THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) ON STUDENTS' ACADEMIC PERFORMANCE IN SELECTED SECONDARY SCHOOLS IN MUBENDE MUNICIPALITY, MUBENDE DISTRICT

BY

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DECLARATION

I, Asaba Kamida, hereby declare that this research proposal entitled "The impact of information and communication technology (ICT) on students' academic performance," A case study of Mubende Municipality, Mubende district is my original work, except where acknowledged, and has not been submitted before to any university or any institution of higher learning for the award of any degree or any other purposes.

SIGNED---------- DATE----------

APPROVAL

This is to certify that this research proposal entitled "The impact of information and communication technology (ICT) on students' academic performance in Mubende Municipality, Mubende district'' is submitted and accepted with my full consent and approval.

SIGNATURE---------- DATE----------

DR. JOYCE SSESSANGA BUKIRWA

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DEDICATION

This report is dedicated to the memory of my father, Hajj Ibrahim Bisangabasaija who passed on a love and respect for education.

It is also dedicated to my four children branded as the four" C^{s}". To Comfort (Human adult), Confidence (Mr. Generous), Cachet (Mzeei) and lovely Candy (Maama), who have been affected by every way possible by this quest.

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DEFINITION OF KEY TERMS

Impact: Is the far- reaching effects of one thing on another.

Science: Is a branch of knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general laws.

Tool: An implement especially one held in the hand, as a hammer, saw or file for performing or facilitating mechanical operations.

ICT: Information and Communication Technology. It is the integration of telephone line and wireless signals, computers as well as necessary enterprise software, middle ware, storage and audio visual and systems which enable users to access, store, transmit and manipulate information.

Also ICT is used to refer to the convergence of audio visual and telephone networks with computer networks through a single cabling or link system.

ICT tools: An integration of telephone lines, wireless signals, computers software, middle ware, storage and audio visual gargets which enable users to access, store, transmit and manipulate information.

Academic performance: Is the extent to which a student, teacher or institution has achieved their educational goals.

Classroom: Any place where one learns or gains experience. A room as in school or college, in which classes are attended.

Student: Any person who studies, investigates, or examines thoughtfully.

Secondary school: A high school or a school of corresponding grade, ranking between a primary school and a college or university.

Teacher: A person who teaches or instructs, especially as a profession.

ABBREVIATIONS

ICT-information and communication technology

IOS-Inspector of Schools

SPSS: Statistical Package for Social Science

WCEA-Wisconsin Community Education Association

MTN-Mobile Telecommunications Network

GDP- Gross Domestic Product

GMS- Global Messaging System

PMA- Plan For Modernization of Agriculture

FM-Frequency Medium

PEAP- Poverty Eradication Action Plan

TV-Television

UCE- Uganda Certificate of Education

UNESCO-The United Nations Educational, Scientific and Cultural Organization

BECTA-British Education Communication and Technology Agency

UK- United Kingdom

BBC- The British Broadcasting Corporation

RIC- Regulation of Interception of Communication

UNEB-Uganda National Examinations Board

UACE- Uganda Advanced Certificate of Education

ANOVA- Analysis of Variances

CD-ROMs-Compact Disc, Read-Only-Memories

GSM-Global System for Mobile Communications

ABSTRACT

The study investigated the impact of **I**nformation and Communication Technology (ICT) on students' academic performance, a case study of Mubende Municipality, Mubende district. It sought to establish the relationship between ICT and students' academic performance, particularly looking at the availability, accessibility and adequacy of ICT resources in Mubende Municipality, specifically in five schools of, Mubende Army secondary school, Universal college-Mubende, Comprehensive High School-Mubende, Mubende Light secondary school and Christ The King secondary school-Mubende. The study was prompted due to the persistent poor academic performance of the students In Mubende Municipality, Mubende district

It was conducted through cross- section survey design; data was collected during the month of August 2017 using questionnaires with close ended and open ended questions, observation check list and interview guides from a sample of ten administrators, ten ICT teachers and sixty students.

In verifying the hypothesis the researcher used the Pearson Chi-Square analysis method to find out whether the academic performance of the learners was linearly correlated with ICT.
The study established that the availability of ICT resources in secondary schools in Mubende Municipality is still very much wanting and very inadequate for the students to use. Because of limited number of functional computers and computer laboratories, accessibility is timetabled.

The researcher concluded that availability, accessibility and adequacy of ICT resources significantly affect students' academic performance in secondary schools in Mubende Municipality-Mubende district.

Based on the above, the researcher recommends that the government and head teachers of secondary schools in Mubende Municipality should invest more in computers and related technology.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study.

1.1:1 Theoretical background

Although there is no single, universal definition of ICT, the term is generally accepted to mean all devices, networking components, applications and systems that combined allow people and organizations (i.e., businesses, nonprofit agencies, governments and criminal enterprises) to interact in the world. ICT (information and communications technology – or technologies) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as videoconferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries. The term is somewhat more common outside of the United States. (Margaret Rouse 2005). The study, design, development, application, implementation, support or management of computer-based information systems. The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones. (Chandler, Daniel; Munday, Rod, iaugust 2012)

A branch of engineering dealing with the use of computers and telecommunications equipment to store, retrieve, transmit and manipulate data. (Daintith, John, ed. (2009))

ICT covers all forms of computer and communications equipment and software used to create, design, store, transmit, interpret and manipulate information in its various formats. Personal computers, laptops, tablets, mobile phones, transport systems, televisions, and network technologies are just some examples of the diverse array of ICT tools. (http://www.uq.edu.au/ICT/what-is-ICT 2012)

Information and Communication Technology refers to any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. Information and communication technology in education can be understood as the application of digital equipment to all aspects of teaching and learning. It is present in almost all schools in advanced countries and is of growing influence, however, for the past three decades, there is a legitimate concern that

developing countries have been slow in terms of incorporating the use of ICT equipment to facilitate the teaching and learning process in school (Hubert 2006)

According to World Bank, ICT consists of the hardware, software, network and media for the collection, storage, processing, transmission and presentation of information. These aid constructing knowledge and problem solving through internet- mail, CD-ROMs, databases, video conferencing, enabling explanation of concepts, and communicating ideas by using power point and desktop publishing. (WCEA, 2002).

Mooij, (2007) observed that integrating ICT in an educational context means combining all technologies that can process information and transmit it for purposes of learning and educational development.

Kiyaga, (2013) notes that although science subjects remain the Achilles' heel of Uganda's education, examination results still indicate that science subjects continue to be poorly performed. In some secondary schools there is increasing poor performance in mainly the science subjects, Bitamazire, (2005).

1.1:2 Conceptual background

Developments in ICTs have dramatically changed the way information is collected, stored, processed, disseminated and used, thus making it a powerful tool for modernization and development.

The presence of Cyber classrooms in some schools especially secondary institutions has greatly impacted on the learning of students especially those who are offering science subjects. Key science subjects such as Biology, Chemistry, Physics, and Mathematics are simplified for students when taught using Cyber rooms (Ndidde 2009). Cyber schooling has increased student motivation, willingness and generally changed the traditional belief of saying science subjects are difficult and therefore mostly done by boys. This is so effective in Nabisunsa secondary school which is a girls' school (Uganda report 2009).

Another impact of ICT on learning as reported by learners is that it makes learning more interesting and exciting as well as improving the level of participation on the part of learners compared to other subjects where there is no integration of ICT at all.

Parents believe that using computers may increase their children's academic achievement and future job opportunities (Ortiz et. al, 2011); therefore they buy computers with an internet connection to help their children succeed in school (Turow, 1999).

Katongole (2006) reports that in 2003, a modern Information and Communication Technology (ICT) centre was established in Mubende, the first one ever that was not only to confirm visibility of a computer to many, but also improve students' academic performance in schools.

1.1:3 Historical background

The history of ICTs in Uganda was a short but intense one. Uganda started embracing ICTs as part of its economic development strategy when the first mobile phone service came onto the Ugandan scene in December 1994. The telecom company Celtel, using the GSM 900 technology mainly targeted high end users like business people and the diplomatic community. The cost of owning and maintaining a mobile phone was so high that that having a car was estimated to be a cheaper undertaking. Owning a mobile phone was a status symbol.

Things began to change however, with the entry into the market, of the South African giant Mobile Telecommunications Network (MTN) in 1998. Calls became cheaper, and the network was extended to rural areas, going beyond Kampala as the hub for the mobile telephone industry. More players like Airtel, Warid and Zain entered the marked with more diversified products making communication even cheaper. More internet providers also came on the scene and the cost, while still one of the most expensive in the world, became much cheaper than before.

Since then, the ICT sector had grown rapidly. The industry grew by 30.3% in the 2009/10 financial year accounting for 3.3% of the GDP. Over 50% of the population were subscribed to mobile phone service provider and the number of internet users increased from 2,475,812 in 2008 to 4,178,085 in 2010 (168% of growth). Millions own smart phones, a fact driving digital penetration even in the rural countryside. Internet users were estimated at 6.5million as of 2012, accounting for 18.5 percent of the country's population of 35 million. The increase in internet usage had been further fueled by the country's youth bulge. Uganda had the world's youngest population, with over 78% below 30 years. These were more embracing of ICTs than their older, and inevitably old school, parents.

The liberalization of the communication industry also led to an increase in FM radio stations which by then numbered in hundreds and as a result up to 80 percent of all households especially in the countryside relied on radio for news and information. The "Ebimeeza" (people's parliaments) call-in talk shows were popularized and people began to freely debate the most important political and social issues of the day. There were also dozens of TV stations and a couple of daily newspapers serving different audiences in the country.

The explosion in ICTs was aided by friendly ICT policies which created an enabling environment for ICT entrepreneurs to blossom. The National Information And Communication Technology Policy of 2003 was intended to help the government implement more successful long term national development programmes like the Poverty Eradication Action Plan (PEAP), the Plan for Modernization of Agriculture (PMA), and others, by ensuring that timely and relevant information was available at all levels of implementation.

The Ministry of Information and Communications was established in June 2006 with a mandate of "providing strategic and technical leadership, overall coordination, support and advocacy on all matters of policy, laws, regulations and strategy for the ICT sector". Developments in ICTs have dramatically changed the way information was collected, stored, processed, disseminated and used, thus making it a powerful tool for modernization and development. Inevitably however, the growth in ICTs also culminated into social, political and economic situations that were not equally desirable for all the stakeholders

The free discussions by ordinary people of social-political issues on several radio stations did not augur well for some in the government who decided to start clamping down on these discussions. 'Ebimeeza' were banned by the Broadcasting Council in September 2009

Radio and TV stations as well as newspapers that were deemed to "spread inflammatory material" were threatened and some were closed which forced others into self-censorship

Then came the explosion in Social Media growth. Million of Ugandans were signed up on Face book, Twitter and many young elite activists were endlessly sharing their opinions on blogs across the internet. This was aided by the increasing ownership of smart phones that were replacing old, 'call-only' handsets that were now derided as belonging to 'stone age'. Face book and Twitter were blocked by the government during the 2016 presidential election over fears that people might

announce premature results. Officials were still warning of the potential dangers of social media to Uganda's stability.

Cyber crime was also increasing in Uganda. The country's tax collecting body, The Uganda Revenue Authority (URA)'s systems were hacked into in 2013 leading to an estimated sh2billion ($700,000) tax loss in vehicle registrations. The telecom giant MTN also lost sh15 billion (US$5.7 million) in Mobile Money fraud, a scam made possible by insider collaboration. Many companies desisted from reporting such crimes for fear of scaring away potential clients so it's possible the problem was more widespread than reported. Such crimes were complex and difficult to prosecute by a justice system to which they were a completely new development.

1.1:4 contextual background

The government had so far failed to walk this fine line. Sweeping legislations had been put in place that were threatening the rights of individuals' constitutional rights to privacy and self expression

The regulations put in place and their enforcement sometimes went beyond their mandate. In March 2012, the Government of Uganda tabled the Communications Regulatory Authority Bill, a major piece of legislation 'intended to consolidate and harmonize existing and overlapping laws.

Citing what it calls 'security ramifications of online activity that had begun to permeate the national consciousness' Government under the Ministry of Information and Communications Technology developed a National Information Security Strategy (2011) which aimed at addressing security challenges that were envisaged in the era of technological advances.

Other laws that came before or at the heels of this strategy included: the Regulation of Interception of Communications (RIC), 2010, which parliament hurriedly passed in the aftermath of the July 2010 bomb attacks, and allowed for interception of communications and possible intrusion into personal communications. It also required telecom companies to collect customers' information, including name, address and identity number, and to take other measures to enable interception. A registration of all SIM card owners in Uganda exercise concluded on May 31, 2013, which made the monitoring easier. As a matter of fact, an explosive report by the BBC last year stated that Uganda's government had been spying on the opposition and the media for years, using spying equipment supplied by a UK technology firm.

The Anti-Terrorism Act No.14 of 2002 gave security officers powers to intercept the communications of a person suspected of terrorist activities and to keep such persons under surveillance. The scope of the interception and surveillance included letters and postal packages, telephone calls, faxes, emails and other communications, as well monitoring meetings of any group of persons. Other powers included the surveillance (including electronic) of individual's movements and activities, and accessed to their bank accounts.

Older laws such as the Anti-Terrorism Act (2002); Press and Journalist Act of 2000 and the Regulation of the Interception of Communications Act of 2010 remained on the books to negate these freedoms. Since 2010, a number of other restrictive laws had also been drafted such as the Public Order Management Act (2013) which sought to regulate the conduct of public meetings as well as discussion of issues at such meetings and the 2010 Press and Journalists Amendment Bill intended to enforce annual registration and licensing of newspapers by the statutory Media Council.

Even those laws exclusively focused on fighting cyber crime were suspiciously viewed by some due to the dubious language in which they were crafted:

- The computer misuse act of 2010 was intended to "ensure the safety and security of electronic transactions and information systems and other related matters"
- The Electronic Transaction Act 2011 was "to provide for the use, security, facilitation and regulation of electronic communications and transactions and to provide for related matters"
- The Electronic Signatures Act, 2011 aimed "to make provision for and to regulate the use of electronic signatures and to provide for other related matters"

It was those "other related matters" that analysts believed could in the end make these laws go beyond the limits of their jurisdiction, and negated some of the freedoms enshrined in other government laws that guaranteed peoples' freedoms to use and benefit from the country's ICTs revolution

Government therefore needed some self-restraint to avoid overzealousness in controlling people's enjoyment of the information age. The ICT industry in Uganda had a number of stakeholders who played different complementary roles. These included the Government that played regulatory role, private sector that invested in technology and established ICT businesses, the donor community that supported the sector financially and technically, civil society and the media, while citizens

consumed and used the proceeds from the industry. A framework needed to be worked out to protect the stakeholder roles and to promote positive interrelationships in the ICT ecosystem and thus increased the positive impact of ICTs in Uganda without harming the interests of any stakeholder.

Therefore, the use of ICT tools in Uganda grew so rapidly in the last four decades as many Ugandans have become computerized especially in the use of smart phones, I Pads, and Laptops. This has improved both the quantity and quality of the academic work and results since access to interment was available which made research by both the teachers and the learners easy and possible.

This study was therefore set to investigate the impact of information and communication technology on students' academic performance in sciences in Mubende town council, Mubende district and in this chapter is; introduction, problem statement, objectives, scope and significance of the study.

1.2: Statement of the problem

Students' learning remained central in any academic achievement debate (Opira, 2006). ICTs provided a window of opportunity for educational institutions like secondary schools to harness and use technology to complement and support the teaching and learning process. This was usually aimed at improving the academic performance. However, many challenges had come with the introduction of compulsory science subjects in secondary schools and the most one being poor performance in those disciplines (Bitamazire 2005).The cause of concern was that much as the central region of Uganda continued to dominate in UCE results (Ladu 2014), Mubende was always among the worst performing districts in the country (Kayiwa, 2011).It was against this back ground of looking at ICT as a medium of instruction in teaching and learning sciences in secondary schools that this study was conceived, Therefore, the study was an attempt to establish the availability and accessibility of ICT on students' academic performance in sciences in secondary school in Mubende town council, Mubende district.

1.3 Purpose of the study

The purpose of the study was to investigate the impact of ICT on students' academic performance in sciences in secondary schools in Mubende Municipality, Mubende district and to find out

whether science teachers and students in senior secondary schools were exposed to video and computer usage in classroom teachings and whether it made any impact on the academic performance of students in science subjects in Mubende town council.

