computer by school regulations. For effective use of ICT to enhance teaching and learning, this reported recommended a collective effort of Government, administrators in schools, parents, teachers, learners, NGOs and CBOs, business community and cultural institution.

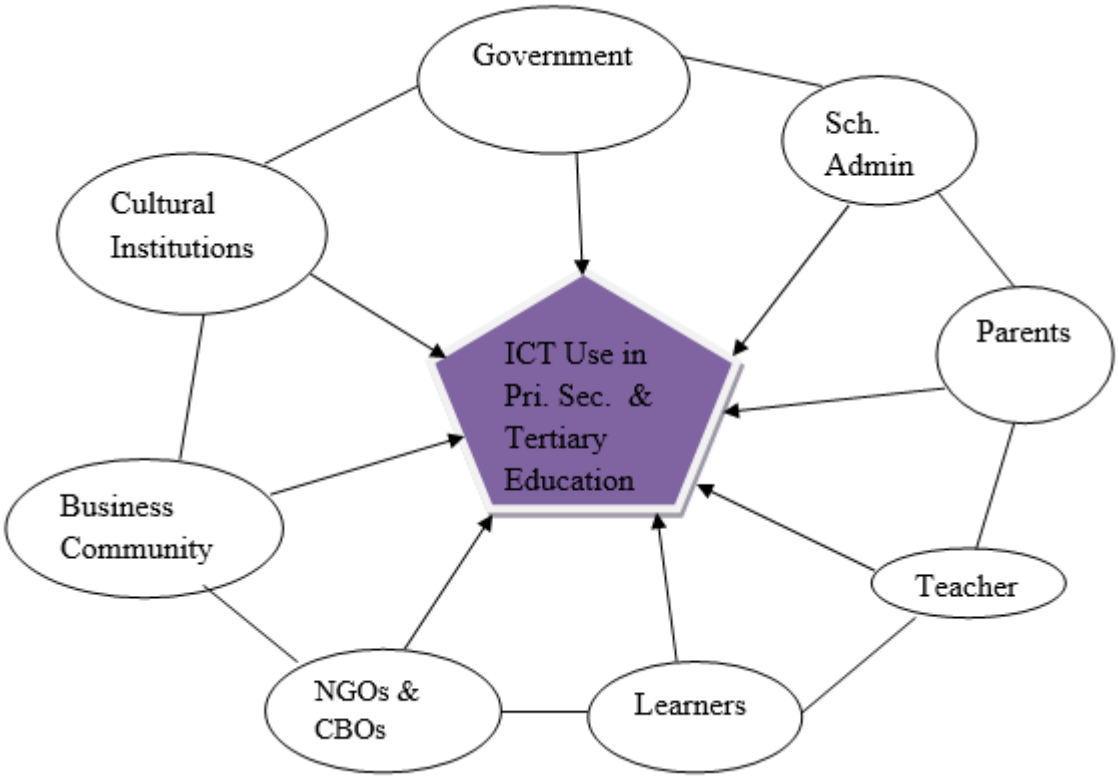


***Figure 4: Ndidde Framework of ICT Use: Source: Ndidde et al, (2009)***

### 2.5.6 Framework for sustainability and utilization of ICT in Secondary Schools

Ndawula, (2013) in a research on *Information and Communication Technology in Secondary Schools of Uganda: Examining the Trends and Hurdles* recognizes the fact that efforts have been made to introduce ICT in secondary schools of Uganda so as to equip learners with the necessary skills and tools. Though Educational ICT plays a crucial part of the school curriculum, in Uganda the adoption level is still low in secondary schools. There are also variations from school to school in terms of scope and depth, content coverage, timing, use of materials and resources. After examining the concept of educational ICT, its progress and

setbacks in secondary schools of Uganda, Ndawula, (2013) developed a framework recommending the participation of students, teachers, parents, international agents and donors, government and school administrators.

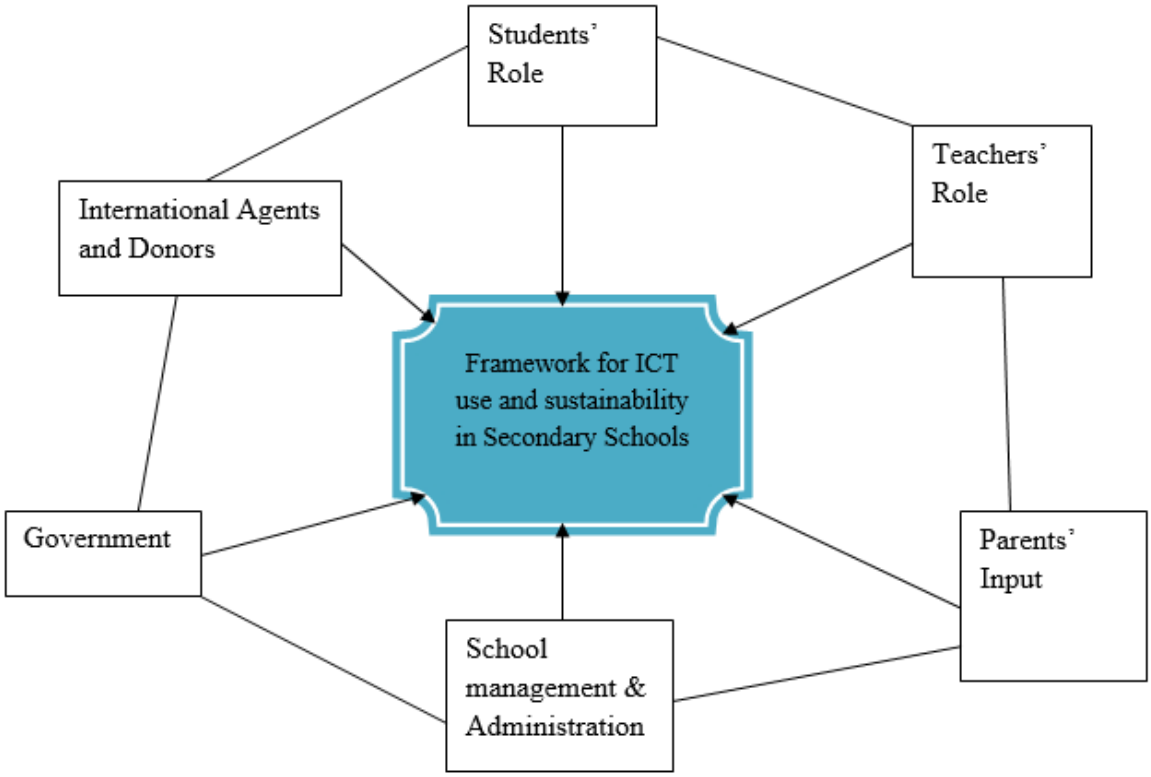


***Figure 5: Ndawula Framework of ICT use and sustainability. Source: Ndawula (2013)***

### 2.5.7: Summary of the major features from the reviewed frameworks

**The Edinburgh ICT use Self Evaluation Framework**

My position on this framework is that;

- It was designed for schools in developed countries that have reached an acceptable standard of ICT adoption and integration.
- This framework evaluates ICT and the school vision, the strategy to achieve the vision, most of the schools don't have a strategy to achieve whole School vision which in most cases is also non-existent.
- There will be a lot of issues to address in planning assessment opportunities, recognising "that learners will progress in different ways" and can "demonstrate their skills in different ways"
- It cannot address the challenges of assessing the broad range of learning across all Contexts and settings in which the curriculum is experienced.

- Some of the evaluation techniques used will be adopted in the proposed evaluation framework concerning resources, planning, management and Administration

**The UNESCO Framework for ICT Use**

This framework brings out the need to avail ICT through physical infrastructure, ICT infrastructure, teachers, student and private partners. Although the role of different stakeholder is implicit, the idea is managing education information system that indeed requires availability, accessibly and ability to use. These can be achieved through the elements mentioned by this framework.

**Info Dev Framework for ICT Use in Primary and Secondary Education**

With this framework, to effectively prepare students to participate in ICT-driven education, greater commitments and willingness to share and adopt innovative solutions are needed from all aspects. ICT driven education involves commitment and support from government, the private sector, the communities, donors, teacher, parents, and students.

**Ndidde et al Framework for ICT Use in Education**

This framework once more articulates the need for collective effort of government, administrators in schools, parents, teachers, learners, NGOs and CBOs, business community and cultural institution in facilitating ICT use in education.

**Framework for ICT sustainability and Utilization (Ndawula, 2013)**

With this framework, the Ndawula framework once more presents the participation of different stakeholders in fostering ICT use in education. The stakeholders as per the diagram above include the students, teachers, parents, international agents, governments and school administrators.

### 2.6. Common Ground among the Frameworks that Determine Requirements for the New Framework for effective deployment and utilization of ICTs.

The frameworks for ICT use in education that are presented above have similar elements that are essential for determining the requirements for the new evaluation framework. InfoDev talks about participation of the government, the private sector, the communities, donors, teacher,

parents, and the students. Ndidde et al also talks about involvement of the Government, administrators in schools, parents, teachers, learners, NGOs and CBOs, business community and cultural institution; And Ndawula talks about participation of students, teachers, parents, international agents and donors, government and school administrators in ICT application in education.

The similarities amongst the frameworks of InfoDev, Ndidde and Nduwula is that they all present facilitators or stakeholders who foster ICT use in Education. The stakeholders are the government, donors, school administrator, teachers, parents and students. Therefore, these frameworks focus on stakeholders' facilitation of ICT use in Education. It's thus necessary to briefly talk about each stakeholder's role in facilitating ICT use in education.

**Government**: The government as argued by Ndawula (2013) through its agencies like parliament and ministry of education sets up policies to govern ICT use, it trains teachers, reviews the curriculum, deploys teachers, provide security and carries out assessment and supervisions. The government also provides funds, electricity supply, and monitors ICT imports tariffs. Amuriat (2012) also contends that the government leads the policy formulation process, review, approves and harmonizes ICT sector issues.

In Uganda, the parliament approved ICT policy to be used in education in 2005. In secondary sub-sector, the aim of ICT policy is that secondary teachers should be equipped to make use of ICT in their lesson preparation. The policy also tasked the government to provide ICT infrastructure in each institution (Uganda. MoES Internal Report on ICT, 2009).

Consequently, according to Kasse & Bulunywa (2013), the MoES has also supported other ICT initiatives in partnership with other agencies. Notable among these are SchoolNet, the Microsoft Partners in Learning Program, Connect-ED, Curriculum Net, NEPAD e-schools initiative, Cyber-schools technology solutions (CSTS) program and Computers for Schools-Uganda. These initiatives have focused on equipping of schools with computers and associated hardware / software, provision of internet connectivity, training of teachers and teacher educators in ICT, and the development / selection of digitized pedagogical content. Some such as the Microsoft Partners in Learning Program are quite ambitious; this initiative has already equipped 100 schools with donated PCs and the plan is to have all (8000) secondary schools equipped with computers and training modules by the end of 2015 (Hennessy et al (2010).

**International Agents and Donors:** These agents and donors **s**ensitize end-users of ICT, support in training ICT staff, and improve on the quality and number of ICT equipment, give

student interns opportunity to learn more on computers, participate in monitoring ICT education and its ICT budgets implementation. They also provide funds, computer hardware and facilitate ICT lab construction in schools (Amuriat, 2012).

In Uganda, International Donors include; IDRC, The World Bank, UNESCO, UNDP, USAID (Leland Initiative), The Department for International Development (DFID- UK), The UN Economic Commission for Africa Partnerships in ICTs in Africa- PICTA), European Union (National ICT Infrastructure- NICI), The Swedish International Development Agency (Sida), Netherlands' International Institute for, Communication and Development –IICD (Kasse & Bulunywa, 2013).

**Business Community:** They play a role of donating computer equipments to schools and also provide funds that can be used to train teachers on ICT Use. In Uganda, these business communities are the private business institutions like the banks, MTN, Airtel, Orange, and UTL telecom companies (Amuriat, 2012). In 2014, Centenary Bank is reported to have donated 30 computers to four secondary schools and one primary school with the aim of promoting computer literacy among students in Uganda.

**Cultural Institutions**: Play the role of sensitizing their masses to inculcate the use of ICT both at school and home.

**School Management and Administration:** School administration pays staff remuneration, buy ICT materials & facilities, monitor ICT lessons, sensitize parents on the need to support their children on ICT use, provide security and carries out regular assessment on both teachers and students' ICT use.

**Parents' Input:** Parents pay tuition promptly, boost morale in their children, encourage girl child education, provide ICT materials, visit schools and classes, attend parents' meetings and provide advice(Amuriat, 2012; Ndidde et al, 2009).

**Teachers' Roles:** Teachers employ learner centeredness, do lesson preparation, report on the condition of ICT equipments, provide conducive teacher-learner relationship, carry out research, assign learners roles, go for refresher courses of ICT and provide safety for both students and ICT infrastructures (UNESCO, 2014).

**Students' Roles:** They take rewards & incentives, leadership position in ICT, get involved in group participation and ICT clubs, provide safety of ICT equipment, and attend ICT classes and use computers and internet in their studies (Ndawula, 2013; Ndidde, 2009).

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter presents the methodology that was used during the study. It involved the, 3.2 Research design, 3.3Study population, 3.4 Sample size and selection, 3.5 Sampling techniques, 3.6 Data Collection Methods, 3.6.1 Questionnaire survey, 3.6.2 Focus Group Discussion (FGD), 3.6.3 Documentary reviews, 3.7 Data Collection Instruments, 3.7.1Structured questionnaire, 3.7.2 Focus group discussion check list, 3.7.3 Documentary review checklist, 3.8 Research procedure to be used in data collection, 3.9 Validity and Reliability of Instruments, 3.9.1 Validity, 3.9.2 Reliability, 3.10 Data analysis, 3.10.1 Quantitative data analysis, 3.10.2 Qualitative data analysis, 3.11 Measurement of variables, 3.12 Process of Proposing a framework for effective deployment and utilization of ICTs in Secondary Schools, 3.13 Process of Validating the Proposed Framework, 3.14 Ethical considerations.

## 3.2 Research design

Research design is a process of planning how to carry out a research (study). It is a strategy for conducting research. A research design can also be comprehended as a way of going about the research process; it is concerned with turning research questions into a research project (Ader, Mellenbergh, & Hand, 2008). In developing a framework for ICT use in secondary schools, the researcher employed a case study research strategy.

A case study is an intensive descriptive and holistic analysis of a single entity or a bounded case meant to study a single entity in depth in order to gain insight into the larger cases (Oso & Onen, 2005). This study used Mandela Secondary School and St. Andrea Kaahwa's College in Hoima Municipality as case study.

