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PUPILS AND TEACHERS' PERCEPTION OF THE IMPACT OF THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN TEACHING AND LEARNING IN THE BASIC SCHOOLS IN KUMASI METROPOLIS.

OSWALD OKO ASHONG

2013

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BY

OSWALD OKO ASHONG

Dissertation submitted to the Centre for Continuing Education of the Faculty of Education, University of Cape Coast in partial fulfilment of the requirements for award of Master of Education Degree in Information Technology

JUNE 2013

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: …… Date: ……..

Name: Oswald Oko Ashong

Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

Supervisor's Signature: …… Date: …….

Name: Dr. Jonathan Fletcher

ABSTRACT

Global investment in Information and Communication Technology (ICT) to improve teaching and learning in schools have been initiated by many governments. Despite all these investments on ICT infrastructure, equipments and professional development to improve education in many countries, ICT adoption and integration in teaching and learning have been limited. The study sought to investigate pupils and teachers' perceptions of the impact of the use of ICT in teaching and learning in the basic schools in Kumasi Metropolis.

The descriptive survey design was used for the study. One hundred and thirty three (133) respondents made up of fifty eight (58) teachers and seventy five (75) pupils from fifteen basic schools (i.e. ten public and five private) from the Kumasi Metropolis took part in the study. The questionnaire was the main instrument and was composed of 17 items. The return rate of questionnaires was 89% or 133 out of the 150.

The findings of the study revealed that the computer was the most used ICT tool aside internet, television and radio in the basic schools. Most of the respondents sometimes use these tools in the preparation, presentation, assessment, assignment and research as well as in teaching and learning. About 65% of the respondents' perceive that, the use of ICT tools improve teaching and learning and is beneficial at the basic schools.

The recommendations made were that policy guidelines should be in place to ensure more ICT facilities are available to teachers and qualified teachers and also be made available at the junior high schools in the Kumasi Metropolis.

ACKNOWLEDGEMENTS

My supervisor, Dr. Jonathan Fletcher of the Department of Science and Mathematics Education was so meticulous in his scrutiny of this dissertation and his immense contribution has resulted in the production of this final work. He further exhibited a lot of patience, tolerance, love and devotion throughout the process of carrying out this dissertation.

I am similarly grateful to many others for their assistance in varied ways; especially Westine Publication of Tanoso, Kumasi for typing certain parts of this project work, and Mad. Mabel Arthur, headmistress of Prempeh College M/A JHS Kwadaso, Kumasi for her encouragement.

It is also worth mentioning the direct way Mr. Isaac Oppong of Prempeh College M/A JHS Kwadaso, Kumasi, read through the entire manuscript for language adequacy. Needless to say, I remain entirely responsible for any error that may be detected in this dissertation.

DEDICATION

To my wife, Mrs. Emelia Adwoa Ashong and our two children: Naa Otobea and Nii Amanor.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Technology has been accepted as the best method to achieve efficient and effective productivity because it reduces waste, high cost of production and is time saving among others. This is why many countries, governments and even individuals are leaving no stones unturned in order to adopt technology in every aspect of the economy.

Thurow (1992, p. 28-29) states, “today's head to head competition is the result of a changing global economy in which developed countries have a nearly identical list of industries necessary to give their citizens a world-class standard of living: microelectronics, biotechnology, telecommunications, civilian aviation, robotics, and computer technology and computer software”. All over the world countries and government see an efficient and effective human resource as the engine of growth for the nation, this is why in many countries, resources are being invested heavily in education.

According to Tilbury, Stevenson, Fien and Schreuder (2002), education is seen as key in the process of achieving sustainable development. However, in order for formal education to contribute to sustainability, traditional systems and methodologies need to be re-oriented. This is why there is the need to integrate technology into the methods of teaching and learning.

Modern technology offers many means of improving teaching and learning in the classroom (Lefebvre, Deaudelin, & Loiselle, 2006). Dawes (2001) is of the view that new technologies have the potential to support education across the curriculum and provide opportunities for effective communication between teachers and students in ways that have not been possible before.

In education, some of the technology being use in teaching and learning includes television, videos, computers, projectors, compact disc (CD), digital versatile disc (DVD), radios and others which all together are termed as Information and Communication Information (ICT). The United Nations Educational, Scientific and Cultural Organization (UNESCO) use the term *ICTs*, or information and communication technologies, to describe: "the tools and the processes to access, retrieve, store, organise, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, phones, faxes, modems, CD and DVD players and recorders, digitised video, radio and TV programmes, database programmes and multimedia programmes" (UNESCO, 2003, p.75, in Anderson, p.5).

According to Ololube, Ubogu and Ossai (2007), the introduction of ICT usage, integration and diffusion has initiated a new age in educational methodologies, thus it has radically changed traditional method of information delivery and usage patterns in the domain as well as offering contemporary learning experience for both instructors and students. ICT has made an impact on the quality and quantity of teaching, learning and research in the

The history of the use of ICTs in education is relatively short. Before 1979, computers existed primarily in tertiary level educational institutions. Then, in the eighties, microcomputers began to be distributed to schools, and teachers began to grapple with the question of how to use computing for education rather than simply educating about computing. Starting from the mid-nineties, the use of ICTs in schools rapidly expanded in developed nations through curriculum support, networking, the professional development of teachers and software improvements (Aston, 2002).

The use of ICTs in Ghanaian schools and African countries is generally increasing and dramatically growing. However, while there is a great deal of knowledge about how ICTs are being diffused and used in high schools in developed countries, there is not much information on how ICTs are being used by teachers and students in Ghanaian schools. There is also an assumption that there are wide gaps in the use of ICTs between rural and urban schools (Aduwa-Ogiegbaen, & Iyamu, 2005).

In view of the infrastructural challenges facing Ghana's educational system as a developing country, ICT use, especially computers and Internet, was introduced to increase access and to improve the relevance of education. Cuban (1986) noted that in recent years there has been a groundswell of interest in how computers and the Internet can best be harnessed to improve the efficiency and effectiveness of education at all levels and in both formal and non-formal settings.

Gwang_Jo (2009) describes ICT in education as a multifaceted variable. He delineates five components of ICT in Education which were (a) ICT as a

subject (i.e. computer studies), (b) ICT as a tool to innovate teaching-learning practice (i.e. digital content, multimedia teaching-learning methods, learning environment), (c) ICT as an administrative tool (i.e. education management information systems (EMIS), (d) ICT as an expanding learning opportunity (i.e. distance learning, e-Learning), and (e) ICT as a facilitator of higher-order thinking skills (i.e. learner-centered, self-directed learning, tailored learning)

From Collins (1991), schools that have adopted computer technology (ICT) in education have undergone some degree of changes and they are (a) a change from whole-class to small-group instruction, (b) a move from lecture to coaching, (c) a move from working with better student to working with weaker students, (d) a shift from students becoming more engaged in their learning, (e) a move from an emphasis on verbal thinking to the integration of visual and verbal thinking and (f) a change from a competitive to a cooperative atmosphere in the classroom.

Certainly, the present and future academic global community will utilize ICTs to a higher degree. This has made it imperative that undergraduates not only need to use ICTs, but they need to become comfortable with using them. This is to ensure that they participate fully in life of the contemporary information age and also to use it to accomplish their everyday task (Yusuf, 2005).

Statement of the Problem

(ICTs), according to Dellit (2002, pp. 56-66), do not "automatically add quality to teaching and learning. It is possible to use [them] for trivial purposes, to waste students' time … or even worse, [use them] for destructive or immoral purposes".

However, it has been learnt that the integration of ICT ineducation, *inter alia*, does promote autonomous learning, curriculum differentiation (Smeets, 2005), student-centred learning, higher order thinking, problem-solving, cooperative learning (Mooij & Smeets, 2001), clarification of abstract concepts and transformation of the understanding of the subject matter (Leach & Moon, 2000). Yet it is evident that ICT is rarely used as a teaching - learning tool (Unwin, 2005). There is the need to conduct a study to verify the evidence regarding the use of ICT in teaching and learning.

Purpose of the Study

This study is to assess pupils and teachers' perceived impact of the use of ICT in teaching and learning in the basic schools in the Kumasi Metropolis.

Research Questions

1. What ICTs are available to pupils and teachers and how often do they use them.
2. What stages do pupils and teachers frequently use these ICTs and whether it improves teaching and learning?
3. Whether pupils and teachers agree that the use of ICTs dissuade attention, waste time or is beneficial in teaching and learning?

4. What are the challenges facing the use of ICTs in teaching and learning and the performance of pupils in their examination?

Significance of the Study

The use of ICT in teaching is a relevant and functional way of providing education to learners in order to assist them in imbibing the required capacity for the world of work. Very few jobs today do not require the use of skills in technology, collaboration, and teamwork; all of which can be acquired through teaching with ICT. Thus ICT is fundamentally changing the way we live, learn, and work (Aladejana 2007).

This project will be of benefit to the academia, educational policy makers, educational administrators, teachers, students and researchers in the following ways:

1. It can help educational policy makers to restructure ICTs policy towards the basic schools.
2. It can help educational administrators to embrace ICTs in their schools by providing all the necessary support.
3. It can help teachers in the basic education sector to update and improve their skills in ICTs to improve their teaching.
4. It can help students appreciate ICTs as tool for improving their learning.
5. It can also help researchers in areas where ICTs has not made impact in teaching and learning and how to integrate it into education especially in the basic schools.