1.4:2 Specific objectives

i) The researcher wanted to find out how the use of ICT tools in teaching and learning had impacted on students' academic performance in sciences in secondary schools in Mubende town council.

ii)) The researcher wanted to examine the effect of the availability of ICT resources on students' performance among secondary school students in Mubende town council.

iii)) The researcher wanted to assess the effect of the accessibility of ICT resources on students' performance among secondary school students in Mubende town council.

1.5 Research questions

The following research questions were examined.

i) How had the use of ICT tools impacted on students' academic performance in sciences?
ii) How had the availability of ICT resources affected the academic performance of students in sciences among secondary school students in Mubende town council?
iii) How had the accessibility of ICT resources in secondary schools of Mubende town council impacted on students' academic performance in sciences?

1.6 Scope of the study

1.6:1 area scope

The study was carried out in five secondary schools in Mubende Municipality, Mubende District..The schools included Universal college Mubende, Mubende Light secondary school, Comprehensive secondary school, Mubende Army secondary school and Christ The King secondary school.

1.6:2 content scope

Specifically, the study concentrated on examining the impact of the use of ICT tools to improve students' learning of sciences, the availability of ICT tools and the extent to which those tools were accessible to the students in different secondary schools.

1.7 Significance of the study

The aim of choosing to study about the impact of ICT on students' academic performance in sciences in secondary schools in Mubende Municipality, was to give a better understanding of the students and teachers' knowledge and attitudes concerning ICT and its impact on students' academic performance in sciences in order to adapt any future development programs and education campaigns for integration of ICT tools in the teaching and learning of sciences for better academic results among secondary schools. Therefore, by providing information on the use of ICT tools in education in secondary schools in Mubende Municipality, Mubende district, the study was to help secondary schools' teachers and headteachers to design measures for ICT tools usage in secondary schools in Mubende municipality. The measures would be directed to different stakeholders like district education officer and ministry of education and sports.

The study was also meant to help in understanding how the science teachers would cope with advancement in science and technology in order to improve the delivery of science lessons in classroom.

Furthermore the negative factors for the use of ICT tools in teaching and learning identified would lead to the development of more realistic sensitization measures for use in study of science subjects. The information generated would be used to evaluate programs targeting to increase the use of ICT in the teaching and learning process in classrooms in secondary schools.
The study would also provide a body of knowledge on the use of ICT tools in learning to other researchers.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2:1 Introduction

This chapter explores literature presented by various authors about the impact of information and communication technology (ICT) on the student's academic performance especially in science subjects. The literature is organized in three sub sections. The first one contained literature on how the availability of ICT resources had impacted on student's academic performance in science subjects, the second one explores literature on how the Accessibility of ICT resources had improved the students' academic performance in sciences and the third presents the general impact of ICT on the students' academic performance in science subjects.

2:2 Availability of ICT resources

The availability of ICT resources could enhance learning by making education less dependent on differing teacher quality and by making education available at home throughout the day (Mbwesa, 2002).

Bonnet (1997) argued that the use of ICT could positively transmit knowledge to students. Furthermore, the availability and use of ICT could help students exploit enormous possibilities for acquiring information for schooling purposes and could increase learning through communication (Riel, 1998).

According to Lubega (2009), ICT use was supported by the availability of ICT equipments, internet connectivity and educators being trained in ICT, integration in various institutions of learning, which in turn yielded the intended purpose of the resources.

Media availability varied depending on such things as child's age, gender, race/ethnicity, family socioeconomic status, and so forth (Roberts et al., 1999, p.9). The economic level of the countries could also affect the availability of media for school-age children either at school or at home.

Notten and Kraaykamp (2009) stated that science performance was positively affected if there was a positive reading climate and computer availability. They also mentioned that "the absence of a television set at home seemed to narrow a child's worldview and knowledge of science."

The use of Information and Communication Technology (ICT) was becoming an integral part of education in many parts of the globe; Uganda was not left behind as ICT gradually found its way into the educational system despite chronic limitations brought about by economic disadvantages.

According to Gbamanja (1989 p.131) Education was a process which sought to change the behavior of a learner. Behavior in this sense refered to the way we changed the leaner, his or her thinking, his or her feelings and his other overt actions (Hergenhahn and Olson 1997)

Osborne, J. Hennessy (2003) confirmed that, although the chalk board, textbooks, radio, TVs and Films had been used for educational purpose over the years, none had quite impacted on the educational process like computer. While television and film impacted only on the audio visual facilities of users, the computer was capable of activating the senses of sight, hearing and touch of the users.

Belts, S (2003) confirmed contributions of ICT to quality learning in science which resulted into better students' academic performance. He pointed out that ICT offered particular opportunities to enhance learning by making more time available for predicting and searching for explanations.

Also ICT applications allowed pupils to work at their own speed hence were at an advantage of understanding concepts at their own speed resulting into improved academic performance.Betts's (2003) further confirmed that the use of ICT could enhance the quality of learning where its use was tailored to lesson objectives and the needs of pupils.Many studies had found positive effect associated with technology aided instruction mc Farlane, A. sakellarious (2002).

The key finding of the research were as follows; use of ICT either as a tool in a practical investigation or as a substitute for the laboratory based elements of an investigation could aid theoretical understanding and electronic communications were to be used not just to disseminate information but to create a continuity of learning.

Oshodi (1999) confirmed that awareness towards the use of communication and information technology (ICT) was increasing in the classroom in the developing world such that were verbalization or over verbalization of words alone in the classroom to communicate ideas, skills and attitudes to educate learners was futile, that was incapable of producing any good results or ineffective.

Scott Reid (2002) in his study found out that students could benefit from incorporation of ICT in classroom teaching and learning process. For teachers and their students, the availability of modern computers, peripherals, networking and resources within an increasingly diverse range of technologies was an essential part of learning and teaching in the 21St century. ICT constituted an input in the student learning process that could help produce better learning output.

The availability of ICT resources could also enhance learning by making education less dependent on differing teacher quality and by making education available at home throughout the day (Mbwesa, 2002). Bonnet (1997) argued that the use of ICT could positively transmit knowledge to students and the availability of visual digital technology (such as animation, simulation and moving images) involved students and reinforced conceptual understanding.

Furthermore, the availability and use of ICT could help students exploit enormous possibilities for acquiring information for schooling purposes and could increase learning through communication (Riel, 1998). According to the Swedish National Agency for School Improvement (2008), ICT provided a positive impact on learning and student performance when it became an integrated element in the classroom and teaching. ICT use also encouraged development from a teacher focused or teacher led model to a more student focused model in which students worked together, made their own decisions and took an active role in learning (Swedish National Association for School Improvement, 2008).

Davis (2000) asserted that increased availability of ICT was especially useful for students who suffered from learning disabilities since ICT use allowed teachers to prepare suitable tasks for individual needs and each individual more effectively. However, authors like Cox (1999) believed that allowing certain students to use computers distracted them from focusing on the task at hand.

Central to the argument of availability are the issues of whether or not the teachers and students had ample and convenient access to computers and their accessories let alone the software that was necessitated in the context of their day today research, collaboration, teaching and student evaluation (Fabry, et al., 1997).

Furthermore, students and teachers were to have confidence in these facilities, which were in turn reliant on the facilities‟ reliability or degree to which the teachers and students were sure that they would have access to them at all expected times and utilize them predictably to the betterment of their academic work, an issue on which consensus was enormous as was clear from ICT in education scholars like Russell (1997), Ross (1997),Guha (2000), Mumtaz (2000) and Pelgrum (2001).

The study revealed that computers were but a subset of the information communication technology facilities which were necessary in schools but they had to be furnished with quality accessories, installed with appropriate software and linked to necessary networks to allow access to rich resources beyond the school rather than serve as a resource for minor typesetting and other word processing activities. Whilst the above studies attempted generally to explain how the availability of ICT affected learning, it did not look at how particular ICT tools clearly affected students' learning.

2.3 Accessibility of ICT resources:

Access to ICT infrastructure and resources in secondary schools was a necessary condition to the integration of ICT in education (Charlotte, 2009).

Effective integration of ICT in schools was to call for a whole institution to be networked so as to ensure access to multimedia and learning rich resources via the school's internet and ensure the use of the internet by the students and teachers whenever they were in or out of school. The computer laboratories and needed to be sufficient in number to allow ready access by students and staff in most subjects across the school. A wide range of peripheral and remote working devices, including video conferencing, was provided and integrated into the curriculum and large and small group presentation facilities were readily available (school net Africa, 2004).

Even when computers were available, in some schools evaluation of the actual impact of ICT was rare; computers were often used in specific offices or by specific personnel and many teachers, students and subject areas still lacked access to ICT (wirns and lawyer 2007)

According to Eric Blantz (2010), lack of consistent and affordable electricity was one of the greatest limitation for use of ICT in schools, especially schools in remote parts of the developing world which had no electricity and where electricity was available, such power was usually extremely un reliable or so unstable that it posed a threat to un protected electronic equipment. So he provided an alternative to be solar panels to be installed in schools and use diesel generators.

Despite the above desired situation, most institutions in Africa faced barriers to effective integration of ICT in the teaching and learning process; limited infrastructure in terms of satisfactory physical conditions of laboratories and the subsequent accessibility of the resources (ICT) to the learners (Singh, 1993). Many commercial and academic developers of educational multimedia had focused primarily on information access and presentation (Singh, 1993).

However, it was easy to see that multimedia had tremendous potential to enhance the vividness with which information could be presented and eased with which it could be accessed; the main barriers

to learning were not generally that appropriate information was difficult to access or badly presented. The problem had more to do with that information (Shank & Kass, 1996).

Barriers, associated with ICT integration that fell within the physical realm were beyond the direct control of the teacher (Loveless, 1996). These barriers centered on accessibility and infrastructure which included decisions about purchasing, locations of wiring drops, and decisions regarding the placement of computers in centralized labs verses placement of computer pods in classrooms. Placing computers in centralized laboratories might provide students with equitable and efficient exposure to technology but severely limited the technology's accessibility for classroom instruction (Loveless, 1996).

Lubega (2009) noted that there was an impact of ICT on learners and learning as was reported by those learners that, there had been increased access to qualitative educational materials especially through surfing on the Internet. This access resulted into access to updated educational information. This made learners more enthusiastic to put in more effort and performed better just like their colleagues in other schools and countries.

Technology was one of these factors; that is why it was important to explore how we could explain students' Science and Math achievements by looking at their use and accessibility of computers and related technologies, as suggested by Subrahmanyam et al. (2001).

Ali (2013) said that if teachers could not access ICT resources, then they would not use them. Therefore, access to computers, updated software and hardware were key elements to successful adoption and integration of technology. A study found that access to technological resources was one of the effective ways to teachers' pedagogical use of ICT in teaching.

According to Opira (2006), laboratories deny teachers the flexibility of deciding when technology was to be incorporated into instruction and might send the message to students that computers were not central to learning or the activities in their classrooms. In addition, physical limitations of the classroom including size and location of desks, often limited choices of room arrangement and did not provide the space that was necessary to add pods of computers to be used as technology centers.

For all its revolutionary aspects, though, ICT capabilities weren't evenly distributed. Simply put, richer countries and richer individuals enjoyed more access and thus had a greater ability to seize on the advantages and opportunities powered by ICT.

Consider, for example, some findings from the World Bank. In 2016, it stated that more than 75% of people worldwide had access to a cell phone. However, internet access through either mobile or fixed broadband remained prohibitively expensive in many countries due to a lack of ICT infrastructure. Furthermore, the World Bank estimated that out of the global population of 7.4 billion people, more than 4 billion didn't have access to the internet. Additionally, it estimated that only 1.1 billion people had access to high-speed internet.

In the United States and elsewhere, this discrepancy in access to ICT had created the so-called digital divide. The World Bank, numerous governmental authorities and non-government organizations (NGOs) advocated policies and programs that aimed to bridge the digital divide by providing greater access to ICT among those individuals and populations struggling to afford it. These various institutions asserted that those without ICT capabilities were left out of the multiple opportunities and benefits that ICT created and would therefore fall further behind in socio-economic terms. The United Nations considered one of its Sustainable Development Goals (SDG) to "significantly increase access to information and communications technology and strived to provide universal and affordable access to the internet in least developed countries by 2020."

Economic advantages were found both within the ICT market as well as in the larger areas of business and society as a whole.

Within the ICT market, the advancement of ICT capabilities had made the development and delivery of various technologies cheaper for ICT vendors and their customers while also providing new market opportunities. For instance, telephone companies that once had to build and maintain miles of telephone lines had shifted to more advanced networking materials and could provide telephone, television and internet services; consumers then enjoy more choices in delivery and price points as a result.

Accessibility and use of ICT in Uganda allowed students to investigate more thoroughly the real world (Reginald Grégoireinc., Bracewel l& Laferriére, 1996; Riel, 1998). They could more readily access information sources outside the classroom and could use tools to analyze and interpret such information. Information might be accessed through online systems or through data logging systems (Riel, 1998) The technologies allowed them to receive feedback, refine their understanding, build new knowledge and transfer from school to non-school settings (Committee on developments in the Science of Learning, 2000). In the past, this had been difficult to provide in schools due to logistical constraints and the amount of material to be covered all of which can now

be addressed with ICT. What could be learned was broadened and deepened (Réginald Grégoireinc. et al., 1996).

Barriers, associated with ICT integration that fell within the physical realm were beyond the direct control of the teacher (Loveless, 1996). These barriers centered around accessibility and infrastructure and included decisions about purchasing, locations of wiring drops, and decisions regarding the placement of computers in centralized labs verses placement of computer pods in classrooms. Placing computers in centralized laboratories might provide students with equitable and efficient exposure to technology but severely limited the technology's accessibility for classroom instruction (Loveless, 1996). Laboratories denied teachers the flexibility of deciding when technology was to be incorporated into instruction and might send the message to students that computers were not central to learning or the activities in their classrooms.

In addition, physical limitations of the classroom including size and location of desks, often limited choices of room arrangement and did not provide the space that was necessary to add pods of computers to be used as technology centers.

Teaching was becoming one of the most challenging professions in their society where knowledge was expanding rapidly and much of it was available to students as well as teachers at the same time. Modern developments of innovative technologies had provided new possibilities to teaching professions, but at the same time had placed more demands on teachers and students to use these new technologies in the teaching and learning process (Jung, 2005).

Therefore, there was widespread change across the world to infuse ICT into education.

Recent research by British Education Communication and Technology Agency (BECTA) has highlighted user-ability of ICT resources as one of the five key pillars of successful integration of ICT in schools (National Council for Curriculum and Assessment UK, 2004). In developed countries, teachers were fully using ICT in all aspects of their professional life to improve their own learning and the learning of their students (Davis, 2000). They used ICT to assist students assess their own learning in completing specific personal projects. It was natural for teachers to collaborate with other colleagues in sharing experiences to solve problems. ICT became a stimulus for exciting new teaching and learning opportunities (UNESCO, 2002a).

It was the skill and attitude of the students and teachers that determined the effectiveness of technology integration into the curriculum (Bitner & Bitner, 2002). Once teachers and students developed skills, they were to begin to find ways to integrate technology into the teaching and learning process and demonstrated its use to others. If learning was the impetus that drove the use

of technology in the school, teachers and students were to be partners in the learning process, altering traditional paradigms of the teacher providing wisdom and the student absorbing

2.4 ICT and academic performance

When properly used, information and communication technology held great promise to improve academic performance of learners in addition to shaping work force opportunities, Poole (1995). Miller (2000), recognized that technology-based teaching might not be essential in all classes but generally it was most facilitative as a result of providing relevant examples and demonstrations; changing the orientation of the classroom; preparing students for employment; increasing flexibility of delivery; increasing access; and satisfying public demands for efficiency. "The whole purpose of using technology in teaching was to give better value to students". This better value was meant to also impact the learners'/students' performance.

Louw (2008), argued that ICT held much promise for use in curriculum delivery. Thus, technology could effectively improve teaching and learning abilities, hence increasing learners' performances. As Castroand Cawthera (2003) posited, ICT had the means to aid in the preparation of learners by developing cognitive skills, critical thinking skills, information access, evaluation and synthesizing skills.

