UNIVERSITY OF EDUCATION, WINNEBA

TEACHERS' USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE IMPLEMENTATION OF THE STANDARDS-BASED CURRICULUM

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A thesis in the Department of Educational Foundations, Faculty of Educational Studies, submitted to the School of Graduate Studies in partial fulfilment of the requirements for the award of the degree of Master of Philosophy (Curriculum and Pedagogic Studies) in the University of Education, Winneba

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DECLARATION

Student's Declaration

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

Signature:  .....

Date: .....

Supervisor's Declaration

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

Dr. Joseph Appianing (Supervisor)

Signature: .....

Date: .....

DEDICATION

This research work is entirely dedicated to my late brother Mr. Asambil Mutala.

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ABSTRACT

The study sought to investigate teachers' use of ICTs in the implementation of the Standards-based curriculum in the Sefwi-Wiawso Municipality. The study employed explanatory sequential mixed method design. The sample size was 208 primary and Kindergarten teachers in public primary schools in the Sefwi-Wiawso Municipality. The teachers were randomly sampled for the study. Questionnaire, interview guide and observation checklist were the instruments used for data collection. Data were analysed using frequency counts, percentages, means and standard deviations. The findings revealed that poor or no internet system, unstable electricity, lack of computers, laptops, and digital recorders, lack of educational software and lack of projectors, printers and photocopiers, teaching time schedules preventing maximum utilization of ICT/ computer technology and inadequate technical support were some challenges faced by teachers even though they are proficient in the use of ICTs. Based on the findings, it was recommended that barriers that have and are still hindering the integration of ICT in the curriculum should be tackled by policy makers. ICT facilities should as a matter of urgency be provided to aid the implementation of the standards-based curriculum.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter covers the overview of the study, the background information to the problem, statement of the problem, objectives and the research questions which guided the researcher and the significance of the study.

1.1 Background to the Study

The rapid development in Information Communication and Technologies (ICTs) has made tremendous changes in the twenty-first century, and well affected the demands of modern societies. Recognizing the impact of new technologies on the workplace and everyday life, today's educational institutions try to restructure their educational programs and classroom facilities in order to minimize the teaching and learning technology gap between developed and the developing countries. This restructuring process is providing learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005). The field of education has been affected by ICTs, which have undoubtedly affected teaching, learning and research (Yusuf, 2005). ICTs have the potential to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Yusuf, 2005). In a rapidly changing world, basic education is essential for an individual be able to access and apply information. Such ability must include ICTs in the global village.

Conventional teaching has emphasized content. For many years, courses have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to

consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasize capabilities and to be concerned more with how the information will be used than with what the information is. Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies (Oliver, 2000).

According to Mclean, Turban and Wetherbe (1996), the use of ICT has made the world a global village. It allows information to be passed from one network and communication media to another in digital packet to report, to give context to topic discussed in the curriculum and to make classroom learning more closely approximate to what occur in the work place. Materials that could aid creativity in teaching can be accessed on the internet easily in the world. In a similar manner, difficulty of students acquiring print materials can be reduced in a minimal for they can easily browse this information on the internet. It aids students in gathering vital information on certain school subjects/topics of interest.

ICTs are making dynamic changes in society. They are influencing all aspects of life. The influences are felt more and more at schools. Because ICTs provide both students and teachers with more opportunities in adapting learning and teaching to individual needs, society is forcing schools to aptly respond to this technical innovation. Tinio (2002), states the potentials of ICTs in increasing access and improving relevance and quality of education in developing countries. According to Tinio (2002), ICTs greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution, and widen the range of

opportunities for business and the poor. One of the greatest hardships endured by the poor, and by many others, who live in the poorest countries, in their sense of isolation, and ICTs can open access to knowledge in ways unimaginable not long ago (p. 6).

Watson (2002) posited that ICTs have revolutionized the way people work today and are now transforming education systems. As a result, if schools train children in yesterday's skills and technologies they may not be effective and fit in tomorrow's world. This is a sufficient reason for ICTs to win global recognition and attention. For instance, ICTs are dependable tools in facilitating the attainment of one of the Millennium Development Goals (MDGs), which is achievement of universal primary education by the year 2015. Kofi Anan, the former United Nations Secretary General, points out that in order to attain the goal of Universal Primary Education by the year 2015; we must ensure that information and communication technologies (ICTs) unlock the door of education systems. This indicates the growing demand and increasingly important place that (ICTs) could receive in education.

Since ICTs provide greater opportunity for students and teachers to adjust learning and teaching to individual needs, society is, forcing schools to give appropriate response to this technical innovation. ICT, according to United Nations Development Program [UNDP] (2006) report, has been defined to include the full range of electronic technologies and techniques to manage information and knowledge. It is about computer-based technology including computer hardware, software, CD-ROM, videodisc player and the internet. These forms of technology provide teachers and students with vast quantities of information in an easily accessible, non-sequential format that can be used as teaching tools. It has been touted as potentially powerful enabling tool for educational change and reform. When used appropriately, ICTs are said to help expand access to education, strengthen the

relevance of education to the increasingly digital workplace, and raise educational quality and also help make teaching and learning active process connected to real life. Hakkarainen, Ilomaki, Lipponen, Muukkonen and Rahikainen (2000) point out that ICT is a transformative tool and its full integration into the school system is necessary to prepare students for the information society they will inherit.