Delimitation of the Study

Delimitations are restrictions or bounds that researchers impose prior to the inception of the study to narrow the scope of a study (Creswell, 2003). In this study, the researcher delimited the study by the participants, instruments used, and the geographical location in order to make the study better and more feasible.

The study did not cover every teacher at the junior high school, but targeted ICT teachers and pupils who use ICTs. These respondents were the subjects of the study because of their frequent interactions with ICTs in teaching and learning in their schools.

With regards to the geographical location, the Kumasi metropolis was chosen for the study. The aim of the researcher was to look at diverse ICT cultures existing in closely situated communities for sufficient evidence of inference and generalization of the results. Most of the junior high schools of this characteristic were clustered in the Kumasi metropolis.

Limitations of the Study

A major limitation encountered during the study was that most of the questionnaire were taken home by the teachers and might have discussed with other colleagues who might have validity and time constrains on the results which also delayed the study. Some of the questions were explained to the pupils and therefore the result from the pupils might have been tilted to the same direction.

Also, it was later observed that some selected participants did not answer the questionnaire truthfully or at all. These lead to a reduction in the perceived sample size and this could affect the results generalization.

Definition of Terms

Computer An electronic machine that computes. accept data, process it, stores it, and display it according to instruction.

Education system of formal teaching and learning as conducted through schools and other institutions.

Teaching is a systematic presentation of facts, ideas, skills, and techniques to students.

Learning acquiring knowledge or developing the ability to perform new behaviors.

Technology is the making, modification, usage and knowledge, of tools, machines, techniques, craft and systems

Telecommunication devices and systems that transmit electronic or optical signals across long distances.

Logistics the planning and control of the flow of goods and materials through an organisation or manufacturing process.

Perception the way and manner some one looks or thinks about something.

Metropolis is a very large city or urban area which is a significant economic, political, and cultural centre of a country.

Organization of the Rest of the Study

The dissertation is organized into five main chapters. The first chapter focuses on the background to the study, statement of the problem, purpose of the study, research questions, significance of the study, delimitation and limitations of the study, definition of terms and organization of chapters. The second chapter reviews the necessary related literature on the concept and subject matter of the topic. In Chapter three, the methodology for the research work is examined. The Methodology is made up of the research design, the study area, target population, sample and sampling procedure, and data collection procedure and data analysis.

The fourth chapter deals with results and discussion of the findings of the study. The summary, conclusions and recommendations of the study as well as the areas for further research is provided in the fifth chapter.

CHARPTER TWO

REVIEW OF RELATED LITERATURE

Overview

Educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs) (Yuen, Lee, Law & Chan, 2008). The information society demands a workforce that can use technology as a tool to increase productivity and creativity. This involves identifying reliable sources of information, effectively accessing these sources of information, synthesizing and communicating that information to colleagues and associates (Alibi, 2004).

Theoretical Framework of the Study

This segment is to diagnose the view of the perception of teachers and pupils usage of ICT in the basic schools and its impact on teaching and learning. In this light, researcher seeks to cover the following areas: definition of ICT in the context of the study; Ghana ICT policy; benefits of ICT in teaching and learning; challenges in the usage of ICT in teaching and learning; and some of the reasons why the pupils fail in ICT in the Basic Education Certificate Examination (BECE).

Definition of Information Communication Technologies (ICTs) in the Context of the Study

Tinio (2009, p.4) defines ICT as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony."

Torero and Braun (2006) offer a much broader definition of ICT which encompasses equipment and services. For them, ICT "includes the computing industry (hardware, software, networks, the Internet, and related services); electronic data processing and display (such as photocopiers, cash registers, calculators, and scanners, as well as a myriad of less well-known machines specifically tailored to production and manufacturing); telecommunications and related services (such as fixed and cellular telephones, facsimile machines, instant messaging, teleconferencing, and so on.); and audiovisual equipment and services (including television, radio, video, DVDs, digital cameras, compact discs, MP3 players, and so on)" (p. 3).

ICT as described by Scott and Sender (2002) encompasses a range of applications, communication and technologies which aid information retrieval, research communication and administration. These include: Internet access, electronic mail, CD-ROMS, telephone, on line databases, library services and fax machines. In this study, the use of the term "ICT" is in line with the definition given by Torero and Braun (2006).

The rapid development in 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 in order to minimize the teaching and learning technology gap between developed and the 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).

Ghana's ICT Policy

Over the years, Ghana has undertaken educational reforms aimed at raising the standard of education. The junior high school (JHS) system was introduced to equip their graduates with technical and vocational skills while preparing students for the senior high schools. In view of the infrastructural challenges facing Ghana's educational system, ICT use, especially computers and Internet, was introduced to increase access and to improve the relevance of education.

Therefore, the Pedagogical Integration of Information Communication Technology (PIICT) project has come at an opportune time in Ghana to contribute to the ICT broadening process and to participate in the access, construction, and production of knowledge in the information era. The project is a great opportunity for the nation because the integration of ICT into her educational system was formally introduced as part of educational reforms which began in September 2007 as part of government's initiative to improve quality of teaching and

learning in the nation's schools. One major requirement of the 2007 educational reform was to ensure that all students in pre-tertiary institutions in Ghana acquire basic ICT literacy skills (including internet use) and apply these not only in their studies but also in a variety of ways in their everyday life activities (CRDD, 2007a).

For Ghana, and Africa as a whole, to be able to fully integrate ICT into teaching and learning there is the need for frequent collection and analysis of data on ICT usage. The 'Pan-African Agenda on Pedagogical Integration of ICT' project, which is being coordinated by the International Development Research Centre (IDRC) in Canada, was therefore instituted to address this very important need.

The main research goal of the project is to better understand how the pedagogical integration of ICT can improve the quality of teaching and learning in educational systems of participating African countries. From the early 1990s, education stakeholders in Ghana have been concerned about how teachers and students use computers (one of the main ICT tools) in schools and how their use supports learning.

Due to this when the Ministry of Education, Science and Sports implemented the educational reforms in September 2007 the emphasis was on ICT. Currently, ICT has been incorporated into the school curriculum, beginning with the pre-tertiary institutions. ICT is now a subject on the schools' timetable from primary to senior high school (Asamoah, 2008).

It appears that policy in the area of ICT usage in the teaching and learning is not well develop or implemented in Ghana. At their most basic level, ICTs enable the presentation of course content using multimedia (images, text and sound) and facilitate archiving of that content.

Haddad and Draxier (2002), identify at least five levels of ICT use in education: Presentation, demonstration, drill and practice, interaction, and collaboration. In regard to the design of effective support for learning, Merrill (2002, 2006) also identified five principles of instruction: (a) task centeredness, (b) demonstration, (c) activation, (d) application, and (e) integration. Merrill argues that any quality instruction should meet all the five principles. One can agree that Ghana is far from implementing a policy that covers the above principles of instruction in spite of the benefits that can be derived from ICT integration into teaching and learning.

Benefits of ICTs in Teaching and Learning

ICT used appropriately can stimulate the development of higher cognitive skills, deepen learning and contribute to the acquisition of skills needed for learning all life-long and for working in today's job market (Tchombe, Maiga, Toure, Mbangwana, Diarra, & Karsenti, 2008). According to Haddad and Drexler (2002), an effective teaching/learning process must stimulate intellectual curiosity and offer a sense of enjoyment that will move the students from the passive role of recipients of information to the active role of builders of knowledge.

The computers have become motivating tools for teaching and learning in schools. Computers have been used to create electronic libraries and catalogues to

enhance academic research work. According to Heeks (1999), many libraries now provide online resources to facilitate learning and research electronically.

Teachers use computers to write lesson plans, prepare materials for teaching, record and calculate student grades, and communicate with other teachers. As such, computers have become a routine tool for helping teachers accomplish their professional work (Becker, Ravitz, & Wong, 1999).

Tinio (2002) further noted that ICT can expand access to education in the following ways:

1. Anytime and anywhere: One defining feature of ICTs is their ability to transcend time and space. ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. ICT-based educational delivery (e.g., educational programming broadcast over radio or television) also dispenses with the need for all learners and the instructor to be in one physical location. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners (i.e., synchronous learning).
2. Access to remote learning resources: Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries, and available in limited quantities for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in

almost every subject and in a variety of media can now be accessed from anywhere at any time of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons- mentors, experts, researchers, professionals, business leaders, and peers all over the world.

3. Improving the quality of education and training is a critical issue, particularly at a time of educational expansion: ICTs can enhance the quality of education in several ways; by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training (Haddad & Jurich, 2002). ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.
4. Motivating to learn: ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become involved in the lessons being delivered. More so than any other type of ICT, net-worked computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events.

According to Gwang-Jo (2009, p. 4), ICT in Education can serve the following purposes (a) restructuring education system, (b) diversifying teaching-learning methods and practices, (c) engaging all stakeholders of education and adapt rapidly to changes in society and the environment, and (d) enhancing education efficiency, effectiveness, and productivity. Torero and Braun (2006) also describe the benefits of ICT in these terms: "ICT has the potential to accelerate growth, create jobs, reduce migration pressure from rural to urban areas, increase agricultural and industrial productivity, increase services and access to them, facilitate the diffusion of innovations, increase public administration efficiency and the effectiveness of economic reforms, strengthen competitiveness in developing countries, and encourage greater public participation and democracy" (p. 1).