The study used a mixed methods research approach where both qualitative and quantitative data collection methods were employed. Cross-sectional data collection was used in assessing respondents' views on assessment of framework of Information Communication Technology (ICT) utilization in the selected secondary schools in Hoima Municipality. Results were descriptively analysed using SPSS 16.0 to form requirements of the proposed framework. The researcher designed the framework using Microsoft word Ver. 2010. The proposed framework

was validated using Validation checklist which was administered to School administrators and management, and Experts in the field of ICT and the results were presented in chapter four.

### 3.3 Study population

In this study, the target population was drawn from Hoima Municipal, Hoima district and included those involved in or with knowledge about the study variables and were divided within four (4) categories comprising of the following: Head teachers of the selected Schools within the Municipality (02), Deputy Head Teachers and school administrators (10), Teachers (30), Students (308). The Head teachers and their deputies are targeted because they are directly involved in overseeing the adoption, implementation and utilization of ICT in education among the selected Hoima Municipal Secondary Schools. They manage the schools, handle government grants to the schools, supervise teachers and monitor the entire progress in delivering the service.

The School administrators are targeted because they participate in planning, budgeting and reviewing activities pertaining ICT implementation. Finally Teachers are considered because they transfer knowledge, encourage and motivate students during the learning process. Students' were also targeted since they are involved in general planning, through participatory involvement of bottom up planning and they are the beneficiaries.

### 3.4 Sample size and selection

In this study, the number of individuals in their targeted population was known in advance as lists indicating the members readily available at the two selected Secondary Schools were exhaustive. The respondent categories comprised of both sexes but of different marital status and age group. The ultimate sample size of 201 respondents was derived from the target population of 420 respondents based on sample table developed by krejcie and Morgan (1970) cited in Amin (2005), (Appendix V).

### 3.5 Sampling techniques

The study used both purposive and simple random sampling technique. A sample of 201 respondents was selected. In selecting the respondents groups, purposive (census) sampling was used on the respondents with the knowledge needed and where few in number. Here, the entire accessible population (target population) was used as respondents, these included Head

teachers, Deputy Head teachers and administrators of the two selected Schools. Simple random sampling was used for teachers and students because these respondents had equal chance of being selected.

**Table 3.1: Category, target population, sample size and sampling technique that was used in the study**

| **Category** | **Target Population** | **Sample size** | **Sampling Techniques** |
|---|---|---|---|
| Head teachers | 2 | 2 | Purposive sampling |
| Deputy Headmasters and Administrators | 10 | 10 | Purposive sampling |
| Teachers | 42 | 28 | Simple random sampling |
| Students | 366 | 161 | Simple random sampling |
| **Total** | **420** | **201** | |

***Source:*** *Hoima Municipal Education Department, Annual Report 2011.*

### 3.6 Data Collection Methods

Data for the research was collected using three methods. These included self-administered questionnaires; focus group discussion and documentary review. Self-administered questionnaires and focus group discussion were used since it enabled the researcher obtain first-hand information from the field. Data was obtained from respondent categories indicated. The type of data included social demographic characteristics of the respondents (age, gender, level of education etc.), perceptions about the study variable etc. Documentary review enabled the researcher obtain information on already existing literature about frameworks for Information Communication Technology (ICT) use in secondary schools. This information was collected from reports, circulars, newspapers, Magazines and internet.

#### 3.6.1 Questionnaires

A self-administered questionnaire was used in the study for all respondents. Mugenda and Mugenda (2005) states that questionnaires are used to obtain vital information about the population and ensure a wide coverage of the population in a short time. In addition, Sekaran

(2003) states that questionnaires are an efficient data collection mechanisms where the researcher knows exactly what was required and how to measure the variables of interest. He further asserts that administering questionnaires to a number of interest simultaneously was less expensive and time consuming and does not require much skill to administer as compared to conducting interviews. Closed ended questions were used with detailed guiding instructions as regards the manner in which respondents were required to fill them independently with minimal supervision. This was made possible due to the fact that majority of the respondents are able to read and write and in instances where the respondents were illiterate, a research assistant trained by the researcher was used to translate questionnaire into the local language and fill them according to the responses provided by the respondents. Closed ended questionnaire had pre-coded answers according to themes from which respondents were asked to choose the appropriate responses. Respondents were given ample time to fill and return questionnaires later when they are through.

### 3.6.2 Focus Group Discussion (FGD)

This method was used to collect information from authorized persons' respondent category only and this was used to cross validate information got from questionnaires. The meetings for the respondents under this category were arranged in groups of ten to twenty (10 – 20) respondents comprising both men and women and these included: School Management and Administration, Teachers and Students for purposes of effective research facilitation and respondent participation.

This method also enabled participants to hear from each other's response and make additional comments. It therefore enabled the researcher to get highly interactive sessions of interview in which objectivity and subjectivity of responses were got and it facilitated data collection in a social context.

### 3.6.3 Documentary reviews

The study also involved carrying out library and office research where secondary sources about the research questions were considered. This included related literature on annual and quarterly education progress reports, budgets, newspapers, ICT implementation guidelines, internet, circulars, policies and regulations of government. This was useful to cross validate primary data and provide basis for explaining certain concepts.

### 3.7 Data Collection Instruments

The data collection instruments included structured questionnaires, focus group discussion check list and documentary review check list. These are indicated in the following appendices; Appendix I, Appendix II, Appendix III.

#### 3.7.1 Structured questionnaire

The researcher used closed ended questionnaire for all respondents. The use of questionnaires enabled the collection of data from a large number of respondents and also enabled respondents give sensitive information without fear as their personal identities were not needed on the questionnaire. This supports Amin, 2005 (P.270)'s contention that questionnaires Offer greater assurance of anonymity thus enabling the respondents to give sensitive information without fear. The closed ended questions required the respondents to tick alongside the Likert scale of 5-strongly agree, 4-agree, 3-not sure, 2-disagree and 1- strongly disagree.

This was designed to establish the extent to which respondents are in agreement with statements and it was used to measure the variables under study. In using this, each respondent selected a response most suitable to him / her in describing each statement and the response categories were weighed from 5 – 1.

#### 3.7.2 Focus group discussion check list.

The use of group discussion checklist helped the researcher generate more information with greater in-depth information on the various questions asked. The group discussion checklist made it possible to get the required data to meet the study objectives in addition to the provision of rich information that could not be captured in the closed ended questionnaires.

#### 3.7.3 Documentary review checklist

Documentary review checklist containing a list of documents to be reviewed was used and this provided necessary data for the study. The documents for review were obtained from libraries, Municipal Council Offices, and internet. They included reports, newspapers, policies and regulations ICT guidelines, annual final accounts, Budgets and circulars.

### 3.8 Research procedure used in data collection

After the research proposal was approved and passed together with the research data collection tools, the researcher obtained a letter from the Faculty of Science, granting permission to

proceed with data collection and presented it to the selected schools under study, for acceptance and authorization to undertake the study in their local government.

The authorities' permission to the researcher was of great significance in clarifying and averting suspicion about the study and helped to elicit increased willingness on the part of respondents to be objective and honest while responding to questions posed to them. The letter introduced the researcher as a student of UMU and explained the importance and purpose of the research. In addition, the letter requested for assistance to be offered to the researcher. The researcher recruited one research assistant to ensure that the influence of personal factors of the research during data collection are minimized by bringing on board a person who was neutral about the research variable relationship and the selected organization of the study. The researcher trained the assistant for three days before going to the field to ensure quality work. The researcher made contact with the various authorities where the study will be carried out and together they made appointments when to carry out the study. This approach enabled proper planning and mobilization of resources on the agreed dates. The researcher together with the assistant went to the respondents to collect data.

The research ensured that during data collection, questions were discussed in the presence of respondents in order to be well understood and where necessary make adjustments to reduce chances of non-compliance and non-reliability of the tool.

### 3.9 Validity and Reliability

Validity refers to the ability of the instruments to produce findings that are in agreement with theoretical or conceptual values; in other words to produce accurate results and to measure what is supposed to be measured (Sarantakos, 1998). Reliability of instruments alludes to the ability of the instruments to produce consistent results (Sorantakos, 1998). To ensure the validity and reliability of the instrument, the researcher formulated questionnaires in simple and understandable language and ensured that they examine the content of the variable addressed. The researcher also gave them to the research supervisor and Masters of ICT colleagues to evaluate in relation to the fact that they in agreement with the concept of ICT use.

### 3.10 Data analysis

Sekaran (2003) regards data analysis as the evaluation of data. It is the process of systematically applying statistical and logical techniques to describe, summarize and compare data. Data analysis also refers to the means of studying the collected data. In this study, data collected was analysed qualitatively with the help of SPSS version 16.0.

### 3.10.1 Quantitative data analysis

The quantitative data involved information from the questionnaires only. Data from the field was raw for proper interpretation. It was therefore vital to put it into order and structure it, so as to derive meaning and information from it. The raw data obtained from questionnaires was cleaned, sorted and coded. The coded data entered into the Computer, checked and statistically analysed using the Statistical Package for Social Scientists (SPSS) software package to generate descriptive and inferential statistics. Descriptive analysis was applied to describe the primary variable and associated indicator items related to the study objectives.

The results were presented in form of tables and charts then discussed in relation to existing literature. Conclusion and recommendations were drawn in relation to the set objectives of the study.

### 3.10.2 Qualitative data analysis

Qualitative data was collected using focus group checklist and documentary checklist, this data was collected during discussions with selected respondents in meetings and documentary reviews. Content and interpretative analysis was used to edit the data and re-organize it into meaningful shorter sentences. The content analysis in this study was used on descriptive and interpretive levels (Busha, 2008). Descriptive analysis presented what the data was all about like on the gender, education levels or marital status of respondents. Interpretative analysis articulated the meaning of the data from the feedback of respondents

The data was analysed and organized based on patterns, repetitions and commonalities into themes based on the study variables. The data then was used to reinforce information got from questionnaires to draw conclusion and recommendations.

## 3.11 Measurement of variables

The variables of the study were measured using the five Likert scale. Different variables were measured at different levels. The nominal scale measurement was used in the first part of the questionnaire (demographics) which comprised of items with some common set such as sex, age, marital status, designation and level of education of respondents. According to Mugenda and Mugenda (1999), nominal scales are assigned only for purposes of identification but do not allow comparisons of the variable being measured.

The researcher used ordinal measurement which categorizes and ranks variables being measured like the use of statements such as strongly agree, agree, no comment, disagree and strongly disagree (Amin 2005). The numbers in the ordinal scale represent relative position or

order among the variables (Mugenda and Mugenda 1999: Amin 2005). Both nominal and ordinal scales are used to measure discrete variables and only the specified numbers such as 1, 2, 3, 4, and 5 were applied (Amin 2005, P. 11).

### 3.12 Process of Proposing a Framework for effective deployment and utilization of ICTs in Secondary Schools

The researcher proposed the framework picking on the implementation of the elements examined in the existing frameworks that are presented in literature review as well as incorporating components that would fill the gaps realised from data collected from the field.

### 3.13 Process of Validating the Proposed Framework

Upon proposing an the framework, the researcher made a trip back to the two secondary schools of focus and tabled the proposal to the schools administration comprising of head teacher, deputies, head prefects, and lab attendants. Discussion was made and they approved the proposed framework as valid for the effective use of ICT in secondary schools.

### 3.14 Ethical considerations

In the process of carrying out this research, the researcher observed the following ethical issues;

So as to ensure anonymity of all respondents, they were not obliged to give their names while filling in the questionnaires. In this way, the respondents were assured of being unidentifiable with particular questions throughout the study.

The researcher informed the respondents of the intentions and purpose of the research study being carried out so as to enable the respondents understand that information being collected was strictly for study purpose and nothing else.

The researcher also accorded maximum confidentiality to all information obtained in the field of research.

# CHAPTER FOUR

# PRESENTATION, ANALYSIS AND DISCUSSION OF THE FINDINGS

## 4.0 Introduction

This chapter presents the facts, which the research discovered. The findings were presented in line with the objectives of the study whereby the raw data in form of questionnaires was edited and interpreted which ensured uniformity, legibility and consistency. The data-filled questionnaires were copied and analysed by tallying and tabling in frequency tables while identifying how often certain responses occurred and later evaluation was done. The information was then recorded in terms of percentages. In this chapter therefore, the researcher makes presentation, analysis and discussion of data from respondents.

## 4.1 Demographic characteristics of respondents

The Background information of the respondents was important because they comprised of both sexes but of different marital statuses and age groups from various settings. This was intended in order to get a variety of views and unbiased responses which made the study a reality. The respondents were divided into the Head teachers, Deputy Head teachers and Administrators, Teachers and students. The findings are shown in the figures below;

### 4.1.1 Classification of respondents by gender

The study looked at the gender of teachers and students who were part of the ICT users in secondary schools and the result was as represented in figure 4.1

***Table 4.1 Gender of Respondents***

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Male | 113 | 59.0 | 59.0 | 59.0 |
| | Female | 79 | 41.0 | 41.0 | 100.0 |
| | Total | 192 | 100.0 | 100.0 | |

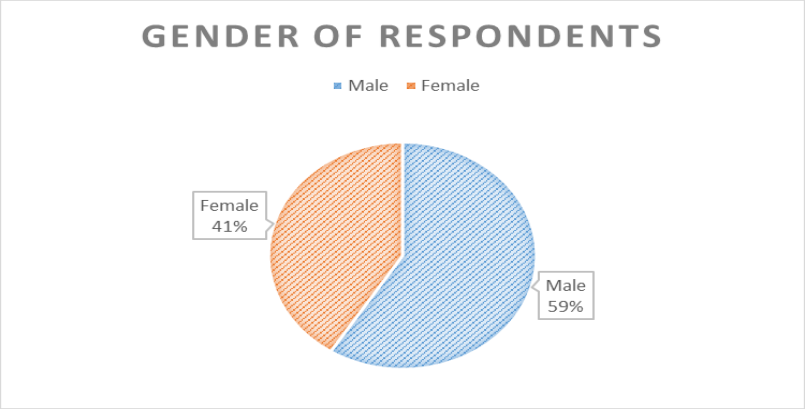


***Figure 6: Classification of respondents by gender (Source; Primary data)***

During the field survey, it was found out that; males greatly participated in the study as represented by 59% whereas 41% of the respondents were females; implying that these secondary schools had more male respondents compared to women respondents as illustrated in the figure above. The respondents are in close proximity in number and this shows that the results were objective and not biased by gender.