Educational environment constantly keeps on changing due to diverse educational needs of society and students, the high expectations from the public, and periodic policy reports demand educational change at the school-based level in local and international contexts (Cheng, 1994). Such demands for change also mean resultant modification or a complete reform in the entire educational curriculum. Cheng (1994) had argued that "curriculum obsolesce occurs at a rapid rate as educational programs face new demands for intellectual quality amid startling expansions in knowledge" (p.1). Such tremendous expansion of knowledge is gradually taking place across all the educational systems and also all fields of study, and more specifically, in the area of Information and Communication Technology (ICT).

The exponential growth and development in ICTs have brought remarkable changes in this 21st century (UNESCO, 2016). It is an undeniable fact that ICTs play a very important role in the development of every nation these days. This is because growth and development are often induced by the flow of information and this realization has led most countries into knowledge acquisition. In fact, the evolution of ICT has had an impact on the way we live, learn and work. Therefore, ICT has the ability to change the nature of learning as well as teachers and students in teaching and learning process (UNESCO, 2016). Grimus (2000) argued that the relevance of teaching and studying of ICT in schools, especially at the basic school levels cannot

be over emphasized. He further opined that the teaching and learning of ICT at the basic level of education prepares learners to face future development based on proper understanding of issues and 21st century demands. Moreover, ICT can motivate pupils in their learning by bringing variety into the lessons, and at the same time, sustaining teacher's own interest in teaching (Grimus, 2000). Therefore, there is a growing demand on countries and educational institutions to utilise ICT to teach skills and knowledge that students need for the 21st century challenges.

Information and communications technologies (ICTs) have become an integral part of education the world over. The importance of Information Communication Technology (ICT) cannot be underestimated. The use of computers in schools started in the early 1980 with several scholars suggesting that ICT will be an important part of education for the next generation (Yelland, 2001). Up-to-date technology offers many methods of enhancing classroom teaching and learning (Ghavifekr et al., 2014). Dawes (2001) stated that new technologies have the potential to upkeep education across the curriculum and deliver opportunities for efficient student-teacher communication in ways not possible before. The rapid growth in Information Communication Technologies (ICT) have brought remarkable changes in the twenty-first century, as well as affected the demands of modern societies. ICT is becoming increasingly important in our daily lives and in our educational system. Therefore, there is a growing demand on educational institutions to use ICT to teach the skills and knowledge students need for the 21st century. Realizing the effect of ICT on the workplace and everyday life, today's educational institutions try to restructure their educational curricula and classroom facilities, in order to bridge the existing technology gap in teaching and learning. This restructuring process requires effective adoption of technologies into existing environment in order to provide

learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005)

The introduction of the Standards-based curriculum in primary schools in Ghana is highly hinged on the use of ICTs. Most lesson deliveries in the classroom have to make use of ICTs under the new curriculum. Currently teachers have to download sample lesson notes as well as other learning materials online. Ensuring the fidelity of implementation of the standards-based curriculum is equally hinged on the use of ICTs as learning in a class is built upon on what has been learned in the previous class. Judging from the manifold benefits of ICT aids to the teaching and learning process its investigating teachers use of ICTs, could inform some remedy to abysmal performance of learners over the years. It is therefore against this background that the researcher investigated teachers use of ICTs in teaching and learning to promote digital literacy as prescribed by the standards-based curriculum.

1.2 Statement of the Problem

The introduction of ICT in education has a lot of benefits. Haddad and Draxler (2005) posit that ICT makes valuable contribution to various aspects of education development and effective learning through expanding access, promoting efficiency, improving the quality of learning and enhancing the quality of teaching. According to Tinio (2003), appropriate use of ICT allows for collaborative learning where students interact with other students, teachers and experts regardless of where they are. Tedla (2012) and Makgato (2012) revealed that the successful integration of ICT in teaching and learning largely depends on teacher competency, availability of ICT infrastructure and teachers' adoption and embrace of ICT in education.

Before the introduction of the Standards-based curriculum, the teaching and use of ICTs was done by "ICT inclined teachers". However, the Standards-based

curriculum require all teachers whether ICT inclined or not to use ICTs in the teaching and learning process. It is now “everyone for himself, God for us all”. How proficient teachers are, using ICTs in the teaching and learning, how teachers use ICTs in teaching and learning, availability of these ICTs and challenges these teachers face in the use of ICTs in teaching and learning in Sefwi Wiawso municipality of the western north region is yet to be known.

An observation by the researcher in some Basic Schools in the Sefwi-Wiawso municipality revealed that despite the advocacy towards integrating ICTs in instructional delivery, the teachers seldom use ICTs in teaching. These raised questions such as were the teachers not proficient in the use of ICTs in their teaching? Or how do these teachers make use of ICTs in teaching? What are some challenges teachers face in using ICTs in their teaching? Also noticed were students' comments on the lack of interest and boring nature of instructional delivery. With such comments, it is apparent that teaching and learning is not interesting and motivating. These comments may arise due to the pedagogical approaches employed of their teachers. The researcher also discovered that due to students' negative approach and lack of interest in learning, they were unconcerned with their dwindling performance in class. Since one cannot base on just an observation to conclude, the researcher deemed it appropriate to conduct a study to investigate the teachers use of information and communication technologies in the implementation of the standards-based curriculum.

1.3 Purpose of the Study

This study sought to investigate teachers’ use of ICTs in the implementation of the Standards-based curriculum in the Sefwi-Wiawso municipality.

1.4 Objectives of the Study

The study sought to:

1. find out ICTs availability in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality.
2. ascertain the proficiency of teachers in using ICTs in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality.
3. examine the use of ICTs in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality.
4. find out the challenges teachers face in using ICTs in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality.

1.5 Research Questions

The study sought to answer the following research questions:

1. What ICTs are available for the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality?
2. How proficient are teachers in using ICTs in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality?
3. How are ICTs used in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality?
4. What challenges do teachers face in using ICTs in the implementation of the primary school standards-based curriculum in the Sefwi-Wiawso municipality?

