

UNIVERSITY OF CAPE COAST

ASSESSING THE EXTENT TO WHICH ICT TOOLS ARE USED FOR
QUALITY TEACHING AND LEARNING IN SENIOR HIGH SCHOOLS- A
CASE STUDY IN TANO SOUTH DISTRICT

ADJEMAN-BADU REGINALD

2015

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BY

ADJEMAN-BADU REGINALD

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 2015

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: Reginald Adjeman-Badu

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: Prof. J. A. Fletcher

ABSTRACT

This study looked at the extent to which information and communications technology (ICT) tools are used in Senior High Schools (SHS) in Tano South District. The study investigated the level of availability of ICT facilities in schools, the capacity for using ICT facilities for teaching and learning, the perceived benefits of using ICT tools and the problems affecting the use of ICT tools in SHS. Survey design was used for the study.

The population consisted of all the teachers and students of the Presbyterian SHS and Presbyterian SH/Commercial in Tano South District. The sample consisted of 117 teachers and 347 students randomly selected from the two SHS in Tano South District. Two different sets of questionnaire were used, one set for teachers and other set for students. Data collected for the study were analyzed using SPSS 19 and MS Excel 2007 for drawing figures.

The study revealed that the schools lacked ICT facilities and teachers and students were not very familiar with the use of ICT tools. Moreover, the study revealed the perceived benefits of using ICT in schools which include making teaching-learning interesting; helping the distance learning programme; helping teachers to be up-to-date; enhancing quality of work by both the teachers and students. However, despite these perceived benefits, the study also revealed some of the challenges adversely affecting ICT in SHS as: irregular power supply; inadequate computer literate teachers; high cost of purchasing computers in schools; inadequate facilities to support full application of the ICT and lack of funds. Recommendations were also made.

ACKNOWLEDGEMENTS

I wish to recognize and acknowledge all my loved ones for their support. This acknowledgement cannot be completed without mentioning my supervisor, Professor Jonathan Fletcher, a lecturer, of the Institute of Education for supervising this dissertation. Special thanks to Mr. Amoh Adinkra, tutor in KNTC, Kumasi for his constant encouragement in my education. Finally, I wish to express my sincere thanks to all those who contributed in diverse ways to make this project a success especially Mr. Samuel Cobbina of Presbyterian Senior High, Bechem for his assistance in the statistical work. I thank you all.

DEDICATION

I dedicate this work to my dearest wife, Mrs. Maureen Adjeman-Badu, my children; Reginald N. Adjeman-Badu and Oberempomaa A. Adjeman-Badu.

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CHAPTER ONE

INTRODUCTION

Background to the Study

The use of Information and Communications Technology (ICT) has penetrated every facet of life today and for this reason, it is widely embraced in the society today. As such, our success as individuals or as a nation depends on our ability to understand the use of ICT tools. No one can afford to ignore the importance of ICT tools in one's everyday life today.

The way ICT has revolutionized the way we do things today has led to the investment of millions of Ghanaian Cedis (GH¢) at both government and school levels for the integration of computer technology into the curriculum in pre-tertiary education. In the early 90's most of the moneys were spent on purchasing computers and software through private Information Technology (IT) companies, Parent Teacher Association (PTA), Old Boys/Girls Associations and Non-Governmental Organizations (NGOs). The early 90's saw the account of internet and by late 90's, the number of internet host sky rocketed to most of the communities. Once again it became imperative for government to provide more funding for internet connectivity in all public schools to make ICT accessible to all students especially Senior High School (SHS) students.

This research work is in line with the integration of ICT tools in the SHS educational system in Tano South District, more specifically in the teaching of other subjects in the SHS programme.

ICT is the emergence of tools that are used in the automatic acquisition, analysis, storage, retrieval, manipulation, management, control, movement, display, transmission, reception, and interchange of quantitative and qualitative data (Boritz, 2000). Now the question is how to harness the power of ICT tools to make education more relevant, responsible and effective for SHS setting and lifelong learning. To compete successfully in a competitive global economic environment, a highly skilled and educated workforce with aptitude and skills in the application of ICT tools is very essential. This makes knowledge and the use of ICT central to education in the 21st century (Wolff & Mackinnon, 2002). People need to be effective and efficient in the use of ICT for success in today's rapidly changing and highly competitive world which depends on such knowledge and skills; hence the concern for Ghana to take the best advantage of the knowledge economy. Assie-Lumumba (2008, p. 2) captures this succinctly:

Beyond the immediate educational goal is the question of how to provide the 'best education' to form the next generation of competent leaders from community to the national and global levels, economic planners, scientists, artists, humanists and more generally informed citizens, especially in this fast paced, technology-prone and globalized world.

The development of ICT in education will result in the creation of new possibilities for learners and teachers to engage in new ways of information acquisition and analysis. ICT however will enhance access to education and

improve the quality of education delivery on equitable basis. Hence the government commitment to a comprehensive programme of rapid development and utilization of ICT within the education sector to transform the education system and hence improve the lives of people.

Tchombe, Maiga, Toure, Mbangwana, Diarra and Karsenti (2008) posited that it is not just acquiring the knowledge of ICT that is important but also teachers need to understand how to use ICT pedagogically. They asserted that ICT if used appropriately can stimulate the development of higher cognitive skills, deepen learning and contribute to the acquisition of skills needed for learning all lifelong and for working in today's job market. Studies have established the roles of ICT in achieving quality teaching and learning at all levels of the school system. ICT is seen as key tool in acquiring, processing and disseminating knowledge (Adedoyin, Akinnuwesi & Adegoke, 2008). It offers increasing possibilities for codification of knowledge about teaching activities through being able to deliver learning cognitive activities anywhere, anytime. Others can also argue that ICT has the potential to transform learning environments and improve the quality of learning, by making learning more situated, providing access to richer environment, increasing opportunities for active learning, interconnectivity and feedback, enhancing motivation to learn, offering varieties of new possibilities to learners and having a positive effect on students' achievement in different subject areas. ICT can therefore make the school more efficient and productive thereby engendering a variety of tools to enhance and facilitate professional activities. Haddad and Jurich (2002, p.33) summed it up:

The traditional model of learning emphasizes mastery of facts and concepts. ICT diversifies the system of representation through the use of various stimuli (images, sounds and movement) and address the needs of diverse types of learning (visual, psychomotor and affective).

Beyond the benefits, a practical application of ICT tools can be used for creative, communicative, collaborative and task-based activities during instruction in various SHS subjects especially Mathematics, Languages and the Sciences; as well as encourage self-discovery by learners.

ICT tools have been proven to be of significant input in teacher professional development as quality in teaching and learning is also dependent on teacher competencies. This is achieved through access to online journals, joining discussion fora, downloading lesson ideas and plans, exploiting teaching resources and record keeping. However, despite all justifications for the need and the use of ICT tools in the teaching and learning process to achieve the goals of SHS educational development, the vision of easy access to all is justifiable but hard to achieve.

The challenge for the future is, therefore, to test and research into applications of ICT in more open learning situations to achieve a richer learning experience. Educational programmes for teachers should train students to deploy ICT as a cognitive tool, also known as ‘mind tools’ (van den Dool & Kirschner, 2003).

In modern educational approaches, students are to a greater degree responsible for their own learning and the teachers focus on the development of thinking (creative, logical and critical), the students’ search for and selection of

information, and on individual and collaborative work situations. This sort of education provides room for students to actually participate and to enter into an active, constructive process with learning how to learn as the primary goal.

Statement of the Problem

Asiedu-Akrofi (1982) posited that since the introduction of formal education in Ghana, educational provisions have been skewed in favour of those in the urban communities and there have been inequitable distribution of educational resources and services. Most often than not, these schools in the rural areas are faced with a lot of problems such as the lack of qualified teachers, inadequate infrastructure and poor implementation of government policies. The situation for teachers in this new field of study might even be worse. As a result of the lack of properly qualified ICT professionals or teachers, stakeholders in those rural areas are heavily dependent on teachers of other field of study with a little knowledge to remedy the situation.

Dankwa (1997) claimed that the provision of ICT tools to Senior High Schools are skewed in favour of the first class or category 'A' schools in the urban areas. Presbyterian Senior High/Commercial School which is day school in the newly carved Tano South District in 2007 in the Brong Ahafo Region of Ghana can definitely not compare herself to category 'A' schools like Prempeh College and Opoku Ware School both in Kumasi Metropolis in Ashanti Region.

Hakkarainen, Ilomaki, Lipponen, Muukkonen and Rahikainen (2000) point out that ICT is a transformative tool and its full integration into the school systems is necessary to prepare students for the information society they will inherit. Contrary to the promising notion of ICT as a means of knowledge

production, there is the need to address the numerous problems that the introduction of ICT tools will bring. These issues include: a lack of adequate planning for implementation of ICT in SHS; inadequate teacher education institutions; inequalities in ICT tools distribution; low levels of literacy in general and lack of relevant content and technology applications to meet the needs of diverse societies. There is a clear tendency for ICT to lead to a digital difference between urban and rural schools.

This study will therefore determine the importance for ICT tools in SHS education and examine its implementation in terms of the availability of ICT tools in schools and their application in improving teaching and learning in SHS school subjects.

Purpose of the Study

In Tano South District, second cycle education caters for both able bodies and physically challenged individuals to meet the learning needs of all the variety of people. However, this study focuses on ICT tools used in teaching and learning activities within the "normal" system of SHS education, i.e. schools, comprising the normal three-year SHS education which are pre-tertiary schools. It does not cover special educational needs schools. The two Senior High Schools are Presbyterian Senior High School (PRESEC) in Bechem and Presbyterian Senior High/Commercial School (PRESECO) in Techimantia. The study therefore attempts to find out: the various ICT tools which are used by headmasters/teachers and students of these schools, the extent to which ICT tools are used in these SHS in teaching and learning, the ineffective use of ICT tools in

SHS in Tano South District, and ways by which the use of ICT tools can be improved in these SHS.

Research Questions

The study seeks to find answers to the following pertinent questions:

1. To what extent are the ICT tools available for teaching in SHS in Tano South District?
2. What requisite training and qualification do teachers have in the use of ICT tools to teach?
3. What are the perceived benefits of ICT tools in SHS?
4. What are the challenges affecting the adoption of ICT tools in SHS in Tano South District?
5. To what extent are teachers and students in SHS in Tano South District exposed to ICT facilities?

Significance of the Study

This research is very significant with respect to the fact that the world is fast developing in ideas and activities and therefore the teaching and learning process should not be left out. The outcome of this study will be important to the SHS in Tano South District. Again, learners, many educational institutions in the Tano South District, non-governmental organizations and corporate bodies in Ghana as a whole may also benefit from it as stated below.

Initially, its outcome will serve as a good resource document for students and other researchers in the district who would want to conduct a further study into the effective use of ICT tools in schools.

Again, the study may serve as a wealth of information for Tano South District Education Office and its affiliate, the Curriculum Research and Development Division of the Ghana Education Service in their search for the appropriate, Communication Technology systems that can warrant effective teaching and learning.

Furthermore, the study could spur the government of Ghana, the Ministry of Education, Science and Sports, and school authorities to see the need to invest in ICT tools in Senior High schools in the Tano South District. The study could also serve as an eye-opener to the government of Ghana to quicken efforts at equipping school teaching staff with the appropriate skills that will make them functional in the application of ICT tools in teaching.

Finally, the use of modern technology in this process will go a long way to improve the teaching and learning conditions of SHS teachers and students and thereby solve some of the major problems the SHS Educational system in Tano South District are facing.

Delimitation of the Study

The study looked at the extent to which ICT tools are used in SHS for quality teaching and learning in Tano South District. Generally, the staff and students were looked at, ICT tools and materials and other environmental conditions in teaching-learning were also considered. The scope and application of this study is delimited to Presbyterian Senior High School in Bechem and Presbyterian Senior High/Commercial School in Techimantia. It is equally delimited to school teaching staff members who have taught at least for one term

in their various schools and students. The study was carried out within two full terms of six months of the academic year.

Limitation of the Study

Every human action is prone to limitations due to human weaknesses. This is even more relevant to this study as some measuring technologies had to be used to carry out the study.

Most of the respondents, especially, the teaching staff have no or little knowledge about national ICT policy and ICT usage. Definitely, those who were not truthful and provided inaccurate information could negatively affect the validity of the study.

Also, because relatively a small sample data was used to represent the entire population, the views of that sample might not fully represent that of the entire population.

Organization of the Study

The research work is structured under five chapters with their accompanying subdivisions. Chapter one forms the introduction. The rest of the dissertation has four additional chapters. Chapter two reviews the related literature. Chapter three tackles the methodology which spells out the research design, population, sample and sampling procedure, instruments, data collection procedure and data analysis. That aside, the presentation of data and discussion of collected data is done in the fourth chapter. Finally, in the fifth chapter, a summary of the findings, conclusions and recommendations are established.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Overview

The advent of Information and Communications Technology has opened up tremendous access and opportunity to increase and advance in our quest for quality in our SHS teaching and learning. It gives its users new way to teach, learn and grow in an unprecedented way.