### 4.1.2: Classification of respondents by age

The study looked at the age of teachers and students' who were part of the ICT users in secondary school and the result was as represented below:

***Table 4.2 Age Bracket of Respondents***

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Less than 20 years | 134 | 70 | 70 | 70 |
| | 21-30 | 27 | 14 | 14 | 84 |
| | 31-40 | 21 | 11 | 11 | 95 |
| | 41 and above | 10 | 5 | 5 | 100 |
| | Total | 192 | 100 | 100 | |

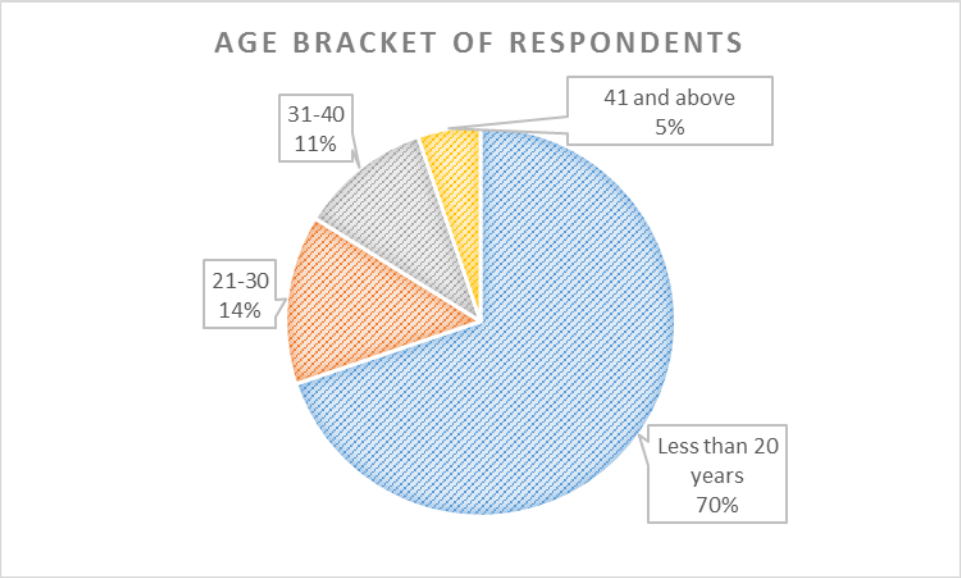


***Figure 7: Classification of respondents by age (Source; Primary data)***

Figure 4.2 above shows that; the biggest percentage of the respondents represented by 70% were found to be under 20 years, followed by 14% of the respondents who were in the age bracket of 21-30 years, then 11 % of the respondents were between 31-40 years and only 5% were 41 years and above. The implication of this is that the majority of respondents being below 20 years, they are in a development phase and can easily cope with changing societal demands and hence learn new skills faster.

### 4.1.3: Classification of respondents by marital Status

The study looked at the marital status of teachers and students' who were part of the ICT users in secondary school and the result was as represented in figure 4.1.3

***Table 4.2 Marital Status of Respondents***

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Single | 163 | 85 | 27.9 | 27.9 |
| | Married | 22 | 11 | 62.3 | 90.2 |
| | Divorced | 4 | 2 | 6.6 | 96.7 |
| | Widowed | 3 | 2 | 3.3 | 100 |
| | Total | 192 | 100 | 100 | |

*Source; Primary data*

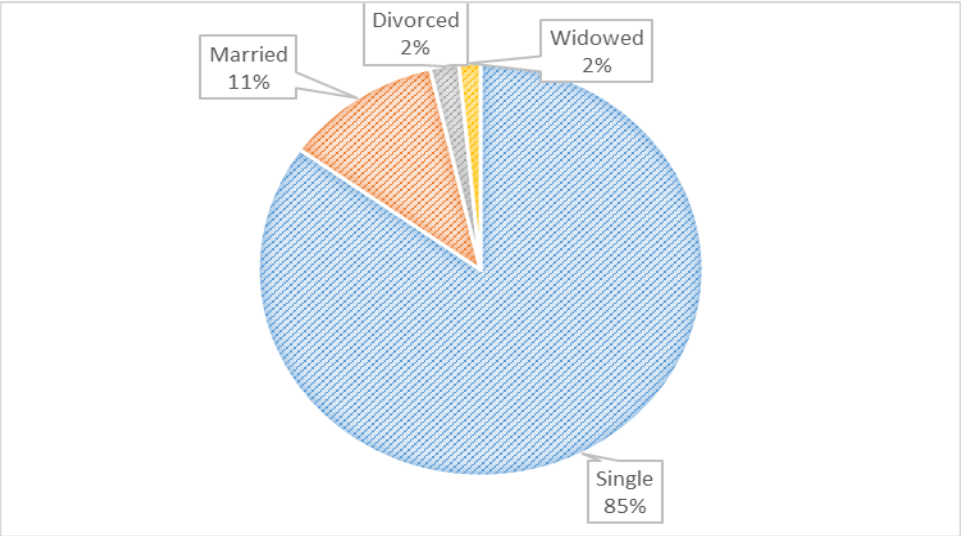


**Figure 8: Classification of respondents by marital Status**

An assessment of the respondents' marital status was as follows; the biggest percentage of the respondents were found to be single as shown by 85% where as 11% of the respondents were found to be married, 2% of them were divorced lastly 2% of the respondents were widowed. This shows that the majority are of school going age and can focus on improved utilisation of ICT to improve performance at Secondary School level.

### 4.1.4: Respondents level of education

The study looked at the level of education of respondents' who were part of the ICT users in the selected secondary schools and the result was as represented in the table below.

***Table 4.4 Education Level of Respondents***

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Certificate | 156 | 81 | 81 | 81 |
| | Diploma | 10 | 5 | 5 | 86 |
| | Degree | 22 | 11 | 11 | 98 |
| | Masters | 4 | 2 | 2 | 100 |
| | Total | 192 | 100 | 100 | |

*Source; Primary data*

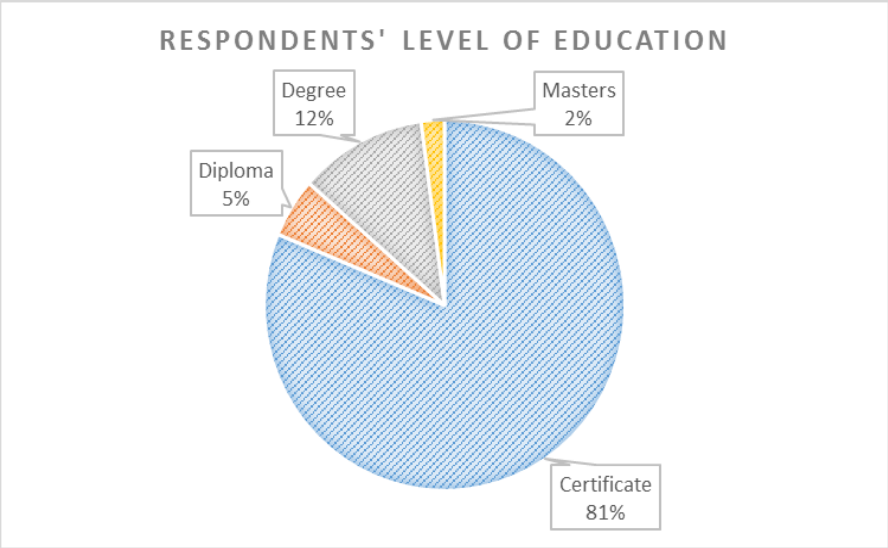


**Figure 9*: Respondents level of education***

The biggest percentage of respondents that is 81% had Certificates as the highest level of education obtained at the time, then 12% of the respondents had Degrees, whereas 5% of the respondents were Diploma holders and lastly 2% of the respondents had attained Masters Degrees. The implication of this was that the biggest number of the respondents had the basic qualification (certificates) which was enough for them to understand the research process and understand the implication of ICT frameworks and the concepts involved.

### 4.1.5 Duration Spent in this school

The study looked at the period for teachers and students' who had stayed in the school and were part of the ICT users and the result was as represented below:

***Table 4.5 Duration of Respondents Spent in the School***

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-3 Years | 106 | 55 | 55 | 55 |
| | 4-6 Years | 52 | 27 | 27 | 82 |
| | 7-9 Years | 23 | 12 | 12 | 94 |
| | 10 and above Years | 11 | 6 | 6 | 100 |
| | Total | 192 | 100 | 100 | |

*Source; Primary data*

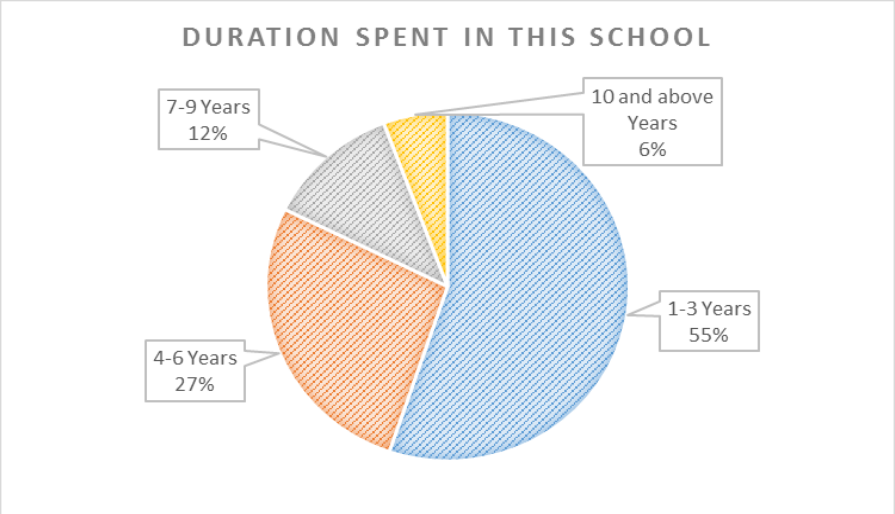


**Figure 10***: Respondents' duration spent in the School*

From the figure above, it was found out that the biggest percentage of the respondents had been in these secondary schools for a period between 1-3 years as represented by 55% whereas 27% of respondents had been in these secondary schools for the period between 4-6years, 12% of respondents had been in these secondary schools for the period of 7-9 years and lastly 6% of respondents had been in these secondary schools for 10 years and above.

The implication of this was that they had been associates of these secondary schools for a long time thus possess enough experience of the culture at the schools. It also reveals the experience in ICT awareness as these Schools have had computers for at least four years.

### 4.1.6: Period spent accessing ICT facilitates in this school

The study looked at the period for teachers and students' spent accessing ICT facilitates in the selected schools and the result was as represented below:

***Table 4.6 Duration of Respondents' ICT Access in the School***

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Less than 1 Year | 50 | 26 | 26 | 26 |
| | 2-3 Years | 84 | 44 | 44 | 70 |
| | 4-6 Years | 38 | 20 | 20 | 90 |
| | Above 6 Years | 20 | 10 | 10 | 100 |
| | Total | 192 | 100 | 100 | |

*Source; Primary data*

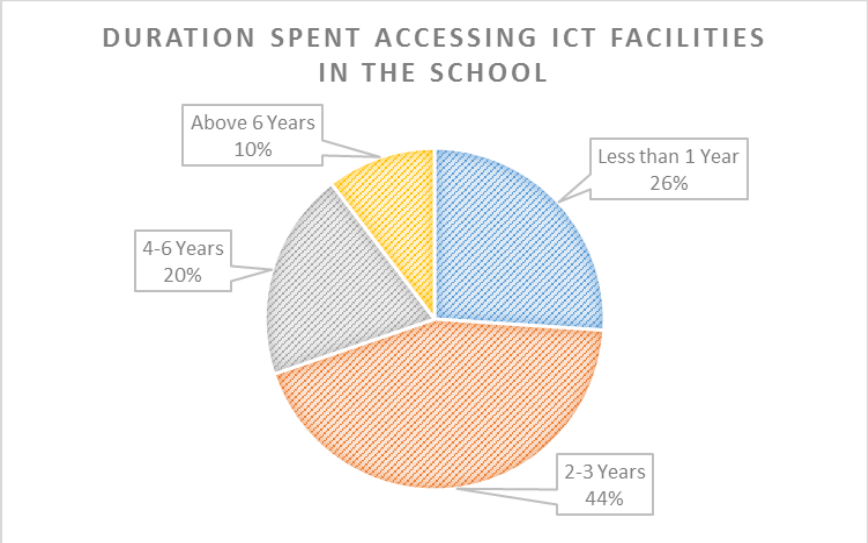


***Figure 11: Duration Spent accessing ICT facilitates in this school***

According to figure 4.6 above, majority of the respondents represented by 44% revealed that they have been accessing ICT facilitates in these secondary schools for 2-3 years, these were followed by 26% of the respondents who said they have been accessing ICT facilitates in these school for less than a year, 20% of respondents said they have accessed ICT facilities for 4-6 years and lastly 10% of the respondents said have been accessing ICT facilitates in the school for more than 6 years. The implications of these results is that a big percentage of the respondents had acquired access to ICT facilities and used them and hence had knowledge on ICT and would not find trouble responding to the questions asked.

## 4.2 DESCRIPTIVE STATISTICS

The first objective of this study was to review existing frameworks to determine requirements for the proposed framework. Upon review of the frameworks, the common elements were

identified. These include the participation of various stakeholders in fostering ICT use in schools. The researcher therefore evaluated how these stakeholders have played their role in promoting ICT use. This section therefore presents respondents' take on the role of various stakeholders in promoting ICT use in secondary schools.

### 4.2.1 Government Role in Fostering ICT Use

The government plays an important role in promoting ICT deployment and use in secondary schools. This ranges from providing equipment to monitoring the implementation of ICT programs. The table below shows respondents' feedback on the question concerning the role of government in fostering ICT in schools.

***Table 4.7 Descriptive Statistics of Government Role***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| Government of Uganda supports ICT in secondary schools through its ministry of education | 192 | 1.00 | 5.00 | 4.6557 | 6.66555 |
| Ugandan government has ICT in secondary curriculum | 192 | 1.00 | 5.00 | 3.8033 | 1.27567 |
| Ministry of education rarely monitors implementation of the ICT curriculum | 192 | 1.00 | 5.00 | 2.6066 | 1.34510 |
| Ugandan government has not employed enough ICT teachers for our school | 192 | 1.00 | 5.00 | 3.2951 | 1.21579 |
| The government has constructed computer lab in our school | 192 | 1.00 | 5.00 | 3.6066 | 1.38177 |
| The government has purchased new and quality computers for our school | 192 | 1.00 | 5.00 | 3.0164 | 1.40821 |
| The government of Uganda does not provides security for our ICT resources | 192 | 1.00 | 5.00 | 2.0557 | 1.25014 |
| The government takes time to make repairs and updates of both computers and software | 192 | 1.00 | 5.00 | 3.7541 | 1.19242 |
| Some computers in our school have virus and some are broken down | 192 | 1.00 | 5.00 | 3.7213 | 1.14209 |
| We experience power fluctuation in our school as well as computer lab | 192 | 1.00 | 5.00 | 3.6721 | 1.24795 |
| The government has not connected our school to internet | 192 | 1.00 | 5.00 | 2.9836 | 1.48876 |
| We have few computers in our school | 192 | 1.00 | 5.00 | 3.4918 | 1.34936 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| Mean Range | Response Mode | Interpretation |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

When asked as to whether the government of Uganda supports ICT in secondary schools through its ministry of education, the results show a mean of 4.6 which is very high and showing strong agreement to the statement. The implication is that Ugandan Government for sure through the ministry of education supports ICT use in secondary schools. This coincides with Ndawula's argument that government through its ministry through its agencies like parliament and ministry of education sets up policies to govern ICT use in schools Ndawula (2013). Records from the ministry of education show that Ugandan parliament approved ICT policy to be used in education in 2005. In secondary sub-sector, the aim of ICT policy is that secondary teachers should be equipped to make use of ICT in their lesson preparation. The policy also tasked the government to provide ICT infrastructure in each institution (Uganda. MoES Internal Report on ICT, 2009). When asked at to whether Ugandan government has ICT in secondary curriculum, the results show a mean of 3.8 which is also very high and showing strong agreement to the statement. This further confirms government support to ICT is secondary schools.