1.6 Significance of Study

This study focuses on identifying how ICTs are used to facilitate the teaching process in the standards-based curriculum in enhancing students understanding. The outcome of the study will provide an insight on the benefits and challenges faced by teachers in the use of ICTs in teaching. The outcome of the study will also provide information on the proficiency of teachers in using ICTs in the implementation of the primary school standards-based curriculum.

The outcome of this study can also be used as a guide for policy-makers, decision-makers and educational investors and other stakeholders to make well-informed decisions about ICT policies and investment in ICT facilities and infrastructure with regards to education at the basic education level, by understanding teachers use of ICTs in facilitating teaching. The findings of the study will inform the government and other interested parties on the hindrances to the use of ICTs to facilitate teaching in the standards-based curriculum. The knowledge may serve as a guide for overcoming challenges that teacher's face while using ICTs to facilitate teaching in primary schools. The outcome of the study will contribute to the existing literature on the use of ICTs to facilitate teaching in primary schools and also serve as a reference material to future researchers.

1.7 Delimitation of the Study

Delimitations deal with characteristics that narrow the scope of a study by defining its boundaries (Tagoe, 2009). The study was delimited to two major areas – geographical area (location) and content of the study. Geographically, this study was delimited to public basic schools in the Sefwi Wiawso municipality of the western north region of Ghana. The study focused on teachers' use of ICTs in the implementation of the Standards-based curriculum. The study was delimited to

ascertaining the proficiency and teachers use of ICTs in the implementation of the primary school standards-based curriculum. It also focused on finding out challenges teachers face in using ICTs in the implementation of the primary school standards-based curriculum.

1.8 Definition of Terms

Technology: is the study, development and application of devices, machines, and techniques for manufacturing and production processes.

Digital technologies: are electronic tools, systems, devices and resources that generate, store or process data. These include social media, online games and applications, multimedia, productivity applications, cloud computing, interoperable systems and mobile devices.

ICTs: Information Communication Technologies are digital infrastructures such as; computers, laptops, desktops, data projector, software programs, printers, scanners and Interactive teaching box.

Basic School: The level of educational system, which precedes Junior High schools in Ghana.

Implementation: In the context of this study, implementation refers to the teaching and learning of contents in the standard-based curriculum.

Curriculum: In this study, curriculum refers to the knowledge, skills, values, and attitudes which form the content of the standard-based curriculum.

Standard-Based Curriculum: The curriculum for kindergarten 1 to basic six (6) in Ghana.

1.9 Organization of the Study

This study has been organized into five chapters. The Chapter One focuses on the introduction of the study. This involves the background to the study, statement of the problem, purpose of the study, research questions and hypotheses, significance of the study, delimitation of the study, definition of terms and the organization of the study. Chapter Two of the study involves the review of literature related to the study. It presents the theoretical and conceptual framework for the study as well as related empirical studies. Chapter Three focuses on the methodology for the study. This chapter describes the research philosophy, research approach, research design, the population, the sample and sampling procedures used as well as the instruments and procedures involved in the collection and the analysis of data. The presentation and discussion of the results of the study was reported in Chapter Four. The collected data were interpreted and discussed in relation with the reviewed literature. Finally, the summary, conclusions and recommendations of the study were discussed in Chapter Five of the study.

1.10 Chapter Summary

The chapter one of the thesis formed the introduction to the study. It describes the background to the study, statement of the problem, the objectives and purpose of the study, as well as research questions which provided direction for the study. The chapter also outline the significance of the study, the delimitation (scope) of the study, definition of terms and organization of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Overview

This chapter consists of the review of related literature to the topic as documented by some writers, theorists, authorities and researchers. This chapter has been organised into theoretical, conceptual and empirical review. The review of related literature on this study is organized under the following sub-headings:

1. Theoretical Review
    a. Technology Acceptance Model
    b. Roger Diffusion Innovation Model
2. Meaning of Information and Communication Technology (ICT)
3. Policy framework for ICT in education in Ghana.
4. Role of ICTS in Curriculum Implementation
5. Availability of ICT facilities and Use of ICT facilities in teaching.
6. Teachers' perception on the use of ICT facilities in teaching.
7. Teacher-factors that influence the use of ICT facilities in the teaching.
8. Teacher Proficiency and ICT Use in Curriculum Implementation
9. Challenges teachers' face in the use of ICT facilities in teaching
10. Conceptual Framework
11. Empirical Review
12. Summary

2.1 Theoretical Framework

The theoretical framework defines the key concepts in research, proposes relations between them, and discusses relevant theories based on a literature review. A strong theoretical framework gives research direction, allowing researchers to

convincingly interpret, explain and generalize from their findings. A theoretical framework consists of concepts, together with their definitions, and existing theory/theories that are used for a particular study. It demonstrates an understanding of theories and concepts that are relevant to the topic of this study and that relate to the broader fields of knowledge. This study was underpinned by Technology Acceptance Model and the theory of Constructivism.

2.1.1 Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) was originally developed by Fred Davis in 1985 (Chuttur, 2009). TAM was based on Ajzen and Fishbein's 1975 Theory of Reasoned Action (TRA) and by Ajzen's 1985 Theory of Planned Behaviour (TPB) (Venkatesh & Davis, 2000). Using these two theories, TAM was fitted to the context of technology acceptance and usage (Olushola & Abiola, 2017). This theoretical model is one of the most significant models on theories of human behaviour. The purpose of TAM as a system is to recognise determinants involved in computer acceptance in general, and to observe an array of behaviours related to technology usage (George & Ogunniyi, 2016). The model's main purpose is to demonstrate that the motivation of users can be calculated by three factors: perceived ease of use, perceived usefulness, and attitude towards using the system (Chuttur, 2009). For the purpose of this study, TAM is used as a framework to investigate the teachers use of information and communication technologies in the implementation of the standards-based curriculum.

