

UNIVERSITY OF EDUCATION, WINNEBA

**ASSESSMENT OF THE AVAILABILITY AND UTILIZATION OF ICT
RESOURCES FOR TEACHING AND LEARNING PURPOSES IN JHS OF
THE EFFUTU MUNICIPALITY**

PRISCILLA AWUNI

POST-GRADUATE DIPLOMA



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PRISCILLA AWUNI

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**A dissertation in the Department of Educational Foundations
Faculty of Educational Studies, submitted to the School of
Graduate Studies, in partial fulfilment of the
requirements for the award of the degree of
Post Graduate Diploma
(Education)
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DECLARATION

Student's Declaration

I, Priscilla Awuni, declare that this dissertation, with the exception of quotations and references contained in published works which have been identified and dully acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:

Date:



Supervisor's Declaration

I hereby declare that the preparation and presentation of this work was supervised by me in accordance with the guidelines for the supervision of dissertation as laid down by the University of Education, Winneba.

Supervisor: Prof. Samuel Asare Amoah

Signature:

Date:

DEDICATION

I dedicate this dissertation to my husband, Dr. Samuel Poatob and my lovely children Jedidiah W. Poatob, Micaiah U. Poatob and Benaiah N. Poatob. You are a sure backbone to me.



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Let me remark here that "if I have seen further, it is by standing on the shoulders of giants." (Isaac Newton, 1675). This is because it has been the help of so many academic giants who have shown me the pathway to this work.

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The comfort of my children would have been sacrificed for this work if not for the ever presence of my mum. My dear mother may you live long to benefit from the sacrifices you have made.

I much appreciate the work done for me by Mr. Solomon Zaagbil, who helped with proof reading of this dissertation.

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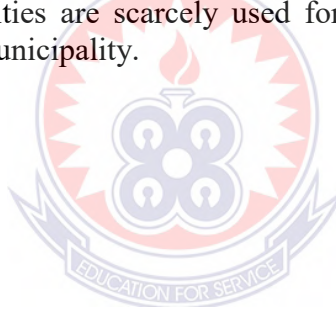
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ABSTRACT

This study examined the availability and usage of ICT for instructional purposes in the Junior High Schools in the Effutu Municipality. The population for the study included all teachers teaching in Junior High Schools in Effutu Municipality. Descriptive survey was the design used for the study. Simple random was used in selecting the schools that participated for the study. A sample size of thirty-one respondents was used for the study. Census was used to include all teachers in the selected schools to form part the study. Findings showed the lack of ICT facilities in Junior High Schools resulting in the inability of teacher to integrate ICT in the teaching and learning process. The findings also showed that most of the teachers do not have the required competencies to integrate ICT in the teaching and learning process. It was therefore, recommended that government and other stakeholders of education aid in the provision of ICT facilities in the Junior High Schools within the Effutu Municipality to make teaching more effective. It also concludes that the schools faced a lack of ICT facilities, internet connectivity, and other ICT facilities. Thus, it is not easy to integrate ICT for instructional purposes. As such, teachers are forced to use traditional teaching and learning approaches. As a result, the lack of ICT facilities and internet access hampered the adoption of ICT in schools. The study also concluded that most teachers in Junior High Schools in Effutu Municipality lack the required competencies to integrate ICT in teaching and learning. The study also concludes that ICT facilities are scarcely used for instructional purposes in Junior High schools in Effutu Municipality.



CHAPTER ONE

INTRODUCTION

1.0 Background to the study

In a society where most work is becoming computer-based, school work cannot resist the change. Recent developments in computer and telecommunications technologies have expanded and enhanced the use of computers in teaching, research and curriculum development (Hefzallah, 1999 cited in Thomas & Emereole, 2002). Indications are that information and communication technology (ICT) with computer as its backbone can bring about a major learning/educational revolution as was caused by the invention of the printing press. According to Seymour Papert (cited in Nikolova, 2001), ICT will have a substantial effect on what we do in the schools just as the advent of the pen and paper did in the past.

A classic example of such a change in the educational sector in Ghana was the 2007 educational reform which resulted in the systematic infusion of ICT that permeated all levels of education, even at the basic school level. This move towards ICT education, even at the grass root level has been spurred on directly by a number of factors, one of which is the Ghana Government's ICT policy. The Government of Ghana has placed a strong emphasis on the role of ICT in contributing to the country's economy (Mangesi, 2007). The country's medium-term development plan captured in the Ghana Poverty Reduction Strategy Paper (GPRS I&II) and the Education Strategic Plan 2003-2015 all suggest the use of ICT as a means of reaching out to the poor in the country. Consequently, the government came up with an ICT in education policy which has the following specific objectives:

1. Facilitate the establishment of the necessary infrastructure needed for the installation of relevant ICT within the Education Sector.
2. Facilitate equitable access to ICT for all students and community
3. Integrate ICT'S into the curriculum
4. Develop Appropriate Content for Open, Distance and e-Learning
5. Provide appropriate ICT training to all teachers
6. Acquire and implement various easily integrated Information Management System
7. Develop institutional capacity in the use of computer-based management tools to enhance administration and management
8. Ensure effective support and maintenance of ICT infrastructure
9. Institute monitoring and evaluation policies and procedures to access the ICT in Education Programme (MOES, 2006).

As part of the drive towards the attainment of these objectives, there was the need to introduce the study of ICT at the basic school level.

Information and Communication Technology (ICT) has become one of the basic building blocks of modern society hence ICT resources are key in effective teaching and learning. However, there seems to be paucity of studies on ICT resources available in public basic schools in general and Junior High Schools particularly in Winneba.

According to Natia and Al-hassan (2015), many teachers and pupils lack the confidence to use ICT and that there is a dearth of qualified personnel to handle ICT in the schools. They maintain that technical know-how and capacities of teachers to use ICT for teaching and research is poor. Other challenges identified were high theft

of computers especially in schools that do not have computer laboratories, lack of harmonisation of efforts by all ICT related NGOs in the delivery of ICT tools to schools in order to avoid duplication of efforts.

The Basic School Computerisation policy was created in 2011 to introduce computers and e-learning into the entire educational system to promote training and life-long learning. The role of the teacher in curriculum implementation cannot be over emphasised. It is the teacher who will have a general guide of topics in a subject field, a sequence among topics, a general set of aims, textbooks, and other instructional resources to effectively organise and plan the curriculum to suit that level and background of the learner in the classroom. This implies that it is very pertinent to ascertain the kind of professional skills teachers hold and their attitude towards teaching a particular subject, especially, ICT (which is an emerging area of study in the basic school curriculum in Ghana).

Many researchers have demonstrated that certain teacher behaviours influence student's achievement. Some of these behaviours may include: teacher self-concept, social relationship, and thinking abilities (Thibeault, 2004; Tyler, 2006). One cannot lose sight of the fact that what teachers do and say in the classroom could affect their teaching and also influence how students perceive a subject, and consequently, their leaning.

Another area of interest worth taking note of in terms of the teacher as a resource in the implementation of the ICT curriculum is teacher empowerment in terms of their acquired content knowledge and skills in teaching ICT. Empowerment is a process whereby school participants develop the competence to take charge of their own

growth and resolve their own problem (Greer & Melvin, 1994, cited in Sekyi-Acquah, 2012).

People usually like to have confidence in themselves that they possess the knowledge and skills required to improve the situation in which they operate. It is therefore necessary to ensure that teachers, who are charged with the responsibility of translating educational plans into action, are confident enough of their own competency.

Research findings clearly indicate that teachers who feel incompetent in their content areas fail to teach those content areas. For example, in a study, Balanskat, Blamire and Kefala (2006) found that limitations in teachers' ICT knowledge makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Becta (2004, p.7) also concluded in their study with the assertion that "many teachers who do not consider themselves to be well skilled in using ICT fell anxious about using it in front of a class of children who perhaps know more than they do".

From the forgoing discussion, one may thus be interesting in the kind of training ICT teachers in the primary schools have acquired and also their preferred modes of training. According to Boser and Daugherty (1994), in order for the technology education profession to move forward, teachers "require updated information on curriculum, methodology, and technology to allow them to make philosophical and programmatic changes that augment technology education" (p. 4). This implies that quality training programmes need to be organised for teachers to augment their knowledge base. This notwithstanding, it is important to ascertain teachers' preferred training methods. Finally, it is of paramount importance to ascertain whether the

relevant material resources required for ensuring the effective implementation of the ICT curriculum are in place. A subject like ICT requires facilities such as computers, internet connectivity, projectors, relevant textbooks and other peripheral devices to be in place to enhance implementation.

In a recent report by the Ghana News Agency (GNA, 2011), Professor Kofi Mereku, Lecturer at University of Education, Winneba made a call on the Ministry of Education to terminate the teaching of ICT as just a core subject in schools, and rather focus on resourcing schools with at least a computer with internet connectivity, as well as build capacity of teachers in academic integration of ICTs to ensure that technology could be used as a means of learning and not what to learn. He made this assertion, based on a research report which revealed that though some basic schools and senior high schools had computers and computer laboratories, most of the equipment had neither been networked nor connected to the internet. He indicated that in some institutions because of lack of plans, a gradual decline in deployment of ICTs was observed, leading to little or no students' hands-on experience during ICT lessons. In identifying some of the factors that hinder the implementation of ICT in education policy in Ghana, Mangesi (2007) in a country report, indicated that Access to ICTs still remains highly inadequate and unevenly distributed through Ghana, with an urban bias.

1.2 Statement of the Problem

Improved basic education is essential to the creation of effective human capacity (Evoh, 2007, cited in Adomi & Kpangban, 2010). In a rapidly changing world, basic education is essential for an individual to be able to access and apply information. Such ability to find information must come from training and use of ICT resources by

our pupils in school (Adomi & Kpangban, 2010). The need for ICT in Ghanaian schools, therefore, cannot be overemphasised. In this technology driven-age, every one requires some level of competence in ICT to survive.

It is, therefore, believed that the teaching of ICT at the basic school level, especially, prepares students to face future development based on proper understanding of issues (Grimus, 2000). Consequently, the government of Ghana, in recognition of this important fact, has called for the inclusion of ICT in the basic school curriculum as part of the implementation of government's ICT in education policy.

However, making a strong case for, and ensuring the inclusion of ICT in the curriculum alone does not guarantee the realisation of government's vision for embarking on ICT education. Examining our schools' environment in Ghana, computer is not part of classroom technology. This implies that the chalkboard and textbook continue to dominate classroom activities in most basic and senior high schools in Ghana in this 21st century. Although efforts have been made to ensure that ICTs are available and used in Ghanaian Junior High Schools, the level of uptake is still low (Buabeng-Andoh & Yidana, 2015). Buabeng-Andoh and Yidana (2015) maintain that students' use of ICT to support their learning was low. This may be attributed to students' low competence level in ICT usage, inadequacy/unavailability of ICT facilities for the teaching of the subject in schools and lack of teachers' knowledge and skill in using ICT tools (Natia & Al-hassan, 2015). A study in 2014 by Al-hassan reported that many schools in Volta, Northern and Upper West schools lacked computer laboratories for performing ICT training and learning; and that many schools do not have the ICT policy document; heads of schools and their teachers were at a loss of what they would do (Al-hassan, 2014).

Though, the government of Ghana, in recognition of the importance of ICT, has called for the inclusion of ICT in the basic school curriculum as part of the implementation of government's ICT in education policy, it appears little studies have been conducted on the availability and usage of ICT facilities for instruction in the Junior High Schools in the Effutu Municipality. This current study is therefore, set out to assess the availability and usage of ICT facilities in Junior High Schools in the Effutu Municipality in the Central Region of Ghana.

1.3 The Purpose of the Study

The prime reason for this study was to examine the availability and usage of ICT facilities Junior High Schools in the Effutu Municipality in the Central Region of Ghana.

1.4 Objectives of the Study

The objectives of this study were to:

1. examine the types of ICT facilities that are available for instructional purposes in Junior High Schools in the Effutu Municipality.
2. examine basic schools teachers' knowledge in the use of ICT resources for teaching and learning.
3. explain the extent to which basic school teachers use the available ICT facilities for teaching and learning.

1.5 Research Questions

The following were there the research questions that guided the study.