When asked as to whether the ministry of education rarely monitors the implementation of the ICT curriculum, the results show a mean figure of 2.6 which is high and showing an agreement to the statement. What it means is that although the government supports ICT use in secondary schools, the monitoring aspect is limited yet it's vital for the accomplishment of the set goals. On the same note, when respondents were asked whether the Ugandan government has not employed enough ICT teachers for their school, the results show a strong agreement with a mean figure of 3.2. Actually both Mandela Secondary School and St. Andrea Kaahwa's College have one teacher each for ICT. This is not sufficient to run a school with a population of about one thousand students. This therefore does not coincide with the teaching that the government through its agencies like parliament and ministry of education ought to set up policies to govern ICT use, trains teachers, reviews the curriculum, deploy teachers, provide security and carries out assessment and supervisions (Ndawula, 2013).

When asked as to whether the government has constructed computer lab in their school, the results show a mean of 3.6 which is very high and reflecting strong agreement and a further confirmation of the government support to the schools. Also when asked as to whether the government has purchased new and quality computers for our school, the results show a mean of 3.0 which high and showing agreement to the statement. This is further a confirmation that government support ICT is schools. Although the respondents agree that computers purchased are new and of high quality, through observation, the researcher saw some computers of old model and some new. It's therefore not possible to argue that all computers are indeed new and of good quality.

When asked as to whether the government of Uganda does not provide security for their ICT resources, the results show a mean figure of 2.0 which is low and showing disagreement to the statement. This also agrees with what literature teaches that it is one of government roles to provide security for ICT resources (Amuriat, 2012). On observation, the researcher found out that the computer labs have strong doors, windows and padlocks. The schools have a watchman who provides security.

Regarding to whether the government of Uganda takes time to make repairs and updates of both computers and software, the results show a mean of 3.7 which very high and showing strong agreement to the statement and hence affecting equipment numbers. On the same note, respondents strongly agreed that some computers in their school have virus and some are broken down (mean 3.7). Respondents also strongly agreed that their school experiences power fluctuation (mean 3.6). They also agreed that the government has not connected their school to internet (mean 2.9). And lastly, the respondents agreed that they have few computers in their school. These results are in disagreement with what the government ought to do regarding promoting ICT use. Although the government has given ICT equipment, according to these results, the government does not push in for repairs and install of updated software yet it is part of information system management that is a requirement in the normal running of ICT in schools. It is the same failure to well manage these systems that is reflected in some computers being attacked by virus leading to their breakdown. The results that their school is not connected to the internet and that they have few computers shows variation in government support of ICT use.

According to Kasse & Bulunywa (2013), the MoES has also supported other ICT initiatives in partnership with other agencies like SchoolNet, the Microsoft Partners in Learning Program, Connect-ED, Curriculum Net, NEPAD e-schools initiative, Cyber-schools technology solutions (CSTS) program and Computers for Schools- Uganda. These initiatives have focused

on equipping of schools with computers and associated hardware/ software, provision of internet connectivity, training of teachers and teacher educators in ICT, and the development/ selection of digitized pedagogical content. Some such as the Microsoft Partners in Learning Program are quite ambitious; this initiative has already equipped 100 schools with donated PCs and the plan is to have all (8000) secondary schools equipped with computers and training modules by the end of 2015 (Hennessy et al (2010). These benefits are not linked to all schools which reflect an imbalance.

### 4.2.2 International Agents and Donors Role in Fostering ICT Use

International Agents and Donors also play an important role in promoting ICT use in secondary schools. This ranges from providing equipment to participating in monitoring of the implementation of ICT programs. The table below shows respondents' feedback on the question concerning the role of donors in fostering ICT use in secondary schools.

***Table 4.8 International Agents/ Donors Role in ICT Use***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| Donors have not participated in sensitizing both teachers and students on the need to use computers in our school | 192 | 1.00 | 5.00 | 3.0656 | 1.42442 |
| Donors have not supported the construction of computer lab in our school | 192 | 1.00 | 5.00 | 3.6721 | 1.17928 |
| In my school, donors and international agencies have not sponsored the training of ICT teachers | 192 | 1.00 | 5.00 | 3.5246 | 1.29880 |
| Donors have not provided our school with computers | 192 | 1.00 | 5.00 | 3.4918 | 1.32442 |
| Donors have constantly updated computer programs | 192 | 1.00 | 5.00 | 2.3361 | 1.25406 |
| Donors have connected our school to strong internet | 192 | 1.00 | 5.00 | 2.1213 | 1.21286 |
| Donors participate in evaluation of ICT use in our school | 192 | 1.00 | 44.00 | 3.8033 | 5.40931 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| Mean Range | Response Mode | Interpretation |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

When asked if donors have not participated in sensitizing both teachers and students on the need to use computers in their school, mean results show a figure of 3.0 which is high and showing agreement to the statement. This implies that the international agents and donor have not rendered their sensitization service on ICT use to these schools. This is further confirmed by respondents' strong agreement to the statement that donors have not supported the construction of computer lab in their school (mean 3.6).

The respondents also agreed to the question that in their school, donors and international agencies have not sponsored the training of ICT teachers (mean, 3.5) and that donors have not provided their school with computers (mean 3.4). Respondents disagreed that donors have constantly updated computer programs (mean 2.3) and that donors have connected their school to strong internet (2.2). Respondents strongly agreed that donors do not participate in evaluation of ICT use in their school (3.8).

These results show limited input of international agents and donors in supporting ICT use. What is known is that donors have actually supported ICT use in some schools but these results show that they haven't in these schools. Yet Kasse & Bulunywa, (2013) argues that agents and donors play a role in **s**ensitizing end-users of ICT, support in training ICT staff, and improve on the quality and number of ICT equipment, give student interns opportunity to learn more on computers, participate in monitoring ICT education and its ICT budgets implementation. They also provide funds, computer hardware and facilitate ICT lab construction in schools. Some of International donors in Uganda, include; IDRC, The World Bank, UNESCO, UNDP and USAID to mention a few.

### 4.2.3 Role of Business Community in Fostering ICT Use

The business institutions also play an important role in promoting ICT use in secondary schools. This ranges from providing equipment to participating in monitoring of the implementation of ICT programs. The table below shows respondents' feedback on the question concerning the role of business institution in fostering ICT use in secondary schools.

***Table 4.9 Descriptive Statistics on the Role of Business Community***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| In my school business institutions like the banks have supported the construction of computer labs | 192 | 1.00 | 5.00 | 1.2951 | 1.28250 |
| Business institution like telecommunication companies have given us computers | 192 | 1.00 | 5.00 | 2.0033 | 1.30153 |
| The business communities have connected our school to the internet | 192 | 1.00 | 5.00 | 2.3344 | 1.32751 |
| Business institutions give us updated computer software | 192 | 1.00 | 5.00 | 2.0361 | 1.33142 |
| They have also sponsored our teachers for ICT Training | 192 | 1.00 | 5.00 | 2.1885 | 1.47807 |
| They have sensitized teachers and students on the importance of computer and internet use | 192 | 1.00 | 5.00 | 2.4557 | 1.47066 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| **Mean Range** | **Response Mode** | **Interpretation** |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

When asked as to whether in their school, business institutions like the banks have supported the construction of computer labs, the results show a mean figure of 1.2 which is very low and showing disagreement to the statement. Respondents also disagreed to the statement that Business institutions like telecommunication companies have given them computers (2.0). Respondents further disagreed that business communities have connected our school to the internet (Mean 2.3). Respondents also disagreed to the statement that business institutions have given the updated computer software (mean 2.0). They further disagreed that business community has sponsored their teachers for ICT Training (mean 2.1). They also disagreed that business community has sensitized teachers and students on the importance of computer and internet use (mean 2.4).

The disagreements to the questions regarding the participation of business institutions in fostering ICT use in secondary schools shows their limited participation. This is contrary to what Amuriat (2012) says about business community role in promoting ICT use. It's argued that they play a role of donating computer equipment to schools and also provide funds that

can be used to train teachers on ICT Use. In Uganda, these business communities are the private business institutions like the banks, MTN, Airtel, Orange, and UTL telecom companies (Amuriat, 2012). In 2014, Centenary Bank is reported to have donated 30 computers to four secondary schools and one primary school with the aim of promoting computer literacy among students in Uganda and also in 2014, MTN also donated computers during their "21 days of Yellocare" festivities to Bududa Secondary School. Unfortunately, Mandela secondary school and St. Andrea Kaahwa's College have not benefited from ICT support by these business institutions.

### 4.2.4 Role of School Administration and Management in Fostering ICT Use

The school administration and management have a role to play in promoting ICT use in secondary schools. The respondents were asked how administrators have performed their roles and the feedback is presented in the table below.

***Table 4.10 Descriptive Statistics on Role of School Administration and Management***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| My school administration normally make requisition for ICT equipment | 192 | 1.00 | 5.00 | 3.6721 | 1.22095 |
| The administration of our school has made requisition for internet connectivity from the ministry of education. | 192 | 1.00 | 11.00 | 3.0492 | 1.60651 |
| The school administration has ensured that we have electricity in our computer lab | 192 | 1.00 | 5.00 | 3.6393 | 1.26534 |
| Our administration has lobbied for computer lab construction | 192 | 1.00 | 5.00 | 3.4590 | 1.24598 |
| Our school admin rarely talks to our parents about the importance of availing computer services to us at home | 192 | 1.00 | 5.00 | 2.4180 | 1.28186 |
| Our school administration is not so much concerned about the security of our computer lab | 192 | 1.00 | 5.00 | 2.1180 | 1.29480 |
| Our school admin ensures we are taught ICT according to the curriculum | 192 | 1.00 | 5.00 | 3.0328 | 1.40199 |
| The school admin does not make regular evaluation of the quality of ICT lessons | 192 | 1.00 | 6.00 | 3.4426 | 1.32319 |
| The school management does not pay much attention to students' ICT learning progress | 192 | 1.00 | 5.00 | 2.2623 | 1.30258 |
| Students ability to research, access and retrieving information using computers is always monitored | 192 | 1.00 | 5.00 | 2.0393 | 1.21151 |
| Our school rarely lobbies for ICT teacher to go for further training | 192 | 1.00 | 5.00 | 2.3279 | 1.35057 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| **Mean Range** | **Response Mode** | **Interpretation** |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |

| | | |
|---|---|---|
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

When asked as to whether the school administration normally makes requisition for ICT equipment, the mean result is 3.6 which is high and showing strong agreement to the statement. The placement of acquisition for ICT equipment is one role administrators have to perform according to Ndidde et al, (2009).

Regarding the question as to whether the administration of their school has made requisition for internet connectivity from the ministry of education, the results show a mean of 3.0 which is high and showing agreement to the statement. The school administrations indeed perform their role of making requisition although they may be limited by their financial inability to purchase what they want.

Respondents further more affirmed the administration's execution of their role in ICT use by strongly agreeing to the statement that school administration has ensured that have electricity in their computer lab (mean 3.6). They have agreed that their administration lobbied for computer lab construction (mean 3.4). Respondents disagreed to the statement that their school administration rarely talks to their parents about the importance of availing computers services to them at home (mean 2.4). They further disagreed with the statement that their school administration is not so much concerned about the security of our computer lab (mean 2.1).

Respondents further exonerated the administrators of execution of the role by agreeing to the statement their school administration ensures they are taught ICT according to the curriculum (mean 3.0). They further agreed to the statement that their school administration does not make regular evaluation of the quality of ICT lessons (3.4). They disagreed to the statement that their school management does not pay much attention to students' ICT learning progress (mean 2.2).

Respondents however disagreed to the statement that their student's ability to research, access and retrieve information using computers is always monitored (2.0). Respondents further disagreed to the statement that their school administration lobbies for ICT teacher to go further training (mean 2.3).

### 4.2.5 Role of Teachers in Fostering ICT Use in Secondary Schools

Teachers also have a role to play in promoting ICT use in secondary schools. The respondents were asked how teachers have performed their roles and the feedback is presented in the table below.

***Table 4.11 Descriptive Statistics the Role of Teachers in Fostering ICT Use***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| In our school we don't have more than one ICT teachers | 192 | 1.00 | 5.00 | 3.8852 | 1.15612 |
| Our ICT teachers have deep ICT knowledge able to teach the students | 192 | 1.00 | 5.00 | 2.5052 | 1.12692 |
| Not all our teachers have ICT skills | 192 | 1.00 | 5.00 | 2.8852 | 1.31781 |
| Our teachers don't have personal but a few office computers | 192 | 1.00 | 5.00 | 3.8852 | 1.21241 |
| Few of our teachers have access to internet on personal modems | 192 | 1.00 | 5.00 | 3.8197 | 1.13296 |
| Rarely do our teachers store learning materials on the internet | 192 | 1.00 | 5.00 | 3.7705 | 1.24356 |
| Our teachers encourage computer and internet use for class work | 192 | 1.00 | 5.00 | 2.1311 | 1.30990 |
| Our teachers give us assignments to research on using computers and internet | 192 | 1.00 | 5.00 | 2.3721 | 1.36286 |
| Our ICT teachers rarely goes for refresher courses | 192 | 1.00 | 5.00 | 3.2787 | 1.22653 |
| Our ICT teachers normally make report on the condition of computers | 192 | 1.00 | 11.00 | 3.7049 | 1.62629 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| **Mean Range** | **Response Mode** | **Interpretation** |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

Regarding the question as to whether in their school they don't have more than one ICT teachers, the mean results show a figure of 3.8 which is very high and showing strong agreement to the statement. This shows that ICT teacher is only one. The limitation of ICT teachers is actually one of the impediments to using ICT in schools. Ndidde (2009) argues that demand for ICT learning has been tremendous and the number of teachers who are trained to teach ICT cannot meet these demands. There are more students willing to be taught computing skills than there are teaches to transfer the skills.

When asked as to whether their ICT teachers have deep ICT knowledge able to teach the students, the respondents disagreed (mean 2.5). This means that the person teaching ICT in these schools may have not trained well.