Challenges of the use of ICTs in Teaching and Learning

There are many factors identified as hindrances to the use of ICTs in the basic schools. Pelgrum (2001) presents a list of ten such factors that impede ICT integration in schools. Out of the ten, the four major ones are; personal ideas about the contribution that technology can make to the processes of teaching and learning and classroom management; teachers' lack of knowledge and skills; insufficient number of computers and ICT infrastructure; and difficulty in integrating ICTs instruction in classrooms.

In related a study, Ely (1993) similarly distinguishes three major conditions, relevant to ICT integration in classrooms, these are: dissatisfaction

with the status quo, existence of knowledge and skills, and availability of resources.

The two categories identify, more or less, the same issues: Ely's existence of knowledge and skills relates to Pelgrum's factor relating to teachers lack knowledge and skills. Also Ely's availability of resources is similar to Pelgrum's insufficient number of computers and ICT infrastructure. Finally Ely's dissatisfaction with the status quo is directly related to what Zhao and Cziko (2001) term as discrepancies that activate the individual.

The problem of teachers' confidence in their ICT competence as a major factor for integrating technology in teaching is reported in other studies as well. Mooij and Smeets (2001) explain that if teachers are not confident in their ability or competence to handle computers this may hinder their willingness to introduce technology in their classrooms.

In their study Smeets et al., cited in Mooij & Smeets, (2001) it is also reported that the most important reason teachers give for not using ICT is that they are not familiar with ICT or they feel unsure about it. This ICT competence factor is the same that Zhao and Cziko (2001) refer to as Control Principle.

Some other important factors are also recorded as significantly influencing ICT use in schools. Teachers claiming to follow more innovative educational practices such as use of inquiry, project-oriented work and hands-on activities, are more likely to use new technologies than those who stick to the more traditional instructional approaches (Myhre, 1998).

International experience has shown that teachers play an important role in diffusing and utilizing ICTs in classrooms. Teachers' attitudes and beliefs affect the way technological innovation is applied in education. They tend to use technology in ways shaped by their own personal perspectives on the curriculum and on their pedagogical practices (Cohen, 1987). Similarly, Kersaint, Horton, Stohl, and Garofalo (2003) found that teachers who have positive attitudes toward technology feel more comfortable using it and usually incorporate it into their teaching.

The development of teachers' positive attitudes toward ICT is a key factor not only for enhancing computer integration but also for avoiding teachers' resistance to computer use (Watson, 1998). Watson warns against the severance of innovation from the classroom teacher and the idea that ''the teacher is an empty vessel into which this externally defined innovation must be poured'' (p. 19).

The teachers' attitudes and beliefs also influence what they themselves learn from education and training programmes and what didactic practices they make use of in their classrooms (Fang, 1996). Research has shown that many educational reform initiatives have failed precisely because they did not influence the beliefs or the practices of the teachers (Cohen & Ball, 1990).

The effective use of computers by teachers depends not only on their attitudes, but also on the training they have received (Ashton & Webb, 1986). Teachers' competence in ICT presupposes: positive attitudes to ICT, understanding of the educational potential of ICT, ability to use ICT effectively in

the curriculum, ability to manage ICT use in the classroom, ability to evaluate ICT use, ability to ensure differentiation and progression and technical capability (Beck, 1997).

It is also worth noting that inadequate pre-service and in-service training is another obstacle for many teachers to integrate technology in their classroom teaching (Yildirim, 2000). There is a large of body of research in the literature that supports the same position that teachers should receive effective, timely and continuous training to promote technology in their teaching. (Yildirim, 2000). In-service training is a key factor in cultivating positive attitudes to the computer (Dupagne & Krendl, 1992).

How teachers construct and reconstruct their knowledge is a critical issue as teachers' thought processes determine largely what happens in the classroom. Teachers' pedagogical decisions and actions are closely tied up with their professional growth. Their professional knowledge might be changed by means of experience, curriculum directives and in-service training. In-service training of good quality could support the process of changing teachers' thinking and practice, recognizing that teaching is a difficult, complex and multifaceted process (Wood & Bennett, 2000).

In a related study Lai, Pratt and Trewern (2001) revealed that school-based professional development is better organized and facilitated by the ICT coordinators, who usually have adequate training and a deeper understanding of integrating computer technologies into the school curriculum and can provide role models for teachers. However, research into in-service training has shown that

what the training programme has to offer all too often fails to meet the teachers' real needs (Crook, 1994). A decisive factor in the effective integration of computer use in the school curriculum is the provision of appropriate in-service training to the teachers, training which will show them how to use the new tools in their everyday teaching practice.

The IEA study in 1989 showed that a fair number of teachers had had some experience of in-service training in computer use, but the majority of programmes at that time emphasized the technical rather than the pedagogical and didactic aspects of computer use. In-service training needs to focus not on the technical, but on the pedagogical and didactic aspects of ICTs use in the classroom (Lai et al., 2001).

Many recent research studies on the state of ICT's diffusion in schools also show that many institutions are failing to integrate technology into existing context. Bauer and Kenton (2005) stated in their study that although teachers were having sufficient skills, were innovative and easily overcame obstacles, they did not integrate technology consistently both as a teaching and learning tool.

In a related studyNorris, Sullivan, Poirot and Soloway, (2003) reveal that appropriate access to technology infrastructure is another key factor in the effective technology integration process. The study reveals substantive correlation between technology access and use. In another study, Yildrim (2007) reveals that teachers agreed that access to ICT infrastructure is one of the effective means to integrate ICT in classrooms.

ICT is increasingly being used to improve access to education and employment opportunities. ICT has the potential to improve young peoples' access to educational opportunities as well as to enhance the quality of that education through the new modes of learning they enable. Through ICT, curricula can be more easily updated, adapted, enriched and personalized to satisfy a broad range of learning needs. Access of ICT by students therefore enhances their chances of succeeding at school. Thus ICT can be used by teachers in the traditional classrooms to reach more students and provide more opportunities for learning, albeit integration provides the best benefits.

Waite (2004) indicates that even though teachers show great interest and motivation to learn about the potential of ICTs, in practice, the use of ICT is relatively low and it is focused on a narrow range of applications, with word processing being the predominant use. Waite's research revealed that the use of other ICT tools such as video conferencing, emailing and the Internet are rarely used. The research further reveals the lack of ICTs infrastructure as one of the factors for non-usage of those tools.

Another research study suggests that ICT as a tool to promote learning is not generally well embedded in teachers' practice (Zhao & Cziko, 2001). Van Belle and Soetaert (2001, p. 38). states that "information technology in the classroom is used in an ineffective way and it has proven difficult to integrate within traditional curriculum settings"

The Way Forward for ICT Usage in Teaching and Learning in Ghana

Educational policymakers in Ghana have hailed the introduction of ICT in Ghanaian high schools as a remarkable step that will contribute to knowledge production, communication and information sharing among pupils and teachers in the school system. However, the commitment of government to the provision of infrastructure for ICT policy implementation has been minimal. Without any direct government investments in provision of ICT resources in second cycle schools, "NGOs and donor organizations in particular, have extended ICT facilities to some schools, mostly in urban communities" (Parthemore, 2003).

Parthemore (2003) points out that many secondary schools in Ghana can now boast of computer laboratories through which students are gaining basic computer literacy. A number of these schools have Internet capabilities, enabling students to deepen their connection to the outside world. The question to ask is how these facilities could be explored to provide greater educational access to these students.

CHARPTER THREE

METHODOLOGY

This chapter describes the research methodology employed in the study on the topic, "pupils and teachers' perception of the impact of the use of Information and Communication Technology (ICT) in teaching and learning in the basic schools in the Kumasi Metropolis".

This chapter focuses on the research design, study area and population, sample and sampling procedure, data collection instruments, data collection procedure, data analysis and ethical consideration.

Research Design

The design for this research is basically descriptive survey. Creswell (2003) notes that a survey design provides a quantitative or numerical description of trends, attitudes or opinions of a population by studying a sample of that population. From the sample results, the researcher can generalize or make claims about the population.

The research was mostly approached from the quantitative perspective. According to Glatthorn (1998), quantitative perspective indicates that there is an objective reality that can be expressed numerically and be described. Glatthorn intimates that the purpose of a descriptive research is to describe a phenomenon. Descriptive studies report frequencies, averages and percentages from which

conclusions can be drawn from numerical values presented. They can also report phenomena qualitatively.

The Data describes the perception pupils and teachers have on the use of ICT in teaching and learning and the impact it has on them, the reasons why most teachers are not able to integrate ICT in their teaching of other subjects and why most students fail in their ICT examinations in the Basic Educational Certificate Examination in the Kumasi Metropolis. The reasons are mainly qualitative and support the quantitative data. In the report therefore, attempt has been made to use the mixed method approaches (quantitative and qualitative) of the data collection for the analysis and discussions.

Population

This research was conducted in Kumasi which is the capital city of the Ashanti region, a very important and historical centre for Ghana. With a population of 1,517,000, Kumasi is the second-largest city in the country. It has a square area of 254 km². The largest ethnic group is the Ashanti, but other ethnic groups are growing in size.

The target population of the study was made up some teachers and pupils in the public and private basic schools who have used ICT tools in teaching and learning for more than five years in the Kumasi Metropolis. The respondents were subject teachers in ICT and pupils in the basic schools where ICT was taught. These schools were chosen due to the adequate ICT infrastructure and personnel who managed or applied the ICT tools in teaching and learning.