1. What type of ICT resources is available in Junior High Schools in Effutu Municipality for instructional purposes?

2. What is the ICT content knowledge of teachers in Junior High schools in Effutu Municipal to integrate ICT in teaching and learning?
3. To what extent do basic school teachers use ICT resources for teaching and learning in the Effutu Municipality?

1.6 Significance of the Study

There is the need for all stakeholders in education to get involved to ensure that Government's ICT policy in the curriculum is effectively implemented. Of particular interest to the researcher is the availability of both the human (in terms of well-trained teachers) and material resources available for implementation of the ICT curriculum at the basic school level. The results of the study will reveal teachers' capacity to use or not to use ICT resources for teaching and learning purposes. This will enable teacher training colleges to see to their ICT course implementation strategies and amend them.

Without the relevant resources, the curriculum might not be implemented in the manner that was originally intended. It is against this background that this research was carried out to find out the status of implementation of the basic school ICT curriculum in terms of the adequacy of both human and material resources required to ensure its effective implementation. So that government can advance funds for furnishing schools without adequate ICT facilities.

1.7 Delimitation of the Study

The study covers only the availability and use of ICT for teaching and learning at the public Junior High Schools in the Effutu Municipality.

1.8 Limitation of the Study

The sample schools covered in this study is small in number; hence results cannot be extended to larger geographical area in Ghana.

1.9 Definition of Terms

ICT Resources and tools: ICT tools refers to the common technology-based tools that are used in schools such as computer, Laptop , LCD, digital photocopy machine, digital Audio and Video devices, digital camera, scanner, DVD player and multimedia projector.

LCD: Liquid- Crystal Display

DVD: Digital Video Disc

1.10 Organisation of the Study

The study is divided into five chapters. Chapter One provides an introduction to the study. It includes the problem of the study, purpose of the study, statement of the problem, objectives, and research questions, significance of the study, delimitations, and limitations. Chapter two deals with literature review on ICT as a tool for teaching and learning. Chapter three deals with methods adopted for study and include study design and sampling procedures, instrumentation and data collection, etc. The fourth chapter treats the results of the study while chapter five discusses summary, conclusions, recommendations and suggestions for further studies.

CHAPTER TWO

REVIEW OF LITERATURE

2.0 Overview

This chapter presents a literature review in relation to the study. The reviewed literature functioned as a guideline for the study. The literature has been discussed under the following subtopics: benefits of using ICT in teaching process, theoretical and conceptual frameworks of the study, the barriers of using ICT in teaching, the factors determining the use of ICT to facilitate teaching.

2.1 Meaning of ICT

The acronym ICT stand for Information and Communication Technology and is defined as a “diverse set of technological tools and resources used to communicate, to create, disseminate, store and manage information (Blurton, 1999, cited in Mafangham, 2016). These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephone. Teaching process is a means through which the teacher, the learner, the curriculum and other variables are organised in a systematic manner to attain pre-determined goals and objectives. Information and Communication Technology is at the very heart of the educational process, consequently ICT-use in education has a long history. Much has been written about the use of film, radio, telephones, and television in education (Mafangha, 2016; Telda, 2012). Because access to digital tools, applications, and networks continues to grow worldwide and media are increasingly available in digital form, use of ICT in education is expected to increase dramatically. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. As described in the United Nations (1999) report ICT cover Internet service provision,

telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities. The various kinds of ICT products available and having relevance to education, are such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes, video and audio tapes and CD ROMs.

According to IMPICT (2012), ICT is the process of gathering, creating, processing, and storage of information by using hardware, software appropriate to use the expression ICT rather than mere information technology which has become the backbone of the new information based global economy (Boni, 2018; Boadu, 2020).

According to Chen (2008), ICT comprises the use of at least a computer and the internet as well as computer hardware and software, networks, and a host of devices that convert information (text, images, sounds, and motion) into general digital formats. Information and Communication Technology (ICT), in this context, represent a new approach for enhancing the dissemination of information and will be used, applied, and incorporating it into learning on the basis of conceptual understanding and from the earliest times when computers were commercially available, they could be found in use in educational institutions, and educators (Fan, 2012) argued that computers should be used to support learning.

2.2 Benefits of Using ICT in the Teaching Process

Several studies from case studies to survey researches have been conducted about the importance of ICT and as why teachers use it. ICT can play various roles in learning and teaching processes. According to Bransford, Brown and Cocking (2000), several studies have reviewed the literature on ICT and learning and have concluded that it has great potential to enhance student achievement and teacher learning. Wong et al., (2006, in Mafagham, 2016) point out that technology can play a crucial part in supporting face-to-face teaching and learning in the classroom. Many researchers and theorists assert that the use of computers can help students to become knowledgeable, reduce the amount of direct instruction given to them, and give teachers an opportunity to help those students with particular needs. According to Gillespie (2006, in Dogan, 2010), new technologies can be used to enable students to collect information and interact with resources, such as images and videos, and to encourage communication and collaboration. BECTA (2004) identify that new technologies may also help to increase student motivation, facilitate clearer thinking, and develop interpretation skills with data. BECTA (2004) indicated that the success of the integration of new technology into education varies from curriculum to curriculum, place to place, and class to class, depending on the ways in which it is applied. Here are a few highlighted benefits of using ICT to facilitate teaching:

Information and Communication Technology (ICT) has become one of the basic building blocks of modern society hence ICT resources are key in effective teaching and learning. One area that has therefore experienced intrusion of ICT is in the field of education, which is strengthening efficiency in teaching, learning and researching.

Information and Communication Technology (ICT) refers to electronic technologies used for receiving, storing, processing and retrieving information. ICT enables learners to access education independent of time and geographical barriers. ICT integration also improves course management, higher order thinking skills, communication skills and supports teaching methodology (Bello, Ahmed, Alabi, Ahmed, Bello & Bello, 2016). Effective integration of ICT in curriculum delivery might concretize abstract topics/ concepts more meaningfully. The use of information and communication technology (ICT) in education encompasses use of the computer system, the internet, telephone and global system of mobile communication (GSM). It also includes e-learning, e-library, video camera, software and hardware applications.

Gholami et al (2010) argue that investments in ICTs not only facilitate economic growth and poverty reduction, but enhance students' academic performance through the use of computers for teaching and learning.

The results of the study by Igboanugo, Igboegwu, Attah and Okonkwo (2020) revealed among others that integrating ICT in teaching method enhances Chemistry curriculum delivery. Based on the findings it was recommended among others that teachers should integrate ICT in teaching methods for effective delivery of the Chemistry curriculum. An earlier study by the International Institute for Communication and Development (2007) indicates that 60% of teaching and learning are directly and positively influenced by the use of ICT, which results in better school performance.

Recognising the importance of ICT in teaching and learning, investments in ICT have been initiated by many governments in both developed and developing countries (Buabeng-Andoh, 2012). For example, the United States of America has since 1989

invested in excess of US\$6billion in the use of ICT for public education (Johnston & Barker, 2012).

Also among the influencing factors for the introduction of ICT at the basic school level is the recognition of the tremendous transformation that ICT has undergone in recent times as a result of the rapid changes in technology, coupled with the effects of globalisation (Asare, 2010). It is again important to note that a perusal of literature clearly suggests that the relevance of the study of ICT in school, especially at the lower levels of education, cannot be over emphasised. For instance, the teaching of ICT at the primary school level prepares pupils to face future development based on proper understanding of issues (Grimus, 2000, in Asare, 2010). Research has also revealed that ICT can motivate students in their learning by bringing variety into the lessons, and at the same time, sustaining teachers' own interest in teaching (Slaouti & Barton, 2007).

The purpose of ICT in education can be grouped into three, namely, teaching purpose, administration purpose and personal purpose (Kellenberger & Hendricks, 2000, in Natia & Al-hassan, 2015). Bhalla (2013) grouped computer technology in education as non-instructional for record keeping, communication between instructors and learners; and pre-instructional purpose for developing teaching materials, researching, teaching, et cetera. A survey by the National Centre for Education Statistics in the United States found that teachers use computers mostly for administration (32%) and pedagogical (36%) purposes to improve overall quality of time for preparing teaching materials, recording students' school attendance, filling students' academic records and delivering students' academic reports to parents online (Rowand, 2000, in Bhalla, 2013). Through the use of ICTs for teaching and learning, there is improved memory

retention, improved problem-solving abilities and improved students' role-playing activities (Forcheri & Molfino, 2000, cited in Natia & Al-hassan, 2015).

Thus, the teacher using ICT in the class will be able to present a well-planned set of lessons and the students will experience these lessons in an exciting environment. Ojo (2005) notes that the misconception that the computer will replace the teacher and thus render them redundant does not arise; all the computer does is to reinforce and enhance the teacher's lessons. ICT can help students to become independent learners capable of developing critical thinking and problems-solving strategies, collaborative works and inquiry. It allows for information searches, computer modelling, teamwork, brain-storming and revision. Teachers can use computers to make learning experiences more effective and to offer students access to a variety of learning tools, expert opinions and alternative viewpoints (Quarshie, 2015).

Idahosa and Ero (2005) states that in computer assisted instruction; lessons production is guided by the learners' knowledge, skills, understanding, expectations as well as motivation. This implies that a computer is an instructor in itself but rather a mere vehicle of instruction. It is a clear secret that the computer not offers powerful features for facilitating learning. Utor and Agbi (2006) identifies telecommunication and teleconferencing as another useful development in ICT where students can sit in their respective classrooms or research centres and partake in teaching without necessarily visiting each other.

ICT play a critical role in socio-economic development because they are being used to achieve sustainable development (Quarshie, 2015). That is, ICT sustains development by enhancing the following:

Improvement of institutional information management, inter-institutional communication, communication between regional or state, cooperation institutions and their organisations thereby facilitating integration. ICT also promotes trade, financial cooperation, agricultural development, educational research, environmental protection, etc.

ICT could also catalyse trans-border data flows bringing down barriers to personal communications and removing the constraints of national boundaries, physical disabilities as well as distance. By providing access to network, ICT reduces the costs of international communication among countries.

2.3 Theoretical Framework of the Study

It is important to isolate the factors underpinning the integration of ICT into teaching and learning. In deriving these factors, several theories can be considered. There are many theories developed by various educators and researchers, namely, the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Technology-Organisation-Environment (TOE) framework, the Theory of Planned Behaviour (TPB), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Technological Pedagogical Content Knowledge (TPACK) framework. However, this study considers the theory of TPACK developed by Mishra and Koehler (2006) as well connected with the issue at stake.

2.4 Technological Pedagogical Content Knowledge Framework

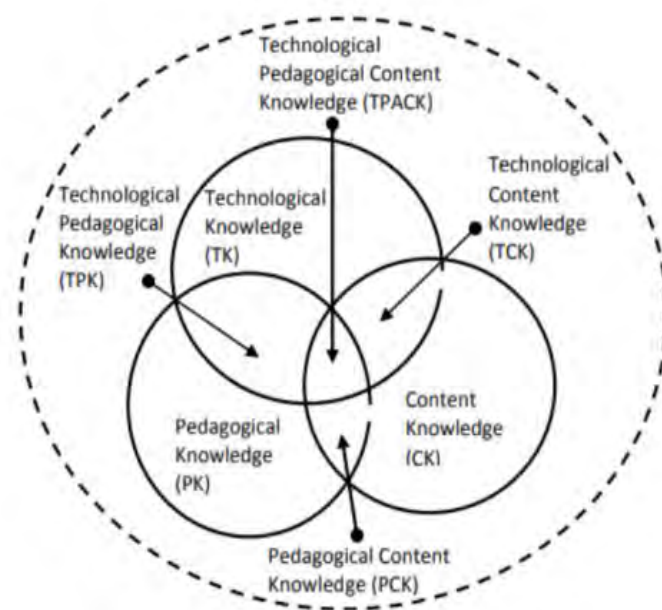
Mishra and Koehler (2006) developed the Technological Pedagogical Content Knowledge (TPACK) framework depicted in Figure 1 below. According to the TPACK framework (Figure 1), Mishra and Koehler posit that a teacher depends on three domains of knowledge for effective integration of ICT into teaching and

learning. These domains are content knowledge (CK), pedagogical knowledge (PK) and technological knowledge (TK). Mishra and Kohler (2006) defined CK as knowledge about the actual subject matter that is to be taught and learned. Mishra and Koehler observed that a teacher must know and understand the subject that he/ she teaches, including knowledge of central facts, concepts, theories, and procedures if the teacher is to integrate technology in teaching.