When asked as to whether not all their teachers have ICT skills, the results show a mean result of 2.8 which is high and showing agreement to the statement. Respondents also strongly agreed to the statement that their teachers don't have personal but a few office computers (3.8). Respondents further agreed to the statement that few of our teachers have access to internet on personal modems (mean 3.8). Teachers not having ICT skills, enough computers as well as access to internet are factors that hinder ICT use in schools (Kaahwa, 2013).

When asked if rarely their teachers store learning materials on the internet, the results show a mean of 3.7 which is very high and showing strong agreement to the statement. Respondents disagreed to the statement that their teachers encourage computer and internet use for class work (mean 2.3). The respondents further disagreed to the statement that their teachers give them assignments to research on using computers and internet (2.3). These results drag behind the benefits of ICT in education. In the modern time, teachers can store learning materials on computers as well as internet; such materials can be retrieved at time of need. Yet here, teachers do not store materials on internet, nor do they encourage students to use computers and internet. Teachers also don't give students assignments that require use of ICT equipment. All this is not congruent to the teaching of cognitive flexibility theory that contends that learners' intellect can be stimulated by computer technology to spontaneously comprehend multiple concepts in response to the situational demand. This theory teaches that a learning environment that has computer technology facilitates learners to assimilate, retain, articulate, transfer and apply knowledge in areas of work (Obira, 2006). This theory therefore urges teachers to provide multiple representations of content; to avoid oversimplifying the content domain and support context-dependent knowledge; and to apply case-based instructions and emphasize knowledge construction, not transmission of information (Kearsley, 2000).

Respondents also agreed to the statement that their ICT teachers rarely go for refresher courses (3.2). They further strongly agreed to the statement that their ICT teachers normally make report on the condition of computers (Mean 3.7). UNESCO, (2014) argues that teachers employ learner centeredness, do lesson preparation, report on the condition of ICT equipment, provide conducive teacher-learner relationship, carry out research, assign learners roles, go for refresher courses of ICT and provide safety for both students and ICT infrastructures

### 4.2.6 Role of Parents in Fostering ICT Use in Secondary Schools

Parents also have a role to play in promoting ICT use in secondary schools. The respondents were asked how parents have performed their roles and the feedback is presented in the table below.

***Table 4.12: Role of Parents in Fostering ICT Use***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| Some of our parents encourage students to learn computer | 192 | 1.00 | 5.00 | 3.6393 | 1.22519 |
| They participate in availing computers to schools | 192 | 1.00 | 5.00 | 2.4262 | 1.29691 |
| They visit schools and computer labs | 192 | 1.00 | 5.00 | 2.4590 | 1.13393 |
| Some of our parents are ignorant of the importance of computers | 192 | 1.00 | 5.00 | 3.2295 | 1.25689 |
| Few Parents avail students with computers at home | 192 | 1.00 | 5.00 | 3.9016 | 1.20699 |
| Some of our parents have negative perception about internet and computer use | 192 | 1.00 | 5.00 | 3.6721 | 1.32566 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| Mean Range | Response Mode | Interpretation |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

When asked as to whether some of their parents encourage students to learn computer, the results show a mean of 3.6 which is high and showing a strong agreement to the statement. Respondents however disagreed to the statement that their parents participate in availing computers to schools (mean 2.4). They further disagreed that their parents visit their school and computer labs (mean 2.4). They also agreed to the statement that few of their parents avail students with computers at home. Parents' encouragement of their children to learn computer is a positive role. Their lack of participation in availing computers both at schools and home is incongruent to the teaching of parents expected roles. Ndidde et al, (2009) contends that parents play roles of paying tuition promptly, boost morale in their children, encourage girl

child education, provide ICT materials, visit schools and classes, attend parents' meetings and provide advice.

When asked as to whether some of their parents are ignorant of the importance of computers, the results show a mean of 3.9 which is very high and showing strong agreement to the statement. On a similar note, when asked as to whether some of their parents have negative perception about internet and computer use, the results show a mean of 3.6 which is equally high. It's true that some parents don't know the importance of computers. Some parents are affected by cultures that negative on ICT. Some of these cultures as reiterated by Barlett et al, (2013) discourage computer use with a reasoning it teachers children bad manners. Socio-cultural barriers is actually one of the factors that hind computer use.

### 4.2.7 Students' Role in Fostering ICT Use in Secondary Schools

***Table 4.13: Students' Role in Fostering ICT Use***

| | N | Min | Max | Mean | Std. Dev |
|---|---|---|---|---|---|
| Students in our school take initiative to learn computer | 192 | 1.00 | 5.00 | 3.5410 | 1.23253 |
| Students are keen in knowing and using computer programs | 192 | 1.00 | 5.00 | 3.1475 | 1.36426 |
| Students do not use internet for study purpose | 192 | 1.00 | 22.00 | 3.7541 | 2.70589 |
| Students don't know how to research on the internet | 192 | 1.00 | 5.00 | 3.3443 | 1.31511 |
| Not all students know how to use emails | 192 | 1.00 | 5.00 | 3.7049 | 1.24290 |
| Not all students know how to store and retrieve stored information on computers as well as the internet | 192 | 1.00 | 5.00 | 3.4167 | 1.33139 |
| Few students know how to use other equipment such as photocopiers, printers and projectors | 192 | 1.00 | 5.00 | 3.4426 | 1.38473 |
| Valid N (listwise) | 192 | | | | |

*Source: Primary Data*

| Mean Range | Response Mode | Interpretation |
|---|---|---|
| 3.51-4.50 | Strongly Agree | Very High |
| 2.51-3.50 | Agree | High |
| 1.76-2.50 | Disagree | Low |
| 1.00-1.75 | Strongly Disagree | Very Low |

When asked as to whether students in their school take initiative to learn computer, the mean results show a figure of 3.5 which is very high and showing strong agreement to the statement. Respondents also agreed to the statement that students are keen at knowing and using computer programs (mean 3.1). Taking initiative to learn computer and its programs is among the ICT activities students are supposed to take. Ndawula, (2013) argues that students ought to take leadership positions in ICT, get involved in group participation and ICT clubs, provide safety for ICT equipment, and attend ICT classes and use computers as well as internet in their studies.

When asked as to whether students do not use internet for study purpose, the results show a mean of 3.7 which is very high and showing strong agreement to the statement. Barlett et al, (2013) argues that students mostly tend to show much more enthusiasm for using ICT, and are as a result quick to pick up skills in using the machines. Students are however often seen in the ICT labs between classes, using the computers to play games or, on occasion, use social networking sites like Facebook, twitter and WhatsApp. Students are on limited occasions observed using the computers for class related activities or assignments assigned by their teachers. Students do not tend to focus on educational benefits without teacher guidance.
When asked if students don't know how to research on the internet, the mean results show a figure of 3.3 which is high and showing agreement to the statement. The respondents further strongly agreed to the statement that not all students know how to use emails (Mean 3.7). Respondents further agreed to the statement that not all students know how to store and retrieve stored information on computers as well as the internet (3.4). They also agreed to the statement that few students know how to use other equipment such as photocopiers, printers and projectors (mean 3.4).

### 4.3 Qualitative Research Findings

In an attempt to understand the views of Headmasters, Deputy Headmasters and Administrators, teachers and students better, the qualitative research approach used teachers and students in-depth interviews in focus group discussions. The students and teachers focus groups were conducted by the researcher separately and at different times. Interview guideline questions were developed from the quantitative study questions in order to get in depth information on ICT level of usage, barriers, ICT infrastructure and policies within the schools.

### 4.3.1 Teachers' focus group discussion results

#### a) ICT usage in schools

Teachers admitted that computers were used in many activities in school but very rarely used in the teaching and learning of other subjects as one female teacher pointed out that *"Computers are used to teach basic ICT applications such as introduction to ICT, Word processing, Spreadsheets and database and also for research purposes".* Most teachers in the schools sampled rarely use computers in their schools owing to high number of lessons per teacher and co-curricular activities which are mandatory for every teacher. Some teachers admitted having not used computers due to limited technical support from school as one of the female teachers' pointed out that *"Computers in the lab are mostly occupied by students and it is hard to get time to use them without interruption from students"*. Teachers agreed that computers make work easier but said they require additional computer skills in order to use computers effectively. Most of the teachers felt that moral and material motivation from the administration in order to boost their morale to learn ICT skills for pedagogical purposes was lacking. Teachers' use of computers in class was limited to number of computers only found in the school computer lab and too much time required to carry desktops in classrooms during use. The percentage of daily computer users was very small in both schools and some expressed fears of computer virus and others not seeing the benefit of their use in areas of teaching and learning. Some respondents' believed that ICT has played an important role in administration and management of information as one male respondent claimed that *"I am fond of the computer now that I can use it to set exams, plan for lessons, do research work and collaborate with other teachers and friends very far from here "*

#### b) Barriers facing the implementation of ICT in the schools

From the group discussion with the teachers, it was revealed that there was insufficient number of computers, and some too old for use. This was also observed by the researcher during the visit to the lab in addition to poor computer maintenance, delayed repairs and the routine of reporting technical failures. Slow internet connection and unreliable internet service in schools particularly in offices and computer labs. An interviewee asserted that "*well we don't have good internet in this school but from my experience, students of now days rarely use internet for study but to chat and look for naked pictures"*. For sure, limited interest by students to use internet for study purposes is one of the challenges facing ICT use in secondary schools. In addition, there was shortage of computer lab technicians in the schools which delayed computer use and teachers felt that this should be addressed with more urgency. One male

respondent said that "*Only one technician to handle the Schools' ICT equipment led to lots of failures not to be attended to on time and affecting availability of these resources*"

There was too much pressure on computer teachers who besides teaching ICT were involved in data and grades entry of all the other subjects and some had expressed fears in technology use. Most teachers felt they were not fully motivated by the administration to acquire ICT skills because computer training was done at odd hours and proved to be expensive and tiresome. One female teacher claimed that *"It is hard to study ICT while students are close by, it discourages most teachers who don't want to be seen as beginners"*. Teachers also complained of difficult times controlling students in computer use in schools. The deputy Headmaster complained of having difficulty on total cost of ownership of ICT items and some teachers argued that they were being divided into those who use and those who cannot use computers thus interfering with their unity. They also cited lack of standard ICT plan and structured Computer use policy.

### c) Teachers and Administrators' professional development

Majority of teachers complained that the timing of ICT courses was inconvenient hence failing to train as expected. They felt that they were incurring more expenses on ICT training. An interviewee asserted that "*although we have made requisition for more ICT trained teachers, we have not gotten one. The one teaching is has brief ICT training as a course unit at University"* (Female Respondent). This tells of how the limitation of few and limited skilled teachers Ndidde (2009) talks about still exists in schools. Ndidde argues that besides the limited number of teachers, the ones available lack necessary ICT skills to impart to students.

Some teachers indicated that they attend ICT courses for the sake of annual increment, many teachers testified that the computer skills they have are too elementary for digital content development and added they would require more training on digital content development. An interviewee argued that *"most teachers have areas of specialization, they make notes and that is all. Many are too busy to learn how to use computer and internet" (*Male Respondent).

Some teachers admitted having attended courses to do with computer maintenance and web design but needed more time to apply it in a classroom setup.

### d) ICT infrastructure in the schools

Teachers and Principals agreed that ICT would improve teaching and learning in schools and had made some efforts which seemed to yield positive results. More needed to be done to improve some aspects such as high students number to computer ratio in most classes, limited computer laboratories in school. Insufficient technical support in the computer usage hence affecting educational process. Some teachers talked of power interruptions and wished that there could be power backups. Most computers in the schools were not matching the demand and number of students. Schools suffered due to use of very old computers and the frequent breakdowns. In the interview as to whether they have enough ICT equipment, a respondent asserted that "*The lab is small but students go there in shifts. We have 66 computers and when we take students, about six of them use one computer. I can say that the adequacy is minimal in relation to the ratio" (Male Respondent).* Through observation, the researcher confirmed the fewness of computers and high student-computer ratio.

Despite efforts of schools to have internet access, they suffered several disconnection issues, limited and unreliable bandwidth which never allowed video streaming in social media. Very few schools in general had well established website and the websites remained very dormant. A respondent recapitulated this in the interview session by asserting that *"Regarding internet, we have for several times requested the ministry to connect our school in vain. We struggle to push and that is all we can do, we are not able to bring by ourselves because its governments' work" (Male Respondent).* This further confirms that the administration does its role of making requisitions. According to (Ndidde et al, 2009) School administration pays staff remuneration, buy ICT materials & facilities, monitor ICT lessons, sensitize parents on the need to support their children on ICT use, provide security and carries out regular assessment on both teachers and students' ICT use.

Most of the schools did not have established guidelines on ICT usage by teachers and students within the school. Some teachers cited a few school rules and regulations set by the teaching staff to control students while using computers in the lab and class. Teachers were positive on the fact that if proper guidelines and instruments of ICT are designed, computers would make greater impact in teaching and learning.

### 4.3.2 Students' focus group discussion results

#### e) Student's computer proficiency level

Some students admitted having acquired basic computer skills at primary level and were able to perform various computer activities given a chance. Many students did not have computer training before and some of the students had forgotten the skills due to long duration of time without computer practice, meaning they could have challenges in use. A few students had done some advanced computer skills such as web design and computer maintenance and were disadvantaged by the schools' inability to allow frequent computer use. Those students with prior computer skills found it easier to operate computers in computer labs. Most students had acquired internet skills outside schools due to pressure from their peers to interact through social media outside schools.

#### f) School ICT infrastructure

Students agreed that there exists computer labs in the schools sampled but the computers available for use were desktops, some too old and not enough for the students to use. There were no laptops in the computer labs but some individual teachers owned laptops for their personal use. Most of the students admitted that there was wireless internet connectivity in the computer labs but it was too slow and at times very unreliable. They agreed having used internet only during special occasions such as during science congress under strict supervision of the computer teacher. Students complained that there was no room for them to access their email, and social media accounts in the schools. Doing so either in the computer lab or within the school compound was attributed to indiscipline. There were a few computer peripherals such as scanners, printers and projectors but only accessible to teachers or the support staff but no students.

#### g) Students' ICT barriers

Students complained about the insufficient number of computers in the computer labs. Some Students said that some of the computers were too old and with limited speed. The students also complained about the shortage of computer lab technicians or school ICT coordinators which made them wait for long before being assisted during the time they used computers in the lab. This was actually confirmed by an assertion by one of the interviewees saying "*we have only one computer teacher. Sometimes the lab attendant's help but the work load remains heavy" (Male Respondent*). Some students felt they did not have the adequate computer skills

for them to use computers in the lab and relied on their fellow colleagues for assistance and at times they were not available. There was very little e-content installed in the computers owing to the limited storage capacity of the computers. Most of the time students went to computer labs to learn computer lessons and no other subjects because they were not provided for in the school time table. Some computers did not have power backups and the students were being inconvenienced in case of power failure where the computers would take too long to boot after power interruptions. One Female Student said *"The generator that is used for the School is not powerful enough to load all the school equipment so when power goes off, few computers are available and makes learning much harder"* The computers did not have updated antivirus software and students would have to lose their saved work from time to time.