Sample and Sampling Procedure

Fifteen basic schools were selected, five from the private and ten from the public schools in the Kumasi Metropolis for the study. The criterion used for the selection was the availability of computers with or without computer laboratory for teaching and learning, and other ICT tools like the radio, television, internet, projectors and others.

The total number of teachers and pupils from the fifteen basic schools (including public and private) were 50 and 100 respectively. In all the targeted population was one hundred and fifty (150) who responded to 17 questionnaire items made up of four sections which are (a) personal data of the respondent, (b) acquisition of ICT skills and knowledge (c) usage and perception of ICT skills and (d) challenges in the usage of ICT.

Since the researcher could not engage all the fifty (50) teachers and hundred (100) pupils in the study, he employed the Krejcie and Morgan (1970) method to select an appropriate sample size of one hundred and thirty four (134). The corresponding sample size for the study was based on a confidence level of 95% and 5% margin of error. (Krejcie & Morgan, 1970).

Since the population was not too large for the researcher to adequately handle, the purposive sampling technique was used in selecting the sample for the study. According to Deming (1990), purposive sampling is considered when the researcher chooses the sample based on who he thinks would be appropriate for the study. This is used primarily when there are a limited number of people that have expertise in the area being researched. Hence, purposive sampling was used

to select the 50 teachers and 100 pupils because of their familiarity with ICT tools in teaching and learning.

The main reason why the researcher used purposive sampling was to focus on particular characteristics of a population that were of interest, which could best enable him to answer his research questions on pupils and teachers' perception of the impact of the use of information and communication technology (I C T) in teaching and learning in the basic schools in the Kumasi Metropolis**.**

Instrumentation

The target population was literate. Respondents could read and write (teachers and pupils). This encouraged the researcher to employ questionnaire as main instrument for the survey. According to Mellenbergh (2008), a questionnaire consists of a number of questions that the respondent has to answer in a set format.

In the questionnaire, the researcher included open-ended questions where the respondent was to formulate his own answers, whereas a closed-ended question requested the respondent to pick an answer from a given number of options. The response options for the closed-ended question were exhaustive and mutually exclusive (Mellenbergh, 2008). ICT teachers and school pupils responded to the same set of questionnaire.

Pilot-Test

According to Haralambos and Holborn (2000), a pilot study is the pre-testing or 'trying out' of a particular research instrument in order to receive advance warning about inappropriate or too complicated research instruments.

Haralambos and Holborn advise researchers not to take the risk until they pilot test first. The researcher after designing the instrument conducted a pilot research in two public and private basic schools to test the reliability of the instruments.

The respondents were teachers and pupils of from Prempeh College Basic School and Kwadaso Basic Schools for the Public Schools and Supreme Saviour and Osaberima for the Private all in the Kumasi Metropolis. Each of the two schools had adequate ICT infrastructure and also had huge student populations. The sample size for this pilot test was 8 teachers and 20 pupils. In all, 28 questionnaires were administered. Both teachers and pupils were made to respond to the same set of questions. 25 of the questionnaire items were retrieved. A respondent took an average time of 25 minutes to answer a questionnaire.

The questionnaires were collected and analyzed using SPSS data editor and the Cronbach's alpha value was noted. One of the most popular reliability statistics in use today is Cronbach's alpha according to Crobach (1951) and Nunnally (1978). Cronbach's alpha determines the internal consistency or average correlation of items in a survey instrument to gauge its reliability.

Before the research, it was very important to know whether the same set of items would elicit the same responses if the same questions were recast and re-administered to the same respondents. Alpha coefficient ranges in value from 0 to 1 and was used to describe the reliability of factors extracted from questions with two possible answers or multi-point formatted questionnaires or scales (i.e., rating scale: 1 = poor, 5 = excellent). The higher the score, the more reliable the

generated scale was. Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient.

The results from the pilot-test study produced a Cronbach Alpha value of 0.78. This meant that the reliability of the instrument was reasonably high. The fact validity as well as content validity of the instruments was also verified by my supervisors and other ICT experts.

Data Collection Procedure

According to Weimer (1995) data collection is a term used to describe a process of preparing and collecting data. The purpose of data collection was to obtain information to keep on record, to make decisions about the perception of teachers and pupils in the usage of ICT and its impact on teaching and learning in the basic, why teachers are not able to integrate ICT in their teaching and learning and why many students fail their ICT examination and to pass information on to others such as school authorities, stake holders and the government. Salant and Dillman (1994) have said that, the most popular data collection techniques or methods include surveys. The major survey instrument used in this study was questionnaires.

The questionnaires were self-administered to teachers and pupils in the basic schools in all the 15 selected basic schools in the Kumasi Metropolis. Necessary guidance and directives were also given on how to complete the questionnaire and the respondents were allowed to ask for clarification. Out of 150 instruments administered, 133 of the instruments were retrieved and fully

answered. Seven (7) of the questionnaires were not retrieved while ten (10) were not properly answered and were rejected.

The average time for a respondent to answer a questionnaire was estimated at 25 minutes, with the hope that questionnaire could be completed within some few days. However, some respondents, especially the teachers spent several weeks to complete the questionnaires. In all, the researcher had to wait for more than six weeks to retrieve the questionnaire instruments from the one hundred and thirty three (133) respondents.

Data Analysis

After collection of the data, inspection was done on the completed questionnaire by sorting, editing, coding and giving serial numbers for easy identification for scoring. When a respondent checked a response it was considered to be correct, but if the response was left unchecked it was considered incorrect. During analysis all items checked were aggregated and the percentage count and frequencies calculated.

Statistical package for social sciences (SPSS) and Microsoft excel were employed to facilitate the analysis of the data. In analyzing the data, descriptive statistics such as frequencies and cross tabulation were employed to sum up and present the quantitative data in the form of tables, and charts to aid interpretations and analysis. Percentages were used to describe the data.

Ethical Consideration

This study was a non-invasive one because it was not meant to cause any physical harm. To deal with ethical issues, permission was sought from the school administration. At each questionnaire administration point. Respondents were given the opportunity to decide whether to partake in the study. The respondents were orally assured of the confidentiality of their involvement in the study. They were also informed that they could leave the study anytime they wanted to.

CHAPTER FOUR

RESULTS AND DISCUSSION

Overview

This chapter discusses the presentation, analysis and interpretation of data obtained from the survey conducted in the fifteen basic schools in the Kumasi Metropolis about the perception of teachers and pupils of the impact of using ICT in teaching and learning. Data was obtained from both teachers and pupils through questionnaire and an analysis was also made to arrive at findings. The scope of the results and discussion in this chapter include personal data of the respondents, acquisition of skills and knowledge, usage and perception of ICT skills and challenges in the usage of ICT.

Background Analysis of Data

The analysis here is focused firstly on the personal data of the respondent. This includes status of the school, status of the respondent, class taught by the teacher or class of the pupil. There were a total of 133 respondents from the public and private basic schools made up of teachers and pupils.

From Table 1 there were 88 respondents from the public schools, 38 teachers and 50 pupils representing 66.2% and 45 from the private schools made up of 20 teachers and 25 pupils representing 33.8%. In all 58 teachers from both public and private schools representing 43.6 % and 75 pupils representing 56.4% responded to the questionnaire. (Appendix B and Appendix C).

Table 1: Status of the School and the Respondents

	Teachers		Pupils		Total	
	N	%	N	%	N	%
Public	38	28.6	50	37.6	88	66.2
Private	20	15.0	25	18.8	45	33.8
Total	**58**	**43.6**	**75**	**56.4**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 2: Status of School and the Class of the Respondents

	Primary		Junior High		Total	
	N	%	N	%	N	%
Public	15	11.3	73	54.9	88	66.2
Private	6	4.5	39	29.3	45	33.8
Total	**21**	**15.8**	**112**	**84.2**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 2 also shows that 21 of the respondents mainly teachers were from the primary schools, 15 from the public and 6 from the private representing 15.8% and 112 teachers and pupils from the junior high made up 73 from the public and 39 from the private schools representing 84.2%.

The second analysis is focused on the acquisition of ICT skills and knowledge. This included the use of ICT tools, the knowledge and skills possessed by the respondent in ICT. All the 133 respondents representing 100%

said they had used an ICT tool before.

Table 3: Respondent Status and the use of ICT Tools

	Computers only		Computers and Internet		Others		Total	
	N	%	N	%	N	%	N	%
Teachers	1	0.8	57	42.9	0	0	58	43.6
Pupils	14	10.5	49	36.8	12	9.0	75	56.4
Total	**15**	**11.3**	**106**	**79.7**	**12**	**9.0**	**133**	**100**

Source: (Fieldwork, February, 2013)

From Table 3,15 of the respondents (i.e. one teacher and 14 pupils) had used only the computer representing 11.3%, 106 respondents made up of 57 teachers and 49 pupils had used the computer and the internet representing79.7% and 12 respondents all pupils had also used other ICT devices like the calculators, phones, digital cameras among others representing 9.0%.