Mishra and Koehler (2006) defined PK as the deep knowledge about the processes or methods of teaching and learning (e.g. values and aims, classroom management, lesson planning, presentation, and student evaluation).

They argued that a teacher with deep PK is likely to integrate technology in his or her teaching considering how students can best learn in a given classroom context and nature of learners. Mishra and Koehler defined TK as knowledge about standard technologies, such as books, chalkboard, and more advanced technologies such as the Internet and digital video and how to operate those technologies.

Figure 1: The TPACK framework Source: Mishra & Koehler (2006), page 1025.



They asserted that a teacher with TK has good knowledge of operating system and Pedagogical Content Knowledge (PCK), Content Knowledge (CK) Pedagogical Knowledge (PK), Technological Knowledge (TK), Technological Content Knowledge (TCK), Technological Pedagogical Content Knowledge (TPACK), Technological Pedagogical Knowledge (TPK), computer hardware, the ability to use standard sets of software tools (e.g. word processors, spreadsheets, browsers, e-mail) and how to install and remove peripheral devices, install and remove programmes, create and archive documents among others.

Mishra and Kohler (2006) as Figure 1 suggests, observed that the interaction of these three knowledge domains; CK, PK and TK gives rise to three paired knowledge domains namely: pedagogical content knowledge (PCK), technological content knowledge (TCK) and technological pedagogical knowledge (TPK).

Mishra and Kohler defined PCK as the knowledge of pedagogy that is applicable to the teaching of specific content such as knowing what teaching approaches fit content, and likewise, knowing how elements of the content can be arranged for better teaching.

They defined TCK as the knowledge about the manner in which technology and content are reciprocally related. They further asserted that a teacher needs to know not just the subject matter he/ she teaches but also the manner in which the subject matter can be changed by the application of technology.

Mishra and Kohler (2006) defined TPK as knowledge of the existence, components and capabilities of various technologies as they are used in teaching and learning settings and conversely, knowing how teaching might change as the result of using

particular technology. According to Figure 1, TPACK is the intersection of all the three bodies of knowledge (CK, PK & TK). Mishra and Kohler argued that the development of TPACK by teachers is central for effective teaching with technology because understanding TPACK is above and beyond understanding technology, content, or pedagogy in isolation, but rather how these forms of knowledge interact with each other.

2.5 Conceptual Framework of the Study

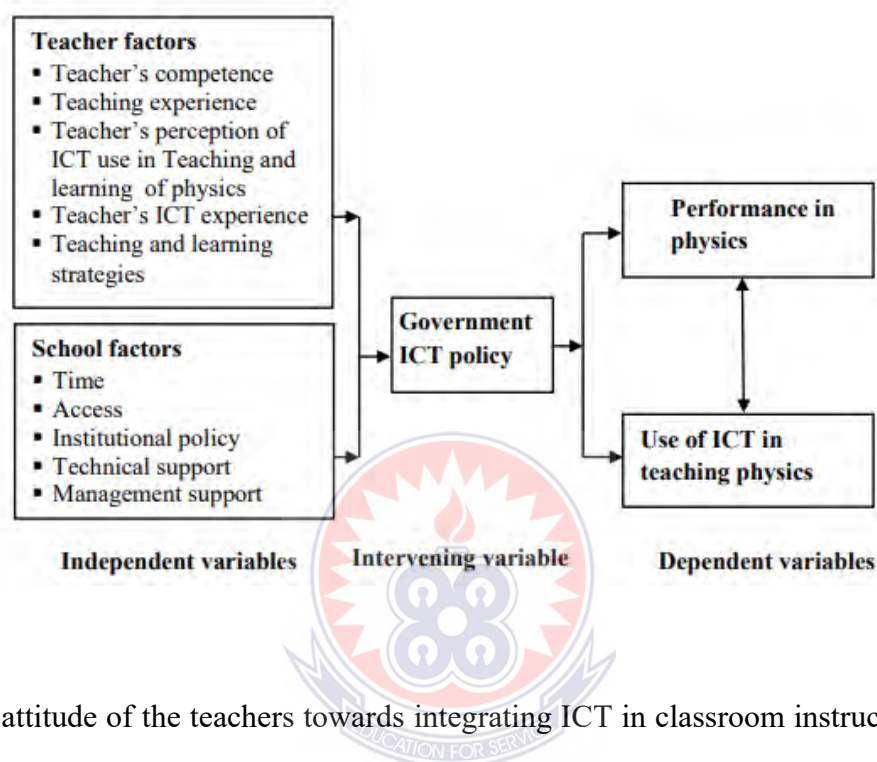
This study isolates teacher and school factors as the main factors that may influence integration of ICT in teaching and learning of school subjects. Teacher related factors are those that directly influence teachers' use of ICT in the teaching-learning process and include: teachers' knowledge and skills in the use of ICT, attitudes of teachers towards using ICT in teaching and teacher's experience, among others.

School factors on the other hand, refer to factors influenced by the institution. They include: support given to teachers by the school management which has a bearing on access to ICT facilities, school ICT policy, technical support in terms of availability of experts, spare parts and software required to keep the ICT tools functioning.

Government policies influence both the adoption of new technologies by the teachers and the schools, which in turn, will affect the extent of integration of ICT in teaching and learning of science subjects. Adoption of ICT in teaching and learning will depend on both the teacher and school factors. For instance, if a teacher has the necessary skills and knowledge on how to integrate ICT in pedagogical practice, then he or she will be willing to try out this innovation and with time, he or she becomes confident in using ICT in teaching. Moreover, the teacher's pedagogical beliefs will influence the teaching strategy adopted when teaching a given lesson. Figure 2

summarises the conceptual framework for this study. It is adapted from Maithya and Ndebu (2011).

Figure 2: Conceptual Framework of the Study. Adapted from Maithya R. and Ndebu S. (2011)



The attitude of the teachers towards integrating ICT in classroom instruction could be influenced by the level of support by the school management. This study investigated how teacher and school related factors influence the use of ICT in the teaching and learning at the JHS level in the Effutu Municipal schools.

In summary, Teacher factors include teacher's competence, teaching experience, and teacher's perception of ICT use in teaching and learning, teacher's ICT experience, teaching and learning strategies. These together with school and environmental factors such as Time, Access, Institutional policy, Technical support, and Management support influence Government ICT policy for education and subsequently the Use of ICT in teaching and Performance in examinations or subjects taught.

Teacher and school factors together form the Independent variables, government ICT policy is the intervening variable, while teachers' actual use of ICT and students' performance form the Dependent variables.

2.6 Challenges to the use of ICT in education

A challenge is anything that retards the progress or achievement of any set objective or aim. It therefore means that the removal of one or more of these challenges or barriers such as the ones in ICT integration should assist perhaps significantly advance the process of integration. Computer integration in the classroom is the application of technology to assist, enhance, and extend student knowledge (Omwenga, 2004). Using ICT in education means more than simply teaching learners how to use computers. Technology is a means for improving education and not an end in itself. Muriithi (2005) has argued that in Kenya, like most developing countries ICT usage is still limited to computer literacy training. A study conducted by Organization for Economic Cooperation Development (OECD) in 2009 and cited in Rodden (2010) confirmed that there are a number of barriers or challenges in the use of ICT in education. These barriers included an inconsistent number of computers to students, a deficit in maintenance and technical assistance and finally, a lack of computer skills and/or knowledge among teachers (OECD, 2009). Jenson et al (2002) classified these barriers as: limited equipment, inadequate skills, minimal support, time constraints and lack of interest or knowledge by teachers. In a research report conducted by British Educational Communications and Technology Agency (BECTA) in 2004, a number of other important barriers were identified. These were: lack of confidence, accessibility, lack of time, fear of change, poor appreciation of the benefits of ICT and age. Ertmer (1999) concurs with Schoepp (2005), asserting that if teachers are aware of and understand such barriers, they can initiate strategies to

overcome them. According to Iddrisu (2009) although valuable lessons may be learned from best practices around the world, there is no one formula for determining the optimal level of ICT integration in the educational system. Significant challenges that policymakers and planners, educators, education administrators, and other stakeholders need to consider include (i) Educational policy and planning, (ii) Infrastructure, (iii) Language and content, (iv) Capacity building, and (v) Financing.

Research has classified these barriers in different ways. Several studies have divided the barriers into two categories: extrinsic and intrinsic. However, what was meant by extrinsic and intrinsic, differed among studies. In one such study, Ertmer (1999) referred to extrinsic barriers as first order barriers citing as examples: lack of time, support, resources and training. She referred to intrinsic barriers as second order barriers, citing as examples: attitudes, beliefs, practices and resistance to change. Balanskat et al (2006) classified barriers as ‘micro level’ (teacher attitude) and ‘meso level’ (institutional). He added a third category called ‘macro level’, to account for the wider educational system. Meanwhile, Pelgrum (2001) identified material barriers as a lack of real or physical equipment and non-material barriers as somewhat intangible entities such as lack of knowledge, confidence or time. The challenges that confront the successful integration of ICT into education will be looked at from two major angles. This approach which was adopted from what the British Educational Communications and Technology Agency (BECTA) used in 2003 will firstly look at the barriers from the teachers’ perspective. The second will consider the barriers that confront the school itself.

2.7 Factors that affect ICT integration in the teaching-learning process

Teachers need to learn and know how to use technologies in their teaching. Hence, teachers' training needs also increase as the result of these new technologies. Mishra and Koehler (2006, in Kennah, 2016) posited that "merely knowing how to use technology is not the same as knowing how to teach with it" and revealed that many teachers do not know the pedagogical use of ICT. It is therefore extremely important that teachers update their knowledge and skills in order to better observe and understand innovative uses of technology (Cox, 2008). Of paramount importance is teachers' attitude towards ICT. Gressard and Loyd (1985, in Ndibalema, 2014) explained that for the fruitful execution of ICT in education, teacher's attitude toward computers and other technologies is a key factor. Further it was asserted that some teachers' unwanted attitude towards use of ICT in teaching and learning consequently hinders its integration in TLP. However, Ndibalema (2014) noted that there is resistance by some teachers to impart classroom instructions to students with the help of ICT. They resist change by clinging to traditional methods of teaching; they don't see any relevance in the usage of ICT. As such, integration of ICT can only be possible if teachers have positive attitude towards the use of technology in TLP. In support of this assertion, Chin and Hortin (1994, in Tambunan, 2014) stressed that teachers should act as change agents with respect to technology and students because teachers are more likely to implement the proposed changes relating to ICT in education. Further, reliability of the ICT itself is another eminent barrier. According to Chizmar and Williams (2001), Butler and Sellbom (2002), reliability of ICT includes hardware failures, outdated and incompatible software and issues of slow or poor connectivity of internet. Nevertheless, there is great evidence in literature which shows that ICT impacts positively on teacher effectiveness; hence the integration of

ICT in teaching and learning processes should be encouraged despite certain limitations that are temporary and addressable.

2.8 Factors affecting Teachers' Successful Adoption and Implementation of ICT in Teaching and Learning

Factors that serve as challenges to teachers' being in-effective in the use of ICT for teaching and learning are many and varied and include the following:

2.8.1 Institution related barriers

The environment or conditions prevailing in the various institutions or schools can also be a factor that will inhibit the integration of ICT into the learning and teaching process. These conditions can be varied depending on where the school is located and the class or category of the school. Some of these include but not limited to the following: (i) Technical problems and shortage of computers in laboratory, (ii) Lack of detailed planned into how ICT can be used to enhance the teaching and learning, (iii) Timetable difficulties and (iv) Willingness of school authorities to provide the needed funds when the need arises.

(i). Technical problems and shortage of computers in laboratory (ICT infrastructure in place)

It is important to acknowledge that ICT can have technical problems and contingency planning is necessary to ensure alternative strategies are in place. Where the infrastructure and the platform for the application are unreliable, the output may be affected and this can adversely affect student motivation. As computers are becoming more sophisticated and the range of software used by schools continues to increase, the schools must recognize the need to employ more and highly qualified technical

staff. However, with pressure on budgets and competition from the commercial sector for the best staff, it is becoming increasingly difficult for schools to attract enough funds to purchase ICT equipment.