The application of Information and Communication Technology in classroom had the capacity to provide higher interactive potential for students and teacher in order to develop their individual, intellectual and creative ability, Belts. S (2003)

Students' academic performance was the extent to which a student had achieved his or her educational goals and in order to achieve the above educational goals in sciences, information and communication technology (ICT) was an essential ingredient. Agommuoh and Nzewi (2003)

The application of Information and Communication Technology (ICT) such as internet applications, CD-ROMs, Video technology and various computer attachments and software programs had caused many changes in the teaching and learning processes in schools. Scott Reid (2002) The presence and use of the ICT resources by the students and teachers provided an avenue of Availability of internet, computers, projectors, TVs, computer Labs, video conferencing etc. Accessibility in the Library, Computer Lab, classrooms, Resource centers, dormitories etc.
These interactions provided feedback which acted as a reinforcement towards the learning

Process. Multimedia applications like games, drills, animation and other graphical applications provided practices that took the form of questions (stimulus) and answers (response) frames which exposed the students to the subject in gradual steps consequently generating more interest in the subject matter which in the long run affected their academic performance and gave them the desire to try and use this acquired knowledge in a different setting outside school.

The impact of ICT on learning was then in relation to use of digital media, primarily computers and internet to facilitate teaching and learning. ICTs were the technologies used in conveying, manipulation and storage of data by electronic means, they provided an array of powerful tools that might help in transforming the present isolated teacher-centered and text-bound classrooms into rich, student-focused, interactive knowledge environments.

To meet these challenges, learning institutions had to embrace the new technologies and appropriate ICT tools for learning. The relationship between the use of ICT and student performance in education was not clear, and there were contradictory results in the literature. Earlier economic research had failed to provide a clear consensus concerning the effect on students' achievement.

Starting from this point, the aims of this study were two-fold: first, we summarized the main findings of this extensive literature and second, we gave two complementary explanations on the contradictory results. Our first explanation was that most of the literature had focused on direct effects of ICT while it was more appropriate to look at the indirect effects through the traditional channels. Since student performance was mainly explained by a student's characteristics, educational environment and teachers' characteristics, ICT could have an impact on these determinants and consequently the outcome of education. The differences observed in the performances of students were thus more related to the differentiated impact of ICT on the standard determinants.

The direct link between ICT use and students' performance had been the focus of extensive literature during the last two decades. Several studies had tried to explain the role and the added value of these technologies in classrooms and on students' performances.

The first body of literature explored the impact of computer uses. Since the Internet revolution, there had been a shift in the literature that focused more on the impact of online activities, that was the use of Internet, use of educative online platforms, digital devices, use of blogs and wikis, etc.

Looking at the link between ICT and student performance seemed then a misunderstanding of the role and nature of these technologies. In fact, since ICT was general purpose technology (GPT), it

needed to be specified in order to meet the needs expressed by students and to be adapted to the local context and constraints (Antonelli, 2003; Ben Youssef, 2008).

A variety of models of usages could be identified leading to the same outcome. ICT brought widened possibilities for the learning processes that were independent from place and space. ICT also allowed more flexible (asynchronous) and more personalized learning. It offered new methods of delivering higher education. Taking advantage of these opportunities needed a profound change in the organization of the higher education system.

By then, the role of Information and Communication Technology (ICT), especially internet in the education sector played an important role, especially in the process of empowering the technology into the educational activities. Education sector could be the most effective sector to anticipate and eliminate the negative impact of ICT. Technology (internet) in another side could be the most effective way to increase the student's knowledge.

Being aware of the significant role of ICT (internet) in our life, especially in the educational activities, education authorities were to be wise enough in implementing the strategies to empower ICT in supporting the teaching and learning process in the classroom. ICT was not just the bloom of the educational activities, but also it would be the secondary option to improve the effective and meaningful educational process.

The main purpose of the Strategy for Information and Communication Technology Implementation in Education was to provide the prospects and trends of integrating information and communication technology (ICT) into the general educational activities.

There were some unavoidable facts in the modern education. **First,** the ICT had been developing very rapidly then. Therefore, in order to balance it, the whole educational system was to be reformed and ICT was to be integrated into educational activities.

Second, the influence of ICT, especially internet (open source tool) could not be ignored in our student's lives. So, the learning activities were to be reoriented and reformulated, from the manual source centered to the open source ones. In this case the widely use of internet access had been an unavoidable policy that was to be anticipated by schools authorities.

Third, the presence of multimedia games and online games by internet had been another serious problem that was to be wisely handled by the educational institutions. The students could not be exterminated from this case. They could have and did with it wherever and whenever they wanted. Schools, as a matter of fact, did not have enough power and time to prevent or stop it after school times. Meanwhile, most parents did not have enough time to accompany and control their children. So, the students had bigger opportunities to do with multimedia games or online games or browsing the negative and porn sites. Having been addicted, the students had too little time to study, and even did not want to attend classes.

In such situation, education institutions played an important role to eradicate these problems. One of which was by facilitating the students to do edutainment or educational games. Schools could let their students be familiar with educational games adjusted by their teachers. Besides, they could also support and facilitate their students to have their own blogs in the internet. A lot of Web Blog providers were free to the users, such as Word Press. In their blogs, the students could create and write something, like an article, poem, news, short stories, features, or they could also express their opinion by an online forum provided in the internet. They were able to share experiences throughout their blogs to others from all over the world. The researcher thought it would be an interesting activity for them, and it would lessen their time to visit the negative or porn sites that existed.

By doing so, the researcher thought the young generation would get more and more information and knowledge by browsing in the internet. They could also create innovation in web design that it was to be out of the formal curriculum content, but it would be useful for their future.

Fourth, the implementation of ICT in education had not been a priority trend of educational reform and the state paid little attention to it. Therefore, there was to be an active participation, initiative and good will of the schools and the government institutions to enhance ICT implementation at school.

Fifth, the teachers had to be the main motivator and initiator of the ICT implementation at schools. The teachers had to be aware of the social change in their teaching activities. They had to be the agent of change from the classical method into the modern one. They had also to be part of the global change in learning and teaching modification.

Educational digital resource sharing and e-learning was emerging as a viable means to improve the quality of education in Uganda. The digital divide in Uganda was reducing, because many schools across the country had acquired ICTs and this had given rise to great demand for digital resources (such as PowerPoint presentations) to aid the teaching and learning process, yet materials on international e-learning systems were not prepared and categorized according to the Ugandan curriculum. Because of this challenge, many schools were developing websites and publishing digital educational resources on eLearning sections of their websites. Many individuals and companies had also established online platforms for eLearning and resource sharing.

E-learn Uganda was a Ugandan based platform trying to improve the access to secondary school content in Uganda. The Vision for E-learn Uganda was a dream that instead of taking long hours on social media, students could also access content for their level on our platform. "We realized that most students across the country accessed internet but in most cases used it to access only social media.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter deals with the methodology that the researcher adopted in conducting the study. It discusses the research design, population, study area, sampling strategies, data collection instruments, data quality control, research procedure and the data analysis techniques employed in the study.

3.1 Study design

The study employed a cross-sectional research design. Cross-sectional was designed allow for the study of the population at one specific time and the difference between the individual groups within the population to be compared. It also provided for the examination of the co-relationship between ICT and students' academic performance in sciences specifically from selected secondary schools of Mubende municipality seeking the views of the students, teachers and administrators.

3.2 Area of study

The study was carried out in Mubende municipality, Mubende District. Mubende District is one of the districts in Central Uganda. Like most other Ugandan districts, it is named after its 'chief town', Mubende Town. Mubende District is bordered by Kyankwanzi District to the north, Kiboga District to the northeast and Mityana District to the east. Gomba District and Sembabule District lie to the south, Kyegegwa District to the southwest and Kibaale District to the northwest of Mubende District. The total area of Mubende District is 4646 square kilometers and Mubende district is still one of the largest districts in Uganda.

The researcher chose this area because she had noticed that students in secondary schools scored poor grades in Uganda Certificate of Education and Uganda Advanced Certificate of Education Uganda National Examinations Board exams in the recent past years and student continue to complain that sciences are hard to understand thus it is easy to generate valuable information.

3.3 Information sources

Information was sought from both primary and secondary sources. Primary sources included students, teachers, head teachers, inspectors of schools, who provided first hand and relevant data. Secondly, journals, dissertations, magazines, web pages of the internet, school records, text books, newsletters and newspapers provided secondary information for the study.

3.4 Procedure for data collection

The researcher obtained an introductory letter from the Dean, School of Humanities and Social Sciences of Nkumba University. The introductory letter helped to introduce the researcher to the various authorities in the area of study before collecting data.

The researcher proceeded to test for the validity of the data collection instruments by finding out whether they would gather the necessary information that would answer the researcher's research questions. This was followed by administering of questionnaires and interviews to the targeted population.

3.5 Sample size and sampling techniques

3.5.1 Study population

The study population comprised of the two government secondary schools and three private secondary schools of which from each school; administrative staff, computer science teachers and students were selected. These provided considerable amount of information because they had substantial exposure and knowledge of the research topic

3.5.2 Sample size

A sample of 140 members was selected including 20 students from Senior One to Senior six, 4 Computer Science teachers and 4 administrative staff from each of the selected schools.

3.5.3 Sampling techniques

During the research, the probability and non-probability sampling techniques were used. In the probability techniques, each member under the category of students, computer science teachers and administrative staff had an equal and known chance of being selected and this necessitated the researcher to use simple random technique. This was employed to obtain data from respondents and Sampling was done without replacement. This method was used because it was free from classification errors, it required minimum knowledge about the population in advance which was needed in case of purposive technique and others. In addition simple random sampling errors could easily be computed and accuracy of the estimates easily assessed. A non-probability technique was also employed to sample the computer science teachers and the administrators where a purposive sampling mode was used.

The researcher used the purposive sampling technique to select Head teachers, directors of studies, heads of departments, teachers and students.

Purposive sampling is where a selection of those to be surveyed is made according to a known characteristic. Therefore, the researcher selected head teachers, Directors of studies, computer

science teachers and students because they are all directly involved in the management and implementation of educational programs in the district.

3.6 Data types and collection

3.6.1 Data types

Only primary data was used in this research study. Primary data was collected directly from the field of study by use of questionnaires, observation and face to face interviews with the respondents.

3.6.2 Data collection method

Secondary data was collected by the method of analysis of documents. Such documents included official records, newspaper accounts, reports, as well as the published data used in the review of Outstanding literature. Primary data on the other hand was got directly from the field and collected through observation, self-administered questionnaires, and interviews.

3.7 Data collection tools

The data collection tools used included questionnaires with close ended and open ended questions, observation check list and interview guides. The researcher used questionnaires and interviews as the main data collection instruments to enhance triangulation of the findings.

3.7.1 Questionnaires

The researcher set both open and close ended questions which were sent to the respondents particularly head teachers, teachers and students. The researcher made sure that the questions are clearly set to avoid false interpretation and responses. The questionnaires were delivered in time so as to allow the researcher to get clarifications where it would enable her to collect much data in a short time and also minimize on costs.

3.7.2. Interviews

The researcher conducted face to face interviews with the respondents particularly administrators and students. The researcher made interview schedules on which to conduct the interviews with respondents and also designed an interview guide to direct her during the interview sessions. The

researcher also utilized interview method so as to record firsthand information and also avoid over exaggeration of data by the respondents.

3.8 Data processing and analysis

The data collected was processed and analyzed to come up with meaning full, use full and understandable information. The data was tabulated and then analyzed using percentages, bar graphs, pie charts, frequencies and cross tabulation. The tabulation and analysis was done using statistical computer packages which included SPSS, and EXCEL. These packages enabled the researcher also to obtain the mean, range, correlation, regressions, and ANOVA tables among others statistical outputs so as to come up with empirical relationship in research variables.

3.9 Validity and Reliability

3.9.1 Validity

To establish the validity, the instruments were subjected to the scrutiny of two experts who evaluated the relevance of each item in the instruments to the objectives. The experts rated each item on a scale. Their recommendations were used to finally modify questions and the
Format of the tools that had the ability to solicit the expected data. Secondary school students, administrators and computer teachers were the relevant subjects that were given questionnaires, observed and or interviewed to obtain data. Relevant documents were obtained from, school libraries.

3.9.2 Reliability

The information in this study is from reliable sources such as internet, newspapers, textbooks; information got from the right respondents within the study area and can be trusted and used by the various policy makers.

3.10 Ethical considerations

The researcher did not harm any participants and issues of informed consent were considered where the research participants were given as much information as was needed to make an informed decision about whether or not they wished to participate in the study.

Issues of privacy and deception were also taken into consideration where by the information obtained was not disclosed to any other person but rather the researcher used it for analysis and making conclusions and Issues of confidentiality of the results were also taken into account.

3.11 Limitations of the study

During the study, the research encountered the following challenges;

I. Lack of time.
II. Lack of money.
III. Lack of library resources.
IV. Lack of adequate theory in the area being researched on.
V. Failure to meet regularly with the supervisor.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter looks at the findings of the study and analysis of the results. The results were from the samples selected from the different schools in determining the impact of information and communication technology (ICT) on students' academic performance in secondary schools in Mubende municipality, Mubende district.

4.2 Characteristics of the respondents

4.2.1 Age of the respondents

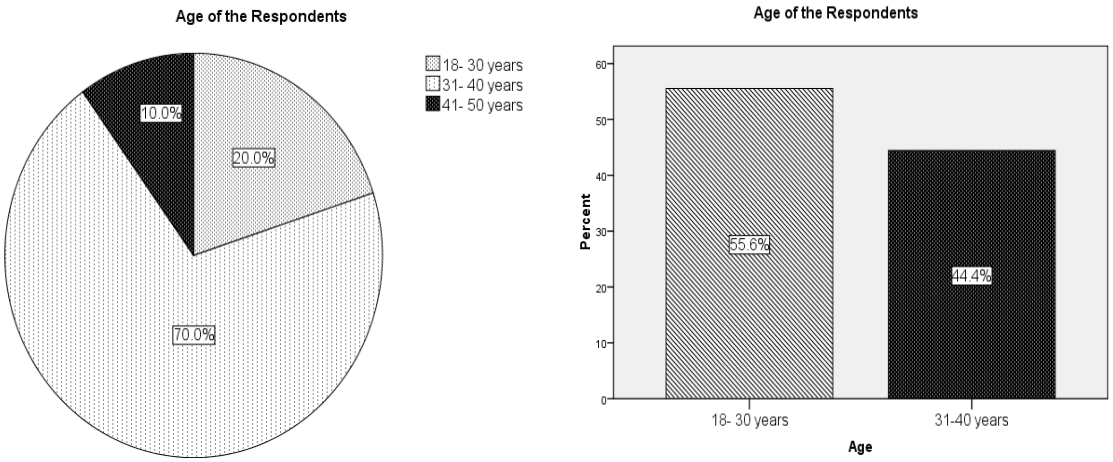


Figure A; Responses on age by administrators. Figure B indicates the responses on age by teachers

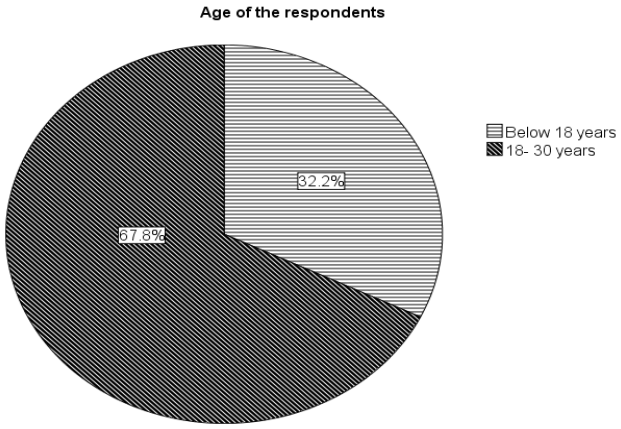
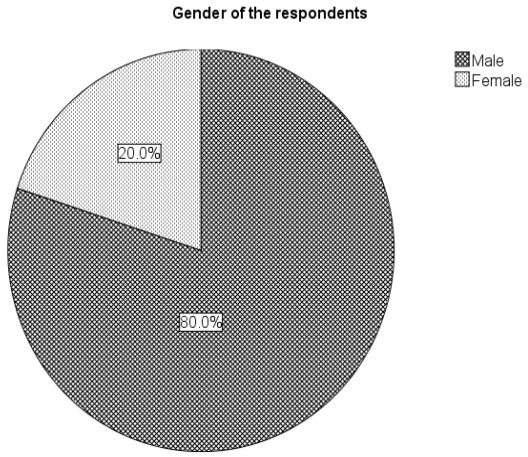


Figure C; Responses on age by students

The results indicate that most of the respondents who were between 31- 40 years accounting for 70% of the respondents while those between 18- 30 years and 41- 50 years accounted for 20% and 10% respectively. For the teachers, 55.6% were between 18-30 years while 44.4% were between 31- 40 years. 32.2% of the students who were interviewed were below 18 years while the rest of the students were between 18- 30 years as shown in the figures A, B and C respectively.