The use of ICT in the classroom has become important, as it provides opportunities for students to learn how to operate in an information age. The study of obstacles to the use of ICT in education may assist educators in overcoming barriers and support students in becoming successful technology adopters in the future. This review of related literature analyses some relevant literature and aims to identify the perceived barriers to technology integration in education.

ICT tools are radically transforming the curriculum in a number of ways, demanding that teachers reflect on new pedagogy and not the traditional methodologies. Educators themselves assert that the integration of ICT into the classroom will greatly enhance the learning experience (Sutherland, Armstrong, Barnes, Brawn, Breeze, Matthewman, Olivero, Taylor, Triggs, Wishart & John, 2004). The growth of ICT itself dictates that in order for students to adjust to modern society and the global economy, the way in which they are taught and what they are taught, requires adjustments to and around ICT (Watson, 2006).

Balanskat, Blamire and Kefala (2006), however argue that although educators appear to acknowledge the value of ICT, difficulties continue to be encountered in adopting and integrating such technologies. Mueller, Wood, Willoughby, Ross and Specht (2008), conclude that although many teachers are comfortable with technology in general, they still may not be ready or capable to integrate such technology, in their classrooms. This chapter discusses the available literature on the various aspects of the topic. The review was done under the following subheadings:

1. The availability of ICT tools in SHS.
2. Inadequate training and qualification of teachers.
3. Perceived benefits of using ICT tools in education.
4. Positive impacts of ICT tools on students learning.
5. Challenges affecting the adoption of ICT tools in education.

The Availability of ICT Tools in SHS

In order to appreciate what is meant by ICT integration in education, it is important that we know the origin of ICT and what it really is. Research has it that the use of computers became popular in the 1980's when personal computers became available to consumers. Again, research has shown that it is this global competition that has influenced governmental policies all over the world in ensuring that they keep pace with these technological advancements. These policies motivated the mass production of computers for schools. Several researchers suggested that ICT will be an important part of the education process for the next generation.

ICT is an acronym for Information and Communications Technology, it is a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information (Blurton, 1999). This means that ICT helps in the storage and management of information. Also, Ayo (2001) defined ICT as the use of computer systems and telecommunications equipment in information processing.

The emerging phenomenon was welcomed in the 1980's that educational systems needed to prepare students to adjust and survive in this new technologically driven society. This means preparing students for "lifelong learning in an information society" (Pelgrum & Law, 2003, p.20). Allied to this, early advocates of ICT integrated education, saw it as a catalyst for change, fostering skills in problem solving and critical thinking, as well as the development of student centred learning (McGrail, 2005).

Inadequate Training and Qualification of Teachers

A full and complete integration of the use of ICT tools in education requires high quality frequent training and professional development. If this training is not provided, then attempts at integration will inevitably be unsuccessful. This is significant, as according to most researchers another barrier that is frequently cited, is the lack of effective training. A study by Pelgrum in 2001 revealed that there were not enough training opportunities for teachers in the use of ICT tools in the classroom.

The training of teachers in the integration of ICT in the learning and teaching process is a difficult one. This is so because it involves a number of complex factors in order to render the training effective. These complex factors

include finding the time for training, training in pedagogy, skills training and the use of ICT tools in the teacher's initial training (Bingimlas, 2009). British Educational Communications and Technology Agency [BECTA] (2004) concurs, asserting that training is particularly complex, because it is important to consider several components to ensure the effectiveness of the training. A similar study conducted by Cox, Preston and Cox (1999) argue that ICT training for teachers needs to incorporate pedagogical aspects. This study concluded that when teachers received basic ICT training without considering the pedagogical aspects of ICT, they still did not know how to use ICT tools in class. Schoepp (2005) maintains that if new technology is going to be integrated into education, teachers should receive training on how to use the specific ICT tool, while Trotter (1999) concludes that training in ICT integration must be preceded by and supplemented with basic skills training. Research by Gomes (2005) also concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom and lack of training concerning the use of technologies in specific subject areas, were obstacles to the use of new technologies in classroom practice.

Cox et al (1999) again assert that if teachers are to be convinced of the value in using ICT in their teaching, their training should focus on pedagogical issues. It is a fact that even after teachers had attended professional development courses in ICT, they still did not know how to effectively use ICT tools in their classrooms. This was because too much emphasis was placed on acquiring technical ICT skills during training, as opposed to skills in how to incorporate ICT into the curriculum.

According to Newhouse (2002), some trainings are still needed for teachers to develop appropriate skills, knowledge and attitudes, regarding the effective use of computers to support learning by their students. He argued that this also requires continuing professional development, to maintain these appropriate skills and knowledge. According to (Osborne & Hennessy, 2003) when there are new tools and approaches in education, teacher training is essential if they are to integrate them into their teaching.

I have opinion that enough training can address some of the barriers in the integration of the use of ICT tools in the teaching and learning process. This is because acquiring the necessary skills will enhance their knowledge base and competence and by extension the level of confidence. The result of this is that it would in the long run reduce the fear of ICT and the anxieties related to student's expectations and perceptions.

Perceived Benefits of Using ICT Tools in Education

i. ICT, a Tool in Teaching and Learning

At their most basic level, ICT tools enable the presentation of course content using multimedia (images, text and sound) and facilitate achievement of that content. But they also provide new means of interactivity and simulation, thereby offering opportunities to improve learning and making new way of understanding possible. The use of new technologies, thus, can offer exciting new possibilities to promote the changes in educational methodologies.

However, simply applying ICT tools to the traditional practices in the formal educational system will not work to achieve sustainability. The traditional formal education system was principally based upon an objectivist approach:

seeing knowledge as something that should be instructed, existing in a world independent of the experience of the learner. This approach is argued to contribute to the creation and continuation of the unsustainable problems in the world, since it does not enable people to connect their actions with the impact they have on the planet (Han, 2002).

In recent years, the traditional formal educational system has increasingly moved from an objectivist approach based on behaviorist learning theories, to include more cognitivism and constructivism. However, Siemens (2005) argues that these learning theories were all originally designed for an education system that predated the availability of ICT tools. “These theories do not address learning that occurs outside of people (i.e., learning that is stored and manipulated by technology). They also fail to describe how learning happens within organizations”. “These theories are learner-centered, while today’s society needs a collective-centered learning theory.” Siemens (2005) recommends a “learning theory for the digital age” called “connectivism,” which incorporates the ideas of chaos and the unpredictability that govern today’s society; of the learning that occurs outside the formal educational system (e.g., communities of practice, personal networks); of the need for lifelong learning; of how technology use makes us change the way we think; and of the link between individual and organizational learning. Siemens therefore makes these suggestions (Siemens, 2005):

1. Many of the processes previously handled by learning theories (especially in cognitive information processing) can now be off-loaded to, or supported by, technology.

2. Know-how and know-what are being supplemented with know-where (the understanding of where to find knowledge needed).

ii. ICT and Other Subjects

Although, ICT is being taught in SHS in Ghana as a subject which was once fused with integrated science as an examinable core paper and may be could be used as an elective subject to be examined in the near future. But the question is how are ICT tools used by other teachers in their day to day teaching activities? This however can be done by the use of power point: Internet connectivity of the school, the use of Skype in linking other interesting areas or institutions, LCD projectors and software with maps animation, market scenes, teleconferencing formulae for subjects like Mathematics, Geography, Economics and the like.

In history, a major benefit of ICT tools is the enhanced access to a wide range of historical sources and resources which could not be assembled in the classroom in any other way. These resources can be more effectively presented by teachers using ICT and stimulate motivation, collaboration and historical enquiry skills (BECTA, 2004e).

iii. Objectives of Using ICT

There is a considerable amount of research describing how ICT tools are being used effectively in schools. Department for Education and Skills [DfES] (2003) set out the objectives for effective use of ICT in teaching and learning as;

1. Broadening horizons with more opportunities for creative expression.
2. Flexibility to study where, when and how best suits individuals need and preferences.
3. Increased motivation through learning that stimulates interest.

4. Wider access to learning and participation.
5. Sensible choices about when, when not and how to use new technology to enhance, enrich and sustain learning.

It further suggests that ICT tools can make significant contribution to teaching and learning across all subjects and ages. Thus it can engage and motivate children and young people and meet their individual needs (DfES, 2003). Cox (1997) also suggested some benefits of using ICT tools in lessons; increased commitment to learning tasks, enhanced enjoyment, interest in learning the subject, increased in self-directed independent learning and enhanced self-esteem leading to expectations of achieving goals.

Positive Impacts of ICT Tools on Students Learning

There are so many positives that students can derive from the effective and efficient use of ICT tools in the teaching and learning process. Some of the positive impacts are:

i. Increased Motivation

Many studies have described the motivating effect of using ICT tools in schools and the positive effect it can have on students' attention and effort in class. Trimmel and Bachman (2004) studied the impact of introducing laptops into classrooms and one of their conclusions was that Information Technology has a positive impact on school attendance and learning interest.

The ICT objectives were useful in their own right as it is a key element of the ICT curriculum that students learn how to present information in a professional way. Most students enjoy working on computers and it is a novelty rather than the norm, then that make it more motivating. However, whilst

students' enjoyment is an important factor in education, adherence to the curriculum is more important and therefore careful planning is an essential element of teaching with ICT tools in our SHS.

ii. High Quality Output

Using ICT improves the quality of students work Watts and Lloyd (2004). Thus the quality of students work produced on ICT is generally of much higher quality than if it is hand-written. Homework reports with images and screen shots explain what they have done and embellished with fancy fonts and word-art titles. Though this may not improve the substance of work, it does demonstrate that students care about what they are doing and put in more efforts for its appearance. A good example of ICT tools being used imaginatively to create high quality output is where Geography lesson on volcanic eruption can be taught using power point to create animation presentation.

iii. Learning Independently

It is a common place for schools to use the internet as a research tool to allow students to find their own information. John and Sutherland (2004) describe the way in which the internet can be used in Geography to develop a “digital earth” concept to enhance students understanding of many aspect of subject. The internet is often used to augment text books at lower cost for instance; a Secondary School Art class uses the internet extensively for research and gathering ideas, and even interacting directory with contemporary artists via their websites (BECTA, 2001).

iv. Doing More Work

ICT tools enable high quality output to be produced at a speed that cannot be matched using the traditional methods and resources. Teaching applications such as graphing packages in mathematics, multimedia authoring software and data analysis packages in Geography and science all allow students to work much faster than if they had to do the task manually.

Morgan and Tidmarsh (2004) studied work of some Geography teachers using ICT tools in their lessons; they describe the advantages of using ICT as a tool to increase the breadth and speed of learning, increasing the efficiency of both teachers and students. ICT was used to gather, analyse and present information. This reduces time where one wants to analyse information.

The integration of ICT tools into the teaching and learning process is extremely difficult and will most likely meet a number of challenges. The next session looks at the challenges that prevent the use of ICT tools in SHS.

Challenges Affecting the Adoption of ICT Tools in Education

Using ICT tools in education means more than simply teaching learners how to use computers. Technology is a means for improving education and not an end in itself. ICT tools integration in the classroom is the application of technology to assist enhance and extend student's knowledge (Omwenga, 2004).

A study conducted by Organization for Economic Cooperation Development [OECD] (2009) confirmed that, there are a number of 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, technical assistance and finally, 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.

One of the barriers to the use of technology in classroom is the lack of on-site support. According to Schoepp (2005), the act of integrating ICT tools into teaching and learning is a complex process and there will be a number of difficulties known as barriers. It is imperative that the obstruction is studied to provide guidance to enhance technology adoption (Schoepp, 2005). It also reiterated by Al-Awani (2005) that identifying the underlying barriers may assist teachers to become successful technology adopters.

BECTA (2004) classified barriers according to either those that relate to the individual (teacher-level barrier) which include lack of time, lack of confidence and resistance to change or institutional (school-level barrier) which is related to lack of effective training in solving technical problems and lack of access to resources.

On the other hand, Ertmer (1999) has categorized barriers into two namely; extrinsic first order barriers and intrinsic second order barriers. Extrinsic first order barriers would be teachers' access to time, support, available resources and training provided to teachers. The intrinsic second order barriers would be attitudes, beliefs, practices and resistance of the teachers.

Pelgrum (2001) sees it from a different perspective that is as two kinds of conditions: material and non-material. Material condition would include number of computers and number of computer software copies. Non-material condition

would be insufficient ICT knowledge and skills, difficulty of integrating ICT in instruction and insufficient time.

In a research report conducted by BECTA in 2004, a number of other important barriers were identified. These were: lack of confidence, accessibility, lack of time, fear of change, poor appreciation of the benefits of ICT and age. Ertmer (1999) concurs with Schoepp (2005), asserting that if teachers are aware of and understand such barriers, they can initiate strategies to overcome them.

Research has classified these barriers in different ways. Several studies have divided the barriers into two categories: extrinsic and intrinsic. However, what was meant by extrinsic and intrinsic differed among studies. In one such study, Ertmer (1999) referred to extrinsic barriers as first order barriers citing as examples: lack of time, support, resources and training. She referred to intrinsic barriers as second order barriers, citing as examples: attitudes, beliefs, practices and resistance to change.