(ii). Lack of Accessibility to ICT resources

Lack of access to computers /lack of computers/lack of adequate materials /insufficient numbers of computers /insufficient peripherals/insufficient number of copies of software /insufficient simultaneous internet access /oldness or slowness of ICT systems /scarcity of educational software/lack of hardware /insufficient computer resources /lack of appropriate infrastructure /lack of appropriate material resources /insufficient ICT resources in schools /insufficient time to review software /resources /lack of computer availability /lack of equipment /unreliability of equipment.

2.8.2 Teachers' knowledge and use of ICT for teaching and learning

The incorporating of Information and Communication Technologies can help revitalise teachers and students. This can help to improve and develop the quality of education by providing curricular support in perceived difficult subject areas (Fan & Ho, 2012). To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies which would include, teaching partnerships with ICT as a tool (Goyal, 2019).

Teachers' attitudes are major predictors of the use of new technologies in instructional settings (Idoko & Ademu, 2010). Teachers' attitude toward ICT shapes not only their own ICT experiences, but also the experiences of the students they teach.

According to Inan and Lowther (2010), three conditions are necessary for teachers to introduce ICT into their classrooms; teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. Afful-Dadzie (2010) reached similar conclusions in their research study: “Training efforts are generally welcomed by teachers but consistent support and extensive training is necessary in order for them to consider themselves able to integrate ICT in their teaching methodologies.” According to Amengor (2011), one of the major factors affecting people’s attitude toward a new technology is related to the features of the technology itself. Rogers’ points out five basic features of technology that affect its acceptance and subsequent adoption: relative advantage, compatibility, complexity, and observability.

Thus, a new technology will be increasingly diffused if potential adopters perceive that the innovation: (a) has an advantage over previous innovations; (b) is compatible with existing practices; (c) is not complex to understand and use; (d) shows observable results and (e) can be experimented with on a limited basis before adoption.

Preparing students for real life in our technological and diverse world requires that teachers embed ICT in significant learning experiences (Braun & Kraft, 1995). However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Ampofo, 2019). Jones and Cowie (2010) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Amenyedzi, Lartey and Dzomeka (2011)

concludes that the benefits of ICT will be gained, “when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT.” As a consequence, the use of ICT will not only enhance learning environments but will also prepare the next generation for their future lives and careers (Chen, 2008).

The development of ICT itself dictates that in order for teachers and students to adjust to modern society and the global economy, the way in which teachers teach and students want to be taught requires modifications to and around ICT. Kok (2007, in Dei De-Graft, 2018) observed that though many teachers are comfortable with the emergence of technology in general, they still cannot be ready or capable to integrate these technology into their classrooms.

Kok noted that the problem of information technology illiteracy was a serious one among teachers. That is, many teachers did not have basic computer appreciation skills and noted that the problem was a hindrance to efforts at achieving the use of computers for educational purposes in schools.

The same conditions can be said of Ghana as established by Quarshie (2015). In Ghana, the state of ICT facilities, and the lack of adequate ICT text books affect effective teaching and learning.

2.9 Teacher related barriers

The researcher is of the view that the teacher (s) is/are the principal actors or stakeholders in the learning process. This belief of the researcher is affirmed by the view of Baylor and Ritchies (2002) who posited that teacher related issues were crucial in determining ICT use in the classroom. Again Gressard and Loyd (1985)

asserted that teacher's attitude towards ICT is one of the key factors which determined successful integration, while Jegede (2008) recognises the teacher as a key instigator in fostering ICT integration in education. From the above it is clear that the teacher is one key determinant factor among the others factors in the integration of ICT. It therefore implies from the above that the barriers of integration with relation to teachers can have a negative impact on the whole integration process. The following sessions will look at some of the teacher related challenges or barriers.

2.9.1 Lack of Teacher Competence

Lack of technological competence /lack of ICT skills/lack of knowledge and skills /lack of teaching experience with ICT /lack of ICT specialist teachers to teach students computer skills /lack of skills on ICT tools and software /lack of qualified ICT coordinators to assist teachers.

According to Bingimlas (2009) teacher competence refers primarily to the ability to integrate ICT into pedagogical practice. Lack of knowledge/competence is regarded as a significant teacher related barrier to ICT integration. A teacher's lack of knowledge serves as a considerable challenge to the use of computers in teaching methods and practices. Tezci (2009) as cited in Roden (2010) posits that if teachers have a high level of ICT knowledge, then there will be a higher level of ICT use in education. These barriers according to some researchers vary from country to country. Pelgrum (2001) found that lack of knowledge/competence in technology, among teachers in developing nations, is the primary obstacle to the uptake of ICT in education.

2.9.2 Lack of confidence in using technology

Research findings have indicated that lack of teachers' confidence prevents teachers from using ICT in their teaching (Peeraer & Van Petegem, 2011). In the same vein, Snoeyink and Ertmer (2002) have lack of computers, lack of quality software, lack of time, technical problems, teachers' attitudes towards computers, poor funding, lack of teacher confidence, resistance to change, poor administrative support, lack of computer skill, poor fit of curriculum, scheduling difficulties, poor training opportunities, and lack of vision as to how to integrate ICT into classroom instruction.

Numerous studies carried out posit that the lack of confidence prevents teachers from using ICTs. According to a BECTA reports in 2004, many teachers who are unskilled in ICT are not prepared to use them in the classroom or in front of students who might probably know more than them. This lack of confidence is further deepened with the expectation of students on the competence of the teacher in the use of ICTs. This is so because students are of the view that their teachers know more than them and with this at the back of the mind of the teacher if he/she is even having a fair knowledge about ICTs will not be willing to go and disgrace himself before the students. The lack of confidence in the use of ICTs is in most instances accounted for by the inconsistency between training and usage. This is so because most teachers even if they have received training in the use of ICTs can still fail to integrate it into teaching. BECTA report 2004 says that the lack of confidence is linked to other barriers affecting the use of ICT in education. The report mentioned the fear of ICT as a factor that can compromise the level of confidence. Other factors that were mentioned included the lack of technical assistance which can lead to low confidence levels, lack of competence and the

quality of training received. According to Jegede et al (2007) as teachers become more appreciative of the use of ICTs as a pedagogical aid, attitudes and interest become positive. The rationale therefore, is that increased interest fosters commitment to honing skills and thereby boosting competence levels. Beggs (2000) posits that fear of failure is a possible cause of lack of confidence whereas Balanskat et al (2006) said the limitation in the knowledge base of the teacher in ICTs use make them feel anxious about using it and thus not confident to use it in teaching. Some researchers are also of the view that the lack of confidence and experience with the use of technology influences the motivation of teachers in the use of ICTs. Cox et al (1999a) found that teachers who have confidence in using ICT, identify that technologies are helpful in their teaching and personal work and that they need to use them more frequently. From the above it can be concluded that when most of the barriers to the use of ICTs in education is removed many of the problems associated with lack of confidence will be resolved.

2.9.3 Fear of use of technology

Computer anxiety or fear is a key barrier, limiting or preventing the use of ICT by teachers. Underlying these anxieties are a fear of humiliation when using computers and a fear of losing professional status through the downgrading of traditional teaching skills. According to a BECTAs (2004) report, teachers who admitted to a lack of confidence ascribe this lack of confidence primarily to fear. According to several reports some teachers have the fear that computers might challenge or compromise their vocation by downgrading their role. The researcher is of the opinion that if teachers are trained in ICT and ICT integration, they should realise, that rather than downgrading pedagogical skills, ICT aims to enhance those skills, in the same way it aims to enhance the learning process and skills acquisition.

2.9.4 Lack of training in ICT

A full and complete integration of the use ICT in education requires high quality frequent training and professional development. If this training is not provided, then attempts at integration will inevitably be unsuccessful. This is significant, as according to most researchers another barrier that is frequently cited, is the lack of effective training. A study by Pelgrum in 2001 revealed that there were not enough training opportunities for teachers in the use of ICTs in the classroom. The training of teachers in the integration of ICT in the learning and teaching process as cited in Rodden (2010) is a difficult one. This is so because it involves a number of complex factors in order to render the training effective. These complex factors include finding the time for training, training in pedagogy, skills training and the use of ICT in the teacher's initial training (Bingimlas, 2009). BECTA (2004) concurs, asserting that training is particularly complex, because it is important to consider several components to ensure the effectiveness of the training. A similar study conducted by Cox et al (1999) argues that ICT training for teachers needs to incorporate pedagogical aspects. This study concluded that when teachers received basic ICT training without considering the pedagogical aspects of ICT, they still did not know how to use ICT in class. Schoepp (2005) maintains that if new technology is going to be integrated into education, teachers should receive training on how to use the specific ICTs, while Trotter (1999) concludes that training in ICT integration must be preceded by and supplemented with basic skills training. Research by Gomes (2005) also concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom and lack of training concerning the use of technologies in specific subject areas, were obstacles to the use of new technologies in classroom practice. Cox et al (1999) again assert that if teachers are to be convinced

of the value in using ICT in their teaching, their training should focus on pedagogical issues. This in the view of the researcher is due to the fact that even after teachers had attended professional development courses in ICT, they still do not know how to effectively use ICT in their classrooms. This was because too much emphasis was placed on acquiring technical ICT skills during training, as opposed to skills in how to incorporate ICT into the curriculum. Some studies as cited in Rodden (2010) assert that attention must be given to both skills training and pedagogical training (BECTA, 2004; Schoepp 2005). According to Newhouse (2002), some training is still needed for teachers to develop appropriate skills, knowledge and attitudes, regarding the effective use of computers to support learning by their students. He argued that this also requires continuing professional development, to maintain these appropriate skills and knowledge. According to Osborne and Hennessy (2003) when there are new tools and approaches in education, teacher training is essential if they are to integrate them into their teaching. In conclusion the researcher is of the opinion that enough training can address some of the barriers in the integration of the use of ICTs in the teaching and learning process. This is so because acquiring the necessary skills will enhance their knowledge base and competence because acquiring the necessary skills will enhance their knowledge base and competence and by extension the level of confidence. The result of this is that it would in the long run reduce the fear of ICT and the anxieties related to student expectations and perceptions.

2.9.5 Extent of Previous ICT Experience

Poor previous ICT experience among teachers can clearly be regarded as a very real barrier to ICT integration in the classroom. Drent and Meelissen (2008, in Adebic-Caesar, 2012) posits that solid experience in the use of ICT and the changes related to ICT, support the development of a learner centered pedagogical practice, while

Becker (1994a) views substantial previous computer use by teachers, as one of the key determinants, in his classification of teachers, as either ‘exemplary computer-using’ or ‘non-exemplary computer-using’.

2.9.6 Difficulty in changing teaching method (pedagogy)

Teachers have to accept that the widespread use of ICT in schools is having an impact on teaching methods and requires a significant rethinking of approach. Becker (2000) describes two main teaching methods and their effects on the ways in which ICT is used in lessons. Traditional transmission institution assumes that students will learn through teacher explanation or reading from texts. Skills are learnt through practicing skill in a sequence prescribed by the teacher. Constructivist institutions assume that understanding comes from relating new ideas to the learners’ prior beliefs skills acquisition comes in as unstructured way as new skills are used as required to solve practical problems. In conclusion one could deduced that using ICT in lessons, the constructivist approach is more likely to lead successful out comes. Furthermore, teachers with the most constructivist philosophies tend to use computers more often and in a more challenging way both in classroom and as users themselves.

2.9.7 Teachers’ hesitancy in integrating ICT in teaching

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

The study conducted by Hennessy et al. (2010) also indicated that teachers' attitudes, expertise, lack of autonomy, and lack of knowledge to evaluate the use of and role of ICT in teaching (technophobia in teachers) are the prominent factors hindering teachers' readiness and confidence in using ICT support.