Table 4: Respondent Status and the level of ICT Knowledge

	Basic		Certificate		Diploma		Degree		Total	
	N	%	N	%	N	%	N	%	N	%
Teachers	0	0	41	30.8	14	10.5	3	2.3	58	43.6
Pupils	74	55.6	1	0.8	0	0	0	0	75	56.4
Total	**74**	**55.6**	**42**	**31.6**	**14**	**10.5**	**3**	**2.3**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 4 shows the level of ICT knowledge (measured in terms of the qualification) of the respondents. From Table 4, 74 out of 75 of the pupils representing 55.6% (of the entire sample) had only basic knowledge in ICT from their teachers in the basic schools; 41 teachers and a pupil had a certificate in ICT which represents 31.6 %; 14 of the respondents, all teachers, had diploma representing 10.5%; and three teachers had degree in the ICT subject which constitute 2.3%.

Table 5: Respondent Status and the level of ICT Skills

	Basic		Certificate		Total	
	N	%	N	%	N	%
Teachers	48	36.1	10	7.5	58	43.6
Pupils	74	55.6	1	0.8	75	56.4
Total	**122**	**91.7**	**11**	**8.3**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 5 shows 48 teachers and 74 pupils totalling 122 of the respondents had basic skills in the use of ICT tools which represents 91.7%. The table also shows 10 teachers and one pupil which represent 8.3% of the respondents had an advance skill in using the ICT tools.

Clearly then, if we were to go by the theory of Gregoire, Bracewell and Lafarriere (1996) in John and Sutherland (2004, p. 102-107) that the "benefit to students of using new technologies is greatly dependent, at least for the moment, on the technological skill of the teacher and the teacher's attitude to the presence of the technology in teaching," then we may conclude to some extent that students are not really benefiting from new technologies in school.

Addressing the Main Research Questions

Research Question 1: What ICTs are available to pupils and teachers and how often do they use them?

In an attempt to answer this question, items 8, 9 and 10 on the questionnaire were designed to solicit information from respondents about what ICTs and facilities they have in their schools and how often they use them. This included information on which area they use the ICT for and the types of ICT tools and facilities they have in their schools. Responses are shown in Table

From Table 6 all the 58 teachers use the ICT tools in teaching representing 43.6% of the total respondents and all 75 pupils use it for learning representing 56.4 %.

Table 6: Respondent Status and their use of ICTs

	Teaching		Learning		Total	
	N	%	N	%	N	%
Teachers	58	43.6	0	0	58	43.6
Pupils	0	0	75	56.4	75	56.4
Total	**58**	**43.6**	**75**	**56.4**	**133**	**100**

Source: (Fieldwork, February, 2013)

Tables 7-12 show the types of ICTs and facilities that are available in the schools of the respondents. They were to tick to show which of them they have and use in teaching and learning. (Appendix A)

Table 7: Availability of Computer Laboratory

	Have		Didn't Have		Total	
	N	%	N	%	N	%
Teachers	31	23.3	27	20.3	58	43.6
Pupils	34	25.6	41	30.8	75	56.4
Total	**65**	**48.9**	**68**	**51.1**	**133**	**100**

Source: (Fieldwork, February, 2013)

In Table 7, 65 of the respondents (i.e. 31 teachers and 34 pupils) representing 48.9% responded that have a computer laboratory while 27 teachers and 41 pupils making 68 of the respondent representing 51.1% say they didn't have it.

Table 8: Availability of Computers

	Have		Didn't Have		Total	
	N	%	N	%	N	%
Teachers	58	43.6	0	0	58	43.6
Pupils	75	56.4	0	0	75	56.4
Total	**133**	**100**	**0**	**0**	**133**	**100**

Source: (Fieldwork, February, 2013)

In Table 8, all the 133 respondents representing 100.0% responded they to had at least one computer in their schools.

Table 9: Availability of Internet

	Have		Didn't Have		Total	
	N	%	N	%	N	%
Teachers	27	20.3	31	23.3	58	43.6
Pupils	27	20.3	48	36.1	75	56.4
Total	**54**	**40.6**	**79**	**59.4**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 9 shows that 54 of the respondents (i.e. 27 teachers and 27 pupils) representing 40.6% had an internet facility in their schools while 79 respondents made up of 31 teachers and 48 pupils representing 59.6% said they didn't have the internet facility.

Table 10: Availability of Television

	Have		Didn't have		Total	
	N	%	N	%	N	%
Teachers	24	18.0	34	25.6	58	43.6
Pupils	25	18.8	50	37.6	75	56.4
Total	**49**	**36.8**	**84**	**63.2**	**133**	**100**

Source: (Fieldwork, February, 2013)

From Table 10, 24 teachers and 25 pupils totalling 49 of the respondents representing 36.8% said that they had a television (with a recordable player) in their schools but 84 of the respondents (i.e. 34 teachers and 50 pupils) representing 63.2% said they didn't have the television.

Table 11 shows that 81 of the respondent comprising 36 teachers and 45 pupils representing 60.9% were having radio sets in their schools while 52 respondents, 22 teachers and 30 pupils representing 39.1% responded that they didn't have.

Table 11: Availability of Radio

	Have		Didn't Have		Total	
	N	%	N	%	N	%
Teachers	36	27.1	22	16.5	58	43.6
Pupils	45	33.8	30	22.6	75	56.4
Total	**81**	**60.9**	**52**	**39.1**	**133**	**100**

Source: (Fieldwork, February, 2013)

The Table 12 revealed 51 of the respondents comprising 27 teachers and 24 pupils representing 38.3% answered that they have other ICTs like projectors, scanners and printers while 31 teachers and 51 pupils totaling 82 representing 61.7% answered they didn't.

Table 12: Availability of Others (Projectors, scanners, printers)

	Have		Didn't Have		Total	
	N	**%**	**N**	**%**	**N**	**%**
Teachers	27	20.3	31	23.3	58	43.6
Pupils	24	18.0	51	38.4	75	56.4
Total	**51**	**38.3**	**82**	**61.7**	**133**	**100**

Source: (Fieldwork, February, 2013)

From the research question one, all the respondents had at least a computer, internet, television, radio, or other ICTs in their school. This confirms part of Tinio (2009, p.4) definition of ICT as 'these technologies include computer, the internet, broadcasting technologies (radio and television), and telephony.' The use of the ICTs by the respondents serves as the bases of finding their perception on the impact of teaching and learning.

Research Question 2: At what stage do pupils and teachers frequently use these ICTs and does it improves teaching and learning?

Questions 11 and 12 were designed to find out the views of the respondents at what stage they use the ICT tools in their teaching and learning and whether it improves the process. Haddad and Draxier (2002), identify at least five levels of ICT use in education: Presentation, demonstration, drill, and

practice, interaction, and collaboration.

Five stages were identified. They are (a) Preparation stage, these includes all that you do concerning the lesson to be taught before going to the class, (b) Presentation stage, these are what you do when the lesson is going on, (c) Assessment (practice) stage, these are what you do during and after the lesson to ascertain pupils level of understanding or mastery of the lesson (d) Assignments (evaluation) these are extra exercise given either individually or in group to sustain interest and understanding of the lesson and (e) Research (expansion) these are normally topics related to the lesson to give a broader knowledge from other sources apart from those in the textbooks.

This information was gathered were based on what stage they were using the ICT tools? Whether Very often (VO), Often (O), Sometimes (S), Rarely (R) or Never (N) used at all

Table 13: Status of respondents and the usage of ICTs at the Preparation Stage

	VO		O		S		R		N		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	7	4.8	2	2.0	35	26.3	13	9.7	1	0.8	58	43.6
Pupils	2	2.0	7	4.8	24	18.1	29	21.6	13	9.7	75	56.4
Total	**9**	**6.8**	**9**	**6.8**	**59**	**44.4**	**42**	**31.3**	**14**	**10.5**	**133**	**100**

Source: (Fieldwork, February, 2013)

From Table 13, 9 of the respondents (i.e. 7 teachers and 2 pupils) representing 6.8% said they use the ICTs very often in the Preparation stage of teaching and learning; 2 teachers and 7 pupils totalling 9 respondents representing 6.8% use the ICTs often; 59 respondent made up of 35teachers and 24 pupils representing 44.4% use the ICTs sometimes; 42respondents, (i.e. 13 teachers and 29 pupils) representing 31.3% rarely use the ICTs and one teacher and 13 pupils totalling 14 representing 10.5 % had never use any ICTs in the preparation stage of their teaching and learning.

Table 14: Status of the respondents and the usage of ICT Tools at the Presentation Stage

	VO		O		S		R		N		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	3	2.3	23	17.3	30	22.5	1	0.8	1	0.8	58	43.6
Pupils	6	4.5	25	18.8	40	30.1	2	1.5	2	1.5	75	56.4
Total	**9**	**6.8**	**48**	**36.1**	**70**	**52.6**	**3**	**2.3**	**3**	**2.3**	**133**	**100**

Source: (Fieldwork, February, 2013)

In Table 14, 9 of the respondents (i.e.3 teachers and 6 pupils) representing 6.8% used the ICT tools very often in the presentation stage of their teaching and learning. From the table, 48 respondents (i.e. 23 teachers and 25 pupils) representing 36.1% use the ICT tools in often; 30 teachers and 40 pupils totalling 70 pupils representing 52.6% use it sometimes and 3 respondents (a teacher and 2 pupils)representing 2.3% had rarely or never used any of the ICT tools in their teaching or learning.