### 4.4 Summary of requirements from the field study;

Below is a summary of the major findings from the data collected from the field, this forms the basis for addition of information that may not have been captured by the components of the framework that was adopted from Literature review to come up with the final proposed Evaluation framework for ICT use in Secondary Schools.

**Shortage of ICT funding**

- Government should increase funding on ICT in schools
- Schools management is encouraged to solicit more funds for ICT projects through grants applications, donations and fundraisings.

**Teacher's attitude, parents and students on the use of ICT for educational purposes**

- Those misusing ICT should be Condemned such as those accessing harmful material (pornographic sites)
- There should be the use of ICT in promotion of cultural values through ICT incorporation in cultural activities
- ICT should be taught in local languages (ease complication)
- Encourage ICT based research (diseases control & new products)
- Organise outreach programs using ICT on agriculture and to sensitize communities about ICT
- Encourage rural education development programs through ICT

**Too difficult to integrate ICT use into the curriculum**

- Government in collaboration with school management should provide installed e-content in the computers
- Government in collaboration with school management should provide multimedia resources to enhance Computer aided instruction
- Government in collaboration with school management should create Local electronic content that can directly be used in the local setup of communities and schools such as MTN Schools Learning project.

**Insufficient technical support for teachers**

- School budget should include regular ICT maintenance and repairs contracts
- Employ ICT technical support staff
- Regular Internal training and knowledge share amongst staff

**The schools do not have computers in classrooms**

- Computers and other ICT equipment should be added in classrooms or other designated areas apart from one computer lab which cannot be used by the whole school

**Existence of ICT framework**

- There were no ICT frameworks and therefore there was need to create ICT frameworks such as framework for ICT use, ICT evaluation and ICT security.

**Lack of school ICT policies and strategies such us; policy on ICT use**

- There should be creation of school ICT policies and strategies that suits to the environment to help in streamlining ICT utilization.

**Lack of proper ICT infrastructure such us; electricity, backup powers and stabilizers**

- Increase the number of computers in the computer labs
- Construct more buildings to allow more computer labs, recruit more technicians or school ICT coordinators.

- Improvise more computer backups because existing computers did not have power backups and the students were being inconvenienced in case of power failure where the computers would take too long to boot after power interruptions.
- More antivirus software's should be bought because the computers did not have updated antivirus software and students would have to lose their saved work from time to time.

## 4.5: FRAMEWORK ADOPTED FOR THE STUDY

The common components discovered after the review of existing literature on frameworks of ICT use where bundled together to formulate an adopted framework. Ndawula (2013) framework for use and sustainability is considered because it is made of all the components considered and he explicitly defined the roles of the stakeholders that were used during field study.

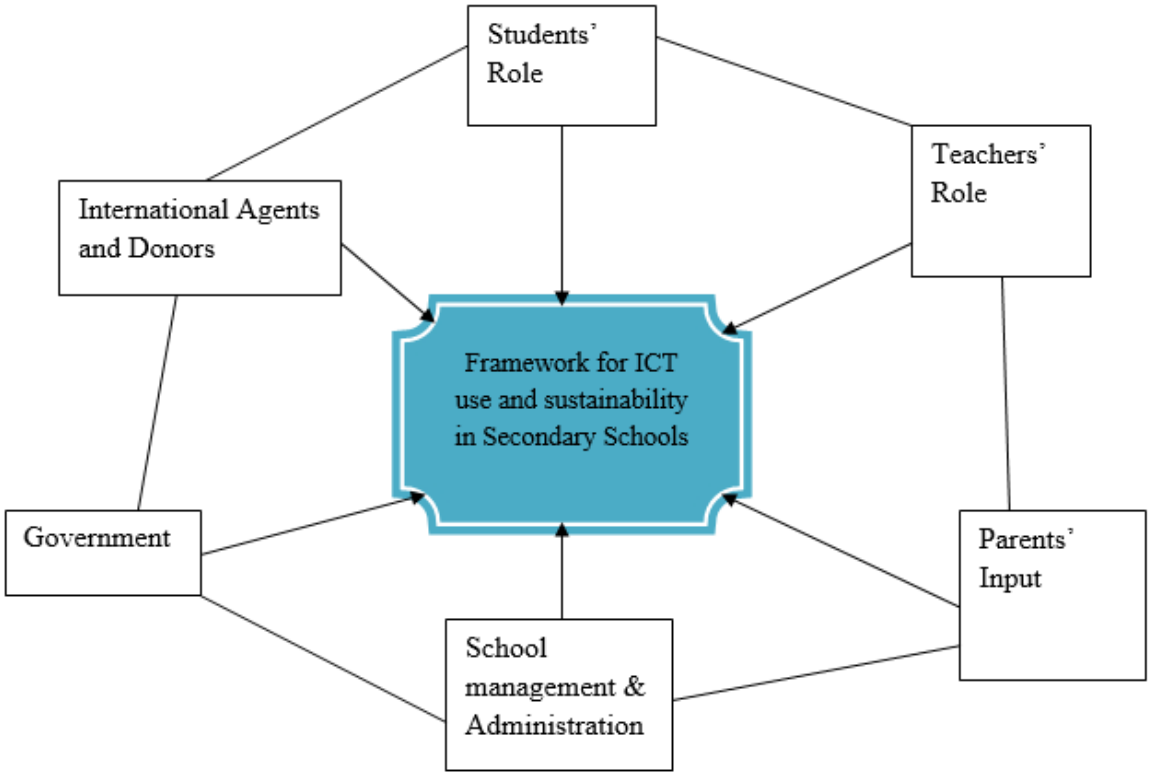


***Figure 12: Framework for ICT sustainability and Utilization (Ndawula, 2013)***

## 4.6 PROPOSED FRAMEWORK

Requirements for this framework came from two sources: literature from which benchmark framework was selected stated in section 2.6.3 i e Ndawula framework for ICT sustainability and Utilization and requirements from field study as stated in section 4.4 Summary of requirements from filed study.

### 4.6.1 Implementation of Government Role in ICT use

Majority respondents strongly agreed that the government of Uganda supports ICT in secondary schools through its ministry of education. Most respondent also confirmed that Ugandan government has ICT in secondary curriculum. Most respondents agreed that the ministry of education rarely monitors the implementation of the ICT curriculum. Most of them also agreed that Ugandan government has not employed enough ICT teachers for their school.

Majority respondents strongly agreed that the government has constructed computer lab their school. Most respondents also agreed that the government has purchased new and quality computers for their school. Most respondents disputed the allegation that the government of Uganda does not provide security for their ICT resources.

Majority respondents strongly agreed the government of Uganda takes time to make repairs and updates of both computers and software. Most respondents also strongly agreed that some computers in their school have virus and some are broken down. Most respondents also agreed that they have few computers in their school. Most of them also strongly agreed that their school experiences power fluctuation. Most of them also agreed that the government has not connected their school to internet. And lastly, the respondents agreed that they have few computers in their school.

The government roles should include but not limited to train teachers in ICT pedagogy, to review curriculum, to deploy teachers and ensure they are skilled, to provide security for physical and ICT infrastructure and the people, to construct facilities for students in schools and the communities around the school to encourage ICT use, to carryout regular assessment and monitoring of ICT facilities and utilization, to supervise instruction regularly, to provide funds and conducive environment to investors in education, to establish ICT policies and strategies to encourage and drive ICT use and deployment, to establish ICT imports tariffs that encourage investment, and to electricity and other utilities at subsidised fees.

### 4.6.2 Implementation of the Role of International Agents and Donors in ICT use

Most respondents agreed that donors have not participated in sensitizing both teachers and students on the need to use computers in our school. Most respondents also strongly agreed that that donor have not supported the construction of computer lab in their school. Most respondents also coincided that donors and international agencies have not sponsored the training.

Most respondents also agreed that donors have not provided their school with computers. Most respondents disagreed that donors have constantly updated computer programs. Most of them also disagreed that donors have connected their school to strong internet. Most respondents strongly agreed that donors do not participate in evaluation of ICT use in their school.

Donors and international agents are expected to sensitize ICT end-users, to train staff and communities, to improve quality and quantity of ICT equipment and infrastructure, to enact ICT policies and strategies to enhance deployment and utilization, to evaluate and monitor ICT education in developing countries, to fund ICT budgets, to setup facilities and provide materials.

### 4.6.3 Implementation of the Role of Business Institutions in Fostering ICT Use

Most respondents strongly disagreed that business institutions like the banks have supported the construction of computer lab at their school. Majority respondents also disagreed that Business institutions like telecommunication companies have given them computers. Many of the respondents disagreed that business communities have connected their school to the internet.

Majority respondents disagreed that business institutions have given them updated computer software. Most of respondents further disagreed that business institutions have sponsored their teachers for ICT Training. Most respondents also disagreed that business community has sensitized teachers and students on the importance of computer and internet use.

### 4.6.4 Implementation of the Role of School Administration in Fostering ICT Use

Majority of respondents strongly agreed that their school administration normally makes requisition for ICT equipment. Most respondents agreed that the administration of their school has made requisition for internet connectivity from the ministry of education. The respondents however confirmed that most requisition have not been successful.

Most respondents strongly agreed that their school administration has ensured that have electricity in their computer lab. Most respondents also agreed that their administration lobbied for computer lab construction. Majority of respondents disagreed that their school admin rarely talks to their parents about the importance of availing computers services to them at home. Most respondents also disagreed their school administration is not so much concerned about the security of our computer lab.

Majority respondents agreed that their school admin ensures they are taught ICT according to the curriculum. Most of them also agreed that their school admin makes regular evaluation of the quality of ICT lessons. Most respondents disagreed that their school management does not pay much attention to students' ICT learning progress. Most respondents disagreed that their student's ability to research, access and retrieve information using computers is always monitored. Most respondents disagreed that their school admin rarely lobbies for ICT teacher to go further training.

The School management and administration are expected to continuously pay staff remuneration, provide materials and facilities for ICT, to motivate teachers and students regularly, to monitor ICT lessons, to sensitize parents, to provide security for physical and ICT infrastructure, to organize exhibitions and workshops, to carryout inter-School visits to share knowledge, to carryout regular assessment of ICT.

### 4.6.5 Implementation of the Role of Teachers in Fostering ICT Use

Most respondents strongly agreed that in their school they don't have more than one ICT teachers. Most respondents also disagree that their ICT teachers have deep ICT knowledge able to teach the students. The respondents affirmed that their ICT teachers are not ICT trained but just computer knowledgeable.

Majority respondents agreed that not all their teachers have ICT skills. Majority respondents strongly agreed that their teachers don't have personal but a few office computers. Majority respondents strongly agreed that few of their teachers have access to internet on personal modems.

Most respondents strongly agreed that rarely do their teachers store learning materials on the internet. Most respondents disagreed that their teachers encourage computer and internet use for class work. Majority respondents disagreed that teachers give assignments to research on using computers and internet. Most respondents agreed that their ICT teachers rarely go for

refresher courses. Most respondents strongly agreed that ICT teachers normally make report on the condition of computers.

Teachers' roles considered as essential in fostering ICT use will include the following; teachers should employ learner centeredness, carryout lesson preparation, encourage conducive Teacher/ Learner relationship, carryout Research, assign Learners roles that enhance skills, attend refresher courses to update on their knowledge and skills, organize School Exhibitions, provide Safety, c*ontinuous improvement on Learner training through knowledge share with peers, application of ICT use in teaching of other subjects, use of the Local language during teaching of ICT where applicable to ease complication on slow learners.*.

### 4.6.6 Implementation of the Role of Parents in Fostering ICT Use

Majority respondents strongly agreed that some of their parents encourage students to learn computer. Most respondents disagreed that their parents participate in availing computers to schools. Most of respondents disagreed that their parents visit their school and computer lab. Most respondents agreed that few of their parents avail students with computers at home.

Most respondents strongly agreed that some of their parents are ignorant of the importance of computers. Most respondents strongly agreed some of their parents have negative perception about internet and computer use.

Parents' roles will include; to pay tuition promptly, to encourage and morale boost to students, to encourage girl child education, to provide ICT materials, to visit classes, to attend Parents' meetings and ICT forums organised at school and around the communities, to provide advice to school management and students.

### 4.6.7 Implementation of the Role of Students in Fostering ICT Use

Most respondents strongly agreed that students in their school take the initiative to learn computers. Most respondents agreed that students are keen at knowing and using computer programs. Most respondents strongly agreed that students do not use internet for study purpose. Respondents further agreed that their schools don't have internet.

Most respondents agreed that students don't know how to research on the internet. Most respondents strongly agreed that not all students know how to use emails. Most respondents agreed that not all students know how to store and retrieve stored information on computers as well as the internet. Most respondents also agreed that few students know how to use other equipment such as photocopiers, printers and projectors.

Students' roles that will be considered to drive the framework include the following; to take rewards and incentives, take up Leadership e.g. ICT prefects, get involved in group participation; join ICT clubs and other interest groups, provide Safety of ICT equipment, attend Classes, *Carryout research through use of ICT, Private ICT practice to improve on ICT knowledge and Skills.*

### 4.6.8 Implementation of the role of the ICT steering committee

It was discovered during field study that there was failure of implementation of elements from the existing frameworks and the researcher recommends a specialised committee of ICT knowledgeable members of the Schools to setup and independent team that will ensure improved implementation and management of ICT resources through regular monitoring and evaluation of ICT deployment and utilization.

As a pilot project, the researcher recommended the inclusion of the following; Deputy Headmaster, ICT coordinator, a member of the board of governors as a patron, Computer administrators, computer technicians, ICT experts and a student representative.

Some of the functions/ roles of the committee will include; take on ownership of the framework for effective deployment and utilization of ICTs and other frameworks that the schools would setup and will ensure that the frameworks are implemented and followed, the committee will continuously update stakeholder roles and encourage stakeholders, carryout monitoring, evaluation, and recommend new ideas on adoption, implementation, and utilization.

The steering committee will also design and update School ICT Policies and Strategies in accordance to Government set ICT policies, carryout periodic evaluation of ICT use and facilities in School using evaluation checklist. The ICT steering committee will also encourage research using ICT on agricultural (diseases control & new products). This will help influence utilization at the students' homes through training of both parents and students by organising outreach programs to sensitize communities about ICT.