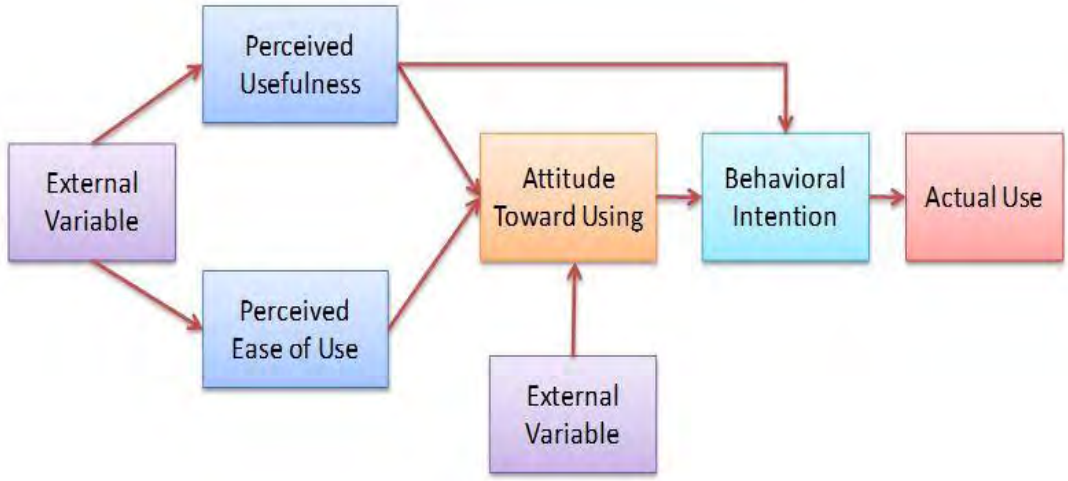

Figure 2.1: Technology Acceptance Model [adopted from Davis (1985)

This framework specifies the relationship between these essential factors that determine the relationship between individuals and technology systems. As depicted in the framework above, each variable is explained in relation to its contextualisation: External Variable (EV 1): Within the context of integrating technology into teaching and learning, the external variables consist of the barriers that teachers face that are beyond their control. This external variable has a direct influence on the perceived ease of use (PEOU) and perceived usefulness (PU) of using the technology. These external variables refer to contextual factors, such as access to resources, technical support and training in the school environment. Other challenges include, but are not limited to, inadequate accessibility of resources and network connectivity, limited school ICT facilities, lack of effective training, limited time and lack of teacher skills (Ghavifekr et al., 2016).

Behavioural Intention (BI) Perceived usefulness (PU): This concept is defined as the degree to which a person regards technology as enhancing performance in the classroom (George & Ogunniyi, 2016). An individual will adopt a new technology if they consider the technology to be useful in the classroom. The following factors are

key elements to determine if the teacher will use the technology in the future: the ICT tools will work more efficiently, performance at work, increased productivity, efficiency and, lastly, how useful the actual tool is (Ghavifekr et al., 2016).

Perceived ease of use (PEOU): The perceived ease of use indicates the level of easiness to use the technology, which should be easy to understand and free from physical and mental effort (George & Ogunniyi, 2016). An individual develops a positive attitude if the technology is easy to use in the classroom. ICT tools should be easy to acquire, clear and logical, easy to use, easy to control and easy to remember (George & Ogunniyi, 2016).

Attitude Towards Use (ATU): Attitude towards using the system refers to the positive and negative feelings of individuals about performing a target behaviour. Central to the behaviour of a teacher to use ICT in the classroom is his or her attitude towards using technology. An individual's attitude is affected by three factors: perceived ease of use, perceived usefulness, and an external variable.

Behavioural Intention (BI): This relates to the degree to which the teacher has made a conscious decision whether or not to conduct the behaviour in the future. Intention has a close link to actual behaviour that the individual will carry out in the classroom.

External Variable (EV 2): This external variable has a direct impact on the attitude towards using (ATU) the technology. These variables include personal factors, such as anxiety, literacy/ability, inspiration, personal beliefs, teaching philosophy and feelings of inadequacy. Thus, the TAM framework suggests that users' BI determines the ATU of a technology, which is an outcome of an individual's attitude towards using a particular ICT tool. Tran and Stoilescu (2016) state that TAM focuses more on the beliefs about the technology than the outcomes of using it. It is

widely noted that, depending on a person's gender, age or experience, these will affect how they perceive technology. Stols et al. (2015) state that South African mathematics teachers fail to use technology optimally during instruction. In a more recent study, Graham, Stols and Kapp (2020) mention that, even though teachers are provided with the required resources, technical support and ICT knowledge, they will not necessarily implement ICT usage in the classroom. This ultimately leads to the determinant that the use of technology is a matter of a person's beliefs. The TAM works perfectly for this study, as it interprets the information the researcher is seeking to explore through the research questions.

2.2 Rogers' (2010) Diffusion Innovation Model

Rogers' (2010) Diffusion Innovation Model. Rogers asserted diffusion as "the process in which an innovation is communicated through certain channels over time among the members of a social system" (p, 37). According to Rogers, the attitude of people towards the introduction of a new technology is a significant factor to process of its diffusion.