In Table 15, 4 teachers and a pupil making up 5 respondents representing 3.8% use ICT tools very often to conduct assessment; 37 of the respondents, (i.e. 27 teachers and 10 pupils) representing 27.8% use the ICT tools often; 46 made up of 26 teachers and 20 pupils representing 36.6% use the ICT tools sometimes; 24 respondents (1 teachers and 23 pupils) representing 18.0% rarely used the ICT tools; and 21 pupils representing 15.8% had never use any ICT tools in assessing their teaching and learning.

Table 15: Status of the respondents and the usage of ICT Tools at the Assessment (Practice) Stage

	VO		O		S		R		N		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	4	3.0	27	20.3	26	20.7	1	0.8	0	0	58	43.6
Pupils	1	0.8	10	7.5	20	15.9	23	17.2	21	15.8	75	56.4
Total	**5**	**3.8**	**37**	**27.8**	**46**	**36.6**	**24**	**18.0**	**21**	**15.8**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 16: Status of the respondents and the usage of ICT Tools at the Assignment (Evaluation) Stage

	VO		O		S		R		N		Total	
	N	%	N	%	N	%	N	%	N	%		%
Teachers	2	1.5	17	12.8	38	28.6	1	0.8	0	0	58	43.6
Pupils	21	15.8	20	15.0	29	21.8	4	3.0	1	0.8	75	56.4
Total	**23**	**17.3**	**37**	**27.8**	**67**	**50.4**	**5**	**3.8**	**1**	**0.8**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 16 shows 23 of the respondents (i.e. 2 teachers and 21 pupils) use ICTs very often in performing assignment in their teaching and learning. From the table, 17 teachers and 20 pupils making up 37 representing 27.8% said they often use the ICT tools; 67 respondents (i.e. 38 teachers and 29 pupils) representing 50.4% sometimes use them; 5 respondents (i.e. a teacher and 4 pupils) representing 3.8% rarely use them and only a pupil representing 0.8% had never use any ICT tools for assignments in teaching and learning.

In Table 17, 55 of the respondents made up of 33 teachers and 22 pupils representing 41.4% use the ICT tools very often for their research while 54of the respondents (i.e. 25 teachers and 29 pupils) representing 40.6% use them often and 24 of the respondents all pupils representing 18.0% sometimes use the ICT tool in their research.

Table 17: Status of respondents and the usage of ICT Tools at the Research (Expansion) Stage

	VO		O		S		Total	
	N	%	N	%	N	%	N	%
Teachers	33	24.8	25	18.8	0	0	58	43.6
Pupils	22	16.6	29	21.8	24	18.0	75	56.4
Total	**55**	**41.4**	**54**	**40.6**	**24**	**18.0**	**133**	**100**

Source: (Fieldwork, February, 2013)

From Table 13, 14, 15, 16 and 17, majority of the respondents sometimes use the ICT tools at the preparation, presentation, assessment (practice), assignment (evaluation), and research (expansion) stages of teaching and learning.

According to Becker, Ravitz & Wong (1999), teachers use computers to write lesson plans, prepare materials for teaching, record and calculate students' grades and communicate with other teachers.

Item 12 of the questionnaire was designed to solicit information from respondents on their perception about whether the use of the ICT tools at each stage improves teaching and learning. The respondents were asked whether they strongly agree (SA), agree (A), they are undecided (UD), disagree (D), strongly disagree (SD) to the perception.

Table 18: Respondents' perception of the use of ICT Tools improve teaching and learning at the Preparation Stage

	SA		A		UD		D		Total	
	N	%	N	%	N	%	N	%	N	%
Teachers	7	5.3	43	32.4	8	6.0	0	0	58	43.6
Pupils	9	6.7	44	33	19	14.3	3	2.3	75	56.4
Total	**16**	**12.0**	**87**	**65.4**	**27**	**20.3**	**3**	**2.3**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 18 show 16 respondents (i.e. 7 teachers and 9 pupils) representing 12.0% strongly agree that the use of ICT tools improve teaching and learning at the preparation stage. From the table, 87 respondents (i.e. 43 teachers and 44 pupils) representing 65.4% agree to the perception while 8 teachers and 19 pupils totalling 27 respondents representing 20.3% were undecided, three pupils representing 2.3% disagree and none of the respondents strongly disagree to the perception.

From Table 19, 61 respondents (i.e. 29 teachers and 32 pupils) representing 45.9% strongly agree to the perception that the use of ICT tools at the presentation stage improves teaching and learning. In the table, 27 teachers and 38 pupils totalling 65 of the respondents representing 48.9% agree 3 respondents, one teacher and 2 pupils representing 2.3% were undecided or disagree respectively to the perception and a pupil representing 0.8% strongly disagree.

Table 19: Respondents' perception of the use of ICT Tools improve teaching and learning at the Presentation Stage

	SA		A		UD		D		SD		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	29	21.8	27	20.3	1	0.8	1	0.8	0	0	58	43.6
Pupils	32	24.1	38	28.6	2	1.5	2	1.5	1	0.8	75	56.4
Total	**61**	**45.9**	**65**	**48.9**	**3**	**2.3**	**3**	**2.3**	**1**	**0.8**	**133**	**100**

Source: (Fieldwork, February, 2013)

As shown in Table 20, 17 of the respondents made up 13 teachers and 4 pupils representing 12.8% strongly agree that the use of ICT tools at the assessment (practice) stage of teaching and learning; 44 teachers and 17 pupils making up of 61 respondents representing 45.9% agree to the perception; 27 respondents, (i.e. a teacher and 26 pupils) representing 20.3% were undecided, 25 pupils representing 18.8% disagree and 3 three pupils representing 2.3% and strongly disagree respectively about the perception that the use of ICT tools at the assessment stage improve teaching and learning.

Table 20: Respondents' perception of the use of ICT Tools improve teaching and learning at the Assessment (Practice) Stage

	SA		A		UD		D		SD		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	13	9.8	44	33.1	1	0.8	0	0	0	0	58	43.6
Pupils	4	3.0	17	12.8	26	19.5	25	18.8	3	2.3	75	56.4
Total	**17**	**12.8**	**61**	**45.9**	**27**	**20.3**	**25**	**18.8**	**3**	**2.3**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 21: Respondents' perception of the use of ICT Tools improve teaching and learning at the Assignment (Evaluation) Stage

	SA		A		UD		D		Total	
	N	%	N	%	N	%	N	%	N	%
Teachers	19	14.3	28	21.1	11	8.3	0	0	58	43.6
Pupils	25	18.8	26	19.5	23	17.3	1	0.8	75	56.4
Total	**44**	**33.1**	**54**	**40.6**	**34**	**25.6**	**1**	**0.8**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 21 shows that 44 of the respondents (i.e. 19 teachers and 25pupils) representing 33.1% strongly agree to the perception that the use of ICT tools improve teaching and learning; 28 teachers and 26 pupils totalling 54 representing 40.6% agree to the perception; 11 teachers and 23 pupils totalling 34 representing 25.6% were undecided; one pupil representing 0.8% disagree and none of the respondents strongly disagree.

In Table 22, 84 respondents made up of 38 teachers and 46 pupils representing 63.2% strongly agree to the perception that the use of ICT tools in research improved teaching and learning; 20 teachers and 26 pupils totalling 46 respondents representing 34.6% agree to the perception; and 3 pupils representing 2.3% were undecided and none of the teachers and pupils disagree and strongly disagree.

Table 22: Respondents' perception of the use of ICT Tools improve teaching and learning at the Research (Expansion) Stage

	SA		A		UD		Total	
	N	%	N	%	N	%	N	%
Teachers	38	28.6	20	15.0	0	0	58	43.6
Pupils	46	34.6	26	19.6	3	2.8	75	56.4
Total	**84**	**63.2**	**46**	**34.6**	**3**	**2.8**	**133**	**100**

Source: (Fieldwork, February, 2013)

From Tables 18, 19, 20, 21, and 22, most of the respondents agree or strongly agree to the question that the use ICT tools have improved teaching and learning greatly at each stage. This confirms the assertion that modern technology offers many means of improving teaching and learning in the classroom (Lefebvre, Deaudelin, & Loiselle, 2006)

Research Question 3: Whether teachers and pupils agree that the use of ICTs dissuades attention, waste time or is beneficial in the teaching and learning?

Item 13 of the questionnaire was designed to answer the research question. This was verify the perception that the use of ICT tools by teachers and pupils (a) diverts the attention of teachers and pupils during teaching and learning, (b) waste the time (spends more time unnecessary) of teachers and pupils in teaching and learning and (c) is of great benefit in teaching and learning. They were to respond whether they strongly agree (SA), agree (A), they are undecided (UD), disagree (D), strongly disagree (SD) to the perception.

Table 23: Respondents' perception of the use of ICT Tools dissuading attention in teaching and learning

	SA		A		UD		D		SD		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	1	0.8	1	0.8	1	0.8	34	25.6	21	15.8	58	43.6
Pupils	2	1.5	3	2.2	0	0	35	26.3	35	26.3	75	56.4
Total	**3**	**2.3**	**4**	**3.0**	**1**	**0.8**	**69**	**51.9**	**56**	**42.1**	**133**	**100**

Source: (Fieldwork, February, 2013)

As shown Table 23, 3 respondents (i.e. 1 teacher and 2 pupils) representing 2.3% strongly agree that the use of ICT tools dissuade or diverts the attention of teaching and learning; 4 respondents made up of a teacher and 3 pupils representing 3.0% agree; a teacher representing 0.8% was undecided to the perception; 69 respondents (i.e. 34 teachers and 35 pupils) representing 51.9% disagree; 21 teachers and 35 pupils totalling 56 respondents representing 42.1% strongly disagree to the perception that the use of ICT tools dissuades the

attention of teaching and learning.