Balanskat et al (2006) classified barriers as 'micro level' (teacher attitude) and 'me so level' (institutional). He added a third category called 'macro level', to account for the wider educational system. Meanwhile, Pelgrum (2001) identified material barriers as a lack of real or physical equipment and non-material barriers as somewhat intangible entities such as lack of knowledge, confidence or time.

The challenges that confront the successful integration of ICT tools into education will be looked at from two (2) major angles. This approached which was adopted from what BECTA used in 2003 firstly looked at the barriers from the teachers' perspective. The second considered the barriers that confront the school itself.

i. Teacher Related Barrier

I am of the view that the teacher(s) is/are the principal actors or stakeholders in the learning process. This belief of mine is affirmed by the view of Baylor and Ritchies (2002) who posited that teacher related issues were crucial in determining ICT use in the classroom. Again Gressard and Loyd (1985) asserted that teacher's attitude towards ICT is one of the key factors which determined successful integration, while Jegede (2008) recognizes the teacher as a key instigator in fostering ICT integration in education.

From the above it is clear that the teacher is one key determinant factor among the other factors in the integration of ICT tools. It therefore implies from the above that the barriers of integration with relation to teachers can have a negative impact on the whole integration process. The following sessions will look at some of the teacher related challenges or barriers.

ii. Lack of Knowledge or Competence

According to Bingimlas (2009) teacher competence refers primarily to the ability to integrate ICT tools into pedagogical practice. Lack of knowledge/competence is regarded as a significant teacher related barrier to ICT integration. A teacher's lack of knowledge serves as a considerable challenge to the use of ICT tools in teaching methods and practices. Tezci (2009) posits that, if teachers have a high level of ICT knowledge, then there will be a higher level of ICT use in education.

These barriers according to some researchers vary from country to country. Pelgrum (2001) found that lack of knowledge/competence in technology,

among teachers in developing nations, is the primary obstacle to the uptake of ICT in education.

iii. Lack of Confidence

Numerous studies carried out posit that the lack of confidence prevents teachers from using ICT tools. According to BECTA (2004), many teachers who are unskilled in ICT are not prepared to use them in the classroom or in front of students who might probably know more than them. This lack of confidence is further deepened with the expectation of students on the competence of the teacher in the use of ICT tools. This is so because students are of the view that their teachers know more than them and with this at the back of the mind of the teacher if he/she even has a fair knowledge about ICT tools will not be willing to go and disgrace himself or herself before the students.

The lack of confidence in the use of ICT tools is in most instances accounted for by the inconsistency between training and usage. This is so because most teachers even if they have received training in the use of ICT tools can still fail to integrate it into teaching. BECTA (2004) says that the lack of confidence is linked to other barriers affecting the use of ICT tools in education. The report mentioned the fear of ICT as a factor that can compromise the level of confidence. Other factors that were mentioned included the lack of technical assistance which can lead to lack of confidence, lack of competence and the quality of training received.

According to Jegede, Dibu-Ojerinde and Llori (2007) as teachers become more appreciative of the use of ICT tools as a pedagogical aid, attitudes and interest become positive. The rationale therefore, is that increased interest fosters

commitment to honing skills and thereby boosting competence levels. Beggs (2000) posits that fear of failure is a possible cause of lack of confidence whereas Balanskat et al (2006) said the limitation in the knowledge base of the teacher in ICT tools use makes them feel anxious about using it and thus not confidence to use it in teaching.

Some researchers are also of the view that the lacks of confidence and experience with the use of technology influence the motivation of teachers in the use of ICT tools. Cox et al (1999) found that teachers who have confidence in using ICT, identify that technologies are helpful in their teaching and personal work and that they need to use them more frequently.

From the above it can be concluded that when most of the barriers to the use of ICT tools in education are removed many of the problems associated with lack of confidence will be resolved.

iv. Fear

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

v. Extent of Previous ICT Experience

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

vi. Difficulty in Changing Teaching Method (Pedagogy)

Teachers have to accept that the widespread use of ICT tools in schools is having an impact on teaching methods and requires a significant re-thinking of approach. Becker (2000) describes two main teaching methods and their effects on the ways in which ICT is used in lessons. Traditional transmission institution assumes that students will learn through teacher explanation or reading from texts. Skills are learnt through practicing skill in a sequence prescribed by the teacher. Constructivist institutions assume that understanding comes from relating new ideas to the learners' prior beliefs skills acquisition comes in as unstructured way as new skills are used as required to solve practical problems.

In conclusion one could deduce that using ICT tools in lessons, the constructivist approach is more likely to lead to successful out comes. Furthermore, teachers with the most constructivist philosophies tend to use computers more often and in a more challenging way both in classroom and as users themselves.

vii. Age

My personal observation has it that the age of an individual is a factor in the person's quest to adapt to changes, more especially in the areas of technology.

It is against this backdrop that this literature is being reviewed to find out the view of other researchers.

Kumar, Rose and D'Silva (2008) posited in their studies with some teachers that age is a significant factor to the use of ICT tools. I concur with this but believe that the age factor in relation to the use of ICT tools is not only peculiar to teachers in the classroom but also permeates all spheres of life.

Young (2000) asserts that younger less experienced teachers use computers more, because they are more likely to be computer fluent, had more technologically rich teacher training and are less likely to be limited by previous habits, perceptions or attitudes, than older teachers. Lee (1997) points out that many older teachers have not had any computer education when training and as a result are in need of training to allow them to make use of computers in their work.

Cavas, Cavas, Karaoglan and Kislá (2009) revealed that there is a relationship between teacher's age and their computer attitudes. Another study by Korte and Husing (2007) concluded that younger teachers appear to be less sceptical about the benefits of ICT tools in learning.

Bradley and Russell (1997) pointed out that, although computer anxiety may increase with age, this does not mean that training or professional development should be specifically targeted at older teachers. They strongly dispute the notion that because computer anxiety may increase with age, younger teachers are unlikely to need training in ICT. Despite this, a substantial body of research literature strongly argues that age has no bearing on the use of ICT tools

by teachers (Al Senaidi, Lin & Poirot, 2009; Lau & Sim, 2008; Wang & Chan, 1995).

viii. Institution Related Barriers

The environment or conditions prevailing in the various institutions or schools can also be a factor that will inhibit the integration of ICT tools into the learning and teaching process. These conditions can be varied depending on where the school is located and the class or category of the school. Some of these include but not limited to the following:

- a. Technical problems and shortage of computers in laboratory.
- b. Lack of detailed plan into how ICT can be used to enhance the teaching and learning.
- c. Timetable difficulties.

a. Technical Problems and Shortage of Computers in Laboratory

It is important to acknowledge that ICT can have technical problems and contingency planning is necessary to ensure alternative strategies are in place. Where the infrastructure and the platform for the application are unreliable, the output may be affected and this can adversely affect students' motivation.

As computers are becoming more sophisticated and the range of software used by schools continues to increase, the schools must recognize the need to employ more and highly qualified technical staff. However, with pressure on budgets and competition from the commercial sector for the best staff, it is becoming increasingly difficult for schools to attract and retain technical staff with the appropriate skills and experience.

b. Lack of Detailed Planning into How ICT Tools Could be Used To Enhance the Teaching and Learning Process

Much of the research highlights the need to plan carefully the use of ICT in lessons. Sutherland (2004) sums this up that ICT alone does not enhance learning. How ICT is incorporated into learning activities is what is important. Abbott Lachs and Williams (2001) also stress the importance of detailed lesson planning when using ICT tools and that, students must be encouraged to understand the process involved rather than simply focusing on the output. Some teachers may use ICT tools as a way of encouraging independent learning skill needs to be planned and supervised with the teacher directing the student's activities and outputs. ICT though is an effective tool in the hands of an effective teacher, and not a panacea in its own right. It would seem that prerequisite for success is the subject knowledge of the teacher and his ability to weave the use of ICT tools into the existing curriculum. BECTA (2001) suggested that success comes when teachers use applications that open up new ways of working. It acknowledges that this involves planning and imagination, and the result will be "spectacular".

c. Timetable Difficulties

Incorporating ICT across curriculum requires careful timetabling and corporation among departments. Sutherland et al (2004) point that in Science department; it may not be possible to move practical classes to ICT because of health and safety consideration or site computers in Science laboratory due to space constraints. On other subjects, the time ICT suites are available may not suit

the schemes of work planned by the teachers. Hence, much more cross-curricular and departmental planning is required than most schools do in the past.

The Extent Teachers and Students are Exposed to ICT Facilities

According to Kozma (2008) there are three rationales for the introduction of ICT into education. The first one is the economic rationale which refers to the role it can play in preparing students as future workers and in supporting economic development. The second is the social rationale where ICT investment aims to: increase knowledge sharing, encourage cultural creativity, increase civic participation, make government services more accessible and finally enhance social cohesion. The third and final rationale is the educational and pedagogic rationale where ICT can advance educational reform and improve educational management structures. Similarly, Hepp, Hinostrroza, Laval and Rehbein (2004) broadly concur, identifying three reasons for the use of ICT tool in education: the development of new skills for the information age, increased productivity and the development of quality learning. Whereas Kozma (2008) posits that there are three rationales for the introduction of ICT tools into education, Hawkrige (1990) proposes four rationales for the utilization of computers in schools. He notes these as social, vocational, pedagogical and catalytically. The social and vocational rationales point to the increased use of ICT in all spheres of human activity. The pedagogical and catalytically rationales relate to the effects of technology on students and schools.

According to Bigum (1997) arguments for using computers in schools stem from technological and socially determined points of view. His standpoint is that the school systems within which the computer is used, is driven by

computers. He argues that a change occurs within the education system using the computer and that change is as a result of the effect of technology. Bigum (1997) argues that the social context sees computers as neutral technology-technical means of achieving a defined purpose in education. Two contexts emerge and are used in this study. The social context and the pedagogical context: The social context runs along the lines of Hawkrige (1990) social and vocational rationales, while the pedagogical context agrees with Hawkrige's pedagogical and catalytically rationales, The pedagogical context also agrees with the views of Bigum (1997), Drent and Meelissen (2008), identify three objectives for the integration of ICT tools in education. They are: the use of ICT as a 'discipline or profession'; ICT as a 'teaching or learning medium' and the use of ICT as an 'object of study' (Drent & Meelissen, 2008, p.187). It can be gleaned from these objectives that integration involves aiding the teaching and learning. Successful integration of ICT tools in education can lead to a number of benefits.

Summary

It is important to recognize that a number of essential components have been identified ICT as a tool in teaching and learning, which encourage and enable all of the stakeholders to integrate ICT tools in teacher education.

The positive impact of efficient use of ICT tools include: increasing motivation, high quality of output, encourages independent learning and doing more work.

Challenges affecting the use of ICT includes: teacher related barrier, lack of confidence on the part of teachers, fear for failure, difficulty in changing teaching methods, age of teacher and time table difficulties.

Appropriate measures are to be taken to minimize the barriers to these essential components so as to facilitate integration of ICT in teaching and learning as well as ICT in the teacher education programmes. Provision of ICT tools by government and stakeholders are very important.

CHAPTER THREE

METHODOLOGY

Overview

This chapter explains how the study was carried out. It tackled the profile of the study area and the method of the study. Furthermore, it also tackled the design of the research, the study population and the sample and sampling procedure. Finally, it explains instruments and instrumentation, data collection and analysis procedure.

Research Design

According to Katundu (1998) the purpose of a research and its objectives determine the type of research design employed for a study. Considering the nature of the research problem and purpose of this study, the most appropriate research methodology that was used is the survey design.

Survey research is one of the most important areas of measurement in applied social research. The broad area of survey research encompasses any measurement procedure that involves the seeking of information from respondents. For this study, a sample survey methodology was used to obtain information about the population by selecting and measuring a sample from the entire population. Sproull (1995) recommends the survey technique for research where attitudes, ideas, comments and public opinion on a problem or issue are studied. Due to the variability of characteristics among items in the population, a

scientific sample design was applied in the sample selection process to reduce the risk of a distorted view of the population.

Population

Population is made up of all the individuals or items of interest under consideration. For this study the target population was made up of 93 teachers and 1955 students from PRESEC, Bechem and 73 teachers and 650 students from PRESECO, Techimantia. Both schools are mixed schools, located in the Tano South District in the Brong Ahafo Region of Ghana.

Tano South District came into existence as a semi-autonomous spatial unit by virtue of the decentralization policy adopted by the Government in 1988. Geographically, Tano South District is one of the 27 Districts in the Brong Ahafo Region of Ghana. It lies between latitudes 7°00 North and 7°25 North and between longitudes 1°45 West and 2°15 West. It is bounded on the North and East by the Offinso and Ahafo-Ano South Districts, both in the Ashanti Region. On the South, it is bounded by the Ahafo-Ano North District, also in the Ashanti Region and on its West and South-West by Tano North District. The District has a total land area of 635 square kilometers, which is 1.54 percent of the total land area of the Brong Ahafo Region. The District strategic location as the entry point into Brong Ahafo Region from Southern Ghana puts it in a unique position to attract tourists if that sector could be well developed.