2.9.8 Age of the teacher

The researcher's personal observation has it that the age of an individual is a factor in the persons quest to adapt to changes, more especially in the areas of technology. It is against this backdrop that this literature is being reviewed to find out the view of other researchers. Kumar et al (2008) posited in his study with some teachers that age is a significant factor to the use of ICT. The researcher concurs with this but believes that the age factor in relation to the use of ICTs is not only peculiar to teachers in the classroom but also permeates all spheres of life. Young (2009) as cited in Rodden (2010) asserts that younger less experienced teachers use computers more, because they are more likely to be computer fluent, had more technologically rich teacher training and are less likely to be limited by previous habits, perceptions or attitudes, than older teachers. Lee (1997) points out that many older teachers have not had any computer education when training and as a result are in need of training to allow them to make use of computers in their work. Cavas et al (2009) revealed that there is a relationship between teacher's age and their computer attitudes. Another study by Korte and Husing (2007) conclude that younger teachers appear to be less skeptical about the benefits of ICT in learning. xliii A report by the European Commission in 2002 and cited in Rodden (2010) found that age is a factor in the use of computers and the internet, arguing that the percentage of teachers using computers falls as their age increases, although the report acknowledged that the importance of this factor is declining. Bradley and Russell (1997) again cited in Rodden (2010) point out that,

although computer anxiety may increase with age, this does not mean that training or professional development should be specifically targeted at older teachers. They strongly dispute the notion that because computer anxiety may increase with age, younger teachers are unlikely to need training in ICT. Despite this, a substantial body of research literature strongly argues that age has no bearing on the use of ICT by teachers (Al-Senaidi et al 2009; Lau & Sim, 2008).

2.10 Summary of the Literature Review

In this chapter, attempts were made to learn from the literature, theoretical and empirical knowledge for several issues concerning this study. The review of literature revealed issues like, teachers attitudes, teacher competence and confidence, accessibility, inadequate ICT infrastructures, lack of technical support and lack of effective training as the barriers that hinders the use of ICT to facilitate teaching. Furthermore, the review of literature identified issues such as individual interactivity, delivery of education resources, and access to global knowledge base and facilitates interaction with education resources as the benefits of using ICT to facilitate teaching. In addition to that issues such as positive attitude towards ICT, competence in ICT use, computer self-efficacy, teacher' working experience, professional development, accessibility, and availability of technical support were identified as the factors influencing the effective use of ICT to facilitate teaching in schools. Thus, this study emanates from the thirst of the researcher to explore the availability and teachers' use of ICT resources to facilitate teaching and learning in selected JHSs in the Effutu Municipal schools in the Central Region of Ghana.

CHAPTER THREE

METHODOLOGY

3.0. Overview

In this chapter, the research design, population and sampling procedures, instrumentation, procedure for data collection, data analysis and ethical issues have been discussed.

3.1. Research design

According to Nconco (2006) research design is a draft or detailed plan for how a research study is to be conducted-operationalising variables so that they can be measured, selecting a sample of interest to study; collecting data to be used as a basis for testing hypothesis, and analyzing results.

Given the nature of the research problem and purpose of the present study, the most appropriate research design is the descriptive survey. According to Busha and Harter (1980, cited in Antwi, 2015), survey research is capable of collecting background information and hard-to-find data and the researcher would not have the opportunity to motivate or influence respondents' responses. Best and Khan (2006) assert that descriptive research attempts to describe systematically a situation, problem, phenomenon, service or program, or provides information or describes attitudes towards an issue. The design was selected because the nature of the problem under study demands wider description and detailed analysis of existing phenomenon with the intent of employing data to justify current condition.

3.2 Population of the Study

Population is made up of all the individual or items of interest under consideration. The population of the study consisted of all public junior high schools in the Effutu Municipality. In all, there were nine (9) public Junior High Schools in the Municipality at the time of the study.

For this study the target population was made up of all teachers in the nine Junior High schools in the Effutu Municipality. The accessible population however, was made up of all teachers in four Junior High Schools within the Effutu Municipality.

3.3. Sample and Sampling procedure

Sampling is a procedure of selecting a part of a population on which a research or study can be conducted. These samples are normally supposed to be selected in such a way that conclusions or inferences drawn from the study can be generalised for the entire population. Since it was difficult for the researcher to reach out to all the nine Junior High Schools within the Effutu Municipality due to the brevity of the time of the programme amid scarce financial resources available to the researcher, simple random sampling technique was used to select four Junior High Schools out of the nine.

All teachers in the four selected Junior High Schools, that is, Methodist B Junior High School, South University Practice Junior High School, Anglican Junior High school, and AM E Zion Junior High School were to participate in the study. However, on the day the researcher visited the schools and distributed the questionnaires, a total of forty (40) teachers were present of which the questionnaires were administered to. Out of the forty, only thirty-one (31) willingly responded and returned the questionnaires. A total of thirty-one respondents therefore form the actual sample for the study. This

means that in terms of selecting respondents from the four randomly selected Junior High Schools, the sampling procedure was nothing but census.

3.5. Instruments

Questionnaire was the main instrument used in gathering data from the respondents. The questionnaire elicited information on the availability and utilisation of Information and Communication Technology. The questionnaire had two sections (A & B). Section A dealt with the Bio-data of teachers which included their age, sex, qualification, and teaching experience, among others. Section B dealt with the ICT facilities or resources that were available in the schools, Teachers' knowledge in integrating ICT in teaching, and the usage of such facilities by teachers, etc. The design was a four type Likert scale in a form strongly agree (SA = 5), Agree (A= 4), undecided (UD = 3), disagree (D = 2) and strongly disagree (SD = 1). Negatively worded items were reversely scored.

3.6. Validity and reliability of the instruments.

These instruments were face, content and construct validated by experts in research and finally by my co-supervisor and supervisor. Their suggestions were used to edit the instruments which made them good for use. The overall internal consistency reliability co-efficient index obtained for the questionnaire through Cronbach Alpha method was 0.77.

3.7. Data collection procedure

A letter seeking for permission to visit and collect data from schools was obtained from the Graduate Coordinator of the Faculty and presented to the Municipal Director of Education for Effutu Municipality to be allowed into their JHS schools to conduct the study. Permission was granted in October 2021.

The same letter was given to the heads of the JHSs who gave permission for the study to be conducted. The teachers were given out the questionnaire on the first day of visit and it was collected from them the following day.

3.8. Data analysis

Quantitative data was analysed by entering the data into SPSS version 23 and descriptive statistics such as means and standard deviations generated, interpreted and adequately discussed.

3.9. Ethical issues

Participants were assured of their safety and that any information given was for the purpose of academic discourse and will not be subjected to any discussion outside the study. Biographical information also did not ask for identification of individuals by names. Confidentiality of respondents was therefore, assured. Introductory letters from the department to GES director and from the director to the various schools of interest also solidified the trust in the researcher.

CHAPTER FOUR

RESULTS

4.0 Overview

The results of the study are presented in this chapter. The section presents the descriptive (arithmetic mean and standard deviation, skewness, and kurtosis) analysis of the data. A total of thirty-one complete responses were retrieved from the respondents. A sample size of this magnitude is good for data analysis (Muah, Adu, Kyei-Frimpong, & Boakye, 2021). The following sub-sections of the study concentrate on the interpretation and discussion of results based on statistical evidence and literature on the study objectives.

4.1 Demographic Characteristics of Participants

This section of the study presents the analysis of the profile of the respondents sampled for the survey. The biographic data reflects the profile of the respondents in terms of their gender, age, educational qualification, rank, and the number of years served by the respondents. Table 1 presents the demographic data of participants. From Table 1, it can be seen that out of the total valid responses used for the analysis, sixteen (16) respondents were male teachers accounting for 51.60% while the remaining fifteen (15) respondents were female teachers, representing 48.40%. It can be concluded that more male teachers participated in the study than female teachers. It can also be seen that the ages of the teachers range from “21-30 years” to “51 years and above”. With which the most frequent age range was those within the age bracket of 31-40 years with a frequency of eleven (11) representing 35.5% of the total sample under study as indicated in the table below.

4.1.1 Biography of participants

Table 1: Demographic Characteristics of Respondents

	Frequency	Percentage
Gender		
Male	16	51.60
Female	15	48.40
Age		
21 to 30 years	8	25.80
31 to 41 years	11	35.50
41 to 50 years	8	25.80
51 years or older	4	12.90
Educational Qualification		
Diploma	4	12.90
Bachelor's Degree	24	77.40
Master's Degree	3	9.70
Number of Years Served		
5 years and below	8	25.80
6-10 years	7	22.60
16-20 years	9	29.00
21-25 years	3	9.70
26 years and above	4	12.90

Source: Field Study (2021)

This shows that most of the employees who participated in this study fell within the age bracket of 31 years and 40 years. The age bracket of 41-50 and 21-30 both had a frequency of eight (8) representing 25.80%. Followed by those within the age bracket of 51 years and above, with a frequency of four (4) representing 12.90 % of the respondents sampled for this study.

Concerning the educational qualification of the respondents sampled for this particular study, the results revealed that the majority of the teachers who took part in this study were bachelor degree holders with a frequency of twenty-four (24) representing 77.40%. This was followed by four (4) respondents with a percentage of 12.9 who were diploma holders and finally, three (3) respondents representing 9.70% who were master's degree holders.

Finally, the results as revealed in Table 1 shows that the majority of the respondents sampled for this particular study, nine (9) representing 29% have served as teachers between 16 to 20 years. This was followed by 28.50% represented by 8 respondents who have served for between 1 to 5 years. Also, 22.60% representing 7 respondents have served between 6 to 10 years. Four (4) respondents representing 12.90% have served for 26 years and above and lastly, three (3) respondents representing 9.7 0% of the respondents sampled for the study have served for between 21 to 25 years. It should however be noted that the year range of 11 to 15 was erroneously excluded from the instrument during the data collection, therefore, teachers whose years of service falls within this range could not be captured correctly.

4.2 Available ICT Resources at the Basic School Level

Research question One (1): What type of ICT resources are available for teaching and learning at the Junior High Schools in the Effutu Municipality?

This question was asked to ascertain the type of ICT resources that were available at the Junior High schools for teaching and learning in Effutu Municipality. Given the availability of ICT resources, the standard deviation and mean score were used for the analysis since they were deemed appropriate in this context of the study. The mean score with standard deviation were used for analysis as they are appropriate for

ranking. A mean score, for instance, provides the arithmetic average of a set of given numbers whereas a standard deviation is a formal measure of central tendency which determines how deviated some values are from the mean. It also determines how dispersed or identical values of the mean are. According to Cohen (1988) and Creswell (2014), the higher the mean score, the higher it explains a particular phenomenon. The result of the mean scores was discussed with 1 to 2 indicating disagreement, 3 indicates indifference (undecided) while 4 to 5 indicates agreement of the availability of the resources as presented in Table 2 below.

Table 2: Availability of ICT Resources in Basic Schools in Effutu Municipality

	Mean	SD	Interpretation
There are Computers in my schools for instructional purposes	2.14	.80	Disagree
There are projectors in my school to aid in teaching and learning	1.14	.31	Strongly disagree
There is internet connectivity in my school to aid in research and instruction	1.14	.31	Strongly Disagree
The availability of other ICT facilities in your school	1.33	.47	Strongly Disagree
The availability of man power in relation to IT in your school	2.27	1.01	Disagree

Source: Field Study (2021)

The results as presented in Table 2 indicate that there were inadequate ICT resources in the Junior High Schools in the Effutu Municipality. Among these, unavailability of other ICT facilities had the least mean with standard deviation (Mean=1.33; SD=.47).

This in essence means that all the teachers sampled for the study were of the view that other ICT facilities besides computers were not available in their schools. This implies that conducting lessons using basic electronics become challenging. Undoubtedly, this reduced their enthusiasm for integrating ICT in their daily teaching and learning activities. Also, they strongly disagree with the availability of internet services for academic purposes in their schools. This is because the result had a small mean of (Mean=1.44; SD=.31). This implies that it could hinder the use of web-based resources in teaching.

The same is the case of the availability of computers (Mean=2.14; SD=.80). This presupposes that all the teachers sampled for the study disagreed that computers were available for use in teaching and learning. This implies that when computers are not available, computer assisted instructions and other reformed pedagogical strategies that depend on the use of computers are invariably not an option. Similarly, the responses of the respondent showed that projectors were unavailable for use in the Junior High Schools. Their responses gave a mean of 1.14 with a standard deviation of 0.31. This in effect showed that teachers in the Junior High Schools in the Effutu Municipality do not have access to projectors for classroom instruction. Finally, the result of the study also revealed that the teachers sampled for the study disagreed that there is man power in relation to IT in schools (Mean=2.27; SD=1.01).

4.3 Basic School Teachers' Knowledge in the Use of ICT

Research Question two (2): Do teachers in Junior High Schools in the Effutu municipality have the required content knowledge to facilitate the teaching and learning of ICT?

This question is based on the second research objective concerning an examination of basic schools' teachers' knowledge in the use of ICT resources for teaching and learning. The results obtained from participants are presented in Table 3.