Table 24: Respondents' perception of the use of ICT Tools waste attention in teaching and learning

	SA		A		UD		D		SD		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	1	0.8	0	0	0	0	27	20.4	30	22.6	58	43.6
Pupils	4	3.0	5	3.8	1	0.8	36	27.3	29	21.8	75	56.4
Total	**5**	**3.8**	**5**	**3.8**	**1**	**0.8**	**63**	**47.7**	**59**	**44.4**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 24 shows 5 respondents made up of a teacher and 4 pupils representing 3.8 % strongly agree that the use of ICT tools waste the time of teachers and pupils in teaching and learning. From the Table, 5 pupils representing 3.8% agree, a pupil representing 0.8% was undecided to the perception, 63 respondents (i.e. 27 teachers and 36 pupils) representing 47.4% disagree and 30 teachers and 29 pupils totalling 59 respondents, representing 44.4% strongly disagree to the perception that the uses of ICT tools waste the time in teaching and learning.

Table 25: Respondents' perception of whether the integration of ICT in teaching and learning is beneficial

	SA		A		UD		D		SD		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Teachers	29	21.8	27	20.3	1	0.8	1	0.8	0	0	58	43.6
Pupils	32	24.1	38	28.6	2	1.5	2	1.5	1	0.8	75	56.4
Total	**61**	**45.9**	**65**	**48.9**	**3**	**2.3**	**3**	**2.3**	**1**	**0.8**	**133**	**100**

Source: (Fieldwork, February, 2013)

As shown in Table 25, 61 of the respondents consisting of 29 teachers and 32 pupils representing 45.9% strongly agree to the perception that the use of ICT in teaching and learning is of great benefits, 27 teachers and 38 pupils totalling 65 respondents representing 48.9% agree and 3 respondents (i.e. 1 teacher and 2 pupils) representing 2.3 % were undecided. Again 3 respondents consisting of a teacher of a teacher and 2 pupils disagree and only one pupil strongly disagrees to the perception.

Research Question 4: What are the Challenges facing the use of ICT Tools in teaching and learning and the performance of pupils in their examination?

Question 14, 15 and 16 of the research questionnaire were formulated to find out the challenges facing the use of ICT Tools in teaching and learning and the performance of pupils in their examination. Items 14 and 15 of the questionnaire were to ascertain the perception of the respondents on the performance of pupils in their ICT examination especially the Basic Education Certificate Examination (BECE).

They were to respond 'Yes' or 'NO'. 'Yes' meaning pupils don't do well and 'No' meaning pupils do well. They were to give their reason (s) to their response. Their reasons were classified into (a) qualified teachers, (b) ICT infrastructure (ICT tools like computers), (c) books (textbooks and workbooks) and (d) students attitude (towards the subject and the ICT examination).

Table 26: Respondents' perception of how pupils perform in their ICT examination

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	44	33.1	14	10.5	58	43.6
Pupils	59	44.3	16	12.1	75	56.4
Total	**103**	**77.4**	**30**	**22.6**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 26 shows that 103 respondents consisting of 44 teachers and 59 pupils representing 77.4% were of the view that pupils do not do well in their ICT examination while 14 teachers and 16 pupils totalling 30 respondents representing 22.6% said students perform well in their exanimation.

In Table 27, 74 respondents made up of 30 teachers and 44 pupils representing 55.6% perceive that the reason pupils don't do well in their ICT examination is because the absence of qualified teachers while 28 teachers and 31 pupils totalling 59 respondents representing 44.4% perceive that the poor performance of the pupils is not as a result of the absence of qualified teachers.

Table 27: Respondents' perception of qualified teachers as a reason for pupils' performance in ICT examination

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	30	22.5	28	21.1	58	43.6
Pupils	44	33.1	31	23.3	75	56.4
Total	**74**	**55.6**	**59**	**44.4**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 28: Respondents' perception of ICT Tools (computers) as a reason for pupils' performance in ICT examination

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	34	25.6	24	18.0	58	43.6
Pupils	49	36.8	26	19.6	75	56.4
Total	**83**	**62.4**	**50**	**37.6**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 28 shows that 83 respondents (i.e. 34 teachers and 49 pupils) representing 62.4% have the perception that the reason pupils don't do well in their ICT examination is because there few computers for teaching and learning ICT and 24 teachers and 26 pupils totalling 50 respondents representing 37.6% perceive that the poor performance of the pupils is not as a result of ICT tools not available in the school.

Table 29: Respondents' perception of reading materials (textbooks and workbook) as a reason for pupils' performance in ICT examination

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	36	27.1	22	16.5	58	43.6
Pupils	37	27.8	38	28.6	57	56.4
Total	**73**	**54.9**	**60**	**45.1**	**133**	**100**

Source: (Fieldwork, February, 2013)

In Table 29, 36 teachers and 37 pupils totaling 73 respondents representing 54.9 % were of the opinion that pupils fail in their ICT examination because they have no reading materials (textbooks and workbooks) on the subject while 22 teachers and 38 pupils totaling 60 respondents representing 45.1% did not agree to this perception.

Table 30: Respondents' perception of students' attitude as a reason for pupils' performance in ICT examination

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	33	24.8	25	18.8	58	43.6
Pupils	31	23.3	44	33.1	57	56.4
Total	64	48.1	69	51.9	133	100

Source: (Fieldwork, February, 2013)

Table 30 shows 64 respondents up of made33 teachers and 31 pupils representing 48.1% have the perception that the reason pupils don't do well in their ICT examination is because students do not take the ICT subject serious and therefore do not prepare well to write the examination while 69 respondents (i.e. 25 teachers and 44 pupils) representing 51.9% disagree to that perception.

Item 16 of the questionnaire was designed to find out the respondents response on some of the factors that hinders the use of ICT Tools in teaching and learning. These factors were gathered as some of the challenges (a) power supply (electricity), (b) poor infrastructure (computer tools), (c) inadequate ICT skills (theoretical and practical abilities of the teachers), and (d) overcrowding as a result of few ICT tools to share by many pupils. They were to tick to show 'Yes' a challenge or 'No' it wasn't a challenge facing the use of ICTs in teaching and learning.

Table 31: Respondents' perception of unstable power supply as a challenge to the use of ICT in teaching and learning

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	50	37.6	8	6	58	43.6
Pupils	63	47.4	12	9	57	56.4
Total	**113**	**85**	**20**	**15**	**133**	**100**

Source: (Fieldwork, February, 2013)

As Shown in Table 31, 113 of the respondents representing 85% made up of 50 teachers and 63 pupils were of the perception that unstable power supply is a challenge facing the use of ICT tools in teaching and learning while 20 respondents (i.e. 8 teachers and 12 pupils) representing 15.0% do not agree to the perception.

In Table 32, 36 teachers and 46 pupils totalling 82 respondents representing 61.7 % were of the opinion that it is difficult to use ICT tools in teaching and learning because of poor infrastructure (including inadequate computers) in their schools while 22 teachers and 29 pupils totalling 51 respondents representing 38.3% did not agree to this perception.

Table 32: Respondents' perception of poor infrastructure as a challenge to the use of ICT in teaching and learning

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	36	27.1	22	16.5	58	43.6
Pupils	46	34.6	29	21.8	57	56.4
Total	**82**	**61.7**	**51**	**38.3**	**133**	**100**

Source: (Fieldwork, February, 2013)

From Table 33, 79 of the respondents representing 59.4% made up of 34 teachers and 45 pupils were of the perception that inadequate qualified teachers is a challenge facing the use of ICT tools in teaching and learning while 54 respondents made up of 24 teachers and 30 pupils representing 40.6% do not agree to the perception.

Table 33: Respondents' perception of inadequate qualified teachers as a challenge to the use of ICT Tools in teaching and learning

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	34	25.6	24	18.0	58	43.6
Pupils	45	33.8	30	22.6	57	56.4
Total	**79**	**59.4**	**54**	**40.6**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 34: Respondents' perception of over-crowding as a challenge to the use of ICT Tools in teaching and learning

	Yes		No		Total	
	N	%	N	%	N	%
Teachers	36	27.1	22	16.6	58	43.6
Pupils	57	42.8	18	13.5	57	56.4
Total	**93**	**69.9**	**40**	**30.1**	**133**	**100**

Source: (Fieldwork, February, 2013)

Table 34 shows that 93 respondents made up of 36 teachers and 57 pupils representing 69.9% have the perception that ICT tools are not use in the teaching and learning because of over-crowding (many pupils gather around few computers) which waste time. 40 respondents (i.e. 22 teachers and 18 pupils) representing 30.1% disagree to that perception.

In Tables 31, 32, 33, and 34 unstable power supplies, inadequate qualified teachers, poor infrastructure and overcrowding are some of the challenges facing the use of ICT tools in teaching and learning. This confirms the list of ten factors

by Pelgrum (2001) that impede ICT integration in schools. These include teachers lack of knowledge and skills; insufficient number of computers and ICT infrastructure; and difficulty in integrating ICTs instruction in classroom. In a related study, Ely (1993) distinguishes three major conditions, relevant to ICT integration in classrooms. These are dissatisfaction with the status quo, existence of knowledge and skills, and availability of resources.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Overview of the Study

ICTs are being integrated in the teaching-learning process in many learning institutions of the world (Ertmer 2005; Steel 2009).With the introduction of the Basic School Computerisation Project by the Ministry of Education of Ghana to supply 60,000 laptops, there was the need to find the perception of pupils and teachers of the impact of the use of ICT in teaching and learning in the Basic Schools in the Kumasi Metropolis.