Sample and Sampling Procedure

Sampling is a procedure of selecting a part of a population on which a research or study can be conducted. In order to enhance the validity of the study, a random sampling procedure was used to get teaching staff and students from the

two Senior High schools. These samples were normally supposed to be selected in such a way that conclusions or inferences drawn from the study can be generalized for the entire population. Leedy (1993) simply defines sampling as the process of choosing from a much larger population, a group about which a generalized statement is made, so that selected parts represents the total group. Sampling per say is not a technique for getting information but it ensures that any technique used will help in getting information from a smaller group, which could accurately represent the entire group.

From the above it can be seen that the total number of teachers ideally to be used in the study was 166 and 2605 students. The Yamane's formula that was developed by Yamane (1967) for calculating sample size was used. The formula is produced below.

$$n = \frac{N}{1+N(\partial^2)} \text{ Where}$$

n = is the required sample size

N = sample frame

∂ = Margin of error (5%)

The sample size was calculated as follows:

- a. Number of teachers (n) = 166, therefore, their proportion in the sample frame is:

$$n = \frac{166}{1 + 166(0.05^2)}$$

$$n = \frac{166}{1 + 0.415}$$

$$n = \frac{166}{1.415}$$

$$n = 117.314488$$

$$n = 117$$

b. Number of students (n) = 2605, therefore, their proportion in the sample frame is:

$$n = \frac{2605}{1 + 2605(0.05^2)}$$

$$n = \frac{2605}{1 + 6.5125}$$

$$n = \frac{2605}{7.5125}$$

$$n = 346.755408$$

$$n = 347$$

From the above, the ideal sample size to be taken was 117 headmasters/teachers and 347 students. Considering the fact that the total population was made up of the sum from two different schools with different populations therefore, there was the need that the sample taken from each school was taken with respect to the real size of the school involved.

The two schools were grouped into different strata. Proportional allocation was used in calculating the size that was supposed to be taken from each stratum. The formula that was used in calculating the sample to be taken from each stratum is presented below:

$$n_h = \frac{N_h}{N} \times n \quad \text{Where}$$

n_h = sample size of stratum h (that is the sample size for each school)

N_h = Population size of stratum h (that is population size of each school)

N = Total size of population

n = Total sample size

The sample to be taken from each school was calculated as follows:

a. Headmasters/Teachers

$$\begin{aligned} \text{PRESEC, Bechem} &= \frac{93}{166} \times 117 \\ &= 0.56024096 \times 117 \\ &= 66 \end{aligned}$$

$$\begin{aligned} \text{PRESECO, Techimantia} &= \frac{73}{166} \times 117 \\ &= 0.43975904 \times 117 \\ &= 51 \end{aligned}$$

b. Students

$$\begin{aligned} \text{PRESEC, Bechem} &= \frac{1955}{2605} \times 347 \\ &= 0.75047985 \times 347 \\ &= 260 \end{aligned}$$

$$\begin{aligned} \text{PRESECO, Techimantia} &= \frac{650}{2605} \times 347 \\ &= 0.24952015 \times 347 = 87 \end{aligned}$$

Table 1 showed the total number and breakdown of questionnaires administered to respondents. In all, a total number of 464 respondents were sampled from the total population of 2771 made up of Headmasters/Teachers and Students.

Table 1: Breakdown of Number of Respondents Selected for the Study

Indicator	PRESEC Bechem		PRESECO Techimantia		Total	
	Pop	Sample	Pop	Sample	Pop	Sample
Headmasters/Teachers	93	66	73	51	166	117
Students	1955	260	650	87	2605	347
Total	2048	326	723	138	2771	464

Source: Field data, 2013.

Simple random sampling was then used in selecting the respondents from the schools. To give equal opportunity to every staff member and student, each staff member and student of the randomly selected classes were asked to pick a piece of paper in a numbered list. Those who picked even numbers were asked to answer the questionnaires which were delivered to them. This sampling technique was used because it affords all the members under consideration the equal chance of being selected.

Instruments

In the process of collecting data for analysis in a research work, the kind of instruments used depends much on the nature of the research being carried out and the characteristics of the sample used and the type of research design. For the purpose of this study, the data collection instrument used was questionnaire. Questionnaires were chosen because they are the best standardized method to gather data from the respondents of this particular study. Again, the use of questionnaires helped control the response rate. Moreover, questionnaires are seen as the easiest method of collecting factual information from the respondents. The

questionnaire came in different forms; from factual to opinion and from tick boxes to free text responses.

In order to validate my research instruments, I developed the questionnaires used with the help of ICT experts. They were also scrutinised by my supervisor.

Data Collection Procedure

In order to facilitate the data collection procedure, the data were collected during school days using two weeks. This was important because many staff members often travel when schools are on holidays and also, students would not be accessible during holidays.

In order to make the random sample procedure worthwhile, most of the respondents of individual schools were given opportunities to ask questions when the need arose. Then, pieces of paper were cut and numbered for the prospective respondents to pick. Those pieces of paper were folded and laid on the table for respondents to pick. Any respondent who picked an even number was selected to answer a questionnaire. During the time when the questionnaire was being answered, I was available to explain any part of the questionnaire if the need arose.

Data Analysis

After the data was collected, it was prepared by removing all the discrepancies that arose as the questionnaires were filled by the respondents. The data were then presented and analyzed with tools of data analysis in the form of Microsoft Excel 2007 and Statistical Package for Social Science (SPSS) 19. Excel

and SPSS were chosen because the data had to be presented in percentages, pictorially and diagrammatically.

Research question one attempted to find out the extent to which ICT facilities were available for teaching SHS in Tano South District, a simple scale of yes and no response was used to collect the data from the respondents. The results were analyzed using tables which used the raw yes and no answers and frequencies such as (Most often, Often, Seldom and Not at all).

Research question two sought to find out the requisite training and qualification of teachers using ICT tools in teaching and learning. The results were analyzed using tables which used the raw yes and no answers and also, respondents were made to tick from group of answers. Finally, tables were made to represent the responses.

Research question three attempted to find out the perceived benefits of ICT tools in SHS. To be able to easily discern the benefits of ICT tools and to be able to do quick analysis of the data, a scale of agreement (strongly disagree, disagree, Indecisive, agree and strongly agree) and (true, neutral and false) were prepared to elicit the perceived benefits of ICT tools listed for both teachers and students to tick where appropriate. After that, the final results were presented in tabular forms.

Research question four tried to find out the challenges affecting the adoption of the ICT tools in SHS. The challenges affecting the adoption of the ICT tools in SHS were sorted out of the answered questionnaires and were presented in table and a bar chart. The results were analyzed using tables which

used the level of agreement and disagreement answers and finally, tabular forms were made to represent the responses.

For research question five, it was intended to find out the extent to which teacher and students in SHS in Tano South District were exposed to ICT facilities. Responses were grouped under frequencies such as (Most often, Often, Seldom and Not at all) and simple yes or no answers. Therefore, to analyze the data, a table was used to group the users for each ICT tool and percentages were computed using ICT tools in teaching and learning. Percentages were computed so that an easy distinction could be made as to which ICT tool teachers and students were exposed to. Finally, a pie chart was used to establish the data pictorially.

CHAPTER FOUR

RESULTS AND DISCUSSION

Overview

This chapter presents the survey data and goes further to analyze the data based on the objective set for the study. Because the objective of the study was broken into research questions outlined in chapter one, this presentation and discussion of data was conducted in accordance with those research questions. The responses of the respondents; headmasters/teachers and students are organized and analyzed with the help of tables whilst the description, explanation and representation of data are further illustrated with diagrams computed with the help of data analysis tools in Excel. In all 466 questionnaires were administered. Out of this figure a total of 450 questionnaires were retrieved. This represents a total response rate of 96.6 percent.

Demographic Characteristics of Respondents

The chapter is made up of six sections. The first section talks about the demographic characteristics and background information of the respondents. The second session discusses the first research question of the assessment of the extent of availability of ICT tools in Education. The third session examines the teachers' requisite training and qualification in the use of ICT tools to teach. The fourth session talks about the perception of teachers and students with regards to the benefits of ICT tools in teaching and learning process in SHS in Tano South

District. The last but not least session looks at the perceptions of the teachers and students with regard to the challenges of ICT tools into the learning and teaching process. The final session looked at the exposure of teachers and students in the use of ICT tools in the school.

Table 2: Gender of Respondents (Teachers)

Respondents	No	%
Male	96	77.4
Female	26	22.6
Total	115	100

Source: Field data, 2014

Table 2 showed that as many as 96 (77.4%) of the respondents were males while the remaining 26 (22.6%) were females. From Table 2, it can be concluded that majority of the teachers used in the study were males.

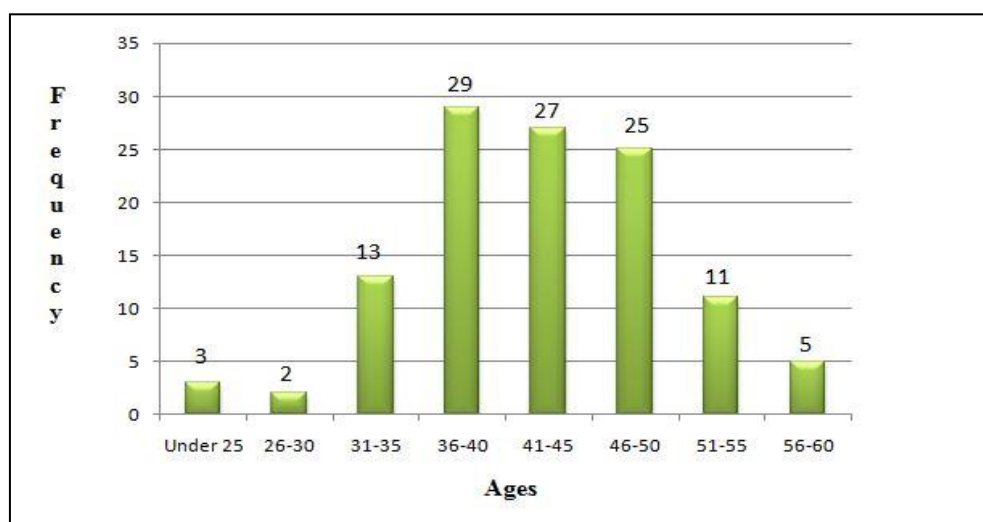


Figure 1: Ages of Respondents

Source: Field data, 2014

Figure 1 showed the age distribution of the respondents indicated that three (2.1%) of the respondents fell under the age 25. 12 (8.6%) and 13 (7.9%)

fell in the 26-30 and 31-35 age brackets respectively. Also, 29 (20.7%) and 27 (19.3%) of the respondents respectively fell in the 36-40 and 41-45 age brackets. Again, 27 (19.3%) of the respondents fell in the 46-50 age bracket while 21 (15.0%) of the respondents fell in 51-55 age bracket. The remaining 10 (7.1%) fell in the 55-60 age bracket. This indicates that respondents are ageing and that might have contributed to the usage of ICT tools in education.

Respondents were then asked of the highest educational level that they have attained. Their responses were presented in Table 3.

Table 3: Highest Level of Education Attained

Response	No.	%
HND	6	5.2
Post Diploma	11	9.6
1 st Degree	81	70.4
Masters	17	14.8
Total	115	100

Source: Field data, 2014

Table 3 showed that six (5.2%) and 11 (9.6%) of the respondents had a Higher National Diploma Certificate and a Post Diploma Certificate as their highest level of education respectively while as many as 81 (70.4%) had a first degree with the remaining 17 (14.8%) having a masters degree. A deduction from Table 3 is that majority of the respondents are first degree holders.

Table 4: Number of Teachers Successfully Administered the Questionnaire

Name of School	No.	%
PRESEC	64	55.7
PRESECO	51	44.3
Total	115	100

Source: Field data, 2014

Table 4 showed the distribution of the names of the school used in the study; 64 (55.7%) and 51 (44.3%) of the respondents were from PRESEC and PRESECO respectively successfully answered the questionnaire.

The respondents were then asked how long they have been teaching. Their response is presented in Figure 2.