4.2.2 Gender of the respondents

Figure D indicates that 80% of the respondents were males while 20% of the respondents were females. Figures E and F show that 88.9% and 54.2% were male while 11.1% and 45.8% were female respectively



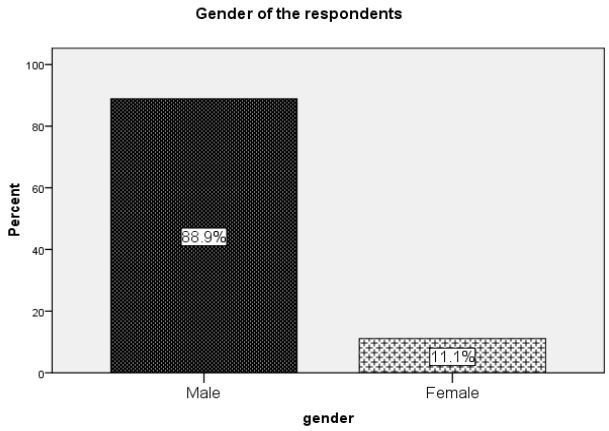


Figure D; responses on gender by administrators. Figure E; responses on age by teachers

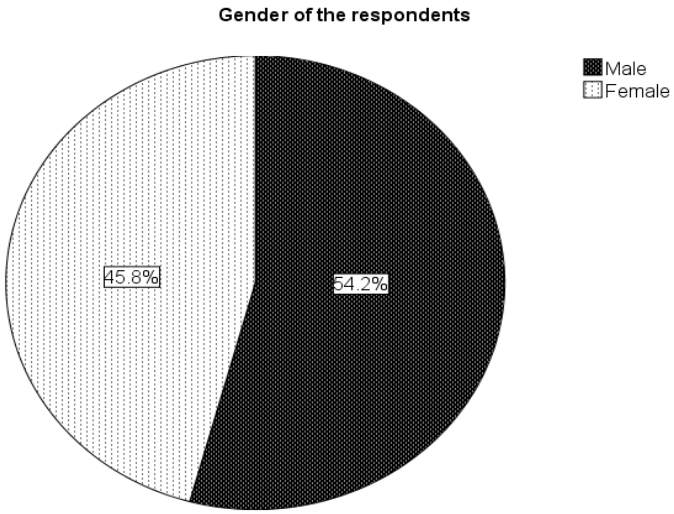
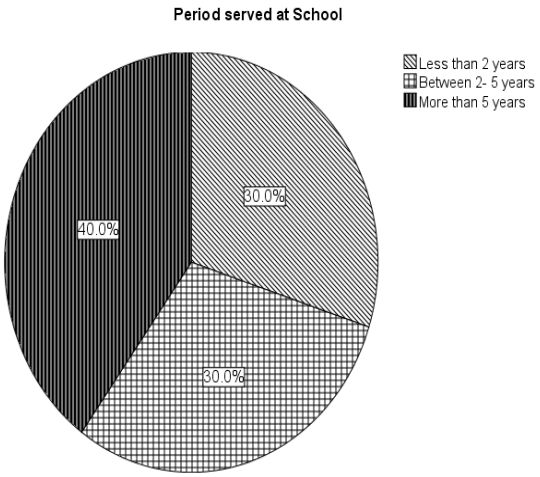
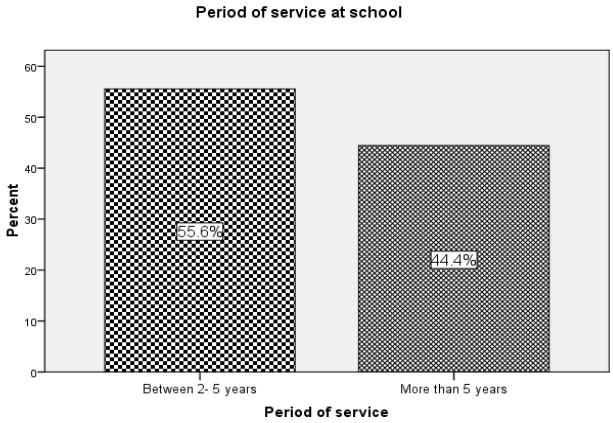


Figure F; responses on age by students

4.2.3 Period of service at school





Figures G and H responses on period of service by both teachers and administrators

Figure H

Results show that 40% of the administrators had served at their respective schools for more than 5 years while the rest had served for the period of less than 2 years and between 2 to 5 years. For the case of the teachers, 55.6% had served at their schools for a period of between 2- 5 years while the rest had served for more than 5 years.

4.2.4 Designation of the administrators and teachers.

4.2.4.1. Designation of administrators.

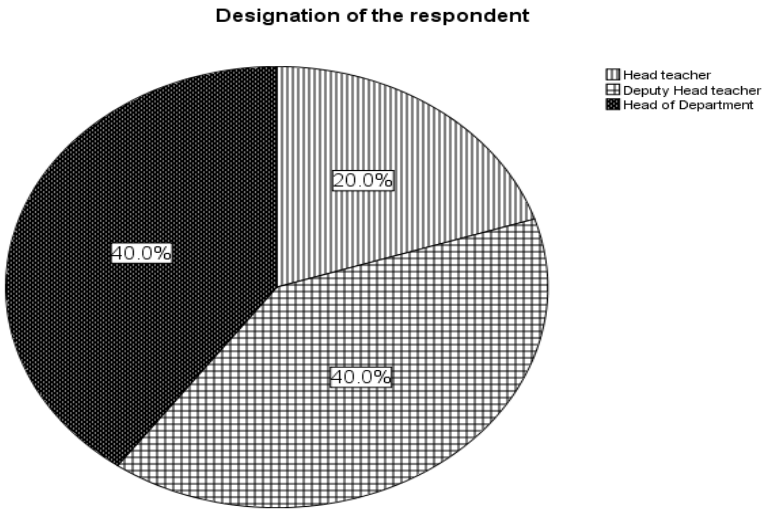


Figure I; Responses on the designation

Results indicate that most of administrators selected were mainly deputy Head teachers and Heads of department each accounting for 40% of the respondents while Head teachers were only 20% from the selected schools.

4.2.4.2. Class of teaching by teachers

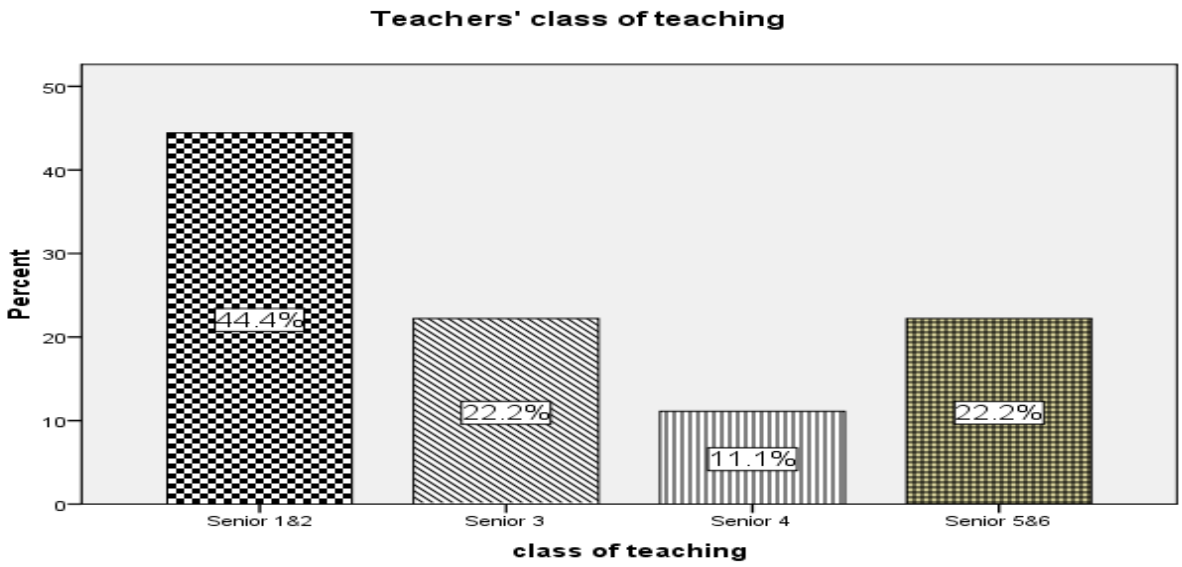


Figure J; responses on class of teaching by teachers

Figure J shows that 44.4% of the teachers that were interviewed were Senior One and Two teachers, 22.2% were Senior Three teachers, 11.1% were Senior Four teachers while 22.2% were Senior Five and Senior Six teachers as responses from the teachers from the different schools.

4.3 Level of study and subject combinations

4.3.1 Level of study

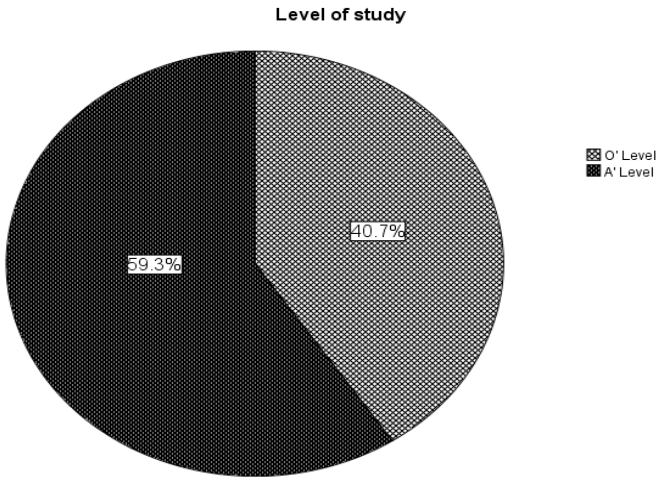


Figure K; responses of the level of study by students

Figure K indicates that 59.3% of the students that were interviewed were in Advanced Level while 40.7% of the students were in Ordinary Level.

4.3.2 Subject combinations by students in Advanced level

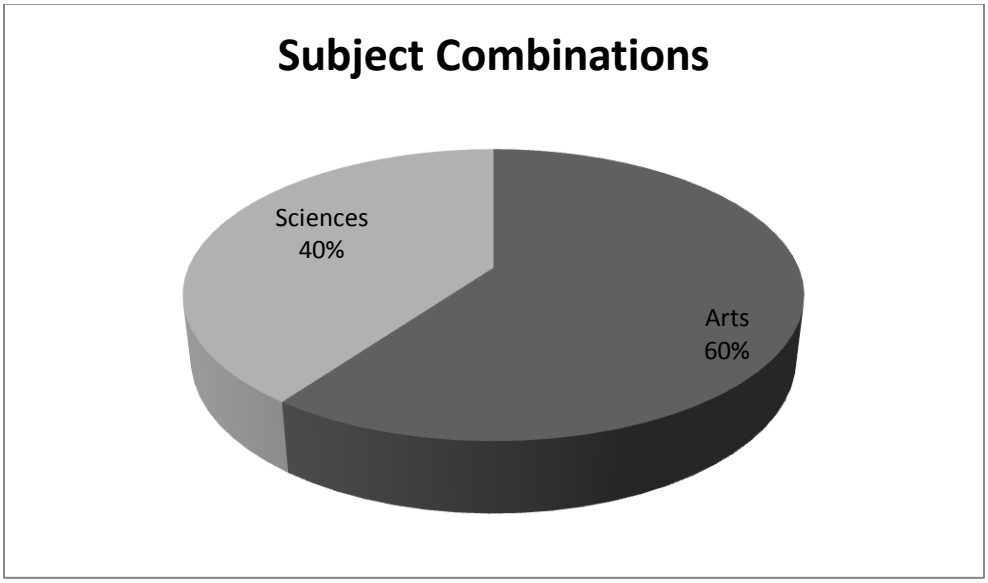


Figure L; responses on the subject combination by the students

60% of the students in Advanced Level offered Arts combination while 40% were offering Science subject combinations.

4.4 Availability and Accessibility of ICT tools in schools

4.4.1 Availability of ICT tools in Schools as responded by administrators.

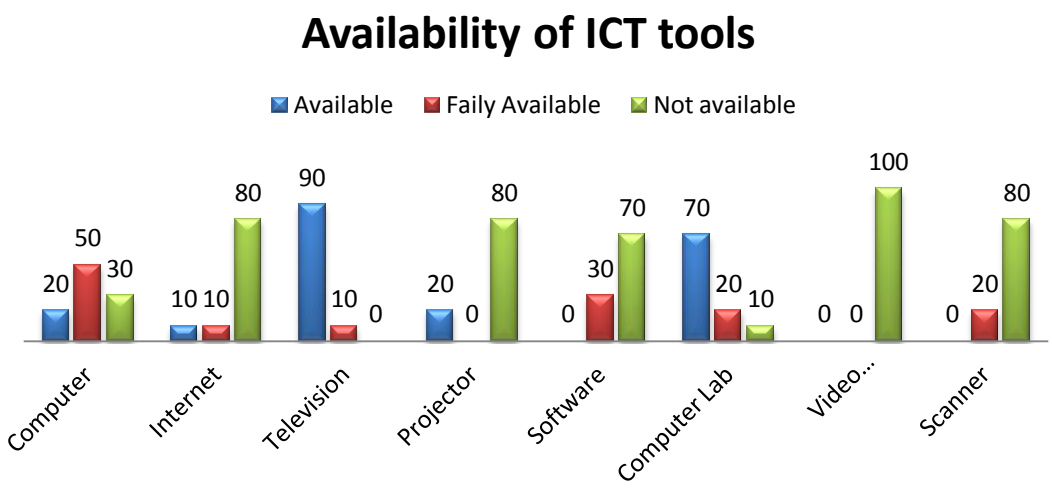


Figure M; Responses on the availability of the ICT in schools by administrators

Figure M indicates that in most schools, computers as ICT tools are fairly available representing 50% as responded by administrators while in some other schools computers were adequate i.e. 20% and in others not available i.e. 30% as per the responses by school administrators.

In most schools, it was found out that internet was not available i.e. 80% while those schools whose internet was available was 10% and those whose internet was fairly available were only 10% as responded by the administrators from the different schools. 90% of schools had television as an ICT available while those schools which indicated that television sets were fairly available were only 10%. Results also indicate that 80% of the respondents showed that projectors were not available in most schools while 20% of the respondents indicated that projectors were available in schools. 70% of the respondents indicated that on and off shelf software was not available in schools while 30% indicated that the software was fairly available in schools.

From figure M above, 70% of the administrators indicated that computer laboratories were available, 20% fairly available and 10% not available in schools. In addition all the administrators in the different schools responded that video conferencing was not available in schools while for scanners, result showed that in the some schools they were fairly available (20%) and not available (80%) as responded by the different administrators.

4.4.2Availability of ICT tools in Schools as responded by teachers.

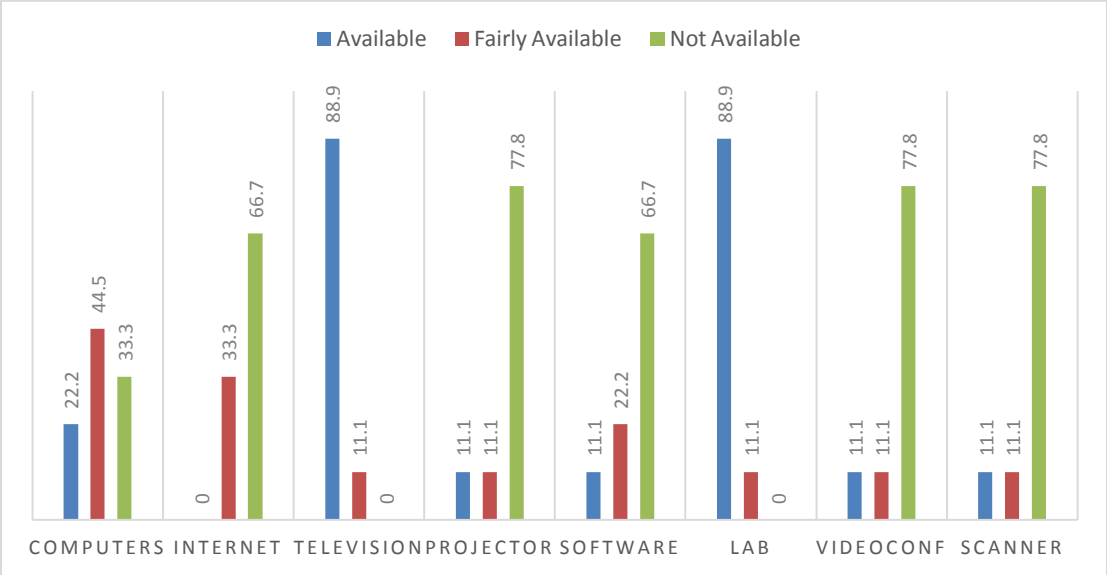


Figure N; responses on availability of ICT tools in schools by teachers

Figure N shows that in most schools, computers as ICT tools are fairly available representing 44.5% as responded by teachers while in some other schools computers were available i.e. 22.2% and in others not available i.e. 33.3% as per the responses by the teachers from their respective schools.