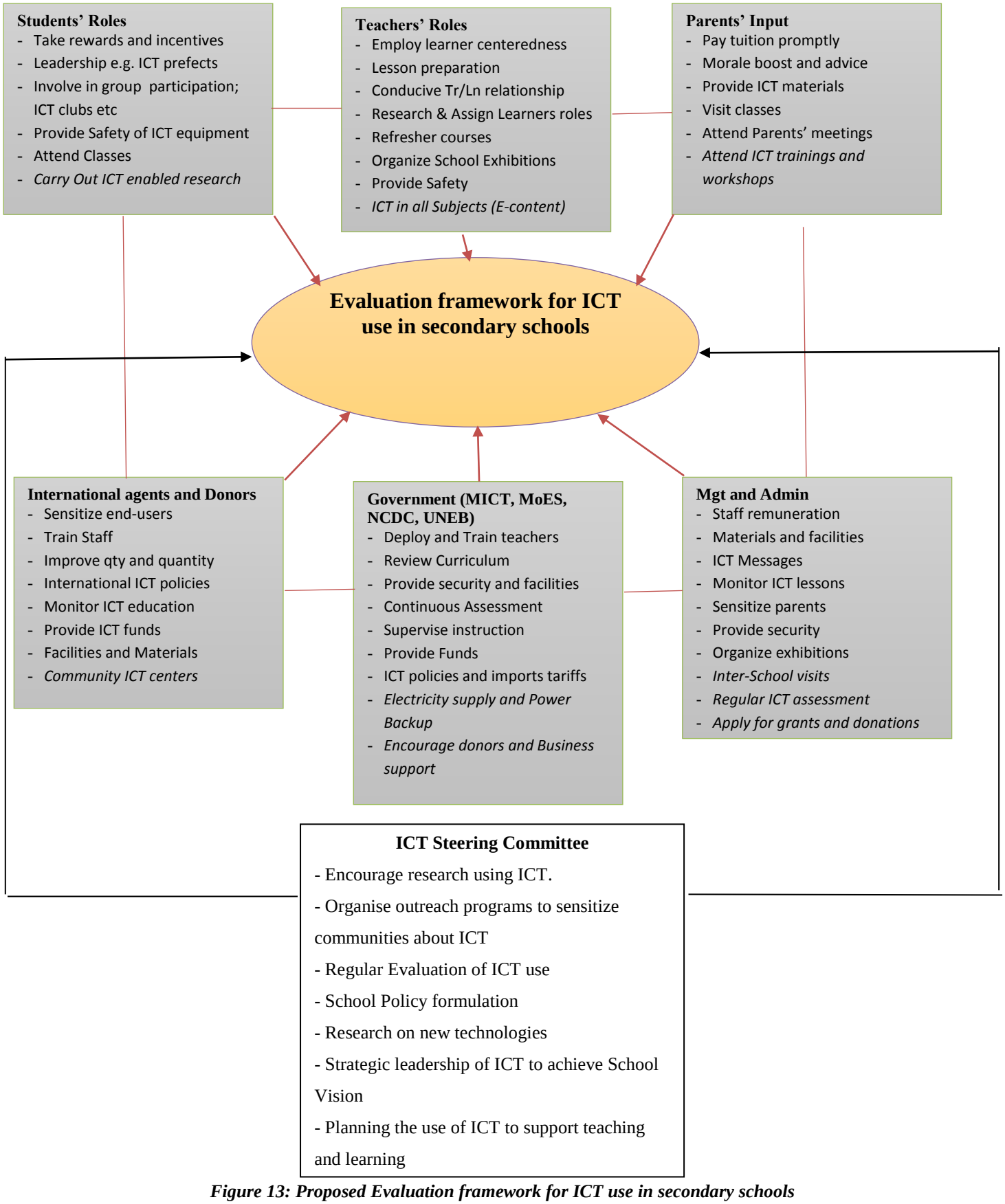


***Figure 13: Proposed Evaluation framework for ICT use in secondary schools***

### 4.7 ICT Integration and use

For effective integration and use of ICT skills in schools, the advancement levels should be viewed in terms of ICT frequency of use, implementation strategies, types of activities and pedagogy, tasks for applications, assessment of students learning outcomes and relevance of ICT to content.

### 4.8 Validation of the framework for effective deployment and utilization of ICTs

After proposing the framework, it was important that it is evaluated and validated in order to measure the output of the achievement. Since the framework designed was for examination purposes, it was validated by experts before it is fully implemented in Secondary Schools.

**Respondents for validation**

| **Respondents** | **Number** |
|---|---|
| Head teachers within Hoima Municipal | 2 |
| Deputy head teachers and Teachers | 10 |
| ICT Experts | 8 |
| **Total** | **20** |

***Source; primary data***

A verification of the above validation was guided by Head teachers within Hoima Municipality, Deputy Head teachers and Teachers from the studied schools and ICT experts that included Master of ICT students and my research Supervisor of Uganda Martyrs University as summarized in the table above. The outcome of the validation generalised the features emphasized during the study. The validation allowed freedom for schools to make their own decisions concerning the positive and negative features.

**Validation results**

Validation results from the respondents which included; Head teachers within Hoima Municipal, Deputy Head teachers and Teachers, Masters of ICT students and research supervisor indicated that majority of the respondents represented with 95% were in favour of the solutions suggested as means of closing the gap that was in existence hindering ICT utilisation.

## 4.9 Conclusion

The analysis of the results gave the findings that demonstrated that the utilization gaps existed; the discussion of the findings also gave critical reasons associated with the digital divide and this was used to come up with a framework. The framework was found useful to facilitate increased utilization of ICT in these secondary schools. The validation results showed that majority accepted the proposed framework. It was generally agreed that the framework is a good guide, needs to be adopted to improve and ensure ICT utilization is monitored, evaluated periodically for improved academic and administrative performance of the secondary Schools.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

This study aimed at developing a framework for effective deployment and utilization of ICTs in secondary schools in Hoima Municipality with focus on Mandela Secondary school and St. Andrea Kaahwa's College. To achieve the major purpose, the study reviewed existing frameworks to determine requirements for the proposed framework. Upon review of identified frameworks such as *InfoDev (2010), Ndidde et al (2009)* and *Ndawula (2013),* the common elements that determine the requirements were identified. These included the participation of various stakeholders in fostering ICT use in schools. These stakeholders are: the government, international agents and donors, business institution, school administration, teachers, parents and students. Upon evaluation of the implementation for the elements that determine the new framework, the framework was then proposed and validated.

In this chapter therefore, the researcher makes summary of findings and the researcher also makes conclusions, recommendations and areas for future researcher.

## 5.2 Summary

**The objectives of the study were**

i. To review an existing ICT evaluation framework and determine the requirements for the proposed framework.
ii. To propose the framework for ICT diffusion in secondary schools.
iii. To validate the framework for ICT diffusion in the selected secondary schools.

The findings revealed that the study comprised of more male respondents. Majority of respondents were single, followed by respondents who were married. Most of respondents hold certificates; UCE as their main qualification, followed by those respondents with Bachelor's Degree. Majority respondents were students and followed by teachers, these are the core users of ICT in secondary Schools and had served in these schools for some time as represented in the demographic results.

From the field, 43.8 % of respondents agreed and 39.4% strongly agreed that there ICT fits into teaching/ learning. A small percentage of 13.1% strongly disagreed and 12.2% disagreed. Since majority of the respondents answered in agreement to this item, it indicates that ICT was important for the education programs for teaching and learning. This is in agreement with (Mikre, 2009) who revealed in his writing that ICT in education promotes active learning in such a way that ICT in education helps in mobilizing tools for examination, calculation and analysis of information in order to provide a platform for student inquiry, analysis and construction of new information. The learners therefore, learn as they do and, whenever appropriate work on real-life problems in-depth. Moreover, ICT makes the learning less abstract and more relevant to their life situations. ICT in learning also promotes increased learner engagement.

The biggest percentage of the respondents represented by 52.6% strongly agreed that they were focused on at the moment in the use of ICT and 35.0% also agreed that they were focused on at the moment in the use of ICT. Surprisingly, 8.7% strongly disagreed that they were not focused on at the moment in the use of ICT in the same way 3.5% disagreed too. However this contradicts with Abuhmaid (2011) who urged that the teachers being stressed that workload is a major barrier for them to integrate ICT tools in the English language classrooms. Similar problem was highlighted in his study. He found that the teachers were already overloaded and they could not cope with the pressure to prepare and practice the ICT integration into lessons. Moreover, the transformation and innovation of national educational system and the independent school's syllabus increases the teachers' workload. They have to prepare different assessment and worksheets for students in their midst of busy working schedule.

Majority of the respondents (62.3%) strongly agreed and (30.7%) agreed that "there are potentials I see in ICT to support in teaching and learning processes with our class". On the other hand, (3.5%) strongly disagreed and (4.3%) disagreed when asked "whether there are potentials I see in ICT to support in teaching and learning processes with our class". Similar findings were in agreement with (Kabir, 2013), who pointed out that ICT in education promotes creative learning in such a way that ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the duplication of received information.

Further, (Youssef & Dahmani, 2010) also supported the argument in their writing that ICT in education promotes integrative learning in a way that ICT-enhanced learning promotes a thematic integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice, which characterizes the traditional approach.

In addition, 62.3% of the respondents strongly agreed and represented by 30.7% who disagreed that it was too difficult to integrate ICT use into the curriculum, 4.3% of the respondents disagreed while 3.5% of the respondents strongly disagreed that it was too difficult to integrate ICT use into the curriculum. In the same way, in Hong Kong, (Wong, 2012) conducted a study of primary heads and teachers to investigate their perspectives on the implementation of ICT. His data show that teachers could not integrate ICT into their teaching because they lack time for planning and preparing, regardless of whether or not they were willing to use it. On the other hand, one of Becta's reports written by Scrimshaw, which was about the enablers that help teachers to make successful use of ICT, suggested allowing sufficient time for teachers to plan and prepare as a key factor that could enable better use of ICT in secondary schools.

Further to indicate that, 12.2% of the respondents disagreed that there was insufficient technical support for teachers and 21.9% of the respondents strongly disagreed, 35.0% of the respondents strongly agreed while 30.7% of the respondents agreed that there was insufficient technical support for teachers. In the same way Preston et al, (2015) asserted the need for training in specific ICT skills, especially skills in solving technical problems and understanding the basic workings of the technology, and they provide evidence that the breakdown of equipment prevents teachers from using ICT. It is also found that teachers who were ICT beginners were more likely to prefer to learn ICT basics first and then later to be involved in pedagogical training. Moreover, Cunningham et al. in their research on the 'Laptops for Teachers' initiative indicated that the teachers who received a laptop would need to be trained to use it properly, especially with regard to the other ICT tools.

Also to note the respondents disagreed that most parents are not in favor of the use of ICT at school and 43.8% of the respondents strongly disagreed that most parents are not in favor of the use of ICT at school, 7.8% of the respondents agreed while 12.2% of the respondents strongly agreed that most parents are not in favor of the use of ICT at school. This was in line with Siraj-Blatchford (2003), who recommends children should use computers in short spells,

and children under 3 years should use not more than 10 to 20 minutes at a time and children under 8 years not more than 40 minutes. Some educationalists and parents are concerned about children's isolation from social interactions or ICT displacing other play and learning activities. In response, what literature points to is the critical importance of the adult's role and development of appropriate use of the tools. This means that safe and effective use of ICT in early childhood largely depends on the knowledge and skills of parents, guardians and practitioners (e.g. preschool teachers).

### 5.3 Conclusion

This study focussed on developing a framework for effective deployment and utilization of ICTs in Secondary Schools. The implementation of common elements in the already developed ICT framework was done. The findings revealed weakness in the implementation of stakeholder roles in the existing frameworks. The government has performed its duties but still limited in monitoring and evaluation of ICT programs in schools. The government has also failed to employ professional ICT teachers in Public schools while the private Secondary Schools employ teachers who won't be so expensive. The government has also failed to connect internet to most Public Secondary schools as well providing enough quality computers. The donors on the other hand have not had any input in fostering ICT In these schools. Business institutions have also not played any role in ICT use promotion. School administration has pushed much on ICT use but has failed in the monitoring and evaluation of the programs. Teachers are limited in skills. Not all teachers know how to use computers and internet and for that matter, they don't assign students to conduct research on internet. Teachers have also not developed a database where learning materials can easily be stored and retrieved. Parents have played limited role in ICT use; they have negative perception on computer and internet use. They have not provided computers at schools and homes. Students have no skills on research using computer and internet, they don't use internet for study rather use them for social networking. They rarely use emails. They can't retrieve learning information from computers and internet.

What is clear about ICT use in secondary schools is that ICT utilization is an evolving process. It involved actual use in form of surfing on internet, typing on computers, drawings on computers, storing materials on computers, retrieving stored information and printing. There is no ICT use in Education frameworks tailored towards addressing teaching and learning activities in the schools. This has made teachers and students believe that ICT is a subject for

the “computer teacher” and not a tool for learning other subjects. There are lessons assigned to ICT subject and very little is seen in teaching and learning of other subjects using computers. However, the actual use of ICT is impossible without role play by the government, donors, business institutions, school management, parents, teachers, students and other well-wishers. Once ICT is in effective use, cognitive flexibility theory will come to fulfilment and students’ academic performance will be positively impacted on.

### 5.4 Recommendations

The researcher therefore makes the following recommendations:

The government of Uganda through the ministries of education and Information technology need to strengthen ICT facilitation and use at schools by equitability providing enough ICT equipment to all schools. The government should further-more post ICT knowledgeable teachers and connect these schools to the internet.

Donors, international organizations and business institutions should also solve the problem of digital divide in schools by also participating in ICT use. They need to reach all schools and help them with ICT infrastructures and training ICT teachers. They need to sensitive teachers, students and parents on the importance of computer use. They need to provide updated software as well internet to these schools. They need to take part in facilitating training of ICT teachers and monitoring and evaluating implementation of ICT programs in schools.

School administration and management need to continue lobbying for more ICT equipment, internet connections and ICT teachers. They need to frequently oversee the repairs of broken equipment as well sensitizing parents and students on the necessity of computer use. They need to develop favorable policies and procedures for ICT use in schools. They also need to provide security for ICT equipment. They need to monitor ICT lessons and conduct regular assessment of ICT progress in their schools.

Teachers need to take initiative to study deep and to have enough ICT knowledge. They need to teach using ICT equipment i.e. computers, projectors, flash disks, and printers. They need to report on broken equipment and outdated software. They need provide safety of equipment. They need to make lesson plans for ICT classes and apply appropriate learner centred approach. They need to store information on computers in a manner accessible by students. They should also teach students how to research on internet as well as how to use computers for study purposes. They also need take refresher courses.

Students need to take up leadership roles, learn computer programs and apply them. They need to research on internet and use emails. They need to regularly attend classes, form ICT promotion clubs, capture what they are taught and apply them in exams and in their everyday lives. They also need to provide safety to the computer hard and software.

### 5.5 Limitations of the study

In the process of carrying out this investigation, a number of limitations were met. These limitations obstructed the speed at which the study was carried out. These included the following;

Some targeted respondents were not willing to set aside time to respond to the investigator's questions this caused frustrations on the researcher's efforts to collect substantial data.