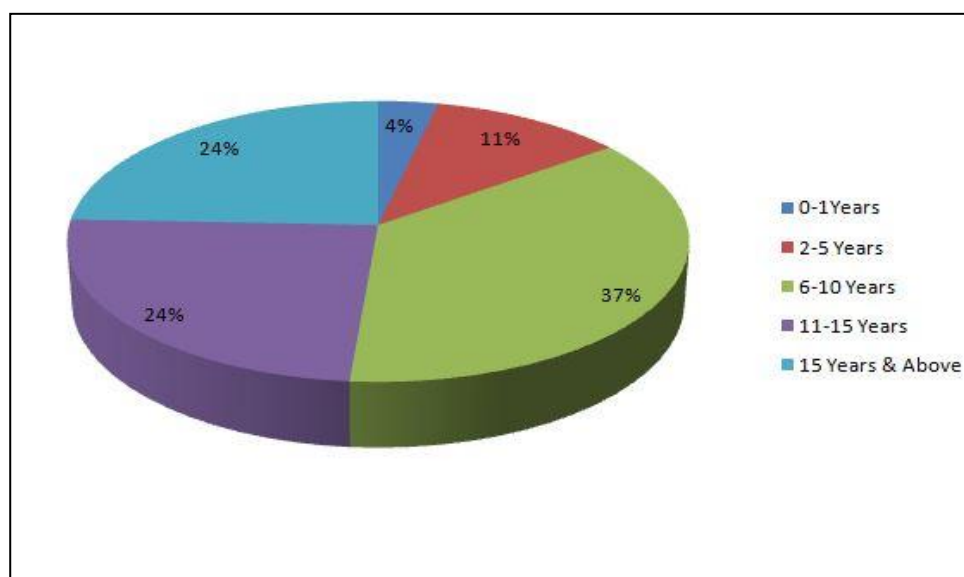


Figure 2: Teaching Experience

Source: Field data, 2014

Figure 2 indicates that 4.0% and 11.0% of the respondents have spent between 0-1 years and 2-5 years respectively in teaching. Also, 37.0% and 4.0% of the respondents have respectively spent 6-10 years and 11-15 years in teaching.

The remaining 24.0% have taught well over 15 years. An inference from Figure 2 is that majority of the respondents have spent more than five (5) years as teachers.

Table 5: Teacher's Field of Study

Field	No	%
Science	6	5.2
Business	26	22.6
General Arts	40	34.8
ICT	6	5.2
Home Economics	17	14.8
Visual Art	10	8.7
Agricultural Science	10	8.7
Total	115	100

Source: Field data, 2014

Table 5 showed that six (5.2%) and 26 (22.6%) of the respondents offered Science and Business respectively. As many as 40 (34.8%), six (5.2%) and 17 (14.7%) offered General Arts, ICT and Home Economics respectively, whereas 10 (8.7%) offered Visual Art and Agricultural Science each. It is obvious that teachers whose field were General Arts and Business were 66 (57.4%). This indicates that less than six (5.2%) of the respondents studied ICT.

The main research questions relating to the issues under study were carried out as follows:

Research Question One

To what extent are the ICT tools available for teaching in SHS in Tano South District?

In trying to answer this question respondents were asked if they had ICT facilities in their schools. Those who responded **yes** were asked to tick ICT tools available in their schools. Their responses were presented in Table 6.

Table 6: Availability of ICT Tools for Teaching in SHS

Items	No.	%
Computer	50	47.1
Radio (Tape Recorder)	20	18.9
Projector	6	5.7
Video	6	5.7
Internet	7	6.6
Disc Player	17	16.0
Total	106	100

Source: Field data, 2014

Table 6 indicated that majority of the respondents had access to computers. As many as 50 (47.1%) of the items available in the schools were computers, 20 (18.9%) said radio (Tape Recorder) was available whereas 36 (34%) of the respondents said ICT tools available were projector, video, internet and disc player. This shows that though computers are available in most of SHS, however, they are like white elephants because other tools which aid the effective use of the computers are woefully inadequate. Looking at the data, it can be discerned that, very lower percentage of projector or video are available in the schools. However, (Blurton, 1999) stated that, ICT are diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information. Table 7 talked about the use of ICT tools.

Table 7: Usage of ICT Tools in Teaching

ICT tools	Most Often		Often		Seldom		Not at All		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Computer	12	11.3	31	29.2	57	53.8	6	5.7	106	100
Radio (Tape Recorder)	23	21.7	27	25.5	51	48.1	5	4.7	106	100
Projector	13	12.3	26	24.5	60	56.6	7	6.6	106	100
Video	10	9.3	15	14.2	70	66.0	11	10.4	106	100
Internet	9	8.5	17	16.0	61	57.5	19	17.9	106	100
Disc Player	11	10.4	14	13.2	61	57.5	20	19.2	106	100

Source: Field data, 2014

Table 7 showed the extent to which the teachers use ICT tools in SHS. Apart from Radio (Tape recorder), more than 50 percent of the respondents use seldomly the rest of ICT tools: Computer 57 (53.8%), Projector 60 (56.6%), Video 70 (66.0%), Internet 61 (57.5%) and Disc player 61 (57.5%). This shows that despite the availability of ICT tools in some SHS, teachers scarcely use them in their teaching; this assertion is supported as in the literature, Mueller et al (2008) concluded that, although many teachers are comfortable with technology in general, they still may not be ready or capable to integrate such technology in their classrooms. 'Seldom' and 'Not at All' use of ICT tools were more than 50 percent of the responses; therefore, there was the need to train teachers how to use ICT tools pedagogically. Also, Cox et al (1999) asserted that if teachers are to be convinced of the value in using ICT in their teaching, their training should focus on pedagogical issues. Looking at the inability of teachers using adequately the

ICT tools in teaching, the next sub question was asked if they had access to ICT tools and whether they used them in their teaching. Their responses were presented in Table 8.

Table 8: Access to ICT Tools in SHS

Items	YES	NO	Total
Do you have access to the ICT tools in the school?	97 (89.0%)	12 (11.0%)	109 (100%)
Do you use them?	20 (20.6%)	77 (79.4%)	97 (100%)

Source: Field data, 2014

Table 8 showed that 97 (89.0%) of the respondents who answered yes, had access to ICT tools and only 12 (11.0%) of the respondents responded no, whereas 20 (20.6%) responded yes. However, as many as 77 (79.4%) of the respondents answered no to the question; if they do use ICT tools available in their teaching. It can be deduced from Table 8 that despite the availability of ICT tools, most of the teachers do not use them. Meanwhile, McGrail (2005), saw ICT integrated into education, as a catalyst for change, fostering skills in problem solving and critical thinking, as well as the development of student centred learning. Also, Cox et al (1999) asserted that if teachers are to be convinced of the value in using ICT in their teaching, their training should focus on pedagogical issues.

In my view, even after teachers had attended professional development courses in ICT, they still did not know how to effectively use ICT tools in their classrooms therefore they need to be trained. To come out with reasons why

teachers are not using ICT tools available, research question two and other sub questions were used.

Research Question Two

What requisite training and qualification do Teachers have in the use of ICT tools to teach?

Table 9: Training and Qualification

Variables	No.	%
Do you have requisite ICT qualification?	No.=115	100
YES	13	11.3
NO	102	88.7
Types of Qualification	No.=13	100
User	2	15.4
Data Entry Clerk	1	7.7
Professional	8	66.7
Programmer	2	15.4
Did you have any ICT training before joining the teaching profession?	No.=13	100
YES	12	92.3
NO	1	7.7
Which aspect of ICT?	No.=12	100
PowerPoint	5	41.7
Word Application	3	25.0
Spreadsheets	2	16.7
Networking	1	8.3
Software Developing	1	8.3

Source: Field data, 2014

Table 9 showed training and qualification of teachers. Only 13 (11.3%) of the respondents responded yes to the question if they had undertaken ICT training and 102 (88.7%) responded no to the same question. This implies that most of the teachers lack the requisite ICT training as concurred by Pelgrum (2001) findings which revealed that teachers lack enough training opportunities on how to use ICT tools in the classroom. Also, Schoepp (2005) maintains that if new technology is going to be integrated into education, teachers should receive training on how to use the specific ICT tool, while Trotter (1999) concludes that training in ICT integration must be preceded by and supplemented with basic skills training.

Table 9 also showed that two (15.4%) and one (7.7%) of the respondents had qualifications as computer users and Data Entry Clerks. As many as eight (66.7%) were ICT Professionals with the remaining two (15.4%) were Programmers. A deduction from Table 9 is that majority of the respondents who have a requisite ICT qualification are ICT Professionals.

In the same Table 9, respondents were asked if they had this ICT training before joining the teaching service; as many as 12 (92.3%) said yes whereas one (7.7%) answered no. This means the majority of the few teachers who have knowledge in ICT had it before joining the teaching service.

Finally in Table 9, the 12 trained teachers went through these various aspect of ICT; five (41.7%) and three (25.0%) of respondents were trained in PowerPoint and Word Application respectively. Whereas, two (16.7%), one (8.3%) and one (8.3%) represented Spreadsheet, Networking and Software Developing respectively. This does not make them use ICT tools effectively in

their teaching. This result is in agreement with Mueller et al (2008) who state that although many teachers are comfortable with technology in general, they still may not be ready or capable to integrate such technology in their classrooms.

Research Question Three

What are the perceived benefits of ICT tools in SHS?

Table 10: Perceive Benefits of ICT Tools in SHS

Variables	Strongly Disagree	Disagree	Indecisive	Agree	Strongly Agree	Total
ICT helps in making teaching-learning more interesting.	5 (4.3%)	3 (2.6%)	17 (14.8%)	42 (36.5%)	48 (41.7%)	115 (100%)
ICT helps in distance learning programme	3 (2.6%)	5 (4.3%)	12 (10.4%)	51 (44.3%)	44 (38.3%)	115 (100%)
ICT enhances quality of work of both teachers and students.	1 (0.9%)	4 (3.5%)	10 (8.7%)	30 (26.1%)	70 (60.9%)	115 (100%)
It makes teachers to be up-to-date in their various disciplines.	20 (17.4%)	15 (13.0%)	20 (17.4%)	55 (47.8%)	15 (13.0%)	115 (100%)

Table 10 (Continued)

It helps teachers	2	3	7	53	50	115
to reach out to	(1.7%)	(2.6%)	(6.1%)	(46.1%)	(43.5%)	(100%)
colleagues in						
other part of the						
country.						
ICT enhances	4	6	3	64	38	115
efficiency of	(3.4%)	(5.2%)	(2.6%)	(55.7%)	(33.0%)	(100%)
workers.						

Source: Field data, 2014

Table 10 showed the perceived benefits of ICT in the secondary schools. These include helping in making teaching-learning more interesting which 90 (78.2%) were in favour as against eight (6.9%) who indicated otherwise whereas 17 (14.8%) had no idea.

Helping in distance learning programmes as many as 95 (79.6%) strongly agreed or agreed whereas, 12 (10.5%) were indecisive and eight (6.9%) strongly disagreed or disagreed.

Enhancing quality of work of both teachers and students 100 (87.0%) strongly agreed or agreed, 10 (8.7%) were indecisive and five (4.4%) strongly disagreed or disagreed. About 70 (60.8%) of the respondents agreed or strongly agreed that ICT tools help teachers to be up-to-date in their various discipline, 20 (17.4%) were indecisive whereas 35 (30.4%) indicated otherwise.

Helping teachers to reach out to colleagues in other parts of the country as many as 103 (89.6%) agreed or strongly agreed to this assertion, seven (6.1%) were indecisive and five (4.3%) were not in agreement with this perceived ICT benefit. As many as 102 (88.7%) of respondents agreed that ICT enhances efficiency of workers, whereas three (2.6%) could not take decision, however, 10 (8.6%) disagreed. There is a clear understanding that ICT tools have overwhelmed benefits in education as concurred by Morgan and Tidmarsh (2004), they describe the advantages of using ICT as a tool to increase the breadth and speed of learning, increasing the efficiency of both teachers and students.

Research Question Four

What are the challenges affecting the adoption of ICT tools in SHS in Tano South District?

In trying to answer this question respondents were asked what factors were preventing them from using ICT tools to teach during their teaching lessons. Their responses were presented in Table 11.

Table 11: Challenges Affecting the Adoption of ICT Tools

(These degrees of understanding are represented as follows: 1= Strongly disagree 2 = Disagree 3 = Indecisive 4 = Agree 5= Strongly agree)

Variables	1	2	3	4	5	Total
Most SHS lack computer literate teachers.	1 (0.9%)	4 (3.5%)	12 (10.4%)	48 (41.7%)	50 (43.5%)	115 (100%)
Irregular power supply hinders the use of computers in schools.	2 (1.7%)	5 (4.3%)	10 (8.7%)	54 (47.0%)	44 (38.3%)	115 (100%)

Table 11 (Continued)

The cost of purchasing ICT tools in the school is high.	4 (3.4%)	6 (5.2%)	3 (2.6%)	64 (55.7%)	38 (33.0%)	115 (100%)
There are inadequate facilities to support full application of the ICT.	1 (0.9%)	3 (2.6%)	7 (6.1%)	64 (55.7%)	40 (34.8%)	115 (100%)
The non-inclusion of ICT programmes in teachers' training institution affects its adoption in SHS.	20 (17.4%)	14 (12.2%)	21 (18.3%)	54 (47.0%)	16 (13.9%)	115 (100%)
Teachers are very reluctant to adapt to the use of ICT tools in teaching-learning process.	15 (13.0%)	20 (17.4%)	15 (13.0%)	55 (47.8%)	20 (17.4%)	115 (100%)
Lack of funds hinders school from embracing the use of ICT tools.	4 (3.4%)	3 (2.6%)	10 (8.7%)	46 (40.0%)	52 (45.2%)	115 (100%)

Table 11 (Continued)

There is fear of exposing	3	5	12	51	44	115
too much information on	(2.6%)	(4.3%)	(10.4%)	(44.3%)	(38.3%)	(100%)
the institution to the						
public.						