The purpose of the study was to (a) assess pupils and teachers' perceived impact of the use of ICT in the teaching and learning in the basic schools in the Kumasi Metropolis, (b) identify the ICTs currently in use to support teaching and learning in the basic schools, (c) identify the extent of the adoption and integration of ICTs by the basic schools in and teaching and learning, and (d)provide a sound theoretical and empirically informed basis for informing policy makers on the teaching and learning using ICTs.

In achieving these purposes, these questions were to be answered (a) what ICTs are available to teachers and pupils and how often do they use them? (b) what stage does pupils and teachers frequently use ICTs and whether it improves teaching and learning? (c) whether pupils and teachers agree that the use of ICTs dissuade attention, waste time, or is beneficial in the teaching and learning? (d)

what are the challenges facing the use of ICTs in teaching and learning and the performance of pupils in their examination?

Survey research methodology was used where the primary source of data was through questionnaire administration. Secondly source of data was through the internet, daily news print and journals at libraries. For data collection, questionnaires were administered to teachers and pupils since they were directly involved in the use of the ICT tools in teaching and learning. Out of the total population of 150, the corresponding sample size for the study chosen was set at 133 with a confidence level of 95% and 5% margin of error according to Krejcie and Morgan (1970). The questionnaire was analyzed using the SPSS software.

Key Findings

Summary of the Status of the respondents (teachers and pupils) on the use of ICT in teaching and learning includes:

1. Around 79.7% of the respondents had used both computer and internet before. About 11% have use only computers and others including calculators, phones and digital cameras.
2. About 56 % of the respondents had a basic knowledge in ICT whilst91% had basic skills in the use of ICT tools in teaching and learning?

From the study, it was found out that, there were many ICT facilities or tools available in the schools. These included computer laboratory, computers, internet, television, radio and others like digital camera, projectors, printers and photocopy machines. Most of the respondents sometimes or very often use the ICT tools in their teaching and learning.

Again, it was ascertained that although the respondents use the ICT tools at every stage of teaching and learning, they were mainly used sometimes at the (a) preparation, (b) presentation, (c) assessment, (d) assignment, and (e) research stages and it improves teaching and learning greatly at these stages. Also, the respondents perceived that the use of ICT tools (a) dissuade pupils and teachers attention in the teaching and learning process, (b) waste the time of pupils and teachers in the teaching and learning process and (c) is beneficial in teaching and learning.

It was ascertained that 77.4% of the respondents were of the view that pupils do not do well in the ICT examination. The reasons for their views include (a) inadequate qualified teachers, (b) inadequate ICT tools (computers) and lack of reading materials (textbooks and workbooks). Again it was also found out that (a) unstable power supply, (b) poor infrastructure, (c) inadequate qualified teachers and (d) over crowding as some of the challenges facing the use of ICT in teaching and learning.

Conclusion

This research examined pupils and teachers' perceptions of the impact of the use of ICTs in teaching and learning in the basic schools in the Kumasi Metropolis". From the research it could be concluded that most of the pupils and teachers perceived that the use of ICT Tools have greatly impacted on the teaching and learning process. They agree with the view of Lefebvre, Deaudeline, & Loiselle, (2006) that, modern technology offers many means of improving teaching and learning in the classroom.

Recommendations

In view of the findings and conclusions, the following recommendations were made to assist the government, educational institutions, policy makers, all stakeholders and organizations to be responsible for implementation:

1. To increases ICT facilities in the basic schools. These facilities include computer laboratories with computers, internet, televisions, radio, projectors and other ICT tools they can aid in teaching and learning. Even though the Ministry of Education has embarked on a basic school computerisation project there is the need to speed up especially in the public schools. This is to make the pupils familiarise with the ICT tools to acquire the basic skills they need.
2. Qualified teachers with knowledge and skills in the teaching of ICT should be employed to teach the subject according to the stipulated syllabus for examination so that the pupils can do well in the ICT examination. In addition the government and the examination body have to provide the teachers and pupils more written materials (ICT syllabus, textbooks, and workbook) in other for the student to be able to have the needed knowledge necessary for the examination.
3. From time to time, there is the need to offer teachers especially more in-service training on both knowledge and skills acquisition in the use of ICT in teaching thereby helping the pupils to use the ICT in learning. Most of the teachers especially in both private and public schools have only basic knowledge in the use of ICT in teaching.

4. Computer manufacture and Software developers must be engage to manufacture and develop computer and educational software friendly to the classroom that will not dissuade and waste pupil's attention. Even though from the study most of the pupils did not agree to this fact there were a substantial amount of people who did.
5. The government should also make sure that there are constant power supply and other alternative power supplies because that is the fuel for ICT tools. Most private schools didn't have problem with it because it had alternative power supply.

Suggestions for Further Research

The research work concentrated so much on the perception of pupils and teachers of the impact of the use of ICT in the teaching and learning in the basic schools in the Kumasi Metropolis.

However, the study could not cover the perception of teachers and students in the senior high schools. An area of further research should therefore target the perception of teachers and students of the impact of the use of ICT in teaching and learning in the senior high schools in the Kumasi Metropolis.

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APENDICES

APPENDIX A

QUESTIONNAIRE

Personal Data of Respondent

1. Status of the School
   Public ☐ Private ☐

2. Respondent Status
   a) Teacher ☐ b) Pupils ☐

3. Class. Taught or Class in.
   Lower Primary ☐ Upper Primary ☐ Junior High ☐

Acquisition of ICT Skills and Knowledge

4. Have you ever use an ICT tool before?
   a) Yes ☐ b) No ☐

5. Which of the following have you use before?
   a) Computer only ☐ b) Computer and internet ☐
   b) Others ☐ d) None of these ☐

6. What level of Information and Communication Technology (ICT) knowledge do you have?
   a) Basic ☐ b) Certificate ☐
   c) Diploma ☐ d)Degree ☐

7. What level of Information and Communication Technology (ICT) skills do you have?
   a) Basic ☐ b) Advance ☐ c) None ☐

Usage and Perception of ICT Skills

8. Which area do you use ICT?
   a) Teaching ☐ b) Learning ☐

9. Which of the following ICT facilities do you have in your school?
   a) Computer Laboratory ☐
   b) Computers ☐
   c) Internet ☐
   d) f) Television ☐
   e) Radio ☐
   f) Others ☐

(Others includes Projectors, scanners, printers, etc)

10. How often do you use these ICT tools in teaching and learning in your school?
    a) Very Often ☐ b)Often ☐ c) Sometimes ☐
    d) Rarely ☐ Never ☐

11. Apart from ICT subject , do you teach or learn with any ICT tools
    Yes ☐ No ☐

12. At what stage of teaching and learning do you use these ICT tools and how frequent?
    (VO = Very Often, O = Often, S = Sometimes, R = Rarely, N = Never.)

	VO	O	S	R	N
Preparation stage					
Presentation stage					
Assessment and Evaluation					
Assignment					
Research					

13. Do you agree that the use ICT tools at each stage improve teaching and learning greatly? (SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree)

	SA	A	U	D	SD
Preparation stage					
Presentation Stage					
Assessment and Evaluation					
Assignment					
Research					

14. For each of the statements in the table , put a tick in the box that describes your point of view(SA = Strongly Agree, A = Agree, U = Undecided, D = Disagree, SD = Strongly Disagree)

Statement	SA	A	U	D	SA
Do you agree that the use of ICT tools dissuade attention on from teaching and learning?					
Do you agree that the use of ICT tools waste pupils and teachers' time?					
Do you agree that the integration of ICT tools in teaching and learning is of great benefit?					

Challenges in the Usage of ICT

15. Do you think pupils don't do well in their ICT examination?
Yes ☐ No ☐

16. If Yes or No Why?
……
……
……
……
……..

17. What are the challenges facing the use of ICT in teaching and learning?
a) Power supply ☐
b) Poor infrastructure ☐
c) Inadequate ICT skills ☐
d) Over- crowding ☐

APPENDIX B

Public Schools Selected for the Study

Serial Number	Name of Public School	Number of Teachers	Number of Pupils
1	Prempeh M/A Basic 'A'	5	5
2	Prempeh M/A Basic 'B'	5	5
3	Kwadaso M/A JHS	5	5
4	Ohwimase M/A Basic 'A'	3	5
5	Ohwimase M/A Basic 'B'	5	5
6	OpokuWare M/A Basic	3	5
7	State Experimental M//A Basic '1'	3	5
8	State Experimental M//A Basic '2'	3	5
9	Kwadaso SDA JHS	3	5
10	Ohwimase Anglican JHS	3	5
	Total	38	50

APPENDIX C

Private Schools Selected for the Study

Serial Number	Name of Public School	Number of Teachers	Number of Pupils
1	Osaberima Education Complex	4	5
2	Vicande International	4	5
3	Supreme Saviour International	4	5
4	Mount Hermon Education Complex	4	5
5	Headlines Academy	4	5
	Total	20	25