UNIVERSITY OF EDUCATION, WINNEBA

THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY AS A TOOL FOR TEACHING AND LEARNING IN SENIOR HIGH SCHOOLS IN THE KWAHU SOUTH MUNICIPALITY

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DECLARATION

STUDENT'S DECLARATION

I, **JERRY ANOM MENSAH**, declare that this dissertation, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my 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 were supervised in accordance with the guidelines for supervision of dissertation as laid down by the University of Education, Winneba.

DR. EBENEZER BONYAH

SIGNATURE: ……

DATE: ……

DEDICATION

To my wife, Diana Ampofoa Acheampong and my children, Maame Nyarkoa, Nana Ama, Perry and Kofi Boakye.

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ABSTRACT

The study was conducted to determine the use of ICT in teaching and learning in Mpraeso Senior High Schools in the Kwahu South District. The study was guided by three research questions. The study was a descriptive survey and had a population of one hundred and seven respondents. The multi-stage sampling procedures were used to select the sample for the study. A questionnaire was developed to elicit information from the respondents. Validity and reliability of the instrument were ensured by making the instrument available to experts and the supervisor for scrutiny and the instrument pilot tested in Nkwatia Senior High School in the Kwahu East District. The data gathered were analysed using tables, frequencies, and percentages. The study revealed that the integration of ICT in the teaching makes the lesson more interesting. It was further revealed that ICT improves lesson presentation. It was noticeable from the study that the availability of ICT tools in teaching and learning was limited. The study revealed that most teachers have low knowledge of the use of ICT in teaching. It was further found that teachers have not been given adequate training in the use of ICT in teaching. The study recommends that the head of the schools should encourage the teachers in the schools to make appropriate use of ICT facilities in the teaching and learning process. The researcher further recommends that the Ministry of Education should make budgetary allocations annually to maintain, replace, and expand ICT facilities in the school. The Head of the school should intermittently organize in-service education and training on the use of ICT for the teachers in the school.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The rapid development in Information and Communication Technologies (ICTs) has made tremendous changes in the twenty-first century, as well as affected the demands of modern societies. Recognizing the impact of new technologies on the workplace and everyday life, today's educational institutions try to restructure their educational programs and classroom facilities to minimize the teaching and learning technology gap between developed and developing countries. This restructuring process is providing learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005).

The sudden rise in Information and Communication Technology has introduced a phenomenal change in contemporary society which has affected the demands of present-day civilization. It is an indisputable claim that Information and Communication Technologies play a crucial role in the advancement of every country these days. The importance of technology to modern concepts such as e-commerce, teleconferencing, e-governance, and telecommunication have all arisen as a result of the application of technology in almost every aspect of human activity (Amoaful, 2011). Countries all over the world, including Ghana, have identified the pivotal role ICT plays in all aspects of human endeavour of which education forms a part. To counter industrial and societal development, individual nations are drafting programmes and guidelines that integrate the application of ICT or computer technologies into education. Several nations have set up national policies that show a synopsis of how ICT should be implemented to improve the educational system in various countries (Komza, 2003).

Information and Communication Technology (ICT) is now being applied in every facet and discipline of human endeavour. It has contributed to the organization, storage, retrieval, access, effective and efficient production and use of information. Throughout the world, there is awareness of the fundamental role of new Information and Communication Technologies (ICTs) especially in the field of education. ICT has unified the world in such a way that the term "global village" has been derived based on its, applications, roles and impacts it serves. Amongst its applications and roles are telecommunication, e-governance, teleconference, e-commerce, e-learning, e-mail etc., ICT and its importance in modern human endeavours cannot in any way be underscored.

The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning and research (Empirica, 2006). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Fox & Henri, 2005). In a rapidly changing world, education is essential for an individual to be able to access and apply information. Such ability must include ICTs in the global village. There is therefore an increasing demand on educational establishments to apply ICTs in teaching and learning and to equip students for the modern-day job market. In education, the application of computer technologies can improve teaching and learning and several studies have confirmed this assertion. As posited by Gannon (2004), the use of ICT in the learning environment can bring about a rapid change in the student's performance. The ideology that ICT can for a fact improve education and learning has compelled the Government of Ghana to draft guidelines geared towards the integration of ICT in education. Having noticed the impact of ICT on

education towards national development, the Government in 2007 introduced a new educational reform which stressed the requirement for more significance on ICT and education. This prompted the incorporation of ICT in both the Basic and Secondary School's educational module where the subject is presently an examinable one. The essential capacity of most instructive approaches is to furnish institutions with the needed accoutrements such as computers, information and communication-related technologies, and to a lesser degree, the expert improvement of educators (Jones, 2003; Owston, 2007).

Education is at the core of every developing and developed nation. It has contributed immensely to the increase in the development of knowledge and providing a conducive atmosphere for advancement and in building human capital needed for possible development in the economy. ICT is considered a basic tool in equipping and teaching students with the required abilities for the worldwide workplace. Amoaful (2011) posits that we are now living in a world of revolution. This revolution is termed the computer revolution or information revolution in history books. In this revolution, the computer is the agent transforming the way people do research, business as well as teaching and learning. Opoku, Badu and Alupo (2016) noted that the rate at which ICT is developing and its impact on socio-economic activities cannot be overemphasized. According to them, the United Nations Development Programme (UNDP) expressed that ICT has been characterized to incorporate the full scope of electronic advancements and strategies used to manage information and innovations. Notwithstanding all the benefits ICT has got to offer, the system is fraught with challenges and one of the major problems associated with the integration of ICT in an academic environment is the inadequacy of ICT infrastructure to improve teaching and learning. Other challenges against the use of ICT by students

and teachers are the lack of requisite skills necessary to operate computers and ICT gadgets in education. Similar studies have also indicated that such barriers include network problems, user-unfriendly programmes and inadequate access to the internet contribute to the disadvantages of ICT integration in education.

The Ghana Education Service is in charge of the coordination of the authorized national policies and projects relating to pre-tertiary education which originates from the Ministry of Education. The overall objective of the Ministry is to give relevant and quality education for all Ghanaians which will enable them to obtain the competence that will make them practically literate and productive to mitigate poverty and advance the fast financial development of the nation. In line with the new educational reform of 2007, ICT was integrated into the Ghana Education Curricula in 2010.

Mpraeso Senior High School was established as a model school in the Kwahu South District. The school like any other government school is mandated to formulate policies and programmes in line with the Ghana Education Service Act 1995 which regulate pre-tertiary education. The school currently has a teaching staff strength of one hundred and twenty (120). The total student population for the school in the 2019/2020 academic year is two thousand, four hundred and fifty (2450). The use of ICT in teaching and learning has become an issue in the school due to the size of the school population and the nature of the ICT laboratory. It is upon this background that I want to investigate the use of ICT in teaching and learning in the school.

1.2 Statement of the Problem

The introduction of ICT as an essential instructive standard, a standout amongst the most powerful developmental strategies in this era of revolution (Aviram & Tami, 2004) and portrays an emitting worldview originating from a desire to better

equip people for life after school. The rate of ICT revolution has caused an exceptional and accelerated advancement in the method of teaching and learning, impacting the ways students and teachers engage in the instructive framework. These advances remain a crucial aspect of teaching and learning at all levels of education in our Ghana. The Ghana Education Service has made some attempts at attaining the objective of enhancing the nature of education through the use of ICT with the help of some policies and adaptation of ICT as an examinable subject. Programmes such as the two weeks training for ICT teachers in the Kwahu East District, Kwahu East and Kwahu South Municipalities in the Eastern Region was held at Nkawkaw Senior High School which was organized by the Eastern Regional Directorate of Education in collaboration with Heads of Schools in August 2019. The training was aimed at improving teachers' knowledge in the use of ICT tools and turn to impact it onto students. Despite the introduction of ICT infrastructure, equipment and expert advancement to enhance teaching and learning in senior high schools, it appears that the potential for integrating ICT into the school's curriculum is missing which has impacted adversely on students' learning. Apart from that, a combination of factors such as the inadequacy of ICT infrastructure in the school, lack of the requisite skills on the part of the teachers as well as lack of interest on the part of most teachers in the use of ICT have further heightened and widened the ICT-teaching deficits. In Ghana, research on the use of information and communication technology as a tool of teaching and learning in senior high level appears to be relatively limited. Specifically speaking, such research in the Kwahu South Municipality is virtually non-existent. There is the need to address this and fill the gap in literature.

1.3 The Objectives of the Study

The overall objective of this study was to investigate the use of ICT as a tool for teaching and learning in Senior High Schools in the Kwahu South Municipality.

1.4 Specific Objectives of the Study

1. To find out the perception of teachers on the use of ICT tools for teaching and learning in senior high schools in the Kwahu South Municipality.
2. To find out the availability of ICT infrastructure for teaching and learning in senior high schools in the Kwahu South Municipality.
3. To find out the challenges related to the use of ICT in senior high schools in the Kwahu South Municipality.

1.5 Research Questions

The following research questions were formulated to guide the study.