Source: Field Data, 2014

Table 11, showed that 98 (85%) of the respondents agreed or strongly agreed to the challenge affecting the adoption of ICT tools in SHS in Tano South District which is lack of computer literate teachers whereas 12 (10.4%) were indecisive and five (4.4%) disagreed or strongly disagreed. This is in agreement with Tezci (2009) that if teachers have a high level of ICT knowledge, then there will be a higher level of ICT use in education. Pelgrum (2001) also concluded that lack of knowledge/competence in technology, among teachers in developing nations, is the primary obstacle to the uptake of ICT in education.

Also the challenge of irregular power supply, 54 (47.0%) agreed whereas 44 (38.3%) strongly agreed. However, 10 (8.7%) could not decide while five (4.3%) and two (1.7%) disagreed and strongly disagreed respectively.

Another challenge affecting the adoption of ICT was the cost of purchasing ICT tools. Respondents strongly in agreement were 38 (34.8%). Whereas as many as 64 (55.7%) agreed to this assertion. However, three (2.6%), six (5.2%) and four (3.4%) of the respondents could not decide, disagreed and strongly disagreed respectively.

More so, as many as 64 (55.7%) agreed while 40 (34.8%) strongly agreed that there were inadequate facilities to support full application of the ICT, seven (6.1%) were indecisive and less than 40% of the respondents disagreed or strongly disagreed.

Another challenge was the non-inclusion of ICT programmes in teachers' training institution that affects its adoption in SHS, 54 (47.0%) of the respondents agreed whereas 16 (13.9%) strongly agreed. However, 20 (17.4%) strongly disagreed, 14 (12.2%) disagreed whereas 21 (18.3%) were indecisive.

On other issue of teachers being very reluctant to adopt the use of ICT tools in teaching-learning process, 55 (47.8%) of the respondents agreed, 20 (17.4%) strongly agreed and 15 (13.0%) were indecisive whereas 20 (17.4%) and 15 (13.0%) disagreed or strongly disagreed.

Apart from teachers lacking knowledge in usage of ICT tools, it is showing in Table 11, 75 (85.2%) of the respondents attested to the fact that teachers are reluctant to adopt the use of ICT tools in their lessons. This also sides with BECTA reports in 2004, many teachers who are unskilled in ICT are not prepared to use them in the classroom or in front of students who might probably know more than them. Again Balanskat et al (2006) said the limitation in the knowledge base of the teacher in ICT tools use makes them feel anxious about using it and thus not confidence to use it in teaching.

Last but not least, 98 (85.2%) of the respondents agreed or strongly agreed that, lack of fund hinders SHS to embrace the use of ICT and 10 (8.7%) of the respondents were indecisive whereas seven (6.0%) strongly disagreed or disagreed.

Finally, the fear of exposing too much information on the school to the public 51 (44.3%) of the respondents agreed while 44 (38.3%) strongly agreed. However, 12 (10.4%) were indecisive whereas three (2.6%) disagreed and four (3.4%) strongly disagreed.

It is clear that the majority of the respondents agreed or strongly agreed that there were some factors such as irregular power supply, cost of purchasing ICT tools, inadequate facilities, unwillingness of some teachers to use ICT tools to teach, lack of funds as well as fear of giving out information to the public serves as barriers to the adoption of ICT tools in teaching and learning. It concurs (Jenson et al, 2002) who classified these barriers: limited equipment, inadequate skills, minimal support, time constraints and lack of interest or knowledge by teachers. Table 12 would look at research question 5; the exposure of teachers to the use of ICT tools.

Research Question Five

To what extent are teachers and students in SHS in Tano South District exposed to ICT facilities?

In trying to address research question 5, respondents were asked to indicate if they use ICT tools in teaching, if yes, what ICT tool they use and how frequently they use these ICT tools in teaching. Another sub question sought to find out factors that contribute to their inability to use ICT tools in teaching. The data responses were indicated in a tabular form in Table 12.

Table 12: Exposure of Teachers to the Use of ICT

Variables	No.	%
Do you use ICT tools in your teaching?	No.=115	100
YES	40	34.8
NO	75	65.2
If yes, How often do you use ICT tools in Teaching?	No.=40	100
Most often	5	12.5
Often	11	27.5
Seldom	24	60.0
What factor contributes to your inability for using ICT tools in teaching?	No.=75	100
Lack of time to use ICT tools	8	10.7
Lack of knowledge about ICT tools	38	50.7
Lack of confidence	8	10.7
Fear	5	6.7
Lack of training	9	12.0
My age	7	9.3

Source: Field data, 2014

It can be seen in Table 12 that a higher percentage of respondents 75 (65.2%) of the respondents responded that they do not use ICT tools in their teaching whereas 40 (34.8%) responded positive to the use of ICT tools in teaching.

Out of the 40 respondents who answered in affirmative; five (12.5%) said they used ICT tools most often in teaching. However, 11 (27.5%) indicated that

they often use the tools. More than half said they do use ICT tools seldom in teaching.

The respondents, who answered no in Table 12, indicated various factors that brought about their inability to use ICT tools in teaching. As many as 38 (50.7%) of respondents said they do not use ICT tools because of lack of knowledge about ICT tools and eight (10.7%) of the respondents attributed their inability to use the ICT tools to lack of time and confidence. However, five (6.7%), nine (12.0%) and seven (9.3%) said they do not use ICT tools in teaching because of fear, lack of training as well as their ages respectively.

It is obvious that lack of training and lack of knowledge have the highest percentages indicated by the respondents. This result is in agreement with Tezci (2009) who posited that if teachers have a high level of ICT knowledge, then there will be a higher level of ICT use in education. Also, Pelgrum (2001) found that lack of knowledge/competence in technology, among teachers in developing nations, is the primary obstacle to the uptake of ICT in education.

Table 13, is the demographic information of 333 student respondents; their gender, age, form/class, programme of study and some opinions about ICT tools.

Demographic Information of the Students in SHS

In order to find out the demographic information of the students, they were asked to answer some of the questionnaires to indicate their gender, class, programme of study and reasons for choosing these programmes in Table 13.

Table 13: Demographic Information of the Students

Variables	No.	%
Gender of Student	No.=333	100
Male	242	72.7
Female	91	27.3
Form/Class of Student	No.=333	100
SHS 1	118	35.4
SHS 2	73	22.0
SHS 3	142	42.6
Programme of Study	No.=333	100
General Arts	74	22.2
Science	63	19.0
Home Economics	82	24.6
Visual Art	54	16.2
Business	23	6.9
Technical	37	11.1
Why are you reading this programme?	No.=333	100
To become a Nurse	55	16.5
To become a Journalist	37	11.1
To become a Teacher	104	31.2
To become an Engineer	80	24.0
To be an Accountant	45	13.5
Others	32	9.6

Source: Field data, 2014

As indicated in Table 13, the total number of students who participated and returned the questionnaires of the study was 333. As many as 242 (72.7%) of the respondents were males whereas the remaining 91 (27.3%) were females. It can be concluded that majority of the students used in the study were males.

For the programme studying, 74 (22.2%), 63 (19.0%) and 82 (24.6%) were offering General Arts, Science and Home Economics respectively. Whereas, 54 (16.2%), 23 (6.9%) and 37 (11.1%) were studying Visual Art, Business and Technical respectively.

Out of 333 respondents who were asked to give reasons why they chose their respective programmes of study; 55 (16.5%), 37 (11.1%) and 104 (31.2%) indicated that they wanted to become nurses, journalists and teachers respectively. Whereas, 80 (24.0%), 45 (13.5%) and 32 (9.6%) wanted to be engineers, accountants and others respectively. It was clearly established that the majority of the respondents wanted to be teachers; hence they intend imparting knowledge to others in the near future, therefore there is the need to introduce them to ICT so that it increases their confidence as future educators.

Research Question One

To what extent are the ICT tools available for teaching in SHS in Tano South District?

The intention of this research question was to find out the availability of ICT tools in schools. This was categorized under four sub questions: whether computer laboratories were in the schools, if they have access to these laboratories, did their teachers use ICT tools in teaching and what ICT tools did they use. Table 14 indicated the results of the research findings.

Table 14: Availability of ICT Tools in SHS

Variable	No.	%
Do you have a computer laboratory?	No.=333	100
YES	331	99.4
NO	2	0.6
If Yes, Do you have access to them?	No.=331	100
YES	247	74.6
NO	84	25.4
Do your teachers use ICT tools to teach?	No.=333	100
YES	128	38.4
NO	205	61.6
If Yes, what ICT tools does your teacher often use?	No.=128	100
Computer	26	20.3
Radio (Tape Recorder)	60	46.9
Projectors	28	21.9
Video	8	6.3
Internet	2	1.6
Disc Player	4	3.1

Source: Field data, 2014

Table 14 showed that all of the respondents answered that they had computers in their laboratories, except two (0.6%) who responded otherwise. This means all the two schools under study have computer laboratories in their schools. Out of 331 respondents, 247 (74.6%) had access to the computer laboratory however, 84 (25.4%) claimed that they did not have access to the computer

laboratory. This denies the assertion of Dankwa (1997) that the provision of ICT tools to Senior High Schools are skewed in favour of the first class or category ‘A’ schools in the urban areas.

Again, 128 (38.4%) of the respondents answered that their teachers use ICT tools to teach them whereas, 205 (61.6%) said no to the question. This asserts the research report about teachers in the literature by BECTA (2004); a number of other important barriers were identified. These were: lack of confidence, accessibility, lack of time, fear of change, poor appreciation of the benefits of ICT and age. The respondents who said that their teachers used the various ICT tools; Computer, Radio (Tape Recorder) and Projectors 26 (20.3%), 60 (46.9%) and 28 (21.9%) respectively whereas, video, Internet and Disc Player were represented eight (6.3%), two (1.6%) and four (3.1%) respectively. It was realised that the two schools under study have computer laboratories and some basic ICT tools. Then, 247 (74.6%) of the respondents accepted that they have access to the ICT tools in the schools. Table 15, dealt with perceived benefits of ICT tools in SHS.

Research Question Three

What are the perceived benefits of ICT tools in SHS?

Table 15: Perceived Benefits of ICT Tools

Variable	True	Neutral	False	Total
ICT helps in making teaching and learning more interesting.	305 (91.6%)	2 (0.6%)	26 (7.8%)	333 (100%)
ICT enhances quality of work for both teachers and students.	260 (78.1%)	22 (6.6%)	51 (15.3%)	333 (100%)

Table 15 (continued)

ICT enhances efficiency of workers.	219	21	93	333
	(65.8%)	(6.3%)	(27.9%)	(100%)
ICT makes decision making in education easy and faster.	247	12	74	333
	(74.2%)	(3.6%)	(22.2%)	(100%)

Source: Field data, 2014

Results in Table 15 displayed the perceived benefits of ICT in the SHS. As many as 305 (91.6%) indicated that ICT helps in making teaching and learning more interesting. However, 28 (7.8%) of the respondents said otherwise, two (0.6%) of the respondents were neutral to this assertion. This is in agreement with Trimmel and Bachman (2004) that Information Technology has a positive impact on school attendance and learning interest.

Enhancing quality of work of both teachers and students 260 (78.1%), 22 (6.6%) and 51 (15.5%) of the respondents responded true, neutral and false respectively.

Enhancing efficiency of workers, 93 (27.9%) of the respondents did not agree to this assertion however, 219 (65.8%) respondents accepted this benefit and indicated that, it makes teaching and learning more interesting.

Also, 247 (74.2%) of the respondents said ICT makes decision making in the education easy and faster, however, 74 (22.2%) of the respondents did not agree. The positive data responses of second, third and fourth question in Table 15 concurs with (Morgan & Tidmarsh, 2004) studies about a work of a Geography teacher using ICT in their lessons; they describe the advantages of using ICT as a tool to increase the breadth and speed of learning, increasing the

efficiency of both teachers and students. ICT was used to gather, analyses and present information. This reduces time where one wants to analyse information.

Therefore, the importance of ICT tools in teaching and learning cannot be over emphasized. In the literature, Department of Education and Skills [DfES] (2003) also said ICT tools can make significant contribution to teaching and learning across all subjects and ages. Thus it can engage, motivate children and young people and meet their individual needs.

Research Question Four

What are the challenges affecting the adoption of ICT tools in SHS in Tano South District?

This research sought to find out from the students some barriers that prevent the use of ICT tools in SHS. Table 16 has data responses of the respondents on challenges of using ICT tools.