Table3: Teachers' Knowledge in the Use of ICT for teaching

	Mean	SD	Interpretation
I have received any ICT training /workshop after your school	1.32	.79	Strongly disagree
I have enough basic computer operating skills to utilize computer and computer related technologies in teaching and learning process.	1.29	.78	Strongly disagree
I have adequate knowledge on how to use a projector for instructional purposes	1.14	.76	Strongly disagree
I can confidently prepare power point for presentation in class.	1.29	.78	Strongly disagree
I have what it takes to search for information from the internet for instructional purposes	1.32	.79	Strongly disagree
I can use the excel sheet to store data of students' performances and retrieve anytime I need them	1.14	.76	Strongly disagree
I can use the computer to make learning more exciting and meaningful to learners.	1.32	.79	Strongly disagree

Source: Field Study (2021)

As seen in table 3 above, analysis of data on research question two reveals the level of competences with which they have in using ICT for instructional purposes. Research findings suggest that majority of the respondents have not received any ICT training / workshop after their training programmes (M=1.32, std.= .79). It is also revealed from the study that majority of the respondents do not have enough basic computer operating skills to utilize computer and computer related technologies in teaching and learning process (M=1.29, std.=.78). Again, the study showed that majority of the respondents do not have adequate knowledge on how to use a projector for instructional purposes (M=1.14, std.=.76). In addition, the findings revealed that majority of the respondents cannot confidently prepare power point for presentation in class (M=1.29, std.=.78). The study also revealed that majority of the respondents do not have what it takes to search for information from the internet for instructional purposes (M=1.32, std.=.79). Similarly, the study revealed that majority of the respondents do not have the expertise to use the excel sheet to store data of students' performances and retrieve anytime I need them (M=1.14, std.=.76). In the same manner, the study revealed that majority of the respondents cannot use the computer to make learning more exciting and meaningful (M=1.32, std.=.79).

This is not surprising because the unavailability of the ICT equipment will not give room for any kind of training. In addition, most of the respondents probably forgot of some of the basic things they learnt from their institutions of training due disuse and decay.

4.4 Utilisation of Available ICT Facilities

Research Question three (3): To what extent do basic school teachers use ICT resources for teaching and learning?

This section of the study presents frequency of utilisation of available ICT resources by basic school teachers in the Effutu Municipality. Standard deviation and mean score were used for the analysis since they were deemed appropriate for the study. A standard deviation is a formal measure of central tendency which determines how deviated some values are from the mean, whereas the mean score provides the arithmetic average of a set of given numbers. The result of the mean scores was discussed with 1 to 2.9 indicating low utilisation while 3 to 5 indicating high utilisation of resources as shown in Table 4.

Table 4: Frequency of Utilisation of ICT facilities

	Mean	SD	Interpretation
I frequently use computers in school for instructional purposes	1.97	.89	Low
I frequently use internet in school to get information to enrich my teaching	1.45	.65	Low
I frequently use other ICT facilities such as projectors in school for instructional purposes	1.46	.77	Low

Source: Field Study (2021)

As shown in Table 4 above, teachers sampled for the study revealed that they barely make use of computers and other ICT facilities in teaching and learning. Majority of the teachers indicated that they use computers in their teaching and learning activities at least once per semester, giving a mean of 1.97. Also, it was recorded that majority of the teachers sampled for this study indicated that they never used internet or other ICT facilities in their teaching and learning process. This yielded the statistics of

(mean=1.45; SD=.65), for frequency of internet utilisation, and (mean=1.46; SD=.77) for frequency of utilisation of other ICT facilities. This is not shocking, however, since there are not enough ICT resources as indicated earlier.

4.5 Discussion of Findings

The study sought to examine the availability of ICT resources in Junior High Schools in the Effutu Municipality, the extent of use of these facilities by basic school teachers for teaching and learning in their classrooms and whether teachers in Junior High Schools have the required knowledge to integrate ICT in teaching and learning. The results of the study are discussed in detail in the following paragraphs.

The first objective of the study sought to examine the available ICT resources at the basic school level for teaching and learning in the Effutu Municipality. The findings of the study revealed that there are inadequate ICT resources. Majority of the teachers sampled for the study were of the view that computers and other ICT facilities besides computers were not available in their schools. The findings also show that lack of internet access was among the major barriers to the use of computers in schools. This suggests a possibility of a school having computers without having access to internet due to the digital divide related issues. These findings are in line with Bariu (2020) findings from a study on successful ICT integration in teaching and learning in Nigerian public secondary schools. According to the findings, a key barrier to the use and integration of computers and ICT in schools is the lack of software and hardware infrastructure. According to the report, not all public secondary schools in Adamawa State were equipped with computers and ICT resources. That is to say, in the absence of software and hardware accessories, teachers will be unable to properly integrate

ICT, as critical software and hardware facilities in schools are required to effectively integrate ICT.

The study's second objective was to look into basic school teachers' knowledge on how to use ICT resources for teaching and learning. The findings revealed that majority of the teachers did not have the required knowledge to integrate ICT in the teaching and learning of their subject areas. This probably was because knowledge learnt from institutions of training was not practically utilized due to the absence of ICT facilities in the various schools. Most of the teachers indicated that they were unable to use the computer to store and retrieve student data. They also indicated their inability to use the excel sheet to process students' data, their inability to prepare power points, their inability to confidently use a projector among others. It is important to note that knowledge not used is lost due to decay. Most of these teachers might have forgotten of those things learnt because they did not get the opportunity to use of what was learnt in ICT due to the unavailability of the ICT facilities in the Junior High Schools.

Positive attitudes toward ICT, understanding of ICT's educational potential, capacity to use ICT efficaciously in the curriculum, skill to handle ICT use in the classroom, capacity to analyse ICT use, ability to ensure distinction and progression, and technical capability are all prerequisites for teachers' ICT competence (Albirini 2006; Beck, 1997). Bauer and Kenton (2005) found that, despite having appropriate abilities, being imaginative, and quickly overcoming hurdles, teachers did not regularly use technology as a teaching and learning tool in their study. These findings, confirms that of Bingimlas, (2009), who examined the use of information and communication technology as a change agent in Nigerian higher education and found

that there were an insufficient number of teachers who were trained on how to use ICT in the classroom.

The study's third objective was to examine how much basic school instructors use available ICT for teaching and learning. Teachers seldom use computers and other ICT facilities in teaching and learning, according to the study's findings. The majority of teachers acknowledged they use computers at least once per term in their teaching and learning activities. It was also discovered that the vast majority of teachers never used the internet or other ICT tools in their teaching and learning. These findings support Waite (2004) argument that, while instructors show a strong interest and desire to learn about the possibilities of ICTs, in practice, ICT use is limited and concentrated on a small number of applications, with word processing being the most common. Other ICT capabilities, including as video conferencing, emailing, and the Internet, are infrequently used, according to the study. The study also identifies a lack of ICT infrastructure as one of the reasons for the tools' non-use.

The fourth objective of the study sought to determine the challenges facing basic school teachers in the use of ICT facilities for teaching and learning. The study found that school-based, leadership, and teacher-related issues all represent significant hurdles for teachers when it comes to integrating ICT into their teaching and learning processes. The absence of enthusiasm and support from the school's leadership and management has a direct impact on the deployment and utilization of ICTs in the classroom. In addition, the respondents cited a number of other impediments. A lack of funding, a lack of teacher confidence, a lack of administrative support, a lack of computer skills, a lack of course curriculum, a lack of incentives, scheduling difficulties, a lack of training opportunities, and a lack of skills in how to integrate

ICT into education are just a few of the factors. As a result, schools must work with the Ministry of Education and other authorities to develop programs to assist teachers in incorporating ICT into their classrooms. As a result, according to Ihmeideh (2009), educators who received constructive support from administrators are more likely to use technology in their teaching practice, whereas those who received poor support or encouragement from higher authorities in school are less enthusiastic in using computers or really do not use them at all.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Overview

This chapter presents a summary of this research work, the conclusion, recommendations proposed by the researcher and suggestions for further studies.

5.1 Summary of the Study

Information and communication technology (ICT), which has become a critical aspect for most companies and corporations nowadays, has had an impact on educational institutions. Despite the government and other stakeholders' efforts to support Ghanaian schools in ICT, the majority of schools still lack these resources. The major goal of this study was to investigate into the availability of ICT resources and how much basic school teachers used them in their classrooms for teaching and learning. The study was carried out in the Effutu Municipality. The descriptive survey research design was employed for this study. A sample of 31 basic school teachers were sampled from four Public Junior High schools in the municipality. The Availability and Utilization of Information and Communication Technology Questionnaire (AUICTQ) was used for data collection from the teachers. The instrument's face, content, and construct were validated by research experts and, finally, by my supervisor. The instrument has a Cronbach Alpha of 0.77, indicating that it is reliable for usage. The questionnaire was administered by the researcher. The data was analysed using SPSS version 23.0 software to produce frequencies, percentages, means, and standard deviations.

The study's findings revealed that there were insufficient ICT resources in the schools used in this study. The majority of the teachers in the survey believed that computers were not available for instructional purposes. The study also revealed the lack of projectors and other ICT facilities in the Junior High Schools for instructional purposes. Again, the study revealed that teachers did not have the required competencies to integrate ICT for instructional purposes in the Junior High Schools in the Effutu Municipality. Majority of the respondents did not have what it takes to store and retrieve students' data on the computer. Majority of the respondent admitted that they could not use prepare power point slides for instructional purposes. Majority of the respondents could not use the computer to search for information from the internet for instructional purposes. The study further revealed that majority of the respondents could not use the computer to make learning more exciting and meaningful to learners.

5.2 Conclusion

This study investigated the availability and use of ICT in teaching and learning in public basic schools in the Effutu Municipality in the Central Region of Ghana. The study concludes that the schools faced a lack of ICT facilities, internet connectivity, and other ICT facilities. Thus, it is not easy to integrate ICT for instructional purposes. As such, teachers are forced to use traditional teaching and learning approaches. As a result, the lack of ICT facilities and internet access hampered the adoption of ICT in schools.

The study also concluded that most teachers in Junior High Schools in Effutu Municipality lack the required competencies to integrate ICT in teaching and learning.

The study also concludes that ICT facilities are scarcely used for instructional purposes in Junior High schools in Effutu Municipality.

5.3 Recommendations

As a result of the findings of the study, the following recommendations were arrived at:

- The Ministry of Education, Science, and Sports, as well as the Ghana Education Service's Curriculum Research Development Division, should offer adequate computers, internet access, and other ICT resources to ensure that ICT is integrated smoothly in schools.
- The Effutu Municipal Directorate of Education and the Member of Parliament for the area should join hands and financial resources to help equip the schools with ICT facilities for effective ICT education.
- The Ministry of Education, Science, and Sports, should also give policy guidance to schools in order to solve the issues that ICT integration poses in the classroom. They should not only introduce computers, but also consider a wide variety of educational policies, programmes, and institutions that must be altered if computers are to contribute to the nation's social and economic progress. The policy direction must handle concerns such as the supply of computer laboratories and the hiring of permanent technology coordinators in such laboratories, among other things.
- As part of the new pedagogical models necessary for the adoption of constructivist and constructionist learning outcomes, teacher education

institutes should make ICT courses mandatory for all trainee teachers in order to familiarise them with the use of ICTs in teaching and learning.

- Since the survey revealed that manpower resources are scarce, there is also a need to give technical help to schools in terms of ICT infrastructure construction and maintenance. The degree of effort required for large-scale installation and maintenance of hardware, software, and networking equipment for efficient ICT integration tends to be underestimated. The system cannot be maintained only by computer coordinators. To serve schools, administrators, instructors, and students, a large network of qualified technicians must be established.

5.4 Suggestion for Further Research

Based on the research carried out, the following suggestions were offered for further studies:

- To see if geographic location has an impact on the acquisition of ICT infrastructure, the study should be reproduced in another geographical area in Ghana.
- The availability, functioning, and use of ICT facilities at the senior high school level should also be explored.
- Similar studies in post-secondary institutions, such as colleges of education, polytechnics, universities, and research institutes, are required.