In most schools, it was found out that internet was not available i.e. 66.7% while in the rest of the schools, internet was not available. 88.9% of the responses by teachers shows that television sets were present in schools while only 11.1% indicated that television sets were fairly available. Results also indicate that 77.8% of the teacher responded that projectors were not available in most schools while 11.1% and 11.1% of the teachers indicated that projectors were available in schools and fairly available in schools.

66.7% of the respondents indicated that on and off shelf software was not available in schools while 22.2% and 11.1% respectively indicated that the software was fairly available in schools and available in schools.

From figure N above, 88.9% of the teachers indicated that computer laboratories were available while 11.1% responded that computer laboratories were fairly adequate in schools. In addition 77.8% of the teachers showed that video conferencing was not available in schools while the rest in the different schools responded that video conferencing was not available in schools while for scanners, result showed that in the some schools they were not available (77.8%), 11.1% fairly available and 11.1% available not available as responded by the different teachers.

4.4.3 Availability of ICT tools in Schools as responded by students.

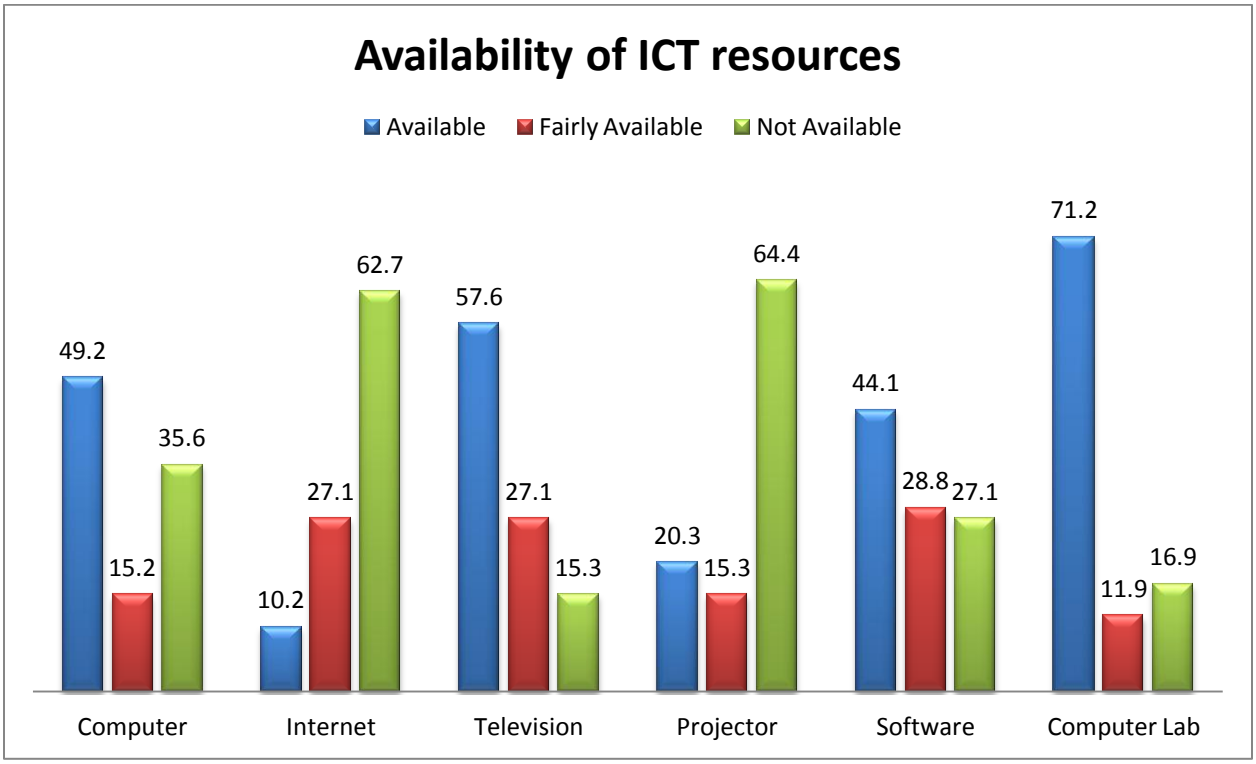


Figure O; responses on the availability of ICT tools by students

The figure above shows that in most schools, computers as ICT tools were available representing 49.2% as responded by students while in some other schools computers were not available i.e. 35.6% and in others fairly available i.e. 15.2% as per the responses by the students from the different sampled schools.

In most schools, it was found out that internet was not available i.e. 62.7%, 27.1% responded that internet was fairly available while in the rest of the schools internet was available 10.2%.

57.6% of the students sampled showed that television sets were present in schools, 27.1% fairly available while only 15.3% indicated that television sets were not available. Results also indicate that 64.4% of the students responded that projectors were not available in most schools while 20.3% and 15.3% of the teachers indicated that projectors were available in schools and fairly available in schools respectively. 66.7% of the respondents indicated that on and off shelf software was not available in schools while 22.2% and 11.1%respectively indicated that the software was fairly available in schools and available in schools Students also responded that on and off shelf software was available representing 44.1%, 28.8% fairly available and 27.1% of the students indicated that software was not available in their respective schools. Lastly 71.2% of the students

sampled showed that computer laboratories were available in schools while 11.9% and 16.9% indicated that computer laboratories were fairly available and not available in schools respectively.

4.5 Adequacy of ICT tools in Schools.

4.5.1 Responses on the adequacy of ICT tools by Administrators.

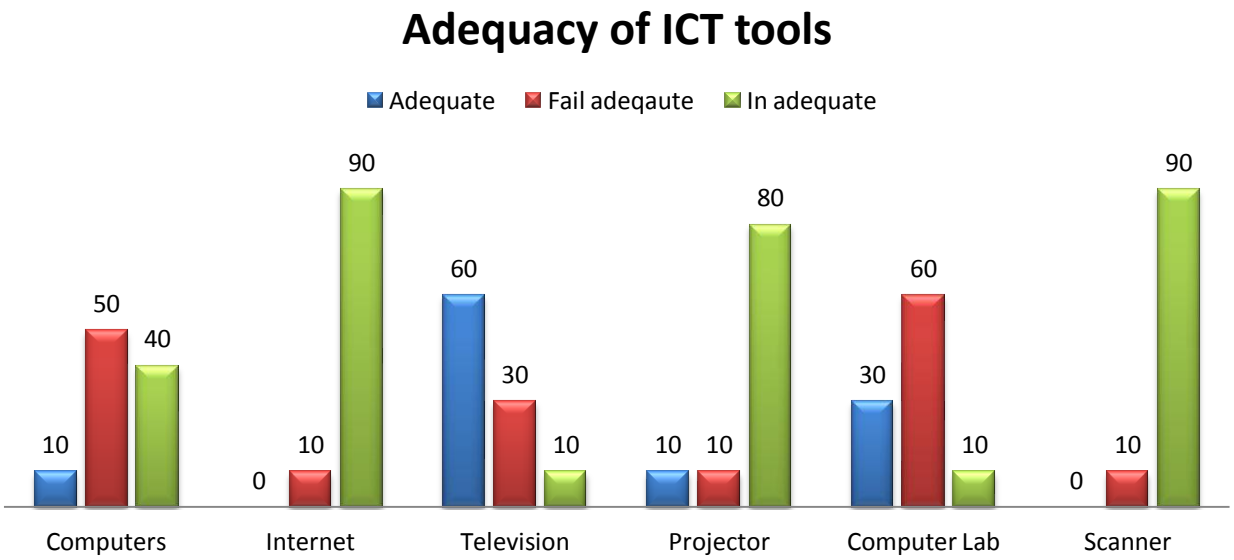


Figure P; Responses on the adequacy of ICT tools in schools by administrators

Results indicate that computers were fairly adequate accounting for 50% of the respondents,10%said they were adequate and 40% responded that computers were inadequate.

Internet is in adequate with 90%of the administrators agreeing and only 10% showed that internet was fairly adequate.

Television sets were adequate accounting for 60% of the responses from the administrators, 30% fairly adequate and 10% inadequate. Most administrators agreed and responded that scanners, projector, internet and computers were not adequate as per the results i.e. scanners 90%, projectors 80%, while computers were fairly adequate accounted for 60.o% respectively

4.5.2 Responses on the adequacy of ICT tools in schools by teachers.

ADEQUACY OF ICT TOOLS FROM TEACHERS' RESPONSES

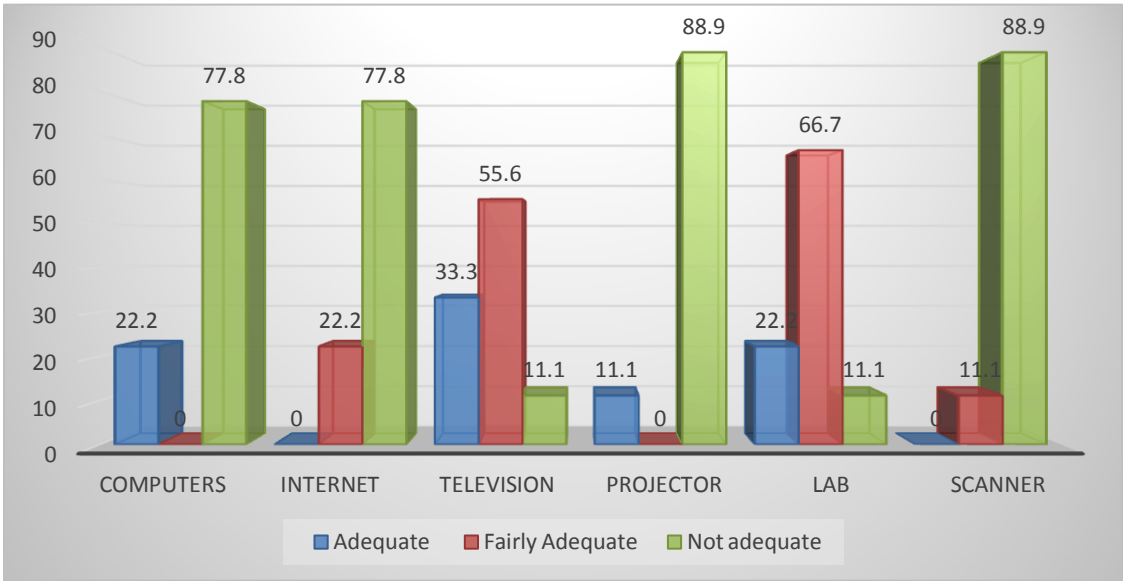


Figure Q; responses on the adequacy of ICT tools by teachers

Most teachers responded that scanners, projector, internet and computers were not adequate as per the results i.e. scanners 88.9%, projectors88.9%, internet 77.8 while computers also accounted for 77.o% respectively. Computer laboratories and television sets were recorded to be fairly adequate in most schools as responded by the different teachers accounting for 66.6% and 55.6% respectively.

4.5.3 Responses on accessibility of ICT tools in schools by Students.

54.2% of the students that were interviewed indicated that computers were not accessible, 17% indicated that computers were fairly accessible while only 28.8% showed that computers were available and accessible by learners within their respective schools. In addition, internet was also revealed not to be accessible with 66.1%, 27.1% showing that internet was fairly accessible and only 6.8% agreed that internet was accessible.

About the accessibility of television sets students who were interviewed indicated that 49.2% of the responses revealed that televisions were accessible, 23.7% of the students said they were fairly accessible and 27.1% said they were not accessible. Results indicate that 66.1% of the students agreed that projectors were not accessible, 15.3% said they were fairly accessible and 18.6% revealed that projectors were not accessible.

About the computer soft ware, 35.6% of the total learners revealed that computer software was accessible, 32.2% said that it was fairly available and also 32.2% revealed that it was not accessible.

When asked about the accessibility of the computer laboratories, students' responses revealed that 50.8% agreed that computer laboratories were accessible, 20.4% said they were fairly accessible and 28.8% showed that computer laboratories were not accessible

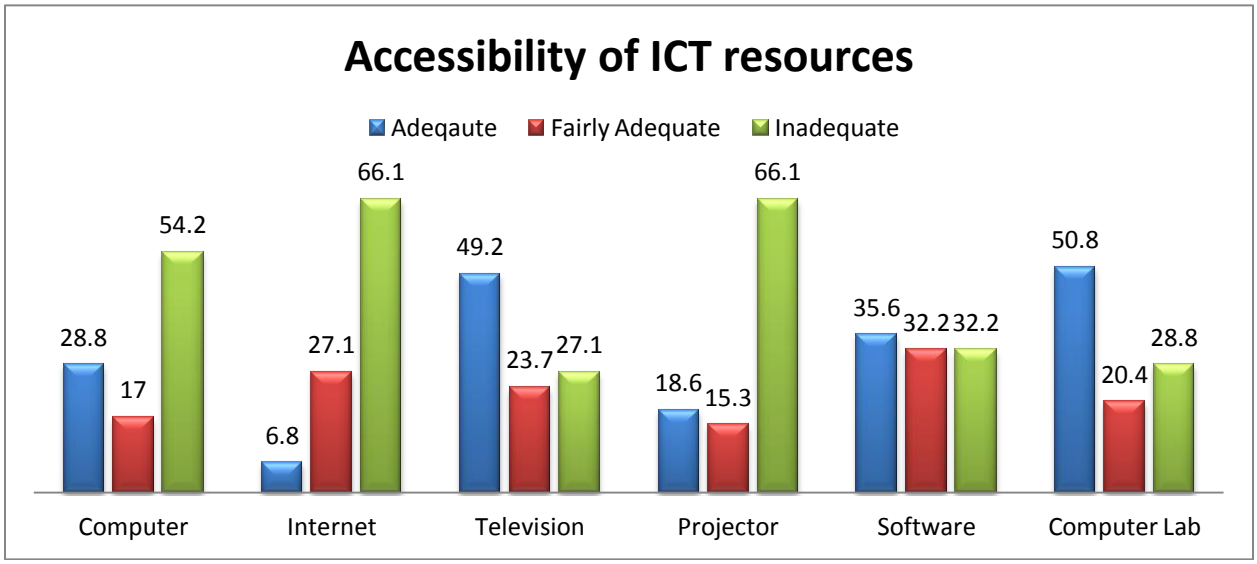


Figure R; accessibility of ICT tools by student

4.6 Limiting challenges to accessibility to ICT resources in teaching and learning process

Table 1; Challenges limiting students' accessibility to ICT resources as responded by administrators

challenges facing students accessibility to ICT resources

Challenge	Frequency	Percent	Valid Percent	Cumulative Percent
Power	1	10.0	10.0	10.0
Lack of enough ICT resources	5	50.0	50.0	60.0
Limited time	1	10.0	10.0	70.0
Limited funds	1	10.0	10.0	80.0
Lack of teachers	1	10.0	10.0	90.0
Limited space	1	10.0	10.0	100.0
Total	10	100.0	100.0	

The most challenge facing accessibility of ICT resources in most schools in the teaching and learning process was lack of enough ICT resources (50%), power (10%), limited time (10%), limited funds (10%), lack of teachers (10%) and limited space (10%) as per the responses from the different administrators in the sample schools.

Table 2; Responses on the challenges limiting students' accessibility by teachers

Challenges facing students' accessibility to ICT resources

	Challenge	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lack of power	1	11.1	11.1	11.1
	Limited ICT resources	4	44.4	44.4	55.6
	Limited space	2	22.2	22.2	77.8
	Lack of enough teachers	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Results indicate that lack of enough ICT resources with in schools is most challenge limiting students' accessibility to ICT resources (44.4%). 22.2%, 11.1% and 22.2% of the sampled teachers responded that limited space, lack of power and lack of enough teachers respectively are other challenges limiting the accessibility of the ICT resources by the students.