Table 16: Challenges of Using ICT Tools

Variable	Agree	Disagree	Total
My Schools lack computer literate teachers.	223 (67.0%)	110 (33.0%)	333 (100%)
Irregular power supply hinders the use of computers in school.	313 (94.0%)	20 (6.0%)	333 (100%)
There are inadequate facilities to support full application of ICT tools.	291 (87.4%)	42 (12.6%)	333 (100%)
Teachers are very reluctant to use ICT tools in teaching and learning process.	250 (75.1%)	83 (24.9%)	333 (100%)

Table 16 (Continued)

Lack of confidence of using ICT tools.	260	73	333
	(78.1%)	(21.9%)	(100%)

Source: Field data, 2014

Table 16, showed the major challenges affecting the adoption of ICT in SHS. As many as 223 (67.0%) of the respondents agreed that the major challenge is lack of computer literate teachers whereas, 110 (33.0%) of the respondents disagreed. As many as 313 (94.0%) agreed that irregular power supply hinders the use of computers in school whereas 20 (6.0%) disagreed. For inadequate facilities to support the application of ICT, 42 (12.6%) of respondents disagreed whereas 291 (87.4%) agreed. As many as 250 (75.1%) agreed and 83 (24.9%) disagreed to the assertion that teachers are very reluctant to use ICT tools in the teaching and learning process. And on the challenge; lack of confidence of using ICT tools, 73 (21.9%) disagreed whereas 260 (78.1%) of the respondents agreed.

The students' responses indicated that they agreed with Jenson et al (2002) classification of ICT barriers: limited equipment, inadequate skills, minimal support, time constraints and lack of interest or knowledge by teachers.

Also, BECTA (2004) indicated that many teachers who are unskilled in ICT are not prepared to use them in the classroom or in front of students who might probably know more than them. Again, Balanskat et al (2006) said the limitation in the knowledge base of the teacher in ICT tools use makes them feel anxious about using it and thus not confidence to use it in teaching.

Table 17 sought to find out the differences between normal traditional lesson and using ICT tools in lesson.

Table 17: Difference between Normal Traditional Lesson and Using ICT Tools in Lesson

Variable	No.	%
YES	299	98.8
NO	34	10.2
Total	333	100

Source: Field data, 2014

According to Table 17, the vast majority 299 (98.8%) of respondents accepted that there were differences between normal traditional lesson and using ICT tools in lesson, whereas 34 (10.2%) were not in agreement. It is clear that using ICT tools in lesson is in agreement with (Siemens, 2005):

1. Many of the processes previously handled by learning theories (especially in cognitive information processing) can now be off-loaded to, or supported by, technology and
2. Know-how and know-what are being supplemented with know-where (the understanding of where to find knowledge needed). Table 18 discussed the degree of exposure of students to ICT tools.

Research Question Five

To what extent are teachers and students in SHS in Tano South District exposed to ICT facilities?

The fifth research question asked respondents to select their degree of exposure to introduction to computer. Table 18 summarizes respondents' responses.

Table 18: The Degree of Exposure of Students to ICT Tools

(MK=Much Knowledge EK=Enough Knowledge LK=Little Knowledge and NK= No Knowledge)

Statement	MK	EK	LK	NK	Total
To switch on and start up the computer.	29 (11.2%)	45 (17.3%)	180 (69.2%)	2 (0.8%)	260 (100%)
To use all the keys on the key board.	15 (5.8%)	85 (32.7%)	102 (39.2%)	2 (0.8%)	260 (100%)
To use the start button to launch programme.	21 (8.1%)	47 (18.1%)	190 (73.1%)	2 (0.8%)	260 (100%)
To close, minimize and restore a window from task bar.	9 (3.5%)	51 (19.6%)	199 (76.5%)	1 (0.4%)	260 (100%)
To name and save work on hard drive.	19 (7.3%)	41 (15.8%)	193 (74.2%)	7 (2.7%)	260 (100%)
Save work in appropriate named files.	17 (6.5%)	96 (36.9%)	140 (53.8%)	7 (2.7%)	260 (100%)
To single click and double click a mouse button.	80 (30.8%)	47 (18.1%)	131 (50.4%)	2 (0.8%)	260 (100%)
Save and load work to and from pen drive.	6 (2.3%)	149 (57.3%)	165 (63.5%)	10 (3.8%)	260 (100%)

Source: Field data, 2014

Table 18 showed that 182 (70.0%) of the respondents had little knowledge or no knowledge to switch on and start up the computer whereas 74 (30%) had much knowledge or enough knowledge.

Also, using all the keys on the key board 15 (5.8%) had much knowledge whereas 85 (32.7%) had enough knowledge, however, 102 (39.7%) had little knowledge while two (0.8%) had no knowledge.

Another degree of exposure was, using the start button to launch programme. Respondents who had much knowledge were 21 (8.1%), whereas 47 (18.1%), had enough knowledge. However, 190 (73.1%) and two (0.2%) of the respondents had little knowledge and no knowledge respectively.

More so, as many as 199 (76.5%) had little knowledge while 51 (19.6%) had enough knowledge to be able to close, minimize and restore a window from task bar. However, nine (3.5%) had much knowledge and one (0.4%) of the respondents had no knowledge.

Naming and saving work on hard drive, 19 (7.3%) of the respondents had much knowledge whereas 193 (74.2%) had little knowledge. However, 41 (15.8%) had enough knowledge and seven (2.7%) had no knowledge.

On other issue of saving work in appropriate named file 17 (6.5%) of the respondents had much knowledge, 96 (36.9%) had enough knowledge and as many as 140 (53.8%) had little knowledge whereas seven (2.7%) had no knowledge.

Last but not least, 127 (48.9%) of the respondents had much knowledge or enough knowledge for single click and double click of a mouse button. As many

as 165 (63.5%) of the respondents had little knowledge whereas, two (0.8%) had no knowledge at all.

Finally, save and load work to and from pen drive six (2.3%) of the respondents had much knowledge while 149 (57.3%) had enough knowledge. However, 165 (63.5%) had little knowledge whereas 10 (3.8%) had no knowledge.

Apart from teachers using ICT tools in teaching, respondents had fulfilled one of the Drent and Meelissen (2008, p.187), three objectives for the integration of ICT tools in education. They were: the use of ICT as a ‘discipline or profession’; ICT as a ‘teaching or learning medium’ and the use of ICT as an ‘object of study’

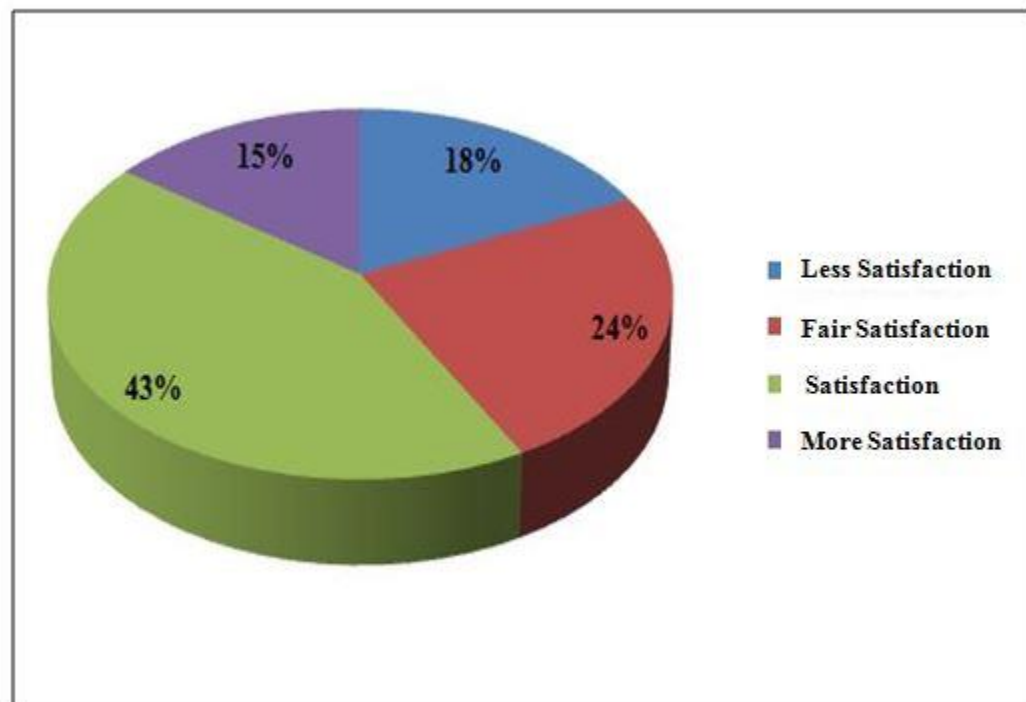


Figure 3: Student Satisfaction level of ICT Tools Usage in Teaching and Learning

Source: Field data, 2014

Figure 3 indicated the satisfaction level of the respondents on ICT tools usage in teaching and learning. As many as 43% of the respondents were more satisfied, whereas the rest 15%, 18% and 24% were satisfied, fairly satisfied and less satisfied respectively.

In conclusion, it can be deduced from Figure 3 that more than 50% of the respondents were satisfied that ICT tools usage should be encouraged in teaching and learning. Table 19, dealt with students experience with computers.

Table 19: Students Experience with Computers

Variation	No.	%
Have never use computer and do not intend to.	254	76.3
I have never used a computer but would like to learn.	71	21.3
I use applications such as word processing, Spreadsheets, the internet and PowerPoint.	2	0.6
I use computers extensively in learning.	6	1.8
Total	333	100

Source: Field data, 2014

In Table 19, two (0.6%) of the respondents had used applications like word processing, Spreadsheet, internet and PowerPoint before. As many as 71 (21.3%) of them had never used a computer but would like to learn. Whereas, six (1.8%) had used computer extensively in learning. However, 254 (76.3%) had never used computers before and did not intend to. This indicates that a higher percentage of students lack basic knowledge in computing therefore there is the need to motivate and educate students as stated by van den Dool and Kirschner (2003) that educational programmes for teachers should train students to deploy ICT as a cognitive tool, also known as 'mind tools'.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This chapter focuses on a complete overview of the entire study, from the introduction of the study to its final conclusion that were drawn and the recommendation thereof. In fact, the use of ICT tools in SHS in Tano South District was imbued with inadequacies. Consequently, this study sought to find out and to assess the effect to which ICT tools are for quality teaching and learning in Senior High Schools. More specifically, the study sought to find out the challenges they face as they use the ICT tools. The background to the study looked at the integration of ICT tools in the educational system, more specifically in the teaching of other subjects in the SHS programme. The purpose of the study was discussed and some research questions were asked to guide the research. The research questions that guided the study were:

1. To what extent are the ICT facilities available for teaching in SHS in Tano South District?
2. What requisite training and qualification do teachers have in the use of ICT to teach?
3. What are the perceived benefits of ICT in SHS?
4. What are the challenges affecting the adoption of ICT in SHS in Tano South District?

5. To what extent are teachers and students in SHS in Tano South District exposed to ICT facilities?

The study applied descriptive survey design. The target population for the study consisted 2605 students and 166 teachers in PRESEC, Bechem and PRESECO, Techimantia. Sampled from the two schools were 347 students and 117 teachers.

The methodology provided a sample size for the study which was conducted through questionnaire. The questionnaire for the study was sent to the selected Senior High Schools. It was then administered and returned for preparation and interpretation.

The next part of the study carried out was the discussion of the results of the study. With the help of MS Excel application and SPSS software, the data was described, presented and interpreted with tables, charts and graphs so that clear, distinctive and defensible analysis of the data could be made.

Key Findings

The following were the key findings:

1. It was found that though ICT tools are available in most of SHS. However, they are like white elephants because other tools which aid the effective use of the ICT tools are woefully inadequate. Also, despite the availability of ICT tools in some SHS, teachers scarcely use them in their teaching.
2. In examining whether the teachers had gotten the adequate training and qualifications in the use of ICT tools, the following findings were made: Majority of the respondents did not have any training in the use of ICT tools before they joined the teaching profession. A few teachers who have

requisite ICT training do not use them in teaching because they lack pedagogical experience. Besides the above, another fact worth mentioning is that, the studies revealed that majority of the respondents had not attended any computer training session before either for upgrading or as a refresher course. Less than 10 percent of the respondents studied ICT whereas more than 88 percent have no requisite ICT qualification hence will find it difficult to impart same to students.

3. With regard to attitudes of the teachers in the use of ICT tools the following findings were made:
 - a. Lack of knowledge about the use of ICT tools.
 - b. Fear of using the ICT tools.
 - c. Lack of confidence in the usage of the ICT tools.
 - d. Inadequate training in the use of computers and other ICT tools.
 - e. Little previous experience.
 - f. The age.
4. Majority of the respondents who claimed they had not used computers before were not prepared to even learn how to use it. Also, it came out that although there were ICT tools in the various schools, most teachers could not use them to become conversant with their usage let alone using them in their teachings.
5. The following findings were made on the perceptions of the teachers with regard to the integration of ICT into the learning and teaching process.
 - a. In the first place, majority of the teachers were of the view that they were too old to be introduced to the use of ICT tools in their teaching.

They concluded that the use of computers in general was meant for the younger generation and not for them the elderly ones.