REFERENCES

- Acquah, B. Y. S. (2012). Status of implementation of the ICT Curriculum in Ghanaian Basic Schools. *Journal of Arts and Humanities (JAH)*, 1(3), 27-37.
- Adebi-Caesar, T. E. (2012). Assessment of ICT situation in senior high schools: A case study in Lower Manya Krobo District. A thesis submitted to the Institute of Distance Learning, Kwame Nkrumah University of Science and Technology in partial fulfillment of the requirements for the degree of Commonwealth Executive Master of Business Administration. Retrieved July 10, 2021 from *www.Information Technologies*, 16(4), 423-439.
- Afful-Dadzie, F. (2010). Use of ICT by students and teachers in senior high schools in the Sekondi-Takoradi Metropolis (Unpublished Master's Thesis), University of Cape Coast, Cape Coast.
- Agyei, D. D., & Voogt, J. (2011). ICT use in the teaching of mathematics: Implications for professional development of pre-service teachers in Ghana. *Education and Information Technologies*, 16 (4), 423-439.
- Akbaba-Altun, S. (2006). Complexity of integrating computer technologies into education in Turkey. *Journal of Educational Technology & Society*, 9(1), 176-187.
- Albirini, A. (2006). Teacher's attitudes toward information and communication technologies: the case of Syrian EFL teachers. *Journal of Computers and Education*, 47, 373-398.
- Al-Senaidi, S., Lin, L., & Poirot, J. (2009). Barriers to adopting technology for teaching and learning in Oman. *Computers & Education*, 53(3), 575-590.
- Amengor, J. (2011). History teachers' perception of ICT in promoting teaching and learning (Unpublished Master's Thesis), University of Cape Coast, Cape Coast.
- Amenyedzi, F. W. K., Lartey, M. N., & Dzomeku, B. M. (2011). The Use of Computers and Internet as Supplementary Source of Educational Material: A Case Study of the Senior High Schools in the Tema Metropolis in Ghana.
- Ampofo, A. J. (2019). *Performance management and appraisal in improving teachers' quality*: Wa: Lambert Academic Publishing.
- Ampofo, J. A. & Abigail, A. A. (2020). ICT resources available for teachers in Basic schools in Adansi Atobiase in the Adansi South District of Ghana. *International Journal of Applied Research in Social Sciences*, 2(4), pp. 97-110. *and development using ICT*, 11(2), 104-112.

- Antwi-Boasiakoh, F. (2015). Assessment of ICT situations in senior high schools: a case study of Ejisu Juaben municipality. A dissertation in the Department of Educational Administration and Management, Faculty of Educational Studies, submitted to the School of Research and Graduate Studies, University of Education, Winneba, in partial fulfillment of the requirements for the award of the Master's Degree in Educational Administration and Management.
- Asare, A. O. (2010). Enhancing quality education through ICT. Ghana National Commission for UNESCO. Retrieved July 15/2021 from www.natcomreport.com/ghana/livre.
- Babette, M., & Reitzes, T. (2011). *Education development center, Inc. (EDC). Integrating technology with student-centered learning*. Quincy, MA: Nellie Mae Education Foundation.
- Balanskat, A., Blamire, R. & Kefala, S. (2006). A review of studies of ICT impact on schools in Europe. *European School net: European Communities*.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bariu, T. N. (2020). Status of ICT infrastructure used in teaching and learning in secondary schools in Meru County, Kenya. *European Journal of Interactive Multimedia and Education*, 1(1), 27-39.
- Bauer, J. & Kenton, J. (2005). Toward Technology Integration in the Schools: Why it isn't Happening. *Journal of Technology and Teacher Education*. 13(4), 519-546.
- Baylor, A. L. and D. Ritchie (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classroom? *Computers and Education* 39(4), 395-414.
- Beck, J. (1997) Teacher education and IT: National perspective. *European Journal of Teacher Education*, 20(1), 93-99.
- Becker, H. J. (2001). *How Are Teachers Using Computers in Instruction? Meetings of the American Educational Research Association*. Seattle: America.
- Bede, B.C.O., Termit, K.R.S., & Fong, S.F. (2015). Need for ICT integration for effective instructional delivery in Nigerian Colleges of Education". *Journal of Education and Practice*, 6(3), 51-56.
- Beggs, T. A. (2000) Influences and barriers to the adoption of instructional technology [Online], available: <http://www.mtsu.edu/~itconf/proceed00/beggs/beggs.htm>
- Bello, G.; Ahmed, M.A.; Alabi, H.I.; Ahmed, A.R.; Bello, Z.A. & Bello, R.A. (2016). Information communication technology integration in Biology teacher education in Nigeria: problems and prospects. *57th Annual Conference Proceedings of Science Teachers Association of Nigeria*, 231-238

- Bhalla, J. (2013). Computer Use by School Teachers in Teaching-learning Process. *Journal of Education and Training Studies*, 1, (2), 174-185.
- Bingimlas, K. (2009). 'Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature. *Eurasia Journal of Mathematics, Science and Technology Education*, 5(3), 235-245.
- Boadu, M. K. (2020). The impact of ICT training in basic schools-Ghana. Retrieved 02/09/2021 from <https://www.linkedin.com/pulse/impact>.
- Boni, R. K. (2018). The use of ICT for teaching and learning in Senior High Schools in Ghana: A study of Nungua and Presbyterian, Teshie. Unpublished Dissertation submitted to the University of Ghana, Legon in partial fulfillment of the requirement for the award of MA Information Studies Degree.
- Bransford, J., Brown, A. L., & Cocking, R. R. (2000). *How people learn: Brain, mind, experiences and school* (2nd ed.). Washington, D. C. National Academy.
- Braun, J. A., & Kraft, C. (1995). Using technology to learn from travel mates' adventures. *Social Studies and the Young Learner*, 7 (3), 8-10.
- British Education Communications and Technology Agency (BECTA) (2004). A review of the research literature on barriers to the uptake of ICT by teachers.
- Buabeng-Andoh, C. & Yidana, I. (2015). Teachers' ICT usage in second cycle institutions in Ghana: A qualitative study. *International journal of education*.
- Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature". *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 8 (1), 136-155.
- Buabeng-Andoh, C. (2012b.) An exploration of teachers' skills, perceptions and practices of ICT in teaching and learning in the Ghanaian Second Cycle Schools. *Contemporary Educational Technology*, 3(1). 36-49.
- Butler, D. L., & Sellbom, M. (2002). Barriers to adopting technology for teaching and learning. Retrieved 15/08/2021 from <https://www.researchgate.net/>
- Cavas, B., Cavas, P., Karoglan, B., & Kislal, T. (2009). A study on science teachers' attitudes toward information and communication technologies in education. *The Turkish Online Journal of Educational Technology – TOJET* 8 (2) ISSN: 1303-6521 volume 8 Issue 2 Article 2
- Chen, R.-J. (2010). Investigating models for preservice teachers' use of technology to support student-centered learning. *Computers & Education*. In Press, Retrieved 12/07/2021 from www.doc.ed.commons.

- Chin, S., & Horton, J. A. (1994). Teachers' Perceptions of Instructional Technology and Staff Development. *Journal of Educational Technology Systems*. 3(5), 233-251.
- Chizmar, J. F., & Williams, D. B. (2001). What do faculty want? *Educause Quarterly* 24(1), 18-24.
- Cohen, J. (1988). Statistical power analysis for the behavioural sciences. *Statistical Power Analysis for the Behavioral Sciences*, 567.
- Connect for Change Education Ghana Alliance (C4C-EGA) (2014). "Availability and use of ICT in teaching and learning. Baseline study final report".
- Cox, M., Preston, C. & Cox, K. (1999a). What factors support or prevent teachers from using ICT in their classrooms?', accepted for British Educational Research Association Annual Conference, 2-5 Sept.
- Creswell, J. W. (2014). *Qualitative, quantitative and mixed methods approaches*. Sage. 11-20.
- Dawson, V. (2008). "Use of information communication technology by early career science teachers in Western Australia". *International Journal of Science Education*, Vol. 30, pp. 203-219.
- Dei, De-Graft, J. (2018). Assessing the use of ICT in teaching and learning in secondary schools. Retrieved 7/25/2021 from <http://digitalcommons.unl.edu/phiprac/2003> development? *Journal of Global information management*, 18(1), 66-83.
- Dogan, M. (2010). Primary trainee teachers' attitudes to and use of computer and technology in mathematics: The case of Turkey. *Educational Research and Review*, 5(11), pp.690-702.
- Drent, M. and Meelissen, M. (2008) 'Which Factors Obstruct or Stimulate Teacher Educators to Use ICT Innovately?', *Computers and Education*, 51(1), 187-199.
- Durndell, A., & Thomson, K. 1997. "Gender and computing: A decade of change?" *Computers and Education*, Vol. 28, no. 1, pp. 1-9. 124
- Enu, J., Nkum, D., Ninsin, E., Diabor, C.A., & Korsah, D. P. (2018). Teachers' ICT skills and ICT usage in the classroom: The case of basic school teachers in Ghana. *Journal of education and practice*, 9(20), 35-38.
- Ertmer, P. (1999), 'Addressing first-and second-order barriers to change Strategies for technology integration'. *Educational Technology Research and Development*, 47(4), 47-61

- Fan, C. W., & Ho, KK (2012). A tale of three cities: Review of development of ICT in school education between Hong Kong, Macau and Singapore. *New Horizons in Education*, 6(1), 1-13.
- Fan, C.W. (2010). The readiness of schools of Macau to integrate IT in education and the extent of actual IT integration. *International Journal of Education and Development using ICT*, 6(4), 52-63.
- Gillespie, H. (2006). *Unlocking learning and teaching with ICT: Identifying and overcoming barriers*. London: David Fulto.
- Goldman, D. (2012). Sorry, America. Your wireless airwaves are full. Accessed 20/09/20 from <http://money.cnn.com/2012/02/21/technology/spectrum> .
- Gomes, C. (2005). *Integration of ICT in science teaching: Recent Research Developments in Learning Technologies*. Azores: Portugal.
- Goyal, J. (2019). ICT as a tool for building innovative knowledge society. *Open Access Journal of Social Sciences*, 11 (1) 136-141.
- Grefins, A.T. (2011). Information needs and seeking behaviour of secondary school students. *Library Review*, 6(1): 101-121.
- Gressard, C. P., & Loyd, B. H. (1986). Validation studies of a new computer attitude scale. *Association for Educational Data Systems Journal*, 18(4), 295-301.
- Grimus, M. & Ebner, M. (2013). M-Learning in Sub Saharan Africa Context - What is it about. In J. Herrington et al. (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2013*. Chesapeake, VA: AACE.
- Grimus, M. & Ebner, M. (2016). Mobile Learning and STEM: First experiences in a senior high school in Ghana. In: Crompton, H. and Traxler, J. (Eds.). *Mobile learning and STEM: Case studies in practice*. New York: Routledge. pp. 1-16.
- Grimus, M. (2000). ICT and multimedia in the primary school. A paper presented the 16th Conference on educational uses of ICT. Beijing, China. Retrieved 22/02/2020.
- Gumbo, S. D. (2003). Utilisation of information and communication technology as tools and resources for teaching and learning at the Midlands State University in Zimbabwe. *Proceedings of the 11th Annual SAARMSTE Conference*. Waterford: Webster Print Ltd.
- Hennessy, S., Harriossn, D.J., & Wamakote, L. (2010). Teacher Factors Influencing Classroom use of ICT in Sub-Saharan Africa. *Itupale Online-Journal of African Studies*, 2(2010), 39-54.
- Idahosa, O. M. and Ero, N. R. (2005). The use of ICT in Mathematics Education. A paper presented at the Annual National Conference of School of Science, College of Education Ekiadotor-Benin.