1. What is the perception of teachers on the use of ICT tools for teaching and learning in senior high schools in the Kwahu South Municipality?
2. What is the availability of ICT infrastructure for teaching and learning in senior high schools in the Kwahu South Municipality?
3. What are the challenges related to the use of ICT in senior high schools in the Kwahu South Municipality?

1.6 Significance of the Study

The discovery of this study will add to the benefit of society considering that ICT plays a vital role in education today. The significance of this study lies in the fact that it will add to a body of already existing information in the field of ICT and education after the work is published. The researcher also believes that the findings of the study would be beneficial not only to the school under investigation but to teachers in general, the Ghana Education Service and other agencies responsible for

the formulating of ICT policies into teaching and learning curricula in schools in Ghana.

For researchers, practitioners and policymakers, the study will help them reveal critical areas in the educational procedures that numerous researchers were not able to investigate. Thus, another hypothesis on learning with ICTs may be arrived at. A proper assessment of teaching and learning with ICTs will be useful to researchers and scholars; as it will add to the already existing scholarly research and literature in the field as well as creating awareness of the importance of teaching with ICT in the school.

The result of this study would add to the already existing policies which would promote adequate ICT usage in the teaching and learning of various subjects throughout the country. Hopefully, the result of these findings will improve upon the use of ICT tools in teaching and learning in Mpraeso Senior High School.

1.7 Delimitations of the Study

This study aimed at identifying the use of ICT as a tool for teaching and learning in Mpraeso Senior High School in the Kwahu South District.

It examined various factors which include; the perception of teachers and students on the use of ICT, availability of ICT infrastructure for teaching and learning, a traditional mode of teaching versus ICT integration, effective integration of ICT for teaching and learning and challenges of using ICT for teaching and learning. A questionnaire was used to solicit information from the respondents. Science teachers and forms two and three General Science students were used for the study.

1.8 Limitations of the Study

The research should have covered students and teachers in all Senior High Schools in the District but time allocation for this study did not permit for a larger population to be covered. For this reason, the researcher concentrated on teachers and first and second-year students of the selected school as the target population for the study. The use of self-rating questionnaires to collect data from the respondents on the use of ICT as a tool for teaching and learning was limiting because it was difficult for them to be honest in situations that demanded talking about themselves truthfully. Despite this limitation, the findings of the study were consistent with the reviewed literature. In addition, the sample was representative enough such that the findings of this study can still be generalized within the school where the study took place.

1.9 Organisation of the Study

The rest of the study is organized into four chapters. Chapter two is structured into three thematic areas, thus, the definition of the concept, review of empirical studies as well as theoretical review.

Chapter three presented the methodology aspect of the study and it constituted research design, the population, sample and sampling techniques, research instrument, validity and reliability of the instrument, pilot testing, data collection procedure, data analysis and ethical consideration.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of related literature relevant to the issues being investigated . The chapter deals with the theoretical and empirical review. The conceptual review centred on the concepts of teaching and learning and information and communication technology.

Conceptual Review

This section explores the concept of teaching and learning and information and communication technology.

2.2 Teaching and Learning

Teaching and learning are tightly bound activities, so questioning “what is learning?” might lead to having a closer look about what precisely are the components of teaching and their underlying principles as well as what can cause efficient learning (Dessus, Mandin, & Zampa, 2008). Joyce (2017) defined teaching as the creation of learning environments with long-range and short-term effects on students. "Content, skills, instructional roles, social relations, types of activities, physical facilities and their use all add up to an environmental system whose parts interact with one another to constrain the behaviour of all participants. The different combinations of these elements create different environments eliciting different educational outcomes". These outcomes are further differentiated as "instructional" (content and skills gained by the student through activities which characterize a learning environment) and "nurturing" (capacities and values which result from living in an environment). Thus, teaching is the process of carrying out those activities that experience has shown to be effective in getting students to learn.

De Houwer, Barnes-Holmes and Moors, (2013) defined learning as ontogenetic adaptation, that is, as changes in the behaviour of an organism that result from regularities in the environment of the organism. Learning is the process by which one acquires, ingests, and stores or accepts information. Thus, our experiences with learned information compose our bodies of knowledge. Learning is a process unique to each individual. Some learn quickly, scanning the information and mastering the concept or skill seemingly effortlessly. Others stumble while processing information, taking longer to grasp the concept of requiring numerous exposures over a sustained period. Some individuals store the information they have learned indefinitely, cementing it in their memories. Others find that the information they have learned slips away rapidly. Some learn best through text, others through practice and some through hearing. Learning styles are as unique and varied as our personalities. Learning is a lifelong endeavour. As long as one remains engaged in life, learning does not cease.

2.3 Information and Communication Technology

According to Owusu-Ansah, (2015), Information technology (IT) refers to all equipment, processes, procedures and systems used to provide and support information systems (both computerized and manual) within an organization and those reaching out to customers and suppliers (Hashim & Jones, 2007). The term "Information and Communication Technology (ICT)" was coined to reflect the seamless convergence of digital processing and telecommunications (Gragert, 2000). ICTs include hardware, processes and systems used for storing, managing, communicating and sharing information (ICT in Education Policy, 2008). ICTs are indispensable and have been accepted as part of the contemporary world especially in industrialized society (Hawkins, 2002). Pelgrum and Law (2003) state that near the

end of the 1980s, the term 'computers' was replaced by 'IT' (Information Technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the introduction of the term 'ICT' (Information and Communication Technology) around 1992 when e-mail started to become available to the general public (Pittard, Bannister & Dunn, 2003).

According to a United Nations report (1999), ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities. According to Tomei (2005), information and communication technology (ICT) may be regarded as the combination of 'Informatics technology' with other related technology, specifically communication technology. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs have been used in education for different purposes (Somekh, 2008). Zhao (2007), is of the view that the field of education has been affected by ICTs, which have undoubtedly affected teaching, learning, and research. A great deal of research has proven the benefits to the quality of education (Al-Ansari, 2006). ICTs have the potential to innovate, accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Kozma, 2003).

According to Nwagwu (2006), Information and Communication Technologies (ICTs) are electronic technologies used for information storage and retrieval. Ayodeji

(2004) defined ICT as electronic-based technology that is generally used to retrieve store, process, and package information as well as provide access to knowledge. The development of microcomputers, optical disc, the establishment of telecommunication network, television, the internet, etc. have assisted in broadening people's knowledge and facilitating effective communication. Ugwu and Oboegbulem (2011) stated that ICTs in education encompasses a great range of rapidly evolving technologies such as desktops, notebooks, digital camera, local area network (LAN), the internet and the World Wide Web (WWW), CD-ROM (Compact Disc Read-Only Memory)and DVDs and applications spreadsheets, tutorials, simulations, electronic mails, digital libraries, computer-mediated conferencing, video conferencing and virtual reality. In effect, ICT has reduced the barriers that characterized interrelationship in terms of space, time, and learning activities. ICT tools for teaching and learning include computer, internet, PowerPoint, television, overhead projectors, camera, radio cassette, videotape, audio cassette, audio cd, www and telephone (Gannon, 2004).

Information and Communication Technology as tools within the school environment include use for school administration and management, teaching and learning of ICT related skills for enhancing the presentation of classroom work, teaching/learning tasks, teaching/learning intellectual, thinking and problem-solving skills, stimulating creativity and imagination, for the speech by teachers and students and as a communication tool by teachers and students (Pennington, 1996; Moore, 1996).

As public awareness grew, this need for computer literacy became extremely influential and many schools in the developed world purchased computers based on this rationale. The 1990s was the decade of computer communications and information access, particularly with the popularity and accessibility of internet-based

services such as electronic mail and the WWW. At the same time, the CD-ROM became the standard for distributing packaged software replacing the floppy disk. This allowed large information-based software packages such as encyclopedia to be cheaply and easily distributed. As a result, educators became more focused on the use of technology to improve student learning. This transformation requires that the education sector be able to harness the full potential of ICTs to improve the quality of teaching and learning. It is, therefore, not surprising that the use of ICTs is on the rise in many educational institutions because they serve numerous purposes in teaching and learning. Fan and Ho (2012) identify three main uses of ICT in education. The primary role of ICT is to improve teaching and learning using application software. The second purpose is to facilitate administrative roles such as grading and keeping records in schools for tracking students' learning history and performance. The third role of ICT in education is to build the information literacy of students.

The rationale for ICT investments in education is based on the assertion that traditional teaching and learning methods in which knowledge is imposed on learners have not provided enough opportunities for learners to create their knowledge and develop critical minds. Osun (1998) thus argues that the use of computers in classrooms provide key ingredients in teaching and learning that were lacking in all previous tools that raised high expectations when introduced in the educational system. Previous tools such as the blackboard only presented information to students. Computers have resulted in what he calls ''individualized interactivity'', providing the opportunity for information to be given to students as well as adopting presentations to students' needs and preferences. The integration of information and communication technologies can help revitalize teachers and students. This can help

to improve and develop the quality of education by providing curricular support in difficult subject areas.

To achieve these objectives, teachers need to be involved in collaborative projects and the development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to Zhao and Cziko (2001), three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally, teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Sheets, 2005).