- b. Respondents had the perception that their students would laugh at them if they made a mistake as a result of this, they were not willing to use the computers.
6. With regard to the assessment of the availability of ICT tools and equipment for effective teaching and learning the following findings were made; almost all of the schools used in the study did not have enough computers considering the fact that both schools had student population well over thousand. Besides the fact that the computers were not enough for the students to use, the teachers who were willing to use the computers for their personal practise could hardly get the chance as the computers in the laboratories were always under intense pressure for use by the students as it has been designed on the schools timetable.
7. Most of the respondents were of the view that ICT helped distance learning. Again, majority of respondents believed that ICT enhanced quality of work. It is clear that ICT tools have overwhelmed benefits in education.
8. Challenges affecting the adoption of ICT tools: majority of the respondents were of the opinion that, irregular supply of power hindered the use of computers in schools. Again, cost of purchasing ICT tools is very high. This has made it barely impossible to have adequate facilities to support full application of the ICT tools in schools.
9. It has been observed that most institutions do not include ICT programmes in the training of teachers hence this affects it adoption in SHS. Again, most of

the respondents have the opinion that there is lack of computer literate teachers to man ICT at SHS level. Attitude of some teachers to the use of ICT tools was very poor. Also, it is believed that unless adequate financial support is given to various SHS: it will be difficult to achieve quality ICT education in SHS in Ghana.

10. Although most of the respondents had the basic requisite knowledge such as how to switch on and start up the computer, I realised that, they barely could perform basic functions such as, adequate usage of the keyboard; start button to lunch programmes; close, minimise and restore window from task bar; name and save work on the hard drive; save work in appropriate named files and load work to and from pen drive.

Conclusions

The followings conclusions were drawn based on the objectives that were set;

First of all, with respect to the factors that were inhibiting the integration of the use of ICT tools in the classrooms, three major factors were identified. These factors were the lack of training, inadequate knowledge about computers and the lack of previous or no experience in the use of computers. Other factors that also dominated the responses of respondents were the age of teachers, the fear of using the machines either due to the lack of knowledge of the use of computers or lack of training and finally the lack of confidence of the teachers concerned.

Also, with regard to whether the teachers have gotten enough training and qualification in the use of ICT tools, it can be concluded that majority of them do not have the requisite training and knowledge in the use of ICT tools. It is obvious

that there are lack of training and lack of knowledge by most of the respondents teaching in SHS, hence government should resource GES to enable it equip them with the requisite training in order to be abreast with the use of ICT tools in their teaching.

Moreover, it can be concluded that most of the respondents do not have positive attitudes towards the use of computers. This conclusion was arrived at because despite the fact that respondents had computers at their disposal they were not ready and had no intention of even using them. By extension it could be inferred that even if there were to be internet facilities which would provide a wide database of information respondents would still not use it.

Furthermore, on the perceptions of the teachers with regard to the integration of ICT tools into the teaching and learning process it can be concluded that older teachers were of the opinion that the use of computers was a preserve for the younger generations and not for the elderly ones. With this perception they contended that the use of ICT tools in education should be designed and taught on its own so that they can still have a job to do and not be compelled to rush and go and undertake a course in the use of ICT in education.

Finally, on the assessment of the extent of availability of ICT tools such as computers in the various SHS, it can be concluded that most of the schools do not have enough computers to be used by the students.

Recommendations

The following recommendations were made:

1. It is recommended that ICT infrastructure should be provided to the Senior High Schools for effective teaching and learning process since it is the

basic stage of equipping the youth with the necessary skills and knowledge for national development.

2. Teachers should be given the necessary training in ICT tools usage so that they become familiar with modern pedagogy of imparting knowledge and skills, and possibly become part of curriculum structure for their professional training.
3. Modern ICT laboratories should be built for our Senior High Schools to accommodate enough students at a time looking at their population size for effective and efficient teaching and learning environment.
4. Also, it is recommended that all frequent power outages must be jointly tackled and resolved by the government, school authorities and Parent Teacher Associations to eliminate the breakdown and inability of using ICT tools.
5. Electrical equipment should be connected to high voltage stabilizers and uninterruptible power supply equipment in order to eliminate the frequent breakdown of that equipment.
6. Policy formulators should be clear with the ICT policy and its direction of implementation with the necessary guide lines so that the implementation agents like Ghana Education Service, Ministry of Finance can help to make a reality since competency in ICT is the modern way of acquiring critical skills and knowledge effective and efficient economic development.

To conclude, conscious effort by policy makers especially GES should be made to enforce full compliances of the use of ICT tools in teaching in the SHS to enable students develop love for the subject.

Suggestions for Further Study

The study was done on a micro basis because it was done in only one out of 216 districts of the country, and therefore could not be used for generalization.

However, similar studies could be conducted in other districts in the region or a whole region or two could be used for the studies on macro basis to give it the 'bird view' for generalization.

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APPENDICES

APPENDIX A
CENTER FOR CONTINUING EDUCATION
MASTER OF EDUCATION (INFORMATION TECHNOLOGY)
UCC, CAPE COAST

This questionnaire is about the extent to which ICT tools are used for quality teaching and learning in SHS- A case study in Tano South District. Please take a few minutes to complete this questionnaire. Your specific answers will be completely anonymous, but your views, in combination with those of others, are extremely important and there is no right or wrong answer.

I therefore promise that it is for Academic purpose and hence any information provided will be private and strictly confidential.

Questionnaire for Headmasters /Teachers

A. Personal Data

1. Gender: Male [] Female []

2. Age:

Under 25 [] 26 – 30 [] 31 – 35 [] 36 – 40 []

41 – 45 [] 46–50 [] 51 – 55 [] 55 – 60 []

3. Highest educational level attained

HND [] Post Diploma [] 1st Degree [] Masters []

4. Name of school.

PRESEC Bechem [] PRESECO Techimantia []

5. How long have you been teaching?

0 – 1 years [] 2 – 5 years []

6 – 10 years [] 11 – 15 years [] 15 years & above []

6. What is your main field of study?

Science [] Business [] General Arts [] ICT []

Home Economics [] Visual Arts [] Agricultural Science []

7. What subject do you teach?

B. Availability of ICT tools.

8. Do you have ICT facilities in your school? **Yes** [] **No** []

a. If **yes**, what ICT facilities are available? (Tick (✓) where appropriate)

i. Computer []

ii. Radio (Tape recorder) []

iii. Projectors []

iv. Video []

v. Internet []

vi. Disc Player []

b. Tick (✓) how often you use these ICT tools in teaching.

ICT Tools	Most often	Often	Seldom	Not at all
Computer	[]	[]	[]	[]
Radio (Tape Recorder)	[]	[]	[]	[]
Projector	[]	[]	[]	[]
Video	[]	[]	[]	[]
Internet	[]	[]	[]	[]
Disc Player	[]	[]	[]	[]

c. Do you have access to the ICT tools in the school? **Yes** [] **No** []

d. If **Yes**, Do you use them? **Yes** [] **No** []

- e. Do you have access to ICT tools in the school? **Yes** [] **No** []
- f. If **yes**, where do you use or have access to the ICT tools in the school?
- Computer lab [] Staff Common Room [] in my office []
- Classroom [] other (please specify).....

C. Training and qualification.

9. Do you have the requisite ICT qualification? **Yes** [] **No** []
- a. If **yes**, (Tick (✓) where appropriate)
- User [] Data Entry Clerk [] Professional [] Programmer []
- b. Did you receive any training in ICT before you joined the teaching profession? **Yes** [] **No** []
- c. If **Yes**, Which aspect, specify.....

D. Benefits of ICT tools.

10. Please use the scale below to indicate your level of agreement or disagreement with the following statements.

1 = strongly disagree 2 = Disagree 3 = Indecisive
4 = Agree 5= strongly agree

- a. ICT helps in making teaching and learning more interesting. []
- b. ICT helps in distance learning programme. []
- c. ICT enhances quality of work of both teachers and students. []
- d. It makes teachers to be up-to-date in their various disciplines. []
- e. It helps teachers to reach out to colleagues in other part of the country.
[]
- f. ICT enhances efficiency of workers. []

g. It makes decision-making in the education sector easy and faster. []

E. Challenges of ICT tools.

11. Please use the scale below to indicate your level of agreement or disagreement with the following statements.

1 = Strongly disagree 2 = Disagree 3 = Indecisive

4 = Agree 5= Strongly agree

Variables	1	2	3	4	5
Most SHS lack computer literate teachers.					
Irregular power supply hinders the use of computers in schools.					
The cost of purchasing ICT tools in the school is high.					
There are inadequate facilities to support full application of the information and communications technology.					
The non-inclusion of ICT programmes in teachers' training curriculum affects its adoption in schools.					
Teachers are very reluctant to adapt to use of ICT in teaching-learning process.					
Lack of fund hinders school from embracing ICT.					
There is fear of exposing too much information on the institution to the public.					

F. Exposure of teachers to the use of ICT tools.

12. Indicate the extent of your exposure.

a. Do you use ICT tools in your teaching? **Yes** [] **No** []

- d. If yes, how often do you use ICT tools in teaching? (Most Often, Often, Seldom)
- e. If **No** to question 12a, what factor contributes to your inability for using ICT tools in teaching? (Tick (√) where applicable)
- i. Lack of time to use ICT tools []
 - ii. Lack of knowledge about ICT tools []
 - iii. Lack of confidence []
 - iv. Fear []
 - v. Lack of training []
 - vi. My age []

Thank You for Sincerely Completing This Questionnaire.

APPENDIX B
CENTER FOR CONTINUING EDUCATION
MASTER OF EDUCATION (INFORMATION TECHNOLOGY)
UCC, CAPE COAST

This questionnaire is about assessing the extent to which ICT tools are used for quality teaching and learning in SHS- A case study in Tano South District. Please take a few minutes to complete this questionnaire. Your specific answers will be completely anonymous, but your views, in combination with those of others, are extremely important and there is no right or wrong answer.

I therefore promise that it is for Academic purpose and hence any information provided will be private and strictly confidential.

Questionnaire for Students

A. Background Information about Student

Please tick in the box

1. Gender of Student: Male [] Female []
2. Form: SHS 1 [] SHS 2 [] SHS 3 []
3. Programme of Study:
4. Why are you reading this programme?
.....
.....

B. Availability of ICT Tools

5. Does your school have a Computer Laboratory? **Yes** [] **No** []
6. If **yes**, do you get access to them during and after your computer lessons?
Yes [] **No** []

7. Do your teachers use ICT tools in teaching? **Yes** [] **No** []
8. If **yes**, what ICT tool does your teacher most often use? (Tick (√) where applicable)
- a. Computer []
 - b. Radio (Tape recorder) []
 - c. Projectors []
 - d. Video []
 - e. Internet []
 - f. Disc Player []

C. Training and qualification.

9. Have you attended ICT training before? **Yes** [] **No** []
10. If **yes**, which application did you learn?

D. Perceived benefits of ICT tools.

11. Indicate if the following statements are **True**, **Neutral** or **False**. (T=True, N=Neutral and F=False)
- a. ICT helps in making teaching and learning more interesting. []
 - b. ICT enhances quality of work of both teachers and students. []
 - c. ICT enhances efficiency of workers. []
 - d. It makes decision-making in the education sector easy and faster. []

E. Challenges of ICT tools.

12. Statements in the table below are challenges of using ICT tools in teaching and learning. Tick where you agree or disagree.

Statement	Agree	Disagree
My schools lack computer literate teachers.		
Irregular power supply hinders the use of computers in school.		
There are inadequate facilities to support full application of ICT tools.		
Teachers are very reluctant to adopt the use of ICT in teaching-learning process.		
Lack of confidence of using ICT tools by some teachers.		

13. Do you see any difference between normal traditional lesson and using ICT tools in lesson? (Tick your answer) **Yes** [] **No** []

E. Exposure of students to ICT tools.

14. Tick (✓) your degree of knowledge of each statement that best describes your usage of computer.

MK=Much Knowledge EK=Enough Knowledge

LK=Little Knowledge and NK= No Knowledge

Statement	MK	EK	LK	NK
To switch on and start up the computer				
To use all the keys on the key board				
To use the start button to launch programme				
To close, minimize and restore a window from task bar				
To name and save work on hard drive				
Save work in appropriate named files				
To single click and double click a mouse button				
Save and load work to and from pen drive				

15. Do you think the introduction of ICT tools in lesson has impacted on the way you learn? **Yes** [] **No** []

16. If **yes**, what is your satisfaction level with present use of ICT tools for teaching and learning?

Satisfaction level	Tick (✓) where applicable
Less Satisfaction	
Fair Satisfaction	
Satisfaction	
More Satisfaction	

17. How would you rate your experience with computers? (Tick (✓) where applicable)

- a. Have never used a computer and do not intend to. []
- b. I have never used a computer but would like to learn. []
- c. I use applications such as word processing, spreadsheets, the internet and PowerPoint. []
- d. I use computers extensively in learning. []

Thank You for Sincerely Completing This Questionnaire.