In fact, much diffusion research involves technological innovations. So, Rogers (2003) usually used the word "technology" and "innovation" as synonyms. For Rogers, "a technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome" (p. 13). It is composed of two parts: hardware and software. While hardware is "the tool that embodies the technology in the form of a material or physical object," software is "the information base for the tool" (Rogers, 2003, p. 259). Since software (as a technological innovation) has a low level of observability, its rate of adoption is quite slow.

For Rogers (2003), adoption is a decision of "full use of an innovation as the best course of action available" and rejection is a decision "not to adopt an innovation" (p. 177). The four key components of Rogers' definition of diffusion encompasses innovation, communication channels, time, and social system.

2.2.1 Innovation

Rogers offered the following description of an innovation: "An innovation is an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 12). An innovation may have been invented a long time ago, but if individuals perceive it as new, then it may still be an innovation for them. For Rogers (2003), "a technology cluster consists of one or more distinguishable elements of technology that are perceived as being closely interrelated" (p. 14). Uncertainty is an important obstacle to the adoption of innovations. An innovation's consequences may create uncertainty: "Consequences are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation" (Rogers, 2003, p. 436). To reduce the uncertainty of adopting the innovation, individuals should be informed about its advantages and disadvantages to make them aware of all its consequences. Moreover, Rogers claimed that consequences can be classified as desirable versus undesirable (functional or dysfunctional), direct versus indirect (immediate result or result of the immediate result), and anticipated versus unanticipated (recognized and intended or not).

2.2.2 Communication Channels

The second element of the diffusion of innovations model is communication channels. For Rogers (2003), communication is "a process in which participants create and share information with one another in order to reach a mutual

understanding" (p. 5). This communication occurs through channels between sources. Rogers states that "a source is an individual or an institution that originates a message. A channel is the means by which a message gets from the source to the receiver" (p. 204). Rogers states that diffusion is a specific kind of communication and includes these communication elements: an innovation, two individuals or other units of adoption, and a communication channel. Mass media and interpersonal communication are two communication channels. While mass media channels include a mass medium such as TV, radio, or newspaper, interpersonal channels consist of a two-way communication between two or more individuals. On the other hand, "diffusion is a very social process that involves interpersonal communication relationships" (Rogers, 2003, p. 19). Thus, interpersonal channels are more powerful to create or change strong attitudes held by an individual. In interpersonal channels, the communication may have a characteristic of homophily, that is, "the degree to which two or more individuals who interact are similar in certain attributes, such as beliefs, education, socioeconomic status, and the like," but the diffusion of innovations requires at least some degree of heterophily, which is "the degree to which two or more individuals who interact are different in certain attributes." In fact, "one of the most distinctive problems in the diffusion of innovations is that the participants are usually quite heterophilous" (Rogers, 2003, p. 19). Communication channels also can be categorized as localite channels and cosmopolite channels that communicate between an individual of the social system and outside sources. While interpersonal channels can be local or cosmopolite, almost all mass media channels are cosmopolite. Because of these communication channels' characteristics, mass media channels and cosmopolite channels are more significant at the knowledge stage

and locality channels and interpersonal channels are more important at the persuasion stage of the innovation-decision process (Rogers, 2003).

2.2.3 Time

According to Rogers (2003), the time aspect is ignored in most behavioral research. He argues that including the time dimension in diffusion research illustrates one of its strengths. The innovation-diffusion process, adopter categorization, and rate of adoptions all include a time dimension.

2.2.4 Social System

The social system is the last element in the diffusion process. Rogers (2003) defined the social system as "a set of interrelated units engaged in joint problem solving to accomplish a common goal" (p. 23). Since diffusion of innovations takes place in the social system, it is influenced by the social structure of the social system. For Rogers (2003), structure is "the patterned arrangements of the units in a system" (p. 24). He further claimed that the nature of the social system affects individuals' innovativeness, which is the main criterion for categorizing adopters.

Rogers proposed features of innovations that helped in the innovation-diffusion process. These features include; relative advantage, compatibility, complexity, trialability, and observability. These attributes were applicable to this study in its effort to find out teachers use of ICTs for implanting the standards-based curriculum.

2.3 Conceptual Review

2.3.1 Meaning of Information and Communication Technology (ICT)

The acronym ICT stand for Information and Communication Technology and is defined as a "diverse set of technological tools and resources used to communicate,

to create, disseminate, store and manage information Blurton (1999). These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephone. Teaching process is a means through which the teacher, the learner, the curriculum and other variables are organized in a systematic manner to attain pre-determined goals and objectives.

Information and Communication Technology is at the very heart of the educational process, consequently ICT-use in education has a long history. Much has been written about the use of film, radio, telephones, and television in education (Daniels, 2002; Sharma, 2003). Because access to digital tools, applications, and networks continues to grow worldwide and media are increasingly available in digital form, use of ICT in education is expected to increase dramatically.

According to Daniels (2002) ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refer to 'computers and computing related activities. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs. ICT is an acronym that stands for Information and Communications Technology. There is no universally accepted definition of ICT because the concepts, methods and applications involved in ICT are constantly evolving on an almost daily basis. ICT covers any product that will store, retrieve, manipulate, transmit or receive information electronically in a digital form. For example, personal computers, digital television,

email, internet etc. The field of education has been affected by ICTs, which have undoubtedly affected teaching and research.

Pelgrum and Law (2003) state that near the end of the 1980s, the term 'computers' was replaced by 'IT' (information technology) signifying a shift of focus from computing technology to the capacity to store and retrieve information. This was followed by the introduction of the term 'ICT' (information and communication technology) around 1992, when e-mail started to become available to the general public (Pelgrum & Law, 2003).