Table 3; Responses on the challenges limiting students' accessibility to ICT resources by students

Challenges facing students' accessibility to ICT resources

	Challenge	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Limited Capital	29	49.2	49.2	49.2
	Lack of Power	16	27.1	27.1	76.3
	Lack of Teachers	9	15.3	15.3	91.5
	Lack of Internet	5	8.5	8.5	100.0
	Total	59	100.0	100.0	

Table 3 shows that lack of enough capital to purchase ICT resources is the major challenge limiting students' accessibility to ICT resources as responded by students. Other challenges include lack of power (27.1%), lack of enough teachers (15.3%) and most least is lack of internet with 8.5%.

4.7 Students' performance

4.7.1 Responses on students' performance by administrators.

Figure S below indicates 50% of the administrators agreed that students use the computers to complete their works while 50% disagreed on that. All the administrators agreed that ICT allows students to learn, 80% of the administrators agreed that ICT helps students apply what they learn to the real world situation while 20% disagreed about it. 90% of the administrators agreed that students use the look for information while 10% disagreed. All the administrators agreed that ICT makes students develop interest in the learning content. 90% agreed that the available ICT resources have students improve in academic performance while 10% disagreed about that.

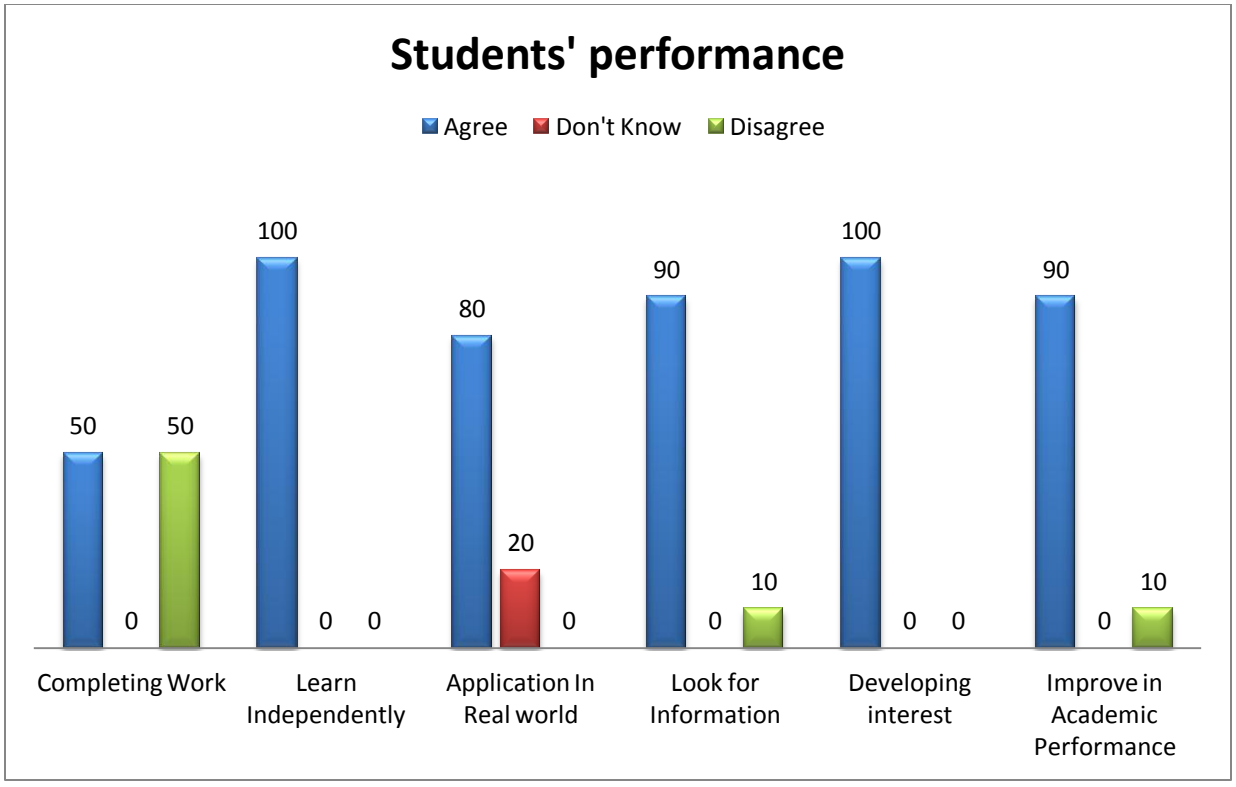


Figure S; Responses by administrators on the students' performance

4.7.2 Responses on students' performance by teachers.

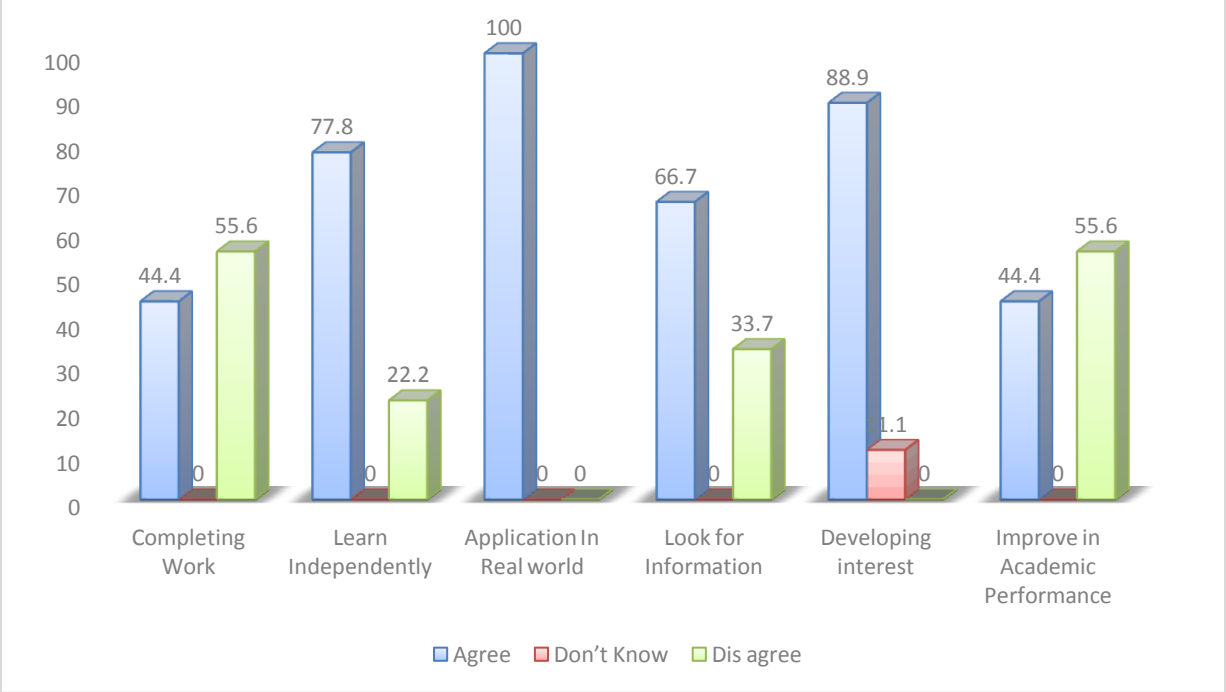


Figure T; responses on students' performance by teachers

Results show that most teachers disagreed that ICT helps students to complete their work i.e. 55.6% and those that agreed ICT helps students in completing were only 44.4%. for the cases of learning

independently, application in the real world, looking for information and developing interest, most teachers accepted ICT would help student achieve all the above mentioned with percentage responses of 77.8%, 100%, 66.7% and 88.9% respectively. In addition, teachers also disagreed that ICT helps students to improve in the academic performance i.e. 55.6%.

4.7.2 Responses on students' performance by students.

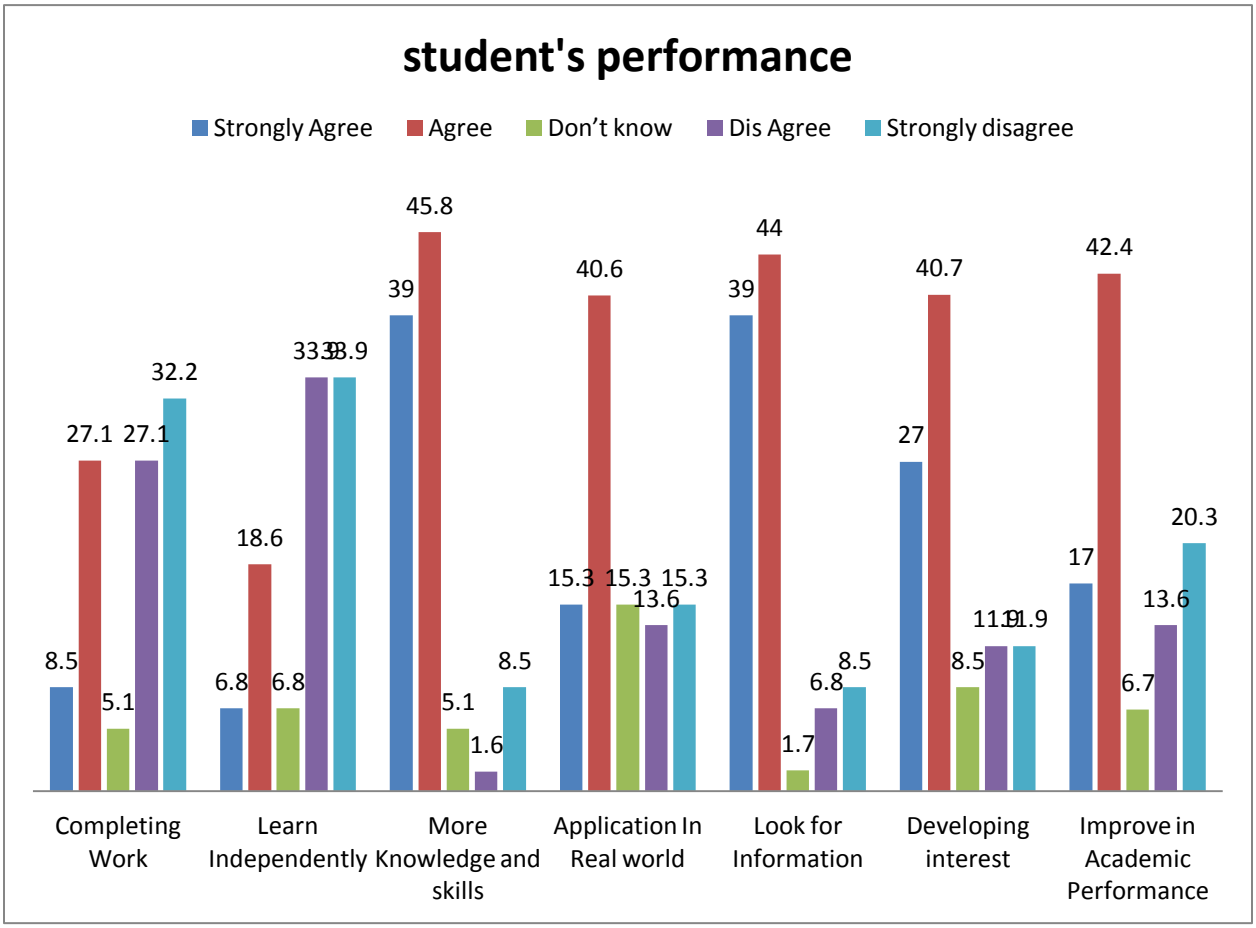


Figure U; Responses on performance by students

Figure U shows that student strongly disagreed that ICT resources help them in completing their works i.e. 32.2%, however 8.5 strongly agreed, 27.1% agreed, 5.1% didn't know while 27.1% disagreed that ICT helps in completing work. Equally, the same number of number of respondents agreed and strongly disagreed that ICT can help students learn independently and only 18.6% didn't know whether ICT resources would help the students learn independently. For the case of obtaining more knowledge and skills from the use of ICT, most respondents strongly agreed and agreed that ICT can be used to obtain more knowledge and skills.

In conclusion, the majority of the respondents the researcher worked with to get findings were between the ages of 18 and 30 years, The study revealed that from most of the respondents'

responses, computers rooms, computers and televisions were the most available, the most accessible and the most adequate. This was because the computers and computer rooms were very key in teaching the basics of ICT lessons and they are cheap to purchase and maintain and the televisions were available because they are cheap to buy and maintain and they assisted in keeping learners informed as well as entertaining them. Other ICT tools were not available, the few that had were not adequate and accessible because they are very expensive to buy and maintain.

4.8 The relationship between the availability ICT tools and academic performance

4.8.1 The relationship between the availability of Computers and academic performance

a) By administrators

Table 4 shows relationship between the availability of Computers and academic performance as responded by administrators

Computers	Academic performance		Total
	Agree	Disagree	
Available	2	0	2
Fairly available	5	0	5
Not available	2	1	3
Total	9	1	10

The above table indicates that two of the respondents who responded that computers were available agreed that availability of computers improves the academic performance of learners. The five administrators who responded that computers that were fairly available also agreed that availability of computers improves academic performance of the learners and out of the three administrators who responded that computers were not available, two agreed that computers help in improving the academic performance and one disagreed.

Table 5; Chi-Square test relationship between the availability of Computers and academic performance

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.593[a]	2	.274
Likelihood Ratio	2.683	2	.262
Linear-by-Linear Association	1.653	1	.199
N of Valid Cases	10		

From Pearson Chi-Square with the significance level of 0.05 (5.99), it can be concluded that the presence of computers in schools can improve the academic performance of learners because the computed value is less than the critical value.

b) By teachers

Table 6:a. shows relationship between the availability of Computers and academic performance as responded by teachers

Computers	Academic performance		Total
	Agree	Disagree	
Available	1	1	2
Fairly available	1	3	4
Not available	2	1	3
Total	4	5	9

Table 6:b. indicating the Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.237[a]	2	.539
Likelihood Ratio	1.275	2	.529
Linear-by-Linear Association	.227	1	.634
N of Valid Cases	9		

From the table above, the two teachers who responded that computers were available, one agreed that availability of computers improves academic performance while the other disagreed. Out of the four teachers who responded that computers were fairly available, only one agreed that availability of computers affect academic performance while the three disagreed and of three teachers who said that computers were not available, two agreed that computers affect academic performance while one disagreed. Using the Pearson Chi-Square with the significance level of 0.05 (5.99), it can be concluded that the presence of computers in schools can improve the academic performance of learners because the computed value is less than the critical value.

c) By Students

From the students' responses, out of the total number of twenty nine who said that computers were available, five strongly agreed, fifteen agreed, two did not know four disagreed and three strongly disagreed that availability of computers affect academic performance of the learners.

Table 7; Shows relationship between the availability of Computers and academic performance as responded by students

Computer	Academic performance					Total
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	
Available	5	15	2	4	3	29
Fairly available	3	2	1	1	2	9
Not available	3	8	1	3	6	21
Total	11	25	4	8	11	59

Table 8. showing results of the Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.506[a]	8	.702
Likelihood Ratio	5.497	8	.703
N of Valid Cases	59		

From Pearson Chi-Square with the significance level of 0.05 (5.99), and the degree of freedom of 8 it can be concluded that the presence of computers in schools can improve the academic performance of learners because the computed value of 5.506 is less than the critical value of 15.51.

4.8.2 The relationship between the presence of internet and the academic performance

a) By administrators

Table 8; relationship between the presence of internet and the academic performance by administrators

Internet	Academic performance		Total
	Agree	Disagree	
Available	1	0	1
Fairly available	1	0	1
Not available	7	1	8
Total	9	1	10

The only administrator, whose response was that internet was available, agreed that the availability of internet improves academic performance. Another administrator who responded that internet was fairly available also agreed that the availability of internet improves academic performance. While out of the eight administrators who responded that internet was not available, seven agreed that the availability of internet improves academic performance while one disagreed.