2.4 Teaching and Learning Technologies

Since the invention of computers, schools have implemented novelties to help deal with the complexities of giving quality pieces of training. With the introduction of the Internet, those advances have extended further. From course enrolment to representative administration to understudy joint effort to task following, PCs and the Internet have radically changed instructing and learning in advanced education. Various programming bundles are touted by organizations as giving rearrangements of the bureaucratic wreckage innate to extensive associations. In today's classroom, innovation is a device, as well as an asset for getting to data that additionally empowers learning. New open doors and approaches to incorporate innovation into the learning procedure are being made each day. The following are a portion of the advances that improve instructing and learning process.

2.4.1 Web Information Systems

A Web Information System is an information system that uses Internet web technologies to deliver information and service to users or other information systems/applications. Thus, it is a software system whose main purpose is to publish and maintain data by using hypertext-based principles. Web Information Systems (WIS's) have turned into a staple for advanced education schools. They can oversee everything from worker finance to understudy course determination. As a suite of programming applications that draw data from a unified database, WIS's are essential to class overseers, letting them rapidly get to data through a web program from any Internet-associated PC.

Understudies and staff can likewise utilize WIS's to deal with their courses, finance status and assess their degree status. WIS's regularly give the establishment other instructive advancements for use in their work (SunGard Higher Education, 2010). For instance, some Learning Management Systems utilize the course information put away in the WIS to make individualized pages controlled by the educator and available to the understudies. Amongst the most prevalent WIS's utilized by educational systems worldwide is the Banner Unified Digital Campus worked by SunGard Higher Education (2010). It can be incorporated and customized to a specific establishment.

2.4.2. Learning Management Systems

According to Adzharuddin and Ling (2013), Learning Management System (LMS) is an online portal that connects lecturers and students. It provides an avenue for classroom materials or activities to be shared easily. It is also a portal that enables lecturers and students to interact out of the classroom, having discussions through forums that could otherwise take up too much of the time supposed to be spent

learning in the classroom. Learning Management Systems (LMS's) give teachers an individualized online space for each of their classes. Many give the capacity to post archives, send declarations, oversee reviews and empower talks (Powel & Gill, 2003). Educators can contact understudies and keep tabs on their development in online assignments.

Most Learning Management Systems contain the capacity to connect with WIS's keeping in mind the end goal to streamline the page creation preparation (i.e. utilize class records to keep up authorizations for a specific course). Some prominent LMS's incorporate Blackboard, WebCT and Moodle. Chalkboard is the biggest and most compelling element of the three since it obtained WebCT. The backboard is incorporating the two organizations' product bundles (Bremer & Bryant, 2005). On the other hand, Moodle is a free open source programming bundle that has as of late developed as a rival in the advanced education LMS domain. As an open-source extension with many dynamic designers, Moodle permits any product specialist to make modules to develop its abilities. As of now, more than 45,000 government associations, organizations, and instructive establishments keep up dynamic establishments of Moodle around the world; Hong Kong itself has seventy-eight known establishments (Martin & Serrano, 2009).

In this modern world where information is disseminated quickly via the internet, the LMS is an essential tool for university students as not they can keep updated with their coursework, but get instant notifications on their daily assignments. In turn, lecturers have an easier time reaching out to their students out of class hours and can instantly update them over the LMS about issues regarding their coursework. Although those using the LMS might encounter some problems, it's all part of learning and using a whole new system altogether. Schools should provide proper

training and guidance for students and lecturers using the LMS, as well as have a team, which is on-call at all times to solve any problems that may arise (Adzharuddin & Ling (2013).

2.4.3. Virtual Reality

According to Mandal (2013), Virtual Reality (VR) is a technology, which allows a user to interact with a computer-simulated environment, whether that environment is a simulation of the real world or an imaginary world. It is the key to experiencing, feeling and touching the past, present and future. It is the medium of creating our world, our customized reality. It could range from creating a video game to having a virtual stroll around the universe, from walking through our own dream house to experiencing a walk on an alien planet. With virtual reality, we can experience the most intimidating and gruelling situations by playing safe and with a learning perspective.

According to Piovesan, Passerino and Pereira (2012), education can be seen as a discovery, exploration and observation process, besides the eternal construction of knowledge. With this, the specific characteristics of virtual reality can transform it as a mighty tool in service for everybody who seeks an education evolution. Many things that until a short time ago were dreams, here become reality nowadays, with the current technological advances became reality. With virtual reality acting in education we can discover, explore and build knowledge about places and situations that we could never explore. The great potential of virtual reality is exactly on these possibilities, not only through classes or physical objects but also through the virtual manipulation of the target to be explored, analysed and studied.

According to Clark (2006), Virtual Reality can be used to make learning more interesting and fun to improve motivation and attention, decrease costs when using

the objective and the real environment no matter how expensive the simulation is. Virtual Reality presents an opportunity of learning with a real situation, but artificially created, facilitating the visualization and the interaction sensation with the study focus. When we cannot have the real experiences, the Virtual Reality is irreplaceable. The simulation in the Virtual Reality also permits us to be in hard and dangerous situations, which are not usually accessible in the real world. Also, it can change the way a learner interacts with the subject matter. Virtual Reality requires interaction. It encourages active participation rather than passivity. The participant who interacts with the virtual environment is encouraged to continue interacting by seeing the results immediately. It provides an opportunity for the learner to make discoveries previously unknown. New perspectives are made possible by modelling the real world, and studying the model can provide insights never before realized. Virtual Reality allows the disabled to participate in an experiment or learning environment when they cannot do so otherwise (Pantelidis, 2010).

Review of Empirical Studies

The empirical studies have been reviewed in line with the objectives of the study such as; perception of teachers on the use of ICT tools for teaching and learning, availability of ICT infrastructure for teaching and learning, challenges encountered in using ICT for teaching and learning.

2.7 The Perception of Teachers and Students and the use of ICT Tools for Teaching and Learning

The utilization of ICT in senior high schools in Ghana is recognized as a medium for revolutionizing the educational process and has since been welcomed with momentous eagerness (Mfum-Mensah, 2003). ICT integration into educational curricula for students in senior high schools does impact positively on the knowledge

and abilities of both students and teachers (Pittard, Bannister & Dunn, 2003). British Educational Communications and Technology Agency (BECTA) (2004), noted that the perceived benefits of fusing ICT into education could be measured by the pedagogical knowledge of both students and teachers.

Jhurree (2005) posited that much has been said and reported about the impact of technology, especially computers, in education. Initially, computers were used to teach computer programming but the development of the microprocessor in the early 1970s saw the introduction of affordable microcomputers into schools at a rapid rate. Computers and applications of technology became more pervasive in society which led to a concern about the need for computing skills in everyday life. Hepp, Hinostroza, Laval and Rehbein (2004) claim in their paper "Technology in Schools: Education, ICT and the Knowledge Society" that ICTs have been utilized in education ever since their inception, but they have not always been massively present. Although at that time computers have not been fully integrated with the learning of the traditional subject matter, the commonly accepted rhetoric that education systems would need to prepare citizens for lifelong learning in an information society boosted interest in ICTs (Pelgrum & Law, 2003).

In a sense, it was considered that the computer would 'take over the teacher's job in much the same way as a robot computer may take over a welder's job. Collis (1989) refers to this as "a rather grim image" where "a small child sits alone with a computer". However, the use of information and communication technologies in the educative process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education refers to the development of information and communications technology specifically for teaching/learning purposes, while the

ICTs in education involves the adoption of general components of information and communication technologies in the teaching-learning process.

According to Kirschner and Selinger (2003), Information and Communications Technology (ICT) offers the potential to meet the learning needs of individual students; promote equality of opportunity; offer high-quality learning materials, and to increase self-efficacy and independence of learning amongst students of all ages. For the teaching profession, ICT is not only an essential tool for teachers in their daily work, but it also offers them opportunities for their professional development. It can be used to encourage new ways of working as part of professional learning teams and it offers schools themselves the possibility of a faster route to establishing a meaningful role in the wider community, embracing learners of all ages, linking and networking to other educational establishments and bringing professionals together across a range of areas.

Lots of studies continue to report on perceptions of teachers on the use of ICT tools for teaching and learning. In a study of students of some selected schools in Hong Kong, the research found out that the positive result that came out of the educational methods that utilized ICT was the endorsement it gave educators and students. Consequently, teachers over the globe keep on ascribing importance to the use of ICT in teaching and learning (Law, Lee & Chow, 2002). Gragert (2000) noted that students in second cycle institutions were more anxious to study as a result of using ICT related devices and also through computer-based knowledge acquisition. Teachers in the study affirmed the fact that using ICT for teaching and learning increased student‘s participation in the educational process. In similar research, Schulz-Zander, Büchter & Dalmer (2002) perceived students cooperation and concluded that students tend to assist each other technically with problems that arise

from the use of ICT thereby functioning as an academic discourse community and working together in joint associations with different schools.