- Iddrisu, S., A. (2009). Predictive validity of Senior High School (SHS) aggregate of students' grade-point average (GPA). Cape Coast, Ghana: Unpublished Doctoral Dissertation submitted to the Department of Educational Foundations, Faculty of Education, University of Cape Coast.
- Idoko, J. A. and Ademu, A. (2010). The Challenges of Information and Communication Technology for Teaching – Learning as perceived by Agricultural Science Teachers in Secondary Schools in Kogi State. *Journal of Educational Innovators*, 3(2), 43-49.
- Igboanugo, B. I., Igboegwu, E., Attah, F. O., & Okonkwo I. G. (2020). Efficacy of integrating information communication technology (ICT) in teaching method for effective chemistry curriculum delivery. *International Journal of Education (IJE)*, 2(1), 1–10.
- Ihmeideh, F. M. (2009). Barriers to the use of technology in Jordanian pre-school settings *Technology, Pedagogy and Education*, 18(3), 325-341. IMPICT (2012), ICT in Education, http://www.mpict.org/ict_education_defined_importance.html
- Inan, F. A., & Lowther, D. A. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational Technology Research and Development*, 58(2), 137–154.
- Jegade, P., Dibu-Ojerinde, O. & Llori, M. (2007). Relationships between ICT Competence and Attitude among Nigerian Tertiary Institution Lecturers. *Educational Research and Review*, 2(7), 172-175.
- Johnston, J. & Barker, L.T. (2012). (Eds). *Assessing the Impact of Technology in Teaching and Learning: A Sourcebook for Evaluators*. Institute for Social Research, University of Michigan.
- Jones, A. & Cowie, B. (2010). Evaluation approaches for a national ICT initiative: the example of laptops for New Zealand teachers. *Educational Research for Policy and Practice*, 10(1), 3-15.
- Jones, A. (2004). *A Review of the Research Literature on Barriers to the Uptake of ICT by Teachers*. UK: Becta.
- Kennah, M. R. (2016). The use of ICT in the teaching and learning process in secondary schools: A case study of two Cameroonian schools. Master's Thesis submitted to Department of Education Institute of Educational Leadership University of Jyväskylä, Cameroon.
- Keong, C.C, Horani, S. and Daniel J. (2005). A Study on the Use of ICT in Mathematics Teaching. *Malaysian Online Journal of Instructional Technology*. 2(3), pp. 43-51.

- Kok, A. (2007). ICT Integration into Classrooms: Unpublished literature review.
- Korte, WB & Hüsing, T (2007). Benchmarking access and use of ICT in European schools 2006: Results from Head Teacher and A Classroom Teacher Surveys in 27 European countries, *eLearning Papers 2*, 1: 1-6
www.elearningeuropa.info/files/media/media11563.pdf
- Kumar, N., Rose, R.C. and D'Silva, J.L. (2008). Teachers' Readiness to Use Technology in the Classroom: An Empirical Study. *European Journal of Scientific Research*. 21(4), 603-616.
- Kumar, R. (2016). Information and Communication Technology in Teacher Education. *International Journal of Education and Applied Research*, 6(1): 138-139.
- Lau, B., & Sim, C. (2008). Exploring the Extent of ICT Adoption Among Secondary School Teachers In Malaysia. *International Journal of Computing and ICT Research*, 2 (2), 19-36.
- Lewy, A. (1991). *International encyclopedia of curriculum*. Oxford: Pergamon Press.
- Luhanya, A., Bakkabulindi, F. E. K , & Muyinda, P. B. (2017). Integration of ICT in Teaching and Learning: A Review of Theories. *Makerere Journal of Higher Education*, 9(1), 21-36. Retrieved 15/07/202 from:
<http://dx.doi.org/10.4314/majohe>
- Mafangham, M. (2016). Teachers' experience on the use of ICT to facilitate teaching: A case of Ilala District secondary schools. The dissertation submitted in partial fulfilment for the requirement for the Master's Degree in Education Administration, Planning and Policy Studies of the Open University of Tanzania.
- Maithya, R., & Ndebu, S. (2011). *Factors influencing effective use of ICT in teacher education: A Case of Kenya Technical Teachers College. Quality Education for Societal Transformation*, Nairobi: Kenya.
- Makanda, J. L. (2015). Use of ICT in teaching physics: a case of secondary schools in Kimilili District, Bungoma County, Kenya. A thesis submitted to the Department of Educational Communication and Technology, in the School of Education in partial fulfilment for the award of the degree of Master of Education of Kenyatta University.
- Mangesi, K. (2007). ICT in Education in Ghana. *Survey of ICT and Education in Africa: Ghana Country Report - I* www.infodev.org
- Muah, P., Adu, I. N., Kyei-Frimpong, M., & Boakye, A. O. (2021). Explaining How Management Safety Practices and Safety Programmes Influence Job Safety and Employee Commitment: Evidence from the Ghanaian Mining Industry. *SEISENSE Business Review*, 1(3), 41-56.

- Muriithi P. (2005). A framework for integrating ICT in the teaching and learning process in secondary schools in Kenya. MSc. Thesis submitted at the University of Nairobi, School of computing and Informatics.
- Natia, J. A. & Al-hassan, S. (2015). Promoting teaching and learning in Ghanaian Basic Schools through ICT. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 11(2), 113-125.
- Ndibalema, P. (2014). Teachers' attitudes towards the use of Information Communication Technology (ICT) as a pedagogical tool in secondary schools in Tanzania: The case of Kondo district. *International Journal of Education and Research*, 2(2), 1-16.
- Newhouse, P. (2002). *Literature review: The impact of ICT on learning and teaching*. Perth: Specialist Educational Services
- OECD. (2009). *PISA 2009 Assessment Framework: Key Competences in Reading, Mathematics and Science*. Paris: OECD Publishing.
- OECD. (2015a). *Students, Computers and Learning: Making the Connection*. Paris: OECD Publishing. <https://doi.org/10.1787/9789264239555-en>.
- Ojo, M. O. (2005). Information and Communication Technology (ICT) and teacher preparation for basic education. *Journal of Teacher Education*. 3(6), 22-37
- Omwenga, I. J. (2004). Pedagogical Issues and E-learning Cases: Integrating ICTs into Teaching and Learning process. *African Journal of Sciences and Technology* 5(1) 1-11.
- Opoku, M. P., Badu, E. and Alupo, B. A. 2016. Effort at Implementing ICT Policy in Basic Schools in Ghana: An Assessment of Available Facilities and Resources for Successful ICT Education within the Atwima Nwabiagya District in Ashanti Region. *SOSIOHUMANIKA: Jurnal Pendidikan Sains Sosial dan Kemanusiaan*, 9(1): 183-194.
- Osborne, J., & Hennessy, S. (2003). Literature Review in Science Education and the Role of ICT: Promise, Problems and Future Directions. Accessed 21/07/2020 from www.edu.org/unesco
- Peeraer, J. & Van Petegem, P. (2011). ICT in Teacher Education in an Emerging Developing Country: Vietnam's Baseline Situation at the Start of The Year of ICT. *Computers and Education*, 56(4), 974-982.
- Pelgrum, W. J. (2001). Obstacles to the Integration ICT in Education: Results from a Worldwide Educational Assessment. *Computers and Education*, 37(2), 163-178.
- Raman, K., & Yamat, H. (2015). Barriers Teachers Face in Integrating ICT during English Lessons: A Case Study. *The Malaysian Online Journal of Educational Technology Volume 2, Issue 3*.

- Roden, K. (2011). Technology in education. Online Submission. Retrieved from EBSCOhost.
- Schoepp, K. (2005). 'Barriers to Technology Integration in a Technology-Rich Environment, Learning and Teaching in Higher Education: *Gulf Perspectives*, 2(1), 1-24
- Sekyi-Acquah, B.Y. (2012). Status of implementation of the ICT curriculum in Ghanaian Basic schools. *Journal of Arts and Humanities (JAH)*, 1 (3), 27-37.
- Snoeyink, R., & Ertmer, P. A. (2002). Thrust into technology: how veteran teachers respond. *Journal of Educational Technology Systems*, 30(10), 85–111
- Tambunan, H. (2014). Factors Affecting Teachers' Competence in the Field of Information Technology. *International Education Studies*, 7(12), 70-75.
- Tedla, B. A. (2012). Understanding the importance, Benefits and Barriers of ICT on Teaching and Learning in East African Countries. *International Journal for e-learning Security (JeLS)*, Volume 2, Issues 3/4, 1-9
- Thomas, P. Y. & Emereole, H. U. (2002). Effect of computer-based instruction on performance in physics. *African journal of research in SMT education*, 6, pp. 97-112.
- Trotter, A. (2009). Preparing teachers for the digital age. 5 Sept 2009
- Utor, Z. S. and Agbi, A. (2005). Realising the Benefit of ICT in Science and Technical Education through enhance library services. A paper presented at the Annual Conference of the School of Science, College of Education, Ekiadotor – Benin.
- Vygotsky, L. S. (1978). *Mind in society: the development of higher psychological processes*, Cambridge: Harvard University Press.
- Waite, S. (2004). Tools for the job: a report of two surveys of information and communications technology training and use for literacy in primary schools in the West of England *Journal of Computer Assisted Learning*, 20(1).
- Watson, D.M. (2001). Pedagogy before Technology: Re-thinking the Relationship between ICT and Teaching. *Education and Information Technologies*, 6, (4), 251-266.

APPENDICES

UNIVERSITY OF EDUCATION, WINNEBA

FACULTY OF EDUCATIONAL STUDIES,

DEPARTMENT OF EDUCATIONAL FOUNDATIONS

A QUESTIONNAIRE TO BE FILLED BY HEADS AND TEACHERS

Dear Teacher:

My Name is **PRISCILLA AWUNI**. Presently, I am going to conduct a research with a title of “An Assessment of the availability and utilization of ICT facilities for teaching and learning purpose in Junior High schools of Effutu Municipality”.

The purpose of this study is to assess, identify and examine the major factors that hinder availability and utilization of ICT facilities in the teaching and learning process. So the success of this study depends on your genuine responses. Therefore you are kindly requested to read all questions and answer all items provided in the questionnaires.

It is important that you answer the questions honestly, without fear or prejudice of any type, so that I will be able to present a true state of affairs in my research findings. Following the completion of the survey and the statistical analysis of the data, I will gladly send you a summary of the findings. Should you wish to add any information not covered in the questionnaire, please feel free to do so at the end of last page (in the space provided). I look forward to your early response.

THANK YOU IN ADVANCE FOR YOU KIND COOPERATION.

APPENDIX A

PART I: DEMOGRAPHIC INFORMATION OF PARTICIPANTS

Instruction 1: Questions given below are necessary to collect data pertaining to identifying demographic information of the participants. Please circle the code number that indicates your response under each question.

1. What is your gender?

Gender	Male	Female
Code	1	2

2. What is your age group?

Age Group	≤ 20	21-30	31-40	41-50	51 or older
Code	1	2	3	4	5

3. What are the total number of years of teaching experience?

Years of teaching	1-5	6-10	16-20	21-25	26 or more
Code	1	2	3	4	5

4. What is your educational level?

Educational level	Diploma	BA/B. Ed	MA/MSc	PhD.
Code	1	2	3	4

Instruction 2: Questions given below are necessary to collect data pertaining to identify the availability of different ICT facilities in your school. Please **circle** the number that most closely describes your opinion about the availability of different ICT facilities in your school regarding each preceding statements.

NOTE: The following rating numbers indicates that:

1 = Strongly Disagree what is described,

2 = Disagree what is described,

3 = Not sure what is described,

4 = Agree what is described,

5 = Strongly agree what is described.

No	The availability of computers in your school					
1	There are Computers in my schools for instructional purposes	1	2	3	4	5
2	There are projectors in my school to aid in teaching and learning	1	2	3	4	5
3	There is internet connectivity in my school to aid in research and instruction	1	2	3	4	5
4	There are availability of other ICT facilities in your school	1	2	3	4	5
5	There is availability of man power in relation to IT in your school	1	2	3	4	5
	Teachers' knowledge in integrating ICT in teaching	1	2	3	4	5
1	I have received any ICT training /workshop after your school	1	2	3	4	5
2	I have enough basic computer operating skills to utilize computer and computer related technologies in teaching and learning process.	1	2	3	4	5
3	I have adequate knowledge on how to use a projector for instructional purposes	1	2	3	4	5
4	I can confidently prepare power point for presentation in class.	1	2	3	4	5
5	I have what it takes to search for information from the internet for instructional purposes					
6	I can use the excel sheet to store data of students' performances and retrieve anytime I need them	1	2	3	4	5
7	I can use the computer to make learning more exciting and meaningful to learners.	1	2	3	4	5
	EXTENT OF USAGE OF ICT IN TEACHING	1	2	3	4	5
1	I frequently use computers in school for instructional purposes	1	2	3	4	5
2	I frequently use internet in school to get information to enrich my teaching	1	2	3	4	5
3	I frequently use other ICT facilities such as projectors in school for instructional purposes	1	2	3	4	5

THANKS FOR TAKING PART IN THIS DISCUSSION