According to a United Nations Economic Commission for Africa [UNECA] (1999) ICTs cover Internet service provision, telecommunications equipment and services, information technology equipment and services, media and broadcasting, libraries and documentation centres, commercial information providers, network-based information services, and other related information and communication activities.

UNESCO (2016) information and communication technology (ICT) may be regarded as the combination of 'Informatics technology' with other related technology, specifically communication technology. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counselling, interactive voice response system, audiocassettes and CD ROMs and many others have been used in education for different purposes (Sharma, 2003; Sanyal, 2001; Bhattacharya and Sharma, 2007).

It could be viewed as a set of activities which is facilitated by electronic means. It could also mean the processing, transmission and display of information via electronic means. British Educational Communications and Technology Agency

(BECTA, 2000) in its own definition defined ICT as techniques people use to share, distribute, and gather information and to communicate through computers and computer networks. Yunus (2007) described ICT as a complex varied set of goods, applications and services used for producing, distributing, processing, transforming information (including) telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media. Adeleke (2005) and Agba, Kigongo-Bukenya, and Nyemba (2004) and Stevenson (1997) viewed ICT as a cluster of associated technologies defined by their functional usage in information access and communication. Information and Communication Technology are computer-based tools used by people to work with information and communication processing for the needs of an organisation. It covers computer hardware, software, the network and other digital devices like video, audio, camera and so on which convert information (text, sound, motion etc.) into digital form (Muehleisen, 1997).

According to Nwagwu (2006), Information and Communication Technologies (ICTs) are electronic technologies used for information storage and retrieval. Ayodeji (2004) defined ICT as electronic-based technology that is generally used to retrieve store, process, and package information as well as provide access to knowledge. The development of microcomputers, optical disc, the establishment of telecommunication network, television, internet, etc. have assisted in broadening people's knowledge and facilitating effective communication. Ugwu and Oboegbulem (2011) stated that ICTs in education encompasses a great range of rapidly evolving technologies such as desktops, notebooks, digital camera, local area network (LAN), the internet and the World Wide Web (WWW), CD-ROM (Compact Disc Read-Only Memory) and DVDs and applications spread sheets, tutorials, simulations, electronic mails, digital libraries, computer-mediated conferencing, video conferencing and virtual reality. In

effect, ICT has reduced the barriers that characterized interrelationship in terms of space, time, and learning activities. ICT tools for teaching and learning include computer, internet, PowerPoint, television, overhead projectors, camera, radio cassette, video tape, audio cassette, audio cd, www, telephone, etc. (Gannon, 2004).

Information and Communication Technology as tools within the school environment include use for school administration and management, teaching and learning of ICT related skills for enhancing the presentation of classroom work, teaching/learning tasks, teaching/learning intellectual, thinking and problem-solving skills, stimulating creativity and imagination, for speech by teachers and students and as communication tool by teachers and students (Pennington, 1996 and Moore 1996). According to Lever-Duffy, McDonald and Mizell (2003), ICT comprises the use of at least a computer and the internet as well as computer hardware and software, networks, and a host of devices that convert information (text, images, sounds, and motion) into general digital formats. Information and communication technology (ICT), in this context, represent a new approach for enhancing the dissemination of information and will be used, applied, and integrated into learning on the basis of conceptual understanding and methods of informatics. From the earliest times when computers were commercially available, they could be found in use in educational institutions, and educators (Bork, 1980) argued that computers should be used to support learning. Initially, computers were used to teach computer programming but the development of the microprocessor in the early 1970s saw the introduction of affordable microcomputers into schools at a rapid rate. Computers and applications of technology became more pervasive in society which led to a concern about the need for computing skills in everyday life. As public awareness grew, this need for computer literacy became extremely influential and many schools in the developed

world purchased computers based on this rationale. The 1990s was the decade of computer communications and information access, particularly with the popularity and accessibility of internet-based services such as electronic mail and the WWW. At the same time, the CD-ROM became the standard for distributing packaged software replacing the floppy disk. This allowed large information-based software packages such as encyclopedia to be cheaply and easily distributed. As a result, educators became more focused on the use of the technology to improve student learning.

2.3.2 Policy Framework for ICT in Education in Ghana

Ghana has not failed in her efforts to equip her citizens with ICT skills to be able to function efficiently in a world that is progressively being transformed into a knowledge-based one. ICT inception in all sectors of the economy, including education, has therefore become a public policy priority. Efforts to introduce ICT in schools derive from the national ICT for Accelerated Development policy of 2003 and the ICT in Education policy of 2008.

The Government of Ghana has placed a strong emphasis on the role of ICT in contributing to the country's economy. The country's medium-term development plan captured in the Ghana Poverty Reduction Strategy Paper (GPRS I&II) and the Education Strategic Plan 2003-2015 all suggest the use of ICT as a means of reaching out to the poor in Ghana (Government of Ghana, 2004). In 2004 the Ghanaian Parliament passed into law Ghana's ICT for Accelerated Development (ICT4AD) policy, which is currently at various stages of implementation. This policy represents the vision of Ghana in the information age and addresses priority focus areas including accelerating human resource development and promoting ICT in education. In 2008, the Ministry of Education came up with the ICT in Education policy which outlines the plans and strategies for integrating ICT in education at all levels. The

overall vision of the ICT in Education policy is the use of appropriate ICTs to support and align the sector Ministry's policies, objectives and strategies, particularly as it relates to equitable access to education, quality of education, educational management, science and technology and labour market needs. The mission is to articulate the relevance, responsibility and effectiveness of utilizing Information and Communication Technologies (ICTs) in the education sector, with a view to addressing current sector challenges and equipping Ghanaian learners, students, teachers and communities in meeting the national and global demands of the 21st Century. The specific objectives of the policy are to:

1. Facilitate the deployment, utilization and development of ICT within the educational system to improve educational access and delivery to support teaching and learning from the primary level upwards.
2. Transform the education system in order to improve the quality of teaching and training at all levels of the educational system and expanding access to education, training and research resources.
3. Orient all levels of the country's educational system to the teaching and learning of science and technology in order to accelerate the assimilation of science and technology in society.
4. Achieve universal basic education and improve the quality of basic education and computer literacy in the nation.
5. Ensure that all citizens are at least functionally literate and productive.
6. Expand and increase access to secondary and tertiary education.
7. Strengthen science education at all levels of the educational system, especially at the basic and secondary levels.