Haddad and Drexler (2002) revealed that ICT integrated teaching and learning stimulates scholarly interest and offer a feeling of satisfaction that will shift the students from the static part of beneficiaries of knowledge to the dynamic part of manufacturers of information. In an empirical study conducted by Hennessy, Ruthven and Brindley (2005), it was established that there was an anticipated pressure with the integration of ICT in the educational process and this conformed to external conditions of traditional examinations. Conditions needed to integrate ICT into education to intensify teaching and learning were deemed problematic. For instance, the use of ICT gadgets was not allowed during examinations and this action brought about a decline in motivation amid educators and students using ICT for teaching and learning (Hennessy *et al*., 2005).

In a study conducted by Eugene (2006), an observation method was used to investigate educators' expectation and perception of the use of ICT for teaching. The study found out that there was a disparity between educators' expectation and their perception of the substantial utilization of ICT in the classroom. Another study carried out by Simonson (2004) to investigate the beliefs of high school teachers confirmed that there was a correlation between teachers' perception and their use of ICT in teaching. Drent and Meelissen (2008) confirmed the assertion made by Simonson (2004) which revealed a study of two hundred and ten teachers showing a confirmation of teachers' technological use and positive attitude towards the utilization of ICTs correlated the innovative use of ICTs in teaching. Huang & Liaw (2005) in a related study involving six European Union countries affirmed that teachers' perception of the use of ICT has a positive effect on their recognition of the

benefits of ICT and its use in education. A study also conducted by Rozell & Gardner (1999) revealed an interrelationship between teachers' ICT knowledge experience and their perception in the integration of ICT into teaching and learning. Van Braak, Tondeur and Valcke (2004), supported this assertion with a study conducted which revealed that knowledge in ICT is envisaged to allow for efficient use of computers and their related technologies in instructing and learning.

In Africa, Mbah (2010) also explored the influence of ICT integration on the learning pattern of students of the University of Buea in Cameroon and found out that students were more comfortable using ICTs and used them to improve their learning habits. The study also highlighted the positive relationship between students' approach towards the use of ICT and their study habit. Buabeng-Andoh (2012) however stated that in Ghana, the study of teachers' perception in the utilization of ICT in education in second cycle institutions is limited as compared to senior high schools in developed countries. His study, therefore, spanned from teachers' perception, their perceived skills through to the extent of using ICT for teaching and learning. In the study, a greater percentage of the research participants strongly agreed that ICT can improve students' engagement in the educational process, assessment to educators and also increase students' participation. The discovery of the study also revealed a positive correlation between ICT use and competencies and inferred that educators' capability and certainty were indicators of utilizing ICT in educating and learning.

2.8 Availability of ICT Infrastructure for Teaching and Learning

Since the invention of computers, schools have implemented novelties to help deal with the complexities of giving quality pieces of training. With the introduction of the Internet, those advances have extended further. From course enrolment to

representative administration to understudy joint effort to task following, PCs and the Internet have radically changed instructing and learning in advanced education. Various programming bundles are touted by organizations as giving rearrangements of the bureaucratic wreckage innate to extensive associations. In today's classroom, innovation is a device, as well as an asset for getting to data that additionally empowers learning. New open doors and approaches to incorporate innovation into the learning procedure are being made each day.

The utilization of ICT in education became popular in educational policy-making in the early 1980 when microcomputers became accessible to individuals due to their low cost as compared to the days when the computer came into existence. Policymakers have been commended for the introduction of ICT into education especially in secondary schools in Ghana due to the positive impact of ICT integration (Mfum-Mensah, 2003). A careful study of some research on the availability of ICT infrastructure in Ghanaian senior high schools explains the serious injustice meted out to some schools with regards to the distribution of ICT resources for teaching and learning (Mfum-Mensah, 2003). This assertion was supported by Parthemore (2003), who revealed that there was a bias in the distribution of ICT infrastructure among senior high schools found in urban and rural centres. The study also revealed that senior high schools were placed into categories and those found in "Grade A" institutions benefited more from the distribution of ICT resources for teaching and learning as compared to the other categories. Even before the use of ICT in educating and learning in senior high schools, resources meant for formal education was skewed to favour schools that were located in urban centres as compared to those in the rural areas (Folson, 1995).

Since the emergence of formal education in Ghana, there has been an unequally sharing of educational resources among schools found in urban and rural centres, 'Grade A, B, C and D' schools and also among private owned and public owned schools (Asiedu-Akrofi, 1982). The unequal distribution of ICT resources amongst senior high schools has led to the unavailability of ICT infrastructure amongst some senior high schools in Ghana especially those that are less endowed. The introduction of second cycle institutions in Ghana especially those in the rural areas are faced with a dilemma of access and availability of ICT for teaching and learning. Mfum-Mensah (2003) again revealed that most rural senior high schools in Ghana are faced with inadequate infrastructure, lack of trained educators who have the expertise in the use of ICT, unsupported curriculum and a well-established ICT integration policy coupled with inaccessible electricity. All these hinder the access and availability and access of ICT for teaching and learning in some deprived communities.

Notwithstanding these challenges which have affected the accessibility of ICT for instructing and learning, the Ministry of Education in Ghana has put in measures that encourage policymakers, non-governmental organizations (NGO), and school administrators to put in a shared endeavour to encourage the use of ICT in Ghanaian senior high schools. The endeavours of the Ministry of Education and other philanthropist have led to the expansion of ICT facilities to senior high schools in Ghana, especially deprived communities (Parthemore, 2003). Parthemore (2003) again revealed that senior high schools in Ghana can now pride themselves on the availability of ICT infrastructure in the various schools through which students are gaining basic computer knowledge. Mfum-Mensah (2003) also posited that some of these senior high schools who are beneficiaries of these government and donor

support can now boast of internet access which enables teachers and student to have access to more information relating to their subject area of teaching and learning. According to Hawkins (2002) senior high schools which are found in either urban or rural centres, 'Grade A, B, C or D', private owned or publicly owned are now benefiting from the availability of ICT infrastructure which was made possible by the government, NGO's and other donor organization. Parthemore (2003) again argued that ICT integrated teaching and learning has been centred in major cities within Ghana depriving the less endowed ones in the rural centres. The underprivileged schools are also undertaking steps to close up the gap created by their urban and premier counterparts by outsourcing the training of the use of ICT for teaching and learning to private individuals and firms (Mfum-Mensah, 2003). Mfum-Mensah (2003) again pointed out that the amount to be paid for outsourcing has a huge repercussion on the school's budget due to budgetary constraints of most public and private senior high schools.

Notwithstanding the challenges faced by the availability and access to ICTs in senior high schools, most urban and rural schools in Ghana now have ICT rolled out in their respective schools. However, there still are some schools in rural and deprived communities and even in urban communities that are yet to benefit from the Ministry of Education's ICT integration policy as part of their school's curriculum (Mfum-Mensah, 2003). The emergence of information and communication technologies has brought about a collaboration among students and teachers in secondary schools which have led to the contribution to knowledge acquisition and information dissemination.

2.11 Challenges encountered in using ICT for teaching and learning

Despite the use of ICT in educating and learning having several benefits, the system comes with a myriad of challenges. According to Koehler et al. (2012), the use of ICT for teaching and learning comes with several challenges and it is further complicated with the introduction of new technologies every day. Several challenges have been identified from a review of previous empirical studies. There would therefore be the need to classify the challenges into four main categories which are resources, knowledge and skills, institution and subject culture (Koehler *et al*., 2013).

Educational policymakers and stakeholders in Ghana are focused on the way students and teachers integrate ICT into teaching and learning in the various secondary schools and how this adoption has supported their practices. This notwithstanding, educators have not encouraged the meaningful use of ICTs by students for learning activities (Becker, Ravitz, & Wong, 1999).

Inadequate resources arise when there is the need for ICT to be integrated into teaching and learning. Resources may include technology, access to the needed application and support from technical expert. Inadequate technological resources include obsolete and insufficient computers, incompatible hardware and software (Karagiorgi, 2005), leads to little chance for teachers to include ICT into teaching and students into learning. Integration of ICT into teaching and learning according to Koehler et al. (2012), goes beyond the availability of technology in the schools, it includes making the right hardware and software accessible to teachers and students for use. Insufficient time is also a resource-type challenge in the use of ICT for teaching and learning. Teachers, according to Butzin (2001) need more time to go through web pages and to identify pictures they need for the multimedia assignment they give to students. Inadequate technical support as a resource as posited by Rogers,

Medina, Rivera, & Wiley (2005), has led to teachers and student not able to use different technological approaches in integrating ICT into teaching and learning.

British Educational Communications and Technology Agency (BECTA) (2004), also emphasized some challenges to the use of ICT for teaching and learning and attributed it not only to the lack of access to ICTs but rather poor organisation and utilization of availability of resources. This affirmation was supported by Empirica (2006), who saw lack of access as the predominant challenge in the utilization of ICT. The use of inappropriate equipment and lack of infrastructure are among the challenges associated with the integration of ICT into senior high schools (Gomes, 2005).