The researcher also faced a problem of some rude and hostile respondents citing one respondent who claimed that the government that we support is not doing enough that the research was meant for government and there is nothing more it would do to make things better, just a wastage of time.

The study required a lot of time to be dedicated to collecting substantial data from one respondent to another making observations, continuous review of literature, data analysis and report writing.

### 5.6 Areas of Future Research

Since ICT is relatively new in the teaching and learning process, a lot of research is needed to be carried out. This study has exposed many things but not all be covered. The researcher thus recommends the following possible research areas.

- An evaluation of the design of ICT curriculum in secondary schools in Uganda
- The role of ICT in enhancing education and work productivity in Uganda
- Students 'perception and use of the internet as a hub for learning

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# APPENDICES

## Appendix I: Questionnaires

Dear Respondent,

I am Kenneth Mugisa, student of Uganda Martyr's University pursuing Master's Degree in ICT Management, Policy and Architectural Design. As a requirement for this course, I am carrying out research on the topic **"Evaluation Framework for ICT Use in Secondary Schools in Hoima Municipality."** This case study focusses on two sampled Schools namely, Mandela secondary school and St. Anderea Kaahwa's College in Hoima Municipality

You have been selected as one of respondents and I therefore, request you to help answer the following questions. All information obtained will specifically be for study purpose and will therefore be accorded maximum respect and utmost confidentiality.

Thanks in Advance.

**SECTION A: BIO DATA OF THE RESPONDENTS**

1. Gender: i) Male ☐ ii) Female ☐

2. Marital Status i) Single ☐ ii Married ☐ iii Divorced ☐ iv) Widowed ☐

3. Age bracket: i) Less than 20 yrs ☐ ii) 21 – 30 yrs ☐ iii) 31 -40 yr ☐
(41 yrs and above ☐

4. Education status: i) Certificate ☐ ii) Diploma ☐ iii) Degr ☐ iv).Masters ☐

5. Duration of work school i) 1-3 yrs ☐ ii) 4-6 yrs ☐ iii) 7-9 yrs ☐ iv) 10 yrs and above ☐

**In the Following Sections, Indicate the level of your agreement with the given statement based on the scale provided below;**

| Strongly Disagree (SDA) | Disagree (DA) | Not Sure (NS) | Agree (A) | Strongly agree (SA) |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

| | SECTION B: STAKEHOLDERS FACILITATION OF ICT IN SCHOOLS | SD | D A | NS | A | SA |
|---|---|---|---|---|---|---|
| | **A. Government** | | | | | |
| 7 | Government of Uganda supports ICT in secondary schools through its ministry of education | | | | | |
| 8 | Ugandan government has ICT in secondary curriculum | | | | | |
| 9 | Ministry of education constantly monitors implementation of the ICT curriculum | | | | | |
| 10 | Ugandan government has not trained enough ICT teachers for our school | | | | | |
| 11 | The government has constructed computer lab in our school | | | | | |
| 12 | The government has purchased NEW and QUALITY computers for our school | | | | | |
| 13 | The government of Uganda does not provides security for our ICT resources | | | | | |
| 14 | The government takes time to makes repairs and updates of both computers and software | | | | | |
| 15 | Some computers in our school have virus and some are broken down | | | | | |
| 16 | We experience power fluctuation in our school as well as computer lab | | | | | |
| 17 | The government has not connected out school to internet | | | | | |
| 18 | The internet we have in our school in very slow | | | | | |
| 19 | We have few computers in our school | | | | | |
| | **B: Donors and International Agencies** | | | | | |
| 20 | Donors have not participated in sensitizing both teachers and students on the need to use computers in our school | | | | | |
| 21 | Donors have not supported the construction of computer lab in our school | | | | | |
| 22 | In my school, donors and international agencies have not sponsored the training of ICT teachers | | | | | |
| 23 | Donors have not provided our school with computers | | | | | |
| 24 | Donors have constantly updated computer programs | | | | | |
| 25 | Donors have connected our school to strong internet | | | | | |
| 26 | Donors not participate in evaluation of ICT use in our school | | | | | |
| | **C:Business Communities** | | | | | |
| 27 | In my school business institutions like the banks have supported the construction of computer labs | | | | | |
| 28 | Business institution like telecommunication companies have given us computers | | | | | |
| 29 | The business communities have connected our school to the internet | | | | | |
| 30 | Business institutions give us updated computer software | | | | | |
| 31 | They have also sponsored our teachers for ICT Training | | | | | |
| 32 | They have sensitized teachers and students on the importance of computer and internet use | | | | | |
| | **C. School Administration and Management** | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 33 | My school administration normally make requisition for ICT equipment | | | | | |
| 34 | The administration of our school makes has made requisition for internet connectivity | | | | | |
| 35 | The school administration has ensured that we have electricity in our computer lab | | | | | |
| 36 | Our administration has lobbied for computer lab construction | | | | | |
| 37 | Our school admin rarely talks to our parents about the importance of avail computers services to us at home | | | | | |
| 38 | Our school administration is not so much concerned about the security of our computer lab | | | | | |
| 39 | Our school admin ensures we are taught ICT according to the curriculum | | | | | |
| 40 | The school admin makes regular evaluation of the quality of ICT lessons | | | | | |
| 41 | The school management does not pay much attention to students' ICT learning progress | | | | | |
| 42 | Our ICT teacher skills are always evaluated | | | | | |
| 43 | Students ability to research, access and retrieving information using computers is always monitored | | | | | |
| 44 | Our school admin rarely lobbies for ICT teacher to go further training | | | | | |
| | **D:Teachers** | | | | | |
| 45 | In our school we have more than one ICT teachers | | | | | |
| 46 | Our ICT teachers have deep ICT knowledge able to teach the students | | | | | |
| 47 | Not all our teachers have ICT skills | | | | | |
| 48 | Our teachers don't have personal but a few office computers | | | | | |
| 49 | Few of our teachers have access to internet on personal modems | | | | | |
| 50 | Rarely do our teachers store learning materials on the internet | | | | | |
| 51 | Our teachers encourage computer and internet use for class work | | | | | |
| 52 | Our teachers give us assignments to research on using computers and internet | | | | | |
| 53 | Our ICT teacher (s) rarely goes for refresher courses | | | | | |
| 54 | Our ICT teachers normally make reports on the condition of computers | | | | | |
| | | | | | | |
| | **E. Parents** | | | | | |
| 56 | Some of our parents encourage students to learn computer | | | | | |
| 57 | They participate in availing computers to schools | | | | | |
| 58 | They visit schools and computer labs | | | | | |
| 59 | Some of our parents are ignorant of the importance of computers | | | | | |
| 60 | Few Parents avail students with computers at home | | | | | |
| 61 | Some of our parents have negative perception about internet and computer use | | | | | |
| | **F. Students** | | | | | |
| 61 | Students in our school take initiative to learn computer | | | | | |
| 62 | Students are keen are knowing and using computer programs | | | | | |
| 63 | Students do not use internet for study purpose | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 64 | Students know how to research on the internet | | | | | |
| 65 | Not all students know how to use emails | | | | | |
| 66 | Not all students know how to store and retrieve stored information on computers as well as the internet | | | | | |
| 67 | Few students know how to use other equipments such as photocopiers, printers and projectors | | | | | |

**Appendix II: INTERVIEW GUIDE FOR STUDENTS FOCUS GROUP DISCUSSION**

Q1 (a) How many computers do you have in your school?

(b) How are those computers used in your school?

Q2 (a) Do you have internet connectivity in your school?

(b) How many hours would an individual use internet per day?

Q3 (a) How would you rate the level of computer expertise in your school?

(b) In your opinion, do you think the level of computer expertise affects your attitude of computer usage?

Q4 what are some of the tasks that use computers for?

Q5 (a) what limitations do you have while using computers in your school?

(b) How can these limitations be overcome?

Q6 (a) Do you use computers in class while learning other subjects?

(b) If yes/no, what would be the reasons?

Q7 Has there been any ICT training in your school?

Q8 what skills do think you should have to enable integrate ICT in learning?

Q9 Are there ICT guidelines in your school?

Q10 Do you think the school environment in terms of ICT capacity meets your needs in usage of ICT tools for learning?

***Thank you for your participation***

**Appendix III: INTERVIEW GUIDE FOR TEACHERS' FOCUS GROUP DISCUSSION**

Q1 (a) How many computers do you have in your school?

(b) How and where are those computers used in your school?

Q2 (a) Do you have internet connectivity in your school?

(b) How many hours do you use internet per day?

Q3 (a) How would you rate the level of computer expertise in your school?

(b) In your view, does the level of computer expertise affect ICT integration in other subjects?

Q4 what are some of the tasks that you use computers for in your school?

Q5 (a) what hindrances you experience while using ICT tools in your school?

(b) How can these hindrances be overcome?

Q6 (a) Do you use computers in class while teaching other subjects?

(b) If yes/no what would be the reasons?

Q7 (a) Has there been any ICT training in your school?

(b) If yes, what was the intended purpose?

Q8 what skills do you think you should have to enable you integrate ICT in teaching?

Q9 Does your school have any ICT policy?

Q10 Do you think the school is well prepared in terms of ICT capacity and connectivity, to meet your needs in usage of ICT tools for teaching?

***Thank you for your participation***

## Appendix III: VALIDATION QUESTIONNAIRE

Name of the respondent (optional) …….

Date of the interview…….

Designation……

1. What are the future plans that your office has regarding ICT teaching and usage in schools?

2. What do think is your main usage of ICT in the school?

3. What are some of the barriers to effective implementation of ICT in education in your experience? Mention two main ones.

3. Do you think the introduction of ICT can further support your work?

4. If yes How?

5. What do you think needs to be done to ensure that students benefit from internet usage for their educational development?

6. What policies/strategies do you think can ensure wider accessibility of ICTs to the majority of schools in your district?

7. (a) What are your comments on the national Education ICT policy?

(b) Do you think has been successful in achieving what it was meant to achieve?

8. Did you have a walk through the proposed framework and understood its purpose?

9. Do you think the framework can achieve its purpose of bridging the ICT diffusion in secondary schools?

10. Does the government have ICT framework that is currently implementing in secondary schools?

11. Does the walk through the framework convince you to adopt it for implementation in your secondary school?

12. What main barrier do you see in the proposed framework that will bring resistance to implementing the proposed framework?

13. In your opinion, do you think the sustainability component of the framework can enhance the teaching of ICT in schools?

14. How do you think community participation can structure the teaching of ICT in secondary schools in Uganda?

15. What is your position about the proposed framework?

Accept ☐

Don't accept ☐

Don't know ☐

| Vision & contribution | Question | Response (yes or no) |
|---|---|---|
| **Shortage of ICT funding** | -Will the idea of soliciting more funds for ICT projects through grants applications, donations and fundraisings be of benefit?<br>- Will increase in Government funding geared to development of ICT infrastructure improve ICT Diffusion in Secondary Schools? | |
| **Teacher's attitude, parents and students on the use of ICT for educational purposes** | - Will teaching ICT in local languages (ease complication) be of help in as far as change of attitude is concerned?<br>-Will promotion of cultural values through ICT incorporation in cultural activities help to change the attitudes? | |
| **Too difficult to integrate ICT use into the curriculum** | -Will installation of e-content in the computers help in the integration of ICT into the curriculum<br>-Will government's collaboration with school management in the creation of Local electronic content help to ease ICT use in the curriculum? | |
| **Insufficient technical support for teachers** | -Will budget inclusion on regular ICT maintenance and repairs contracts help to solve the Insufficient technical support problem?<br>-Will regular internal training and knowledge share amongst staff help to solve the problem of insufficient technical support for teachers? | |

| | | |
|---|---|---|
| **The schools do not have computers in classrooms** | Will addition of computers and other ICT equipment in class room increase ICT use in schools? | |
| **Existence of ICT frameworks** | -Will ICT frameworks, lead to an increase in ICT use, ICT integration and ICT security? | |
| **Lack of school ICT policies and strategies such us; policy on ICT use** | -Will creation of school ICT policies and strategies help to streamline ICT diffusion? | |
| **Lack of proper ICT infrastructure such us; electricity, backup powers and stabilizers** | - Will increase in the number of computers in computer labs solve the problem of ICT infrastructure?<br>-Will construction of more ICT labs solved the problem of ICT infrastructure?<br>-Will acquisition of solar power systems, Power Backups, Stabilisers and standby Generators improve ICT use and attitude amongst users? | |

## Appendix IV: Krejeie and Morgan (1970) Sample Table

**Sample Size**

Sample size(s) required for the given population sizes (N)

| N | S | N | S | N | S | N | S | N | S |
|---|---|---|---|---|---|---|---|---|---|
| 10 | 10 | 100 | 80 | 280 | 162 | 800 | 260 | 2800 | 338 |
| 15 | 14 | 110 | 86 | 290 | 165 | 850 | 266 | 3000 | 341 |
| 20 | 19 | 120 | 92 | 300 | 169 | 900 | 269 | 3500 | 346 |
| 25 | 24 | 130 | 97 | 320 | 175 | 950 | 274 | 4000 | 351 |
| 30 | 28 | 140 | 103 | 340 | 181 | 1000 | 278 | 4500 | 354 |
| 35 | 32 | 150 | 108 | 360 | 186 | 1100 | 285 | 5000 | 357 |
| 40 | 36 | 160 | 113 | 380 | 191 | 1200 | 291 | 6000 | 361 |
| 45 | 40 | 170 | 118 | 400 | 196 | 1300 | 297 | 7000 | 364 |
| 50 | 44 | 180 | 123 | 420 | 201 | 1400 | 302 | 8000 | 367 |
| 55 | 48 | 190 | 127 | 440 | 205 | 1500 | 306 | 9000 | 368 |
| 60 | 52 | 200 | 132 | 460 | 210 | 1600 | 310 | 10000 | 370 |
| 65 | 56 | 210 | 136 | 480 | 214 | 1700 | 313 | 15000 | 375 |
| 70 | 59 | 220 | 140 | 500 | 217 | 1800 | 317 | 20000 | 377 |
| 75 | 63 | 230 | 144 | 550 | 226 | 1900 | 320 | 30000 | 379 |
| 80 | 66 | 240 | 148 | 600 | 234 | 2000 | 322 | 40000 | 380 |
| 85 | 70 | 250 | 152 | 650 | 242 | 2200 | 327 | 50000 | 381 |
| 90 | 73 | 260 | 155 | 700 | 248 | 2400 | 331 | 75000 | 382 |
| 95 | 76 | 270 | 159 | 750 | 254 | 2600 | 335 | 10000 | 384 |

**SOURCE:** Krejeie and Morgan (1970), Determining sample size for research activities, Educational and psychological measurement, 30,608, sage publications.

**Appendix V: Computer Laboratory and ICT setup in Schools Pictures**