Four key factors underlie the strategies for achieving the specific objectives outlined in the policy. They are equity in the allocation of resources, affordable and continuous access to ICT infrastructure, capacity building of users and the development of norms and standards with regard to ICT use.

Additionally, the policy has seven thematic areas. These areas outline the guiding principles and strategies to be put in place to accomplish the goal of integrating ICT in education. The first thematic area seeks to enhance education management by building the capacity of the Ministry of Education and all its agencies. By doing so, ICT can be effectively used to generate data for informed decision making. The second thematic area concerns building the ICT capacity of all persons involved in education delivery, especially teachers, to facilitate the incorporation of ICT into teaching and learning at all the levels of education in Ghana. The third thematic area is concerned with infrastructure provision, e-readiness and equitable access to ICT in all schools. Other areas of concern are content development, ICT integration into the curriculum, technical support, maintenance and sustainability of ICT infrastructure.

Implementation of the policy consists of three phases. The initial phase is to enhance the preparation of educational institutions to use ICT for teaching, learning and administrative roles. The second phase is to encourage community support for ICT infrastructure in educational institutions as well as introducing curriculum guidelines for ICT integration. The final stage entails the integration of ICT into teaching, learning, education management and governance.

Translating the objectives and strategies of the policy into action requires government support and institutional collaboration. Overall, the Ministry of Education is responsible for the implementation of the ICT in Education Policy. However, the

ministry's ability to shoulder this responsibility is constrained by inadequate funds. Therefore, partnering with other agencies and development partners, both local and international, is essential in the successful implementation of the policy. Indicators and targets are to be developed at the national and regional levels to effectively measure the successes or otherwise of the policy implementation. Annual reviews as well as three years evaluations are to be conducted to help in the implementation process.

2.3.3 Role of ICTs in Curriculum Implementation

ICTs are rapidly transforming the world into an information society. This transformation requires that the education sector be able to harness the full potential of ICTs to improve the quality of teaching and learning. It is, therefore, not surprising that the use of ICTs is on the rise in many educational institutions because they serve numerous purposes in teaching and learning.

Fan and Ho (2012) identify three main uses of ICTs in education. The primary role of ICTs is to improve teaching and learning using application software. The second purpose is to facilitate administrative roles such as grading and keeping records in schools for tracking students' learning history and performance. The third role of ICTs in education is to build information literacy of students.

The rationale for ICTs investments in education is based on the assertion that traditional teaching and learning methods in which knowledge is imposed on learners have not provided enough opportunities for learners to create their own knowledge and develop critical minds. Osin (1998) thus argues that the use of computers in classrooms provide key ingredients in teaching and learning that were lacking in all previous tools that raised high expectations when introduced in the educational system. Previous tools such as the blackboard only presented information to students.

Computers have resulted in what he calls ‘‘individualized interactivity’’, providing the opportunity for information to be given to students as well as adopting presentations to students’ needs and preferences.

The integration of information and communication technologies can help revitalize teachers and students. This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005).

Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002) concludes that the benefits of ICT will be gained “…when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001). Changed pool of teachers will lead to changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (Littlejohn, Suckling, Campbell & McNicol, 2002).

ICT impacts on a large section of education, from record keeping and school websites to the creation of online learning communities (Bishop, 2007). Educational institutions can use specialized websites to make learning resources available online at any time. Some educational institutions do not even require students to be physically present. Virtual classrooms have flourished in tandem with improved internet accessibility. The significant barriers of time and distance are rendered almost obsolete in such virtual classrooms (Stennes, 2008).

Another advantage for using ICT in education is that using ICT tools correctly, in and out of the classroom, can increase communication and collaboration between teachers in and out of school, between teachers and students and between students and students moving away from the old "banking" way of teaching where information is only moved from teacher to students without any freedom for critical analysis on the part of the learner (Hawkins, 2002). Cowie, Jones, Harlow, McGee, Millar, Cooper and Gardiner (2008) found that ICT tools such as the laptop were supporting communication and the sharing of work between teachers and students in and out of class time. Students were said to be seeking to engage with teachers' lesson materials in different ways and teachers were more easily able to share teaching notes and exemplary work with students via CD and email. Furthermore, teacher and student experiences have been improved when working around a computer or using ICT tools.

Jacobson and Levin (1993) noted that teachers have a firm conviction that the use of the technology will help students in their education, and they concluded that the use of electronic mail, for example, in research and communication will help teachers and students to save time. Balanskat, Blamire, and Kefalla (2006) support Jacobson and Levin's position by emphasizing that most progress has been made in

recent years in raising teachers' positive attitudes towards ICT by realizing its value for learning through more experience and embedded use. Teachers increasingly use ICT to prepare their work more efficiently and achieve time gains. In the latest Euro barometer benchmarking survey (September, 2006), 90% of teachers in Europe already use ICT to prepare their lessons.