Insufficient technological knowledge and skills, unsupported pedagogical knowledge and skills have been captured as a crucial challenge to the integration and use of ICT for teaching and learning (Koehler et al., 2012). Inadequate technological know-how is a major reason why teachers and students are not using ICT (Snoeyink & Ertmer, 2001). In an empirical study conducted in Scottish schools, Williams, Coles, Wilson, Richardson and Tuson (2000), identified that insufficient skills in the use of databases and Microsoft excel were a major factor by some secondary school teachers and students. A study also conducted in Australia by Newhouse (2002), emphasized the inadequate knowledge and skills by teachers and students to manipulate computers characterized the challenges faced by the use of ICT for teaching and learning. According to Newhouse (2001), teachers were not excited about the changes and integration of ICT into teaching and learning practices. In the study of high schools in the United States of America, Snoeyink and Ertmer (2001), noted that inadequate pedagogical knowledge was a contributing factor to the challenges associated with the use of ICT for teaching and learning. In the same

study, teachers made sure they acquired basic skills such as connecting to a network, surfing through applications, and simple word processing techniques before they engage in technology-related activities with their students and this they also found to be time-consuming. This was justified by Hughes (2005), who argued that teachers must poses the requisite technical skills to be able to integrate ICT in teaching.

Institutional challenges can also be associated with the use of ICT by teachers and students and these may include school authorities and school timetable or calendar as posited by Koehler *et al*. (2012). Studies have proven that school authorities can impede the integration of ICT into teaching and learning. Fox and Henri (2005) affirmed this in their study which highlighted that most Hong Kong teachers felt their heads in secondary schools did not have knowledge in technology and its importance to the country's shift to more learner-centred activities. A timetable that is not flexible can also be a challenge in the use of ICT by teachers and students. In research that covered over four thousand teachers in more than one thousand one hundred high schools in America, students had less than an hour for subjects they learn in a class (Somekh, 2008). Such limited time will not allow for the variety of ICT usage by both student and teachers.

Subject culture in the context of ICT integration alludes to the "general arrangement of standardized practices and desires which have grown up around a specific school subject and shapes the meaning of that subject as a particular area of study" (Goodson & Mangan, 1995). Subjects taught in secondary schools are shaped by their content and subject pedagogy. Teachers do not have the urge to use ICT to teach subjects that seem incompatible with ICT (Hennessy, Ruthven, & Brindley, 2005). Selwyn (2004) also emphasized an art teacher who rejected the use of computers when painting, arguing that a student will be more inclined with using his

physical hands. The art teacher believed that using a computer mouse makes one's mind and hands disjointed. In Africa, Alemneh and Hastings (2006) conducted an empirical study which suggests the lack of trained teachers who will impact into the intellect of students in secondary school as the major challenge that is faced with the use of ICT for teaching and learning. The same study also found out that trained teachers who were well equipped in the use of ICT for teaching and learning purposes preferred leaving the continent to the western world due to poor remuneration coupled with inadequate ICT infrastructure.

In Ghana, the use of ICT in education is fraught with several challenges. Mereku, Yidana, Hordzi, Tete-Mensah, & Williams (2009) found out that out of ten Ghanaian senior high schools in Ghana which had computer laboratories, the ones accessible to both students and teachers easily got damaged due to inoperative air-conditioners in the computer laboratories, power fluctuations, obsolete computers and malware attacks. The study also found out that none of the computer laboratories in the ten schools was connected to a server and only four computers out of twenty computers in one of the schools were connected to the internet.

A study was conducted by Afful-Dadzie (2010) on the use of ICT by students and teachers in senior high schools in the Sekondi-Takoradi Metropolis. The study employed a descriptive survey as the research design. The data collection instrument for the study was a questionnaire for students and teachers and an observation checklist. The population of the study was derived from students and teachers of all the eleven public senior high schools in the Sekondi-Takoradi Metropolis. Sampling selection of the teachers and student used the lottery method. Concerning the barriers to the use of ICT in the senior high schools in the catchment area, the teachers agreed that the integration of ICT is associated with uncertainty. They did not know how to

incorporate ICT into the normal teaching process. The study also revealed that teacher does not want to change their habit of teaching traditionally to the use of ICT as they agreed that force of habit is a hindrance to the interrogation of ICT. Moreover, the study revealed that an inadequate support network is a barrier to the integration of ICT. Inadequate follow-up support was also seen to be a hindrance to the integration of ICT in the teaching and learning process.

A study conducted by Organization for Economic Cooperation Development (OECD) in 2009 confirmed that there are some barriers or challenges that inhibit 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, Lewis and Smith (2002) classified these barriers as limited equipment, inadequate skills, minimal support, time constraints and lack of interest or knowledge by teachers.

Theoretical Framework

The subsection addresses the basic theories that underpin this study. The assumptions underlying this study are derived within the framework of the Technology Acceptance Model (TRA) and Theory of Reasoned Action (TRA)

Technology Acceptance Model (Venkatesh & Davis 2000)

The technology acceptance model (TAM) is an information systems theory that models how users come to accept and use technology. The actual system *use* is the end-point where people use the technology. Behavioural intention is a factor that leads people to use the technology. The behavioural intention (BI) is influenced by attitude (A) which is the general impression of the technology. The model suggests that when users are presented with new technology, many factors influence their decision about how and when they will use it, notably: Perceived usefulness (PU) –

This was defined by Fred Davis as the degree to which a person believes that using a particular system would enhance his or her job performance. It means whether or not someone perceives that technology to be useful for what they want to do. Perceived ease-of-use (PEOU) – Davis defined this as the degree to which a person believes that using a particular system would be free from effort (Davis 1989). If the technology is easy to use, then the barriers conquered. If it's not easy to use and the interface is complicated, no one has a positive attitude towards it. External variables such as social influence are an important factor to determine the attitude. When these things (TAM) are in place, people will have the attitude and intention to use the technology. However, the perception may change depending on age and gender because everyone is different.

Theory of Reasoned Action

The theory of reasoned action (TRA or ToRA) aims to explain the relationship between attitudes and behaviours within human action. It is mainly used to predict how individuals will behave based on their pre-existing attitudes and behavioural intentions. An individual's decision to engage in a particular behaviour is based on the outcomes the individual expects will come as a result of performing the behaviour. Developed by Martin Fishbein and Icek Ajzen in 1967, the theory derived from previous research in social psychology, persuasion models, and attitude theories. Fishbein's theories suggested a relationship between attitude and behaviours (the A-B relationship). However, critics estimated that attitude theories were not proving to be good indicators of human behaviour The TRA was later revised and expanded by the two theorists in the following decades to overcome any discrepancies in the A-B relationship with the theory of planned behaviour (TPB) and reasoned action approach (RAA). The theory is also used in communication discourse as a theory of

understanding. The primary purpose of the TRA is to understand an individual's voluntary behaviour by examining the underlying basic motivation to act. TRA states that a person's intention to perform a behaviour is the main predictor of whether or not they perform that behaviour. Additionally, the normative component (i.e. social norms surrounding the act) also contributes to whether or not the person will perform the behaviour. According to the theory, the intention to perform certain behaviour precedes the actual behaviour. This intention is known as behavioural intention and comes as a result of a belief that performing the behaviour will lead to a specific outcome. Behavioural intention is important to the theory because these intentions are determined by attitudes to behaviours and subjective norms. TRA suggests that stronger intentions lead to increased effort to perform the behaviour, which also increases the likelihood for the behaviour to be performed.

2.12 Summary

ICT Teachers are employed to adopt and integrate ICT into their teaching and Learning but teachers' preparedness to integrate ICT into teaching determines the effectiveness of the technology and not by its sheer existence in the classroom. One of the factors that influence the successful integration of ICT into teaching is teachers' attitudes and beliefs towards technology. However, according to Law, Lee and Chow, (2002); if teachers' attitudes are positive towards the use of Educational technology they can easily provide useful insight into the adoption and integration of ICT into teaching and learning processes. Moreover, gender differences in the use of ICT have been reported in several studies. Research has revealed that male teachers use more ICT in their teaching and learning processes their female counterparts (Jones, 2003). Finally, teachers' readiness in teaching ICT does not influence the use of computer technology in teaching (Hennessy, Ruthven, & Brindley, 2005).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was adopted in conducting the research. The chapter defines the research design, population, sample and sampling procedure, as well as the type of instrument that were used. The validity and reliability of the instrument were also established. The data collection procedures and data analysis techniques used in analyzing the results of the study are also discussed as well as ethical considerations.

3.2 Research Design

A research design is a plan, blueprint or idea for obtaining responses to the questions being studied and for managing and controlling some difficulties that may be encountered during the research process. The purpose of research design is normally to be able to develop an appropriate research pattern to meet the unique requirement of the study (Polit & Beck 2004). Polit and Beck (2004) suggest that an overarching criterion must direct the selection of a good research design, whether the design does the best possible job of presenting trustworthy answers to the research question.

A descriptive design was used for the study. Descriptive research is research that specifies the nature of a given phenomenon. It determines and reports the way things are. Descriptive research, thus, involves collecting data to test the hypothesis or answer research questions concerning the current status of the subject of the study (Gay, 1992).

Best and Khan (1993) described descriptive research as the conditions or relationships that exist, such as determining the nature of prevailing conditions,

practices and attitudes; opinions that are held, processes that are going on; or trends that are developed. Amedahe (2002) also maintained that in descriptive research, accurate description of activities, objects, processes and persons is the objective. Amedahe noted that research is not fact-finding per se. There is considerably more to descriptive research than just asking questions and reporting answers.