Table 9; Chi square test for the relationship

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.278[a]	2	.870
Likelihood Ratio	.473	2	.789
Linear-by-Linear Association	.220	1	.639
N of Valid Cases	10		

Using Pearson Chi-Square with the significance level of 0.05 (5.99), and the degree of freedom of 2, it can be concluded that availability of internet in schools can improve the academic performance of learners because the computed value of .278 is less than the critical value of 5.99.

b) By teachers

Table 10; Relationship between the presence of internet and the academic performance by teachers

Internet	Academic performance		Total
	Agree	Disagree	
Fairly available	1	2	3
Not available	3	3	6
Total	4	5	9

Three of the teachers whose response was that internet was fairly available, one agreed that the availability of internet improves academic performance while two disagreed and out of the six teachers who responded that internet was not available, three agreed that the availability of internet improves academic performance while three disagreed.

Table 11; Chi Square test for the relationship

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.225[a]	1	.635		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.228	1	.633		
Fisher's Exact Test				1.000	.595
Linear-by-Linear Association	.200	1	.655		
N of Valid Cases	9				

From Pearson Chi-Square with the significance level of 0.05 (5.99), and the degree of freedom of 1 (one), it can be concluded that the presence of computers in schools can improve the academic performance of learners because the computed value of .225 is less than the critical value of 3.84.

c) By learners

Table 12; Relationship between the presence of internet and the academic performance by learners

Internet	Academic performance					
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	Total
Available	1	3	1	0	0	5
Fairly available	4	7	1	4	1	17
Not available	6	15	2	4	10	37
Total	11	25	4	8	11	59

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.096[a]	8	.424
Likelihood Ratio	9.378	8	.311
N of Valid Cases	59		

Out of the five learners whose response was that internet was available, one strongly agreed that the availability of internet improves academic performance, three agreed and one did not know, of the seventeen students who responded that internet was fairly available, four strongly agreed that the availability of internet improves academic performance, seven agreed, one did not know, four disagreed and one strongly disagreed while out of the thirty seven students who responded that internet was not available, six strongly agreed that availability of internet affect academic performance, fifteen agreed, two did not know, four disagreed and ten strongly disagreed that availability of internet affect academic performance of the learners.

Using the Pearson Chi-Square with the significance level of 0.05 (5.99) and the degree of freedom of 8, it is concluded that the presence of computers in schools can improve the academic performance of learners because the computed value of 8.096 is less than the critical value of 15.51.

4.8.3 The relationship between the availability of television sets and the academic performance

a) By administrators

Table 13; relationship between the availability of television sets and the academic performance as responded by administrators

Television	Academic performance		Total
	Agree	Disagree	
Available	8	1	9
Fairly available	1	0	1
Total	9	1	10

Out of the nine administrators whose response was that televisions were available, eight agreed that the availability of television sets improves academic performance and one disagreed and the only one administrator who responded that televisions were fairly available also agreed that televisions improves academic performance.

Table 14; Chi Square test for the relationship

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.123[a]	1	.725		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.223	1	.637		
Fisher's Exact Test				1.000	.900
Linear-by-Linear Association	.111	1	.739		
N of Valid Cases	10				

In reference to the above table of Pearson Chi-Square test with the significance level of 0.05 (5.99), and the degree of freedom of 1 (one), it can be concluded that the availability of television sets in schools can improve the academic performance of learners because the computed value of .123 is less than the critical value of 3.84

b) By teachers

Table 15; Relationship between the availability of television sets and the academic performance as responded by teachers

Television	Academic performance		Total
	Agree	Disagree	
Available	4	4	8
Fairly available	0	1	1
Total	4	5	9

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.900[a]	1	.343		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	1.275	1	.259		
Fisher's Exact Test				1.000	.556
Linear-by-Linear Association	.800	1	.371		
N of Valid Cases	9				

Out of the eight teachers whose response was that televisions were available, four agreed that the availability of television sets improves academic performance and four disagreed and the only one administrator who responded that televisions were fairly available also disagreed that televisions improves academic performance.

The Pearson Chi-Square test above with the significance level of 0.05 (5.99), and the degree of freedom of 1 (one), it can be concluded that the availability of televisions in schools can improve the academic performance of learners because the computed value of 0.900 is less than the critical value of 3.84.

c) By students

Table 16; Relationship between the availability of television sets and the academic performance as responded by students

Television	Academic performance					Total
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	
Available	5	16	1	2	10	34
Fairly available	5	5	1	5	1	17
Not available	1	4	2	1	0	8
Total	11	25	4	8	11	59

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.864	8	.032
Likelihood Ratio	16.732	8	.033
N of Valid Cases	59		

Out of the thirty four students whose response was that television sets were available, five strongly agreed that the availability of internet improves academic performance, sixteen agreed, one did not know, two agreed and ten strongly agreed. Of the seventeen students who responded that televisions were fairly available, five strongly agreed that the availability of televisions improves academic performance, five agreed, one did not know, five disagreed and one strongly disagreed while out of the eight students who responded that televisions were not available, one strongly agreed that availability of internet affect academic performance, four agreed, two did not know and one disagreed that availability of television sets affect academic performance of the learners. The Pearson Chi-Square test above whose significance level is 0.05 (5.99), and the degree of freedom is 8 (eight), it can be concluded that the availability of televisions in schools does not improve the academic performance of learners because the computed value of 16.864 is greater than the critical value of 15.51

4.8.4 The relationship between the presence of projectors in schools and academic performance

a) Responses by the administrators

Table 17; Relationship between the presence of projectors in schools and academic performance as responded by administrators

Projector	Academic performance		Total
	Agree	Disagree	
Available	2	0	2
Fairly available	7	1	8
Total	9	1	10

The two administrators who responded that projectors were available agreed that the availability of projectors improves academic performance, out of the eight who said that projectors were fairly available, seven agreed that projectors affected and improved academic performance and one disagreed.

Table 18; Chi square test for the relationship

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.278[a]	1	.598		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.473	1	.491		
Fisher's Exact Test				1.000	.800
Linear-by-Linear Association	.250	1	.617		
N of Valid Cases	10				

The Pearson Chi-Square test above whose significance level is 0.05 (5.99), and the degree of freedom of 1 (one), it can be concluded that the availability of projectors in schools can improve the

academic performance of learners because the computed value of 0.278 is less than the critical value of 3.84.

b) By teachers

Table 19; relationship between the presence of projectors in schools and academic performance as responded by teachers

Projector	Academic performance		Total
	Agree	Disagree	
Available	1	0	1
Fairly available	0	1	1
Not available	3	4	7
Total	4	5	9

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.057[a]	2	.358
Likelihood Ratio	2.805	2	.246
Linear-by-Linear Association	.400	1	.527
N of Valid Cases	9		

According to Pearson Chi-Square test above whose significance level is 0.05 (5.99), and the degree of freedom of 2 (two), it can be concluded that the availability of projectors in schools can improve the academic performance of learners because the computed value of 2.057 is less than the critical value of 5.99.

c) By students

Table 20; Relationship between the presence of projectors in schools and academic performance as responded by learners

Projector	Academic performance					Total
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	
Available	4	6	0	1	1	12
Fairly available	2	3	2	2	0	9
Not available	5	16	2	5	10	38
Total	11	25	4	8	11	59

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.817	8	.212
Likelihood Ratio	11.929	8	.154
N of Valid Cases	59		

Out of the twelve students whose response was that projectors were available, four strongly agreed that the availability of projector improves academic performance, six disagreed, one agreed and one strongly disagreed. Of the nine students who responded that projectors were fairly available, two strongly agreed, three agreed, two did not know and two disagreed that the availability of projectors improves academic performance, three agreed while out of the thirty eight students who responded that projectors were not available, five strongly agreed that availability of projectors affect academic performance, sixteen agreed, two did not know, five disagreed and ten strongly disagreed that availability of projectors affect academic performance of the learners. .

Using the Pearson Chi-Square test above, whose significance level is 0.05 (5.99), and the degree of freedom of 8 (eight), it can be concluded that the availability of projectors in schools can improve the academic performance of learners since the computed value of 10.817 is less than the critical value of 15.51.

4.8.5 The relationship between the availability of software and the academic performance

a) By administrators

Table 21; Relationship between the availability of software and the academic performance as responded by administrators

Software	Academic performance		Total
	agree	disagree	
Available	3	0	3
Fairly available	6	1	7
Total	9	1	10

The three administrators who responded that software was available, all agreed that the availability of computer soft ware improves academic performance, out of the seven who said that software was fairly available, six agreed that presence of software affected and improved academic performance and one disagreed.

Table 22; Chi square test for the relationship

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.476[a]	1	.490		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.760	1	.383		
Fisher's Exact Test				1.000	.700
Linear-by-Linear Association	.429	1	.513		
N of Valid Cases	10				

According to Pearson Chi-Square test above, whose significance level is 0.05 (5.99), and the degree of freedom of 1 (one), it can be concluded that the availability presence of software in schools can improve the academic performance of learners because the computed value of 0.479 is less than the critical value of 3.84.

b) By teachers

Table 23; Relationship between the availability of software and the academic performance as responded by teachers

Software	Academic performance		Total
	Agree	Disagree	
Available	1	0	1
Fairly available	2	4	6
Not available	1	1	2
Total	4	5	9

The only teacher whose response was that there was presence of software in schools, agreed that presence of software in schools improves academic performance, and out of the six who responded that software was fairly available, two agreed and four disagreed while out of the two teachers whose response was that software was not available, one agreed that presence of software improves academic performance of the learners and one disagreed.

Table 24; Chi square test for the relationship

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.575[a]	2	.455
Likelihood Ratio	1.955	2	.376
Linear-by-Linear Association	.246	1	.620
N of Valid Cases	9		

Results of the Pearson Chi-Square test above whose significance level is 0.05 (5.99), and the degree of freedom of 2 (two), it can be concluded that the presence of computer software in schools can improve the academic performance of learners due to the fact that the computed value of 1.575 is less than the critical value of 5.99.

c) By learners

Table 25; Relationship between the availability of software and the academic performance as responded by students

Software	Academic performance					Total
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	
Available	7	15	2	1	1	26
Fairly available	3	5	1	5	4	18
Not available	1	5	1	2	6	15
Total	11	25	4	8	11	59

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.194[a]	8	.040
Likelihood Ratio	17.117	8	.029
N of Valid Cases	59		

Of the twenty six students who responded that there was presence of computer soft ware, seven strongly agreed that the presence of computer soft ware improves academic performance, fifteen disagreed, two did not know, one agreed and one strongly disagreed.

Of the eighteen students who responded that computer soft ware was fairly available, three strongly agreed, five agreed, one did not know and five disagreed and four strongly agreed that the availability of computer soft ware improves academic performance.

While out of the fifteen students who responded that computer soft ware was not available, one strongly agreed that availability of computer soft ware affect academic performance, five agreed, one did not know, two disagreed and six strongly disagreed that the presence of computer soft ware affects academic performance of the learners. In reference to Pearson Chi-Square test above, whose significance level is 0.05 (5.99), and the degree of freedom of 8 (eight), it can be concluded that the presence of computer soft ware in schools does not improve the academic performance of learners basing on the computed value of 16.194[a] which is greater than the critical value of 15.51.

4.8.6 The relationship between the availability of computer laboratories and the students' academic performance

a) By administrators

Table 26; Relationship between the availability of computer laboratories and the students' academic performance as responded by administrators

	Academic performance		
Laboratory	Agree	Disagree	Total
Available	6	1	7
Fairly available	2	0	2
Not available	1	0	1
Total	9	1	10

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.476[a]	2	.788
Likelihood Ratio	.760	2	.684
Linear-by-Linear Association	.364	1	.546
N of Valid Cases	10		

Out of the seven administrators who responded that computer laboratories were available, six agreed that the availability of computer laboratories improves academic performance and one disagreed, the two who said that computer laboratories were fairly available all agreed that availability of computer laboratories improve academic performance, and that the only administrator who responded that computer laboratories were not available, also agreed that availability of computer laboratories improved academic performance of the learners.

The above Pearson Chi-Square test whose significance level is 0.05 (5.99), and the degree of freedom of 2 (two), it can be concluded that the presence of computer laboratories in schools can improve the academic performance of learners because the computed value of 0.476 is less than the critical value of 5.99.

b) By teachers

Table 27; relationship between the availability of computer laboratories and the students' academic performance as responded by teachers

Laboratory	Academic performance		Total
	Agree	Disagree	
Available	4	4	8
Fairly available	0	1	1
Total	4	5	9

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.900[a]	1	.343		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	1.275	1	.259		
Fisher's Exact Test				1.000	.556
Linear-by-Linear Association	.800	1	.371		
N of Valid Cases	9				

Out of the eight teachers whose response was that computer laboratories were available, four agreed that the availability of computer laboratories improves academic performance and four disagreed, and one who responded that computer laboratories were fairly available disagreed that availability of computer laboratories does not improve academic performance of the learners.

Basing on the Pearson Chi-Square test above, where the significance level is 0.05 (5.99), and the degree of freedom is1(one), it can be concluded that the availability of computer laboratories in schools can improve the academic performance of learners due to the fact that the computed value of 0.900 is less than the critical value of 3.84.

c) By learners

Table 28; Relationship between the availability of computer laboratories and the students' academic performance as responded by learners

Laboratory	Academic performance					Total
	Strongly agree	Agree	Don't know	Disagree	Strongly disagree	
Available	10	19	3	5	5	42
Fairly available	1	5	0	1	0	7
Not available	0	1	1	2	6	10
Total	11	25	4	8	11	59

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.017[a]	8	.015
Likelihood Ratio	20.167	8	.010
N of Valid Cases	59		

Of the forty two students who responded that there was presence of computer laboratories, ten strongly agreed that the presence of computer laboratories improves academic performance, ninteen disagreed, three did not know, five agreed and five strongly disagreed.

Of the seven students who responded that computer laboratories were fairly available, one strongly agreed, five agreed and one disagreed that availability of computer laboratories affect academic performance.

While out of the ten students who responded that computer laboratories were not available, one agreed that availability of computer laboratories affect academic performance, one did not know, two disagreed and six strongly disagreed that the presence of computer laboratories affects academic performance of the learners. The Pearson Chi-Square test above, whose significance level is 0.05 (5.99), and the degree of freedom of 8 (eight), it indicates that the presence of computer laboratories in schools does not affect and improve the academic performance of learners basing on the computed value of19.017[a] which is greater than the critical value of 15.51

4.8.7 The relationship between the availability of scanners and academic performance of learners

a) Administrators

Table 29; Relationship between the availability of scanners and academic performance of learners as responded by administrators

scanner	Academic performance		Total
	Agree	Disagree	
Fairly available	2	0	2
Not available	7	1	8
Total	9	1	10

Two of the administrators who responded that scanners were available, all agreed that the availability of scanners improves academic performance and out of the eight administrators who said that scanners were fairly available, seven agreed that availability of scanners improve academic performance and one disagreed.

Table 30; Chi square test for the relationship

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.278[a]	1	.598		
Continuity Correction	.000	1	1.000		
Likelihood Ratio	.473	1	.491		
Fisher's Exact Test				1.000	.800
Linear-by-Linear Association	.250	1	.617		
N of Valid Cases	10				

According to the above Pearson Chi-Square test whose significance level is 0.05 (5.99), and the degree of freedom of 1 (two), it can be concluded that the presence of computer laboratories in

schools can improve the academic performance of learners because the computed value of 0.476 is less than the critical value of 5.99.

4.8.7 The relationship between the presence of video conferencing and the students' academic performance

a) By administrators

Table 31; Relationship between the presence of video conferencing and the students' academic performance by administrators

Video conferencing	Academic performance		Total
	Agree	Disagree	
Not available	9	1	10
Total	9	1	10

All the ten administrators responded that video conferencing was not available and out of those, nine agreed that the availability of video conferencing improves academic performance and one disagreed

b) By teachers

Table 32; Relationship between the presence of video conferencing and the students' academic performance by teachers

Video conferencing	Academic performance		Total
	Agree	Disagree	
Available	1	0	1
Fairly available	1	0	1
Not available	2	5	7
Total	4	5	9

The only teacher whose response was that scanners were available, agreed that the availability of scanners improves academic performance, and another one who responded that scanners was fairly available also agreed that availability of scanners improves academic performance, and of the seven teachers who disclosed that scanners were not available, two agreed that availability of scanners improves academic performance of the learners and five disagreed.

Table 33; Chi square test for the relationship

Chi-Square Tests

	Value	*df*	*Asymp. Sig. (2-sided)*
Pearson Chi-Square	3.214[a]	2	.200
Likelihood Ratio	3.990	2	.136
Linear-by-Linear Association	2.500	1	.114
N of Valid Cases	9		

Basing on the Pearson Chi-Square test above, where the significance level is 0.05 (5.99), and the degree of freedom is 2(two), it can be concluded that the availability of scanners in schools can improve the academic performance of learners since the computed value of 3.214[a] is less than the critical value of 5.99.