However, the benefits of ICT use in the classroom depend on the success with which it has been integrated (Condie & Munro 2007). Dawes (2001) asserts that new technologies could support education across the entire curriculum, providing innovative opportunities for effective communication. ICT in education has undoubted potential, to be influential in changing teaching methodologies.

UNESCO (2007) is of the view that adopting ICT into the educational systems has the potential of increasing the quality of education delivery as well as facilitating greater access to information and services by marginalized groups and communities. Therefore, when used effectively, ICTs could:

1. Make education easier, cheaper to access and free of the limitation of distance.
2. Result in better academic performance due to changes in teaching and learning.

Studies have also demonstrated that computer use can result in effective literacy gains. There is empirical evidence that students, who are having difficulties with reading, can be motivated and engaged through the use of ICT (Lynch, Fawcett & Nicolson 2000; Segers & Verhoeven, 2002).

ICT can play various roles in learning and teaching processes. According to Bransford et al., (2000), several studies have reviewed the literature on ICT and learning and have concluded that it has great potential to enhance student achievement

and teacher learning. Wong et al., (2006) point out that technology can play a crucial part in supporting face-to-face teaching and learning in the classroom. Many researchers and theorists assert that the use of computers can help students to become knowledgeable, reduce the amount of direct instruction given to them, and give teachers an opportunity to help those students with particular needs. According to Gillespie (2006), new technologies can be used to enable students to collect information and interact with resources, such as images and videos, and to encourage communication and collaboration. Osborne and Hennessy (2003) identify that, new technologies may also help to increase student motivation, facilitate clearer thinking, and develop interpretation skills with data. BECTA (2003) indicated that the success of the integration of new technology into education varies from curriculum to curriculum, place to place, and class to class, depending on the ways in which it is applied. Here under are a few highlighted benefits of using ICT to facilitate teaching:

i. **Individualized Interactivity:** Traditional pedagogic methods focused on a passive one-way flow of information from teachers to students. World Bank (2004) reports that recent trends towards a constructivist approach to teacher-student interaction suggests that learning process can be enhanced through use of technologies which adapt the presentation of needs, preferences and requests. Due to the interactive nature of most of the ICT technologies, it is well suited for creative learning approach in which experimentation and creative thinking skills are emphasized.

ii. **Delivery of Educational Resources:** ICTs can be used to provide immediate up to date resources using one or more media to large numbers of educators and learners easily and relatively cheaply. Any changes made to resources are easily available to educators and students without incurring major additional

distribution costs. An additional benefit is the huge resource base that resides on the World Wide Web. Tinio (2002) asserts that ICT has the ability to transcend time and space making possible asynchronous learning. Online materials can be accessed 24 hours a day, seven days a week. ICT has enabled instructions to be received simultaneously by multiple geographically dispersed learners to be able to access resource persons, learning resources, mentors and professionals from all over the world.

iii. **Access to Global Knowledge Base/Internet:** Perhaps the clearest benefit to education from ICT according to World Bank report (2004) comes from ability to share knowledge, experiences with an emerging networked global community. Students can actively search for their counter parts in other countries to develop joint research projects on a variety of topics e.g., environment or health issues. The same technology allows students and wider community access to both global and local cultural resources.

iv. **Facilitating Interaction with Resources:** According to Bullock (2004) ICT provides educators with a wide range of very interesting opportunities for creating resources that allow learners high levels of interactivity. This can lead to creation of interesting and exciting interaction of learners with educational resources.

v. **Simplify Teaching Job**: Plomp et al., (2007) states that use of ICT such as videos, television and multimedia computer software that combine text, sound and colourful moving images can be used to provide challenging, authentic content that will engage students in the learning process. Moreover, networked computers with internet connectivity can increase learner motivation as it combines the media richness and interactivity of other.

2.3.4 Proficiency Level of Teachers in the Use of ICT in Teaching

The study points out that respondents who had received some form of computer training displayed more use of ICT in teaching various lessons than those who did not receive any training. Becker et al., (1999) stated that there is a positive relationship between ICT training and teachers' attitudes. Training can significantly influence the ways in which a teacher includes technology tools in the classroom. The lack of computer training could lead to technophobia that is likely to limit the use of ICT in teaching. This study aligns with a study by Dogan (2010) which points out that, teacher training in ICT is vital for future conception and uses of computers for teaching process. However, for proper ICT integration in education, the quality of training needs to be taken into account. This finding of the study indicates that lack of adequate training in technology use and experience is one of the main reasons why teachers do not use technology in their teaching. Therefore, training teachers and providing them with the appropriate knowledge and skills facilitates the integration of ICTs in teaching.

Despite the increasing number of research on the adoption and use of ICT in education, it has been suggested in several pieces of literature (Olatokun & Kebonye, 2010) that there is the need for further investigation on the level of ICT adoption and use as well as the impacts of its use in different context worldwide, especially in developing countries. Studies in the area of ICT use in higher education are still under-researched in many sub-Saharan African countries, and Ghana is no exception. For example, Aleke, Wainwright, Ojiako and Maguire (2009) have noted that the impacts of the use of ICT applications have not been explored thoroughly in the developing countries. Boakye and Banini (2008) examined teachers' readiness to use ICT from schools in Benin, Cameroon, Ghana and Mali to determine whether the

teachers were involved in the process of integrating ICT into education in those countries. Teachers were asked about their ICT expertise and the application of ICT in their pedagogical activities. Seventy-one per cent of the teachers surveyed had never used the device in class; while ten per cent used it for classroom events. Approximately 44 per cent had never used the machine to make lesson notes, while 49 per cent had never done so. A third of those who used it in making lessons did so "always' and the rest "occasionally". These uses included using the tool to review Internet content, typing out lecture notes and