The purpose of the survey was generalised from a sample so that inferences can be made about the characteristics being sought about the population. Descriptive research aims to describe the social system, relations, or social events, providing background information to the issues in question as well as stimulating explanation. Descriptive research is also employed to explain the causes of social phenomena and the consequences between variables so that one is the cause of the other.

Any research undertaking involves lots of cost implications; hence this design was deliberately selected for the study because it would allow for quick data collection at a comparatively cheaper cost. Notwithstanding these, the survey design remained the most appropriate because the study could draw meaningful conclusions from the data obtained. Descriptive research was used to find out the use of ICT for teaching and learning in Mpraeso Senior High School in the Kwahu South District.

3.3 Population

Polit and Beck (2004) define a population as "the entire aggregation of cases that meet a designated set of criteria. The target population is the aggregate of cases about which the researcher would like to make a generalisation". (P. 290). The population of the study consisted of all the ICT teachers in senior high schools in the Kwahu South Municipality. The total population was 150.

3.4 Sample and Sampling Procedures

A sample is a selection of units from the total population to be studied that represents a portion of all the elements in a population (Cohen, Manion & Morrison, 2011). The sampling design is the plan for selecting a sample from the population (Cohen, Manion & Morrison, 2011). The objective of any sampling plan is to secure a sample that would represent the characteristics of the population. A sample of 70 teachers was selected for the study. According to Saunders, Lewis and Thornhill (2007), it is appropriate to sample 5 – 30% of the accessible population for a study.

The purposive sampling technique was used in selecting five senior high schools in the Kwahu South Municipality. In purposive sampling, the cases to be used in the sample are handpicked based on their judgment of their typicality or particular knowledge about the issues under the study (Leedy & Ormrod, 2005). The power of purposive sampling lies in selecting information rich-cases for in-depth analysis related to the central issues being studied.

The stratified sampling technique was used to group employees into strata, thus male and female. Robson (1993) described stratified sampling as the optimum choice as the means are likely to be close to the mean of the overall population. Stratified sampling achieves greater precision provided that the strata have been chosen so that members of the same stratum are as similar as possible in respect of the characteristics of interest.

A simple random sampling technique was finally used in selecting teachers from each stratum. The lottery method was specifically used. The researcher wrote all the names of teachers listed in eh sample frame on a sheet of paper and threw it back into the container. The researcher ignored already drawn names. The process continued until the required number of respondents was selected.

3.5 Research Instrument

The questionnaire was employed for the study. The researcher used a questionnaire for the collection of quantitative data. Polit and Beck (2004, p. 729) define a questionnaire as "an instrument for gathering self-report information from respondents through self-administration of question in a paper-and-pencil format". The utilization of structured questionnaires enhances the objectivity and support statistical analysis. The respondents respond to series of pre-developed questions posed by the researcher.

Close-ended types of questions were used. There were four sections in the questionnaire. Section 'A' was used to collect the background information of respondents. Section 'B' contained items used to solicit information about the perception of teacher towards the use of ICT in teaching and learning, section 'C' sought information about the availability of ICT facilities in the teaching and learning in the school. Section 'D' contained information on challenges teachers face in using ICT's in the teaching and learning process. Items on a four and two-point Likert type questionnaire were created for the accurate representation of information. It has been noticed that the Likert scale is the most suitable form of an instrument for attitudes and perceptions assessment. This is because it provides respondents with the opportunity to demonstrate their degree of approval with a series of statements on how respondents feel or think about a question (Bryman, 2004). It was the preferred instrument because it was easy to design, administer and score (Borg & Gall 1983).

The questionnaire was used because, in comparison to other methods, it has the following advantages, it has a high response rate, and it simplifies the data analysis steps. Its setbacks can be seen in the areas where respondents may not have

appropriate answers to the items as the process usually involves the use of structured items.

3.6 Validity and Reliability of the Instrument

The need to get the validity, reliability and appropriateness of the questionnaire instrument, a pilot test of the instrument was conducted in the Nkwatia Senior High School in the Kwahu East District. This District was chosen as it shared a boundary with the Kwahu South District and has similar characteristics to the study area. Cohen *et al.* (2005) explain reliability as the likelihood of obtaining the same results when the researcher measures the same variable more than once, or when more than one person measures the same variable. Reliability, therefore, relates to the measurement accuracy of the Data collection instrument. It can be said that an instrument is reliable if its measurement accurately reflects the true score of the attribute under investigation (Polit & Beck 2004). The significance of the pilot test has been discussed by various writers. Bryman (2004) asserts that it "ensures that the instrument as a whole function well (p.159). In support Cohen, Manion and Morrison (2005) emphasised that there is the need for "the researcher, to select appropriate levels for which to test the independent variables for differences to be observed and to identify possible snags in connection with any aspect of the investigation". (pp. 215-216). Based on these principles, respondents from these two Public Senior High School were used for the Pilot Test. The pilot test results were of great help to the researcher as they revealed flaws in the wording of some of the questions that might have corrupted the responses. Responses to some of the items on the questionnaire and again suggestions from teachers helped to identify the unclear items. This made it possible for the researcher to reach the final items that were used for the study. The researcher calculated the Cronbach's coefficient alpha scores. The Cronbach's

coefficient alpha was calculated to test the reliability of the questionnaire with specific reference to its internal consistency. It is the most commonly used statistic for evaluating internal consistency, and its scores communicate reliable statistics. It measures the extent to which the performance is a good indicator of performance in any other item in the same instrument (Cohen *et al*., 2005). The reliability coefficient of all sections (A, B and C) were computed for the main questionnaire, the table (Table 1) indicates the Cronbach's coefficient Alpha scores of the various sections of the instrument.

Table 1: Cronbach's Coefficient Alpha

Section	Cronbach's coefficient Alpha	Number of items
A	0.74	10
B	0.86	10
C	0.81	10

3.7 Data Collection Procedure

The researcher took permission from the headmistress for the collection of the data needed for the study. Subsequently, the investigator discussed in detail the purpose of the investigation. Good rapport with the respondents was established before the administration of the questionnaire. The procedure of answering the questionnaire was made known to them. To giving responses to the questions free and frankly, honestly and sincerely, they were made aware that their responses would not affect them as it was only an exercise for research purpose and their responses would be kept confidential.

3.8 Data Analysis

Data collected was edited by carefully inspecting it to identify the mistakes and questions wrongly answered and responded to items. Data were analyzed using the Statistical Package for Service Solutions programme. The analysis was done systematically as per the objectives of the study and presented using frequencies and percentages. Measures of central tendencies such as mean scores and standard deviations were also used to analyze the information gathered.

3.9 Ethical Consideration

An undertaking shall be signed to establishing a bond agreement between the researcher and respondents. The students will be given a detailed letter of Assent and a letter of information that provides a thorough explanation of the study. This implies that the researcher should respect the rights, needs, values and desires of the respondents (Creswell, 2012). The respondents shall be assured of confidentiality and anonymity.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results from the analysis of the data collected from the respondents and entails the discussion of findings for the research questions. This chapter is grouped into two sections, thus the demographic and descriptive statistics. It contains information on the respondents' background as well as the various variables used in the study. Tables showing frequencies, percentages, means and standard deviations have also been used to facilitate the interpretation and discussion of the results.

4.1 **Demographic Statistics**

The gender of the respondents was the first demographic variable on the questionnaire intended to ascertain the total number of respondents for the study. The distribution of respondents by gender is presented in Table 1.

Table 1: Distribution of Respondents by Sex

Sex	Frequency	Percent
Male	50	71
Female	20	29
Total	70	100

Table 1 shows that out of the total of 70 respondents, the male respondents were 500 representing 71.0% whilst the female respondents were 29.0% representing 200. This implies that from the schools selected, the majority of teachers were males.

Another demographic variable of interest was the respondents' age. Table 2 presents the distribution of respondents by age.

Table 2–Distribution of Respondents by Age

Age	Frequency	Percent
20 – 30 years	40	57.0
31 – 40 years	15	21.0
41 – 50 years	10	14.0
Above 51 years	5	7.0
Total	70	100

Table 2 indicates that the majority of the respondents were below 40 years. Out of the total of 70 respondents, 40(57.0%) and 15(21.0%) were between the ages of 20 and 40 years. This means that majority of the teachers were between the ages of 20 –40 years.

Another important demographic variable of interest was the respondents' educational qualification. This variable was measured on a 4 point Likert scale. Table 3 presents the distribution of respondents by educational qualification.

Table 3–Distribution of Respondents by Educational Qualification

Educational Qualification	Frequency	Percent
Diploma/HND or equivalent	2	2.8
Degree (BA, BSc) or equivalent	58	82.8
Post Graduate (MED, MPHIL) or equivalent	10	14.2
Total	70	100

Table 3 clearly indicates that most of the respondents had attained some level of formal education. Out of the total of 70 respondents, 58(82.8%) had attained a degree qualification or its equivalent. Apart from that 10 representing 14.2% had obtained postgraduate degree qualification or its equivalent. This gives a clue that almost all ICT teachers in senior high schools in the Kwahu South Municipality had formal qualification which is a sine qua non for their day-to-day activities.