CHAPTER FIVE

DISCUSION OF RESULTS, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter introduces the discussion of results of the findings on the impact of the use of Information and Communication Technology tools and academic performance of the learners, draws conclusion from the findings and suggests recommendations.

5.1 Demographic characteristics

The study indicates that most of the administrators are between 41- 50 years, this is because of the experience they went through teaching which enabled them to become administrators while most of the teachers were between 30- 41 years and this could be related to the fact that it takes long to be trained as professional teachers. In addition, the sampled students were between 18 and 30 years and this is because the lie in the high school going age bracket.

For all cases, the gender of sampled respondent was dominated by males and this could be because of the gender based difficulties among female which hinder them from acquiring higher education for early pregnancies and the negative attitude of parents and the community to girl child education.

The study also reveals out that mostly heads of department and Deputy Head teachers were interviewed. This is because the heads of departments were solely responsible for the management of ICT programs in the schools and at the time of interview most Head teachers were out of station and those that were at the station delegated their Deputies.

In addition, most of the interviewed students were in advanced level of secondary education and the majority was of Arts combinations. This is because ICT is compulsory at advanced level for all students offering Arts combinations without economics and for science combinations with mathematics.

5.2 Availability, adequacy and accessibility of ICT tools in schools

From the study it is found out that computer laboratories and television sets are the most available ICT tools in most schools and this is because for the computer laboratories, it is necessary for every school to have a computer laboratory where computer practices are supposed to be carried out and for television sets, they are used for the social life of the students meant to entertain them, avail them with information and to keep them busy. For other ICT resources like the projector, scanner, software, video conferencing and the internet were not available in most schools. These ICT were

not available because they are very expensive to purchase and maintain and they are not necessarily essential in academic research especially for students in secondary schools. However, computers were available as responded by students because for the case of student, they look at the few available computers as enough while teachers as technical personnel look at the few available computers as not enough to carry out perfect computer practical lessons.

The study also shows that computers are adequate as responded by the administrators which contradict with the response from teachers. This is because teachers a technical people who carry out the work of teaching both theory and practical computer lessons look at the few available computers as inadequate and therefore cannot effectively enable them carry out practical computer lessons because of the big numbers of learners while administrators say that they are fairly adequate because they consider the financial stand of the school in relation to other school necessities. The other ICT resources are not adequate because they are expensive and not very relevant in the teaching learning exercise.

Basing on the results from figure R, television sets and computer laboratories are the most accessible ICT tools by students. This is because television sets are used by students for entertainment for social welfare and the computer laboratories are accessible because computer studies as a subject is compulsory for students offering arts combinations without economics and science combinations with mathematics. However computers were not accessible and this could be due to the limited number of computers within the laboratories to accommodate all students.

5.3 Students' performance in relation to the presence and accessibility of ICT tools in schools.

Results show that 50% of the administrators agreed that the presence and accessibility of ICT tools within schools helps students completing their work while 50% disagreed upon that. For those who agreed, it is true that internet helps student to carry out research and complete their work and 50% who disagreed based the fact that internet and other ICT tools are scare and not accessible. However for the teachers, it is a different case. 55.6% disagree that ICT resources can help students in completing their works. This is because teachers are the implementers who talk from experience base on the exercises they give to the learners and the responses they get from them.

All administrators agreed that the presence of ICT tools can help students learn independently especially when teachers give work for learners to research. Through the use of internet cafes and the most common ICT resource of mobile phones, learners are able to access more knowledge than what the teachers have given them and also to prove what teachers have given them and hence forth

student learning independently. In addition, all administrators agreed that ICT tools help students develop interest in learning because it's a hands on process of learning where learners look at ICT lessons as field work which relieves them from the tension of theory work. Developing interest leads to the desire for looking information for example on the use of micro-soft programs like micro soft word, excel, power point, computer engineering to carry on various tasks. These can be applied in the real word for example they can set up internet cafes, printing centers, computer mechanic centers among others. This is the same for the teachers who were interviewed.

90% of the administrators agreed that the presence and accessibility of ICT resources in schools can help in the improvement of students' academic performance while 0nly 10% disagreed. This is because teachers can also use the ICT tools like internet to carry out comprehensive research on various academic areas hence developing confidence and improving service delivery because has gained the relevant content to teach the learners. Students are able to do their own research in addition to the teachers' content. This in combination can greatly help in the improvement of the students' academic performance. For the case teachers, only 44.4% agree that ICT resources can help in the improvement of students' performance and for the others it is otherwise. This is because it is teachers that assess and evaluate the learners so they find out that ICT resources generally don't improve on the academic performance. This can be related to fact that most schools don't have access most ICT resources and those are available are not enough for the big numbers of the learners. In addition students' performance can be improved through other ways like;

- Regular tests and exams which are meant to test learners understanding and to drive them to read hard for better performance.
- Carrying out remedial teaching which helps teachers to complete syllabus coverage early enough and also to attend to individual learners differences so as to help slow learners pick at almost the same pace with the fast learners.

For the case of students, a bigger percentage strongly disagreed that the use of ICT tools does not at all help the learners complete their work simply because most students use text books rather than ICT resources in completing their work. Equally the same, students also disagreed that ICT resources help them learn independently, however a bigger percentage of the students agreed that ICT resources helps them attain more knowledge and skills. This is because the students can use these resources to discover new ideas through the practical use of these resources for example the use of internet can help can help the students develop new ideas and skills. Most students also agreed that ICT resources can be applied in the real world and this is through various means like

setting up internet cafes, printing centers, computer mechanic centers among others. Never the less many students also agreed that ICT tools and resources can help them develop self interest in both the application and use. This can create the urge to look for information through the use of different ICT resources for example the use of internet eases looking for information both for academic purposes and other kinds of information. Once ICT resources are used to look for information in regard to academics, students' performance can be improved.

5.3 Summary of findings.

The researcher used the Pearson's Chi-Square to get her findings and the significance level was 0.05, and the degrees of freedom varied from one, two and eight. A number of tests were made on responses from school administrators, ICT teacher and the students from all the classes, that is from senior one to senior six. The responses were asked whether the availability of ICT resources affects academic performance of the learners, whether the accessibility of ICT resources affect academic performance of the learners and whether the adequacy of ICT resources affect academic performance of the learners.

Pearson's Chi-Square tests revealed that all school administrators and all ICT teachers agreed that all ICT resources' availability, accessibility and adequacy, that is, computers, projectors, scanners, computer software, computer laboratories, internet and Televisions improve academic performance of the learners and the students agreed that availability, accessibility and adequacy of most of the ICT resources improve academic performance of the learners but disagreed that the availability of televisions and computer software do not improve academic performance of the learners.

5.4 Conclusions

Television sets and computers are the most available ICT resources in most schools within the municipality. Scanners, projectors, software, video conferencing and internet were not available in most schools. This could be because some ICT resources are expensive to maintain, and are not vital in the learning process and also some teachers are not equipped with the skills for their application. Thus priority is given to a few of the vital ICT tools and resources like computers and computer laboratories compared to others.

The study revealed that television sets and computer laboratories were the most accessible ICT resources in most schools within Mubende municipality. This is because television sets and computer laboratories are more essential as ICT tools and are also used for leisure purposes like entertainment. Software and computers were also fairly accessible ICT tools by students because

they are only used for academic purposes whereas internet and projector were not accessible and this could be due to the fact that they are expensive to purchase and maintain.

The study revealed that most schools were facing a problem of lack of power, lack of enough ICT resources, limited time for practice in the use of the existing ICT tools and resources, lack of enough teachers and limited space. This limited the students' accessibility and use of the different ICT resources and tools. The study also revealed that in terms of relevancy of ICT resources to the learners; application of ICT in the real world, learning independently and developing self interest were the most relevant use of ICT tools and resources

5.5 Recommendations

The government should encourage and implement the use of ICT resources by teachers not only in ICT teaching but also in other subjects so as to make teaching and learning an easy and enjoyable process.

Teachers should encourage learners to love and practice ICT since most of the learners think that ICT leads to acquisition of certificates not valued by the literates but looked at as a course for the academic failures.

The researcher recommend the schools to equipping and availing ICT resource like internet, projectors and scanners using the meagre resources available because they are equally important in the improvement of the students' academic performance.

There is need to construct more computer laboratories and also purchase more computers so as to increase the use of computers and consequently improve the academic performance even though computers and computer laboratories are fairly adequate in some schools within Mubende Municipal council.

The government should also empower teachers who are not well conversant with the use of ICT tools and resources by emphasizing and availing more training of the teachers to acquire more knowledge on both the use and application of ICT in the real world.

Both the schools and the government should avail power to ICT laboratories so as to make computers run and also avail both students and teachers source of light that shall enable them carry out employ and post more qualified ICT teachers that will assist in teaching ICT in schools because a number of schools revealed that they lacked qualified ICT teachers. extra reading hence improving on the students' academic performance.

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APPENDIX A

THE IMPACT OF ICT ON STUDENTS' ACADEMIC PERFORMANCE IN SCIENCES IN MUBENDE TOWN COUNCIL, MUBENDE DISTRICT

STUDENT'S QUESTIONNAIRE:

Dear Student,

You have been randomly chosen as a respondent in the above titled survey which is being undertaken as part of an educational research in partial fulfillment of the Masters Degree in Education Management and Planning of Nkumba University. Your cooperation in filling this questionnaire will ensure success of the study. Please feel free to give your views on the items given by answering all the questions and indicate your choice by putting a tick in the checkbox provided for the answer you feel most appropriate, or Fill in the gaps by giving reasons or information in relation to a particular question. The responses will be for academic purposes only and will be treated with utmost confidentiality.

SECTION A

Background information of the respondent:

Please provide information regarding yourself by ticking the appropriate boxes

1. Sex:

(a) Male ☐ (b) Female ☐

2. Age

(a). Below 18 ☐ (d) 41-50 years ☐

(b). 18-30 years ☐ (e) Above 50 ☐

(c). 31-40 years ☐

3. Level of study:

(a) O' Level ☐ (b) A' Level ☐

4. Subject Combination (A' Level)……

Availability of ICT resources:

5. How do you agree or disagree on the availability of the following ICT resources in your School?

Availability	Available	Fairly available	Not available
i) Computers/PC in classroom			
ii) Internet & E-mail			

iii) Television set			
iv) Projector			
v) Software			
vi) Computer laboratory			
Others (specify)			

6. In your opinion, do you think that these resources are adequately available/ accessible? Please rate the adequacy/availability of the following ICT resources

Accessibility	Adequate	Fairly adequate	Inadequate
i) Computers/PC in classroom			
ii) Internet & E-mail			
iii) Television set			
iv) Projector			
v) Software			
vi) Computer laboratory			
Others (specify)			

7. In your own opinion, what do you regard as the biggest challenge affecting accessibility / availability of ICT resources in your school?

……..

……

Students' academic performance:

8. How do you agree or disagree with the following statements about ICT in your school?

Performance:	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
I use the computer to do my assignments/exercises					

I learn on my own using computers					
Computers give me more knowledge and skills					
I CT helped me apply what I have learnt to the real world situation					
ICT made me develop interest in the Learning					
I use the computer to look for Information					
The available ICT resources have helped me and other students improve in academic performance.					

THANK YOU

APPENDIX

THE IMPACT OF ICT ON STUDENTS' ACADEMIC PERFORMANCE IN SCIENCES IN MUBENDE MUNICIPALITY, MUBENDE DISTRICT.

Teacher's questionnaire:

Dear Respondent,

You have been randomly chosen as respondent in a survey which is being undertaken as part of an educational research in partial fulfillment of the Masters Degree in Education Management and Planning of Nkumba University. Your co-operation in filling this questionnaire will ensure success of the study. Please feel free to give your views on the items by answering all the questions and indicate your choice by putting a tick in the checkbox provided for the answer you feel most appropriate or fill in the gaps by giving reasons or information in relation to particular questions. The information provided is purely confidential and to be used for academic purpose only.

SECTION A

Background Information.

Please provide information regarding yourself by ticking/checking the appropriate box

1. Sex:

(a) Male ☐ (b) Female ☐

2. Age

(a). Below 18 ☐

(b). 18-30 years ☐

(c). 31-40 years ☐

(d) 41-50 years ☐

(e) Above 50 ☐

3. How long have you been teaching/ serving in this secondary school?

(a). Less than 2 years ☐ (c). More than 5 years ☐

(b). between 2-5 years ☐

4. What is your designation?

(a). Head teacher ☐ (c). Head of department ☐

(b). Deputy Head teacher (d) Teacher ☐

Availability of ICT resources:

5. How do you agree or disagree on the availability of the following ICT tools in your school?

Availability	Available	Fairly Available	Not available
i) Computers/PC in classroom			
ii) Internet & E-mail			
iii) Television set			
iv) Projector			
v) On and off shelf software			
vi) Computer laboratory			
vii) Video conferencing			
viii) Scanner			
ix) Others, specify			

Accessibility of ICT resources:

6. In your own opinion, do you think that these tools are adequate enough for the students? Please rate the adequacy of the following ICT:

Accessibility	**Adequate**	**Fairly Adequate**	**In adequate**
i) Computers/PC in classroom			
ii) Internet & E-mail			
iii) Television set			
iv) Projector			
vi) Computer laboratory			
vi) Scanner			
vii) Others, specify			

7. In your own opinion, what do you regard as the biggest challenge affecting students' accessibility of ICT resources in the teaching and learning process

....

……..

Students' performance:

8. How do you agree or disagree with the following statements

Performance:	Agree	Don't know	Disagree
Students use the computer to complete their work/ exercises.			
ICT allows students to learn independently.			
ICT helps students apply what they learn to the real world situation.			
Students use the internet/computer to look for information			
ICT makes students develop interest in the learning content.			
The available ICT resources have helped students improve in academic performance.			

THANK YOU

APPENDIX C

THE IMPACT OF ICT ON STUDENTS' ACADEMIC PERFORMANCE IN SCIENCES IN MUBENDE MUNICIPALITY, MUBENDE DISTRICT.

Administrators' questionnaire:

Dear Respondent,

You have been randomly chosen as respondent in a survey which is being undertaken as part of an educational research in partial fulfillment of the Masters Degree in Education Management and Planning of Nkumba University. Your co-operation in filling this questionnaire will ensure success of the study. Please feel free to give your views on the items by answering all the questions and indicate your choice by putting a tick in the checkbox provided for the answer you feel most appropriate or fill in the gaps by giving reasons or information in relation to particular questions. The information provided is purely confidential and to be used for academic purpose only.

SECTION A

Background Information.

Please provide information regarding yourself by ticking/checking the appropriate box

1. Sex:

(a) Male ☐ (b) Female ☐

2. Age

(a). Below 18 ☐ (d) 41-50 years ☐

(b). 18-30 years ☐ (e) Above 50 ☐

(c). 31-40 years ☐

3. How long have you been teaching/ serving in this secondary school?

(a). Less than 2 years ☐ c). More than 5 years ☐

(b). between 2-5 years ☐

4. What is your designation?

(a). Head teacher ☐ (c). Head of department ☐

(b). Deputy Head teacher ☐

Availability of ICT resources:

5. How do you agree or disagree on the availability of the following ICT tools in your school?

Availability	Available	Fairly Available	Not available
i) Computers/PC in classroom			
ii) Internet & E-mail			
iii) Television set			
iv) Projector			
v) On and off shelf software			
vi) Computer laboratory			
vii) Video conferencing			
viii) Scanner			
ix) Others, specify			

Accessibility of ICT resources:

6. In your own opinion, do you think that these tools are adequate enough for the students? Please rate the adequacy of the following ICT:

Accessibility	**Adequate**	**Fairly Adequate**	**In adequate**
i) Computers/PC in classroom			
ii) Internet & E-mail			
iii) Television set			
iv) Projector			
vi) Computer laboratory			
vi) Scanner			
vii) Others, specify			

7. In your own opinion, what do you regard as the biggest challenge affecting students' accessibility of ICT resources in the teaching and learning process

....

……..

Students' performance:

8. How do you agree or disagree with the following statements

Performance:	Agree	Don't know	Disagree
Students use the computer to complete their work/ exercises.			
ICT allows students to learn independently.			
ICT helps students apply what they learn to the real world situation.			
Students use the internet/computer to look for information			
ICT makes students develop interest in the learning content.			
The available ICT resources have helped students improve in academic performance.			

THANKS