4.2 Research Question 1

The perception of teachers towards ICT integration in teaching and learning in Mpraeso Senior High Schools in the Kwahu South District

This research question sought to gather data on the perception of teachers towards ICT integration in the teaching and learning in senior high schools in the Kwahu South Municipality. Information obtained on factors that motivate students to select science programme are presented in Table 2.

Table 2: Perception of teachers towards the use of ICT in the teaching and learning

Statement	Mean	Std. Deviation
Motivate students in their learning	2.15	1.044
Makes lessons more concrete in class	1.92	1.083
Make lessons more diverse	1.89	.984
Increase productivity in lesson update	1.89	1.102
Help students to understand what they have been taught	1.76	1.063
Gives the teacher more confidence in teaching	1.60	.889
Enable the teacher to manage instructional time very well	1.53	.965
Make lessons more interesting	1.53	.994
Improves lesson presentation	1.50	.955
Make students attentive in class	1.37	.666

As shown in Table 2, from the table, it can be seen that teacher's perceptions on how the uses of ICT motivate student in their learning was the highest with (M=2.15, SD= 1.004), followed by how it makes lesson more concrete in class with (M=1.92, SD=1.083). In descending order, teacher's perception on how the uses of ICT in teaching and learning was as follows; Make lessons more diverse (M=1.89, SD= 0.984), Increase productivity in lesson update (M=1.89, D=1.102), Help students to understand what they have been taught (M= 1.76, SD=1.063), Gives the teacher more confidence in teaching (M=1.60, SD=0.889), Enable the teacher to manage instructional time very well (M= 1.53, SD=0.965), Make lessons more interesting (M=1.53, SD= 0.994), Improves lesson presentation (M=1.50, SD=0.955), Make students attentive in class (M=1.37, SD =0.666).

The results indicate that majority of the teachers have positive perception towards the use of ICT facilities in teaching, cluster of teachers agreed to the statement. The results indicated that teacher's perception about ICT facilities are that it makes student attentive in the teaching learning process, meet the different needs of their students, makes teachers more confidence, makes lessons more interesting and makes lesson more diverse. From the analysis of the data, as depicted in Table 2, one could infer that the perception of teachers on ICT integration in the teaching and learning are numerous. A large percentage of respondents agreed that ICT arouse the interest of the learners during teaching and learning process. This confirms a study conducted by Haddad and Drexler (2002). They found that ICT integrated teaching and learning stimulates scholarly interest and offer a feeling of satisfaction that will shift the students from the static part of beneficiaries of knowledge to the dynamic part of manufacturers of information.

These findings are also in line with the view of Perrotta (2013) that the perceived benefits of using technology included aspects such as the access that it gives to wider learning content and resources, and the fact that it allows students to become more motivated, more active and independent, and more attentive in their learning process. Again, these results were congruent to the view of Slouti and Barton (2007) who indicated 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. Balanskat *et al.* (2006) are of the view that ICT use enabled teachers to save time and to increase productivity in such activities as preparing and updating daily lessons and maintaining records.

This current study also affirmed the findings of Lai and Pratt (2004) who concluded that teachers considered ICT to be beneficial to their teaching but not in the area of methods of delivery and classroom practice. Significantly, the most obvious effect identified by the teachers was not a change of philosophy or pedagogy but improved efficiency in the administration and management of teaching, including lesson preparation and presentation.

4.3 Research Question 2

The available ICT tools used in teaching and learning in Mpraeso Senior High Schools in the Kwahu South District

In answering this question, data on the responses to items on the available ICT tools used in teaching and learning in tsenior high schools in the Kwahu South Municipality. The data collected were collated and analyzed using percentages. In doing this, the frequency counts of the number of respondents who gave different responses were computed. The findings are shown in Table 3

Table 3: Available of ICT tools use in teaching and learning

Statement	Mean	Std. Deviation
Printers	3.40	1.008
Internet system e.g wifi	3.37	1.005
Educational software for teaching and learning social studies	3.34	1.027
Overhead projectors	3.20	1.128
Television	3.15	1.172
Computer	3.09	1.060
Photocopier	2.80	1.077
Android phones	2.59	.857
Digital cameras	2.36	.936
Digital video recorder	2.35	.881

Table 3 indicates the available ICT facilities in Mpraeso Senior High School. With regard to Printer availability, it was found that majority (M=3.40; SD=1.008) of teachers agreed to the statement. Most teachers (M=3.37; SD=1.005) indicated that internet system is available in the school. Majority of the teachers (M=3.34; SD=1.027) reported that educational software for teaching and learning social studies in the school. Regarding to Overhead projectors as ICT facilities, most (M=3.20; SD=1.128).

From Table 3, majority (M=3.15; SD=1.172) of the teachers revealed that television was available in the school. This was followed by Computer where majority (M=3.09; SD=1.060) of the teachers indicated that it was available. The majority (M=2.80; SD=1.077) of the teachers also revealed that Photocopier as ICT facility was available in the school. From Table 3, it is seen that ICT facilities are available for teaching and learning in the school, since majority of the teachers agreed that ICT facilities in the schools are available. The ICT facilities that are available in the schools were: Printers, Internet system, Educational software for teaching and

learning social studies, Overhead projectors, Television, Computer, Photocopier, Android phones, and Digital cameras.

A look at Table 3 reveals that majority of the respondents are of the view that there are adequate computers in the school. These results confirmed the study of Yunus (2007) who reports that ICT facilities available in schools include telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media. These results also contradict the findings of Kenya School Net (2003) where almost 40% of schools had less than 10 computers, and were therefore inadequate for teaching and learning.

This result is also in contrary to the study of Ayebi-Arthur, Aidoo and Wilson (2009) that showed that majority of the teachers in Senior High Schools in Cape Coast Metropolis had access to the internet and also 70% of the students had access to the internet. A study by Adebi-Caesar (2012) revealed that 69 (97.9%) of the teachers in all the schools had insufficient computers and resources and only 2.1% agreed they had enough computers.

It is evident from Table 3 that the school have internet facilities to support the teaching and learning. This is in support to a study conducted by Ayebi-Arthur, Aidoo and Wilson (2009) on utilization of the Internet in senior high schools in the Cape Coast Metropolis in the Central Region of Ghana. It was revealed that majority of the teachers and students had access to the internet. This shows that majority of the students and teachers had access to the internet. Majority of the respondents agreed with the availability and the use of television in teaching and learning. This attested to the fact that the school uses televisions as aid in teaching and learning. Majority of the respondents agreed with the availability of ICT facilities such as photocopier, educational software, overhead projectors, printers, digital video recorder and digital

cameras for teaching and learning. This is in support to a study conducted by Ocak and Akdemir (2008) in Turkey. Results demonstrated that improving the computer literacy of science teachers seemed to increase science teachers' computer use and consequently increase their integration of computer applications as an instructional tool. Internet, email and educational software, Compact Discs (CDs) were found to be used frequently in the classrooms.

4.4 Research Question 3

Challenges facing teachers in integrating ICT in teaching and learning in senior high schools in the Kwahu South Municipality

In answering this question, data on the responses to items on the challenges facing teachers in integrating ICT in teaching and learning in Mpraeso Senior High School in the Kwahu South. The data collected were collated and analysed using percentages. In doing this, the frequency counts of the number of respondents who gave different responses were computed. The findings are shown in Table 4.

Table 4: Challenges facing teachers in the use of ICT in teaching and learning

Statement	Mean	Std. Deviation
Limited time in using ICT facilities	3.37	1.005
Lack of confidence in the use of ICT	3.32	1.006
No Electricity in the classroom	3.28	1.071
Fear of making mistakes when using ICT facilities	3.24	1.115
No technical support in using ICT facilities	2.66	.812
No training on ICT integration	2.41	1.018
Belief in the use of traditional method of teaching due to old age	2.10	1.090
Low level of knowledge in the use of ICT	2.00	1.149
Little experiences on the use of ICT facilities	1.69	1.004
Insufficient ICT facilities	1.58	.901

Table 4 indicates the challenges teachers face in the use of ICT facilities in teaching the subject. Limited time in using ICT facilities (M=3.37, SD=1.005) was the greatest challenge teachers. This was followed by Lack of confidence in the uses of ICT (M= 3.32, SD= 1.006). No electricity in the classroom (M=3.28, SD=1.115) was the third greatest challenge face by teachers of Mpraeso Senior High school. The other challenges in the descending order of magnitude are as follows; Fear of making mistakes (M=3.24, SD=1.115), No Technical support in using ICT facilities (M=2.66, SD=0.812), No training on ICT integration (M=2.41, SD=1.018), Belief in the uses of traditional method of teaching due to old age (M=2.10, SD =1.090), Low level of knowledge in the use of ICT (M=2.00, SD=1.149), Little experiences on the use of ICT facilities (M=1.69, SD=1.004) and lastly, insufficient facilities (M=1.58, SD=0.901).

The results therefore showed that majority of the teachers in the schools in the agreed that lack of knowledge about ICT facilities, lack of confidence, insufficient ICT facilities, no technical support when using the ICT facilities, little experience on the use of ICT facilities and lack of training were the majority challenges they face. On the other hand, some of the teachers were of the opinions that fear and age was not a major challenge.

A look at Table 4 reveals that majority of the respondents are of the view that low level on knowledge in the use of ICT is a key challenge in integrating ICT in lesson delivery. This confirms Koehler *et al.* (2012) argument that insufficient technological knowledge and skills, unsupported pedagogical knowledge and skills have been captured as a crucial challenge to the integration and use of ICT for teaching and learning. This is supported by Snoeyink and Ertmer (2001). According to them, inadequate technological know-how is a major reason why teachers and

students are not using ICT. In an empirical study conducted in Scottish schools, Williams, Coles, Wilson, Richardson, and Tuson (2000), identified that insufficient skills in the use of databases and Microsoft excel was a major factor by some secondary school teachers and students. A study also conducted in Australia by Newhouse (2002), emphasized on the inadequate knowledge and skills by teachers and students to manipulate computers characterized the challenges faced by the use of ICT for teaching and learning.

It is evident from Table 4 that majority of the respondents disagreed with limited time in using ICT facilities. This is contrary to what Butzin (2001) purported. According to him teachers need more time to go through web pages and to identify pictures they need for multimedia assignment they give to students. Further analysis from the study indicated that 86.9% of the respondents were on the view that there is no technical support in the use of ICT facilities. This is supported by Rogers, Medina, Rivera, & Wiley (2005). According to them inadequate technical support has led to teachers and student not able to use different technological approaches in integrating ICT into teaching and learning.

Majority of the respondents (71.7%) agreed that there is insufficient ICT facilities. This is in corroboration with Becker, Ravitz, and Wong (1999). According to them inadequate resources arise when there is the need for ICT to be integrated into teaching and learning. These resources may include technology, access to the needed application and support from technical expert. This is supported by Karageorge (2005). According to him, inadequate technological resources include obsolete and insufficient computers, incompatible hardware and software. This leads to little chance for teachers to include ICT into teaching and students into learning.

Majority of the respondents agreed that lack of training on ICT integration in teaching and learning social studies. In Africa, Alemneh & Hastings (2006) conducted an empirical study which suggests the lack of trained teachers who will impact into the intellect of students in secondary school as the major challenge that is faced with the use of ICT for teaching and learning. The same study also found out that trained teachers who were well equipped in the use of ICT for teaching and learning purposes preferred leaving the continent to the western world due to poor remuneration coupled with inadequate ICT infrastructure.

On the issue of belief in the use of traditional method of teaching, majority of the respondents agreed that it affect the integration of ICT in the teaching and learning of social studies. This is in corroboration with a study conducted in Australia by Newhouse (2002) According to Newhouse, teachers were not excited about the changes and integration of ICT into teaching and learning practices. Further analysis from Table 6 indicated that 91(85.1%) of the respondents agreed on the issue of little experiences on the use of ICT facilities. In the study of high schools in the United States of America, Snoeyink and Ertmer (2001), noted that inadequate pedagogical knowledge was a contributing factor to the challenges associated with the use of ICT for teaching and learning. In the same study, teachers made sure they acquired basic skills such as connecting to a network, surfing through applications, and simple word processing techniques before they engage in technology-related activities with their students and this they also found to be time-consuming. This was justified by Hughes (2005), who argued that teachers must poses the requisite technological skills to be able to integrate ICT in teaching.

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Overview

This chapter was the last chapter of the research. The chapter presented the summary, conclusion, and recommendations for the study.

5.2 Summary of the Study

The study was conducted to determine the use of ICT in the teaching and learning in senior high schools in the Kwahu South Municipality. The study was guided by three research questions. The study was a descriptive survey and had a population of one hundred and seven respondents. The study was a descriptive employing multi-stage sampling technique. Questionnaire was developed to solicit for information from the respondents. Validity and reliability of the instrument was ensured by making the instrument available to experts and the supervisor for scrutiny and the instrument pilot tested in Nkwatia Senior High in the Kwahu East District. The data gathered were analysed using tables, frequencies, and percentages.

5.3 Summary of Major Findings

Based on the analysis undertaken the following findings were made:

1. The integration of ICT in the teaching and learning makes lesson more interesting.
2. ICT makes teaching more diverse.
3. ICT improves lesson presentation.
4. Integrating ICT in the teaching and learning motivate students to learn.
5. ICT integration in the teaching and learning increase productivity in lesson preparation.

6. Availability of ICT tools like computers and internet system in the teaching and learning were found to be available.
7. Teachers hardly made use of ICT facilities in the teaching and learning of because of lack of training in the use of ICT tools.
8. The study revealed that most teachers have low knowledge in the use of ICT.
9. Most teachers prefer using traditional method of teaching instead of ICT facilities.
10. Teachers have not been given adequate training in the use of ICT.

5.4 Conclusions

From the study findings, the following conclusions are drawn:

The findings confirm that, ICT inclusion in the teaching and learning makes lesson more interesting, makes lesson more diverse, improves lesson presentation and enable the teacher to manage instructional time very well. It can also be concluded that ICT integration help students to understand what they have been taught, makes lesson more concrete and makes students attentive in class.

It is clear from the findings that ICT tools like computers, internet systems, educational software, printers and overhead projectors were found to be available in the school. The study also reveals that teachers hardly use ICT facilities because of poor knowledge in the use the of the ICT tools.

The study reveals that challenges facing social studies teachers are enormous. These include: low level of knowledge in the use of the ICT, the use of traditional method of teaching, insufficient ICT facilities, no technical support in the use of ICT facilities and no training in the use of ICT.

5.5 Recommendations

Based on the findings and conclusions drawn from the study, the following recommendations are made:

1. Based on the findings it is incumbent on head of the school to encourage the teachers in the school to make appropriate use of ICT facilities in the teaching and learning of social studies.
2. The Ministry of Education should make budgetary allocations annually to maintain, replace, and expand ICT facilities in the school.
3. Head of the school should intermittently organize in-service education and training on the use of ICT for the teachers in the school.
4. Barriers that have and are still hindering the integration of ICT in the teaching and learning should be tackled by policy implementers. In this regard, as teachers who are unwilling to change from the traditional methods of teaching to using information and communication technologies, they should be encouraged by policy makers and sensitized from time to time to understand the good side of technology.

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APPENDIX

UNIVERSITY OF EDUCATION, WINNEBA

QUESTIONNAIRE FOR TEACHERS.

TOPIC – The use of ICT as a tool for teaching and learning in Mpraeso Senior High School in the Kwahu-South Municipality.

Dear respondents,

The researcher is conducting a research on the above topic and would be most grateful if you could assist by answering the questionnaires below to the best of your knowledge. The information gathered is for academic purpose only and would be treated with the strictest confidentiality. Please read through the items as carefully as possible and offer your candid opinion.

SECTION A

TEACHERS' PERCEPTION TOWARDS THE USE OF ICT IN TEACHING AND LEARNING.

Teachers perception on the use of ICT in teaching and learning	SD 1	D 2	A 3	SA 4
1. Makes lessons more interesting				
2. Make lessons more diverse				
3. Improves lesson presentation				
4. Motivate student in their learning				
5. Gives the teacher more confidence in teaching				
6. Enable the teacher to manage instructional time very well				
7. Increase productivity in lesson preparation and lesson				

updates				
8. Help to meet the different needs of students				
9. Makes lessons more concrete and real.				

SECTION B

AVAIBILITY OF ICT FACILITIES IN TEACHING & LEARNING

Add please indicate by ticking

Please indicate your reaction to each of the following statement by ticking (√) the number that represents your level of agreement or disagreement with it. Kindly to respond to all questions.

Level of Agreement or Disagreement – 4 points:

1- Strongly Disagree 2- Disagree 3 – Agree 4- Strongly agree

The availability of ICT facilities in teaching and learning	**SD 1**	**D 2**	**A 3**	**SA 4**
1. Computers				
2. Internet systems e.g. wifi				
3. Televisions				
4. Photocopier				
5. Educational software for teaching				
6. Overhead projectors				
7. Printers				
8. Digital video recorder				
9. Android phones				
10. Digital cameras				

SECTION C

CHALLENGES TEACHERS FACE ON THE USE OF ICT FACILITIES

The use of ICT in the teaching & learning of social studies

Please indicate your reaction to each of the following statement by ticking (√) the number that represents your level of agreement or disagreement with it. Kindly to respond to all questions.

Level of Agreement or Disagreement – 4 points:

1- Strongly Disagree 2- Disagree 3 – Neutral 4 – Agree 5- Strongly agree

Challenges teachers in using ICT in lesson deliveries	SD 1	D 2	N 3	A 4	SA 5
1. Low level of knowledge in the use of ICT					
2. Limited time in using ICT facilities					
3. Fear of making mistakes when using ICT facilities					
4. Belief in the use of traditional method of teaching due to old age					
5. Lack of confidence					
6. Insufficient ICT facilities					
7. No technical support in using ICT facilities					
8. Little experiences on the use of ICT facilities					
9. No training on ICT integration on teaching and learning.					

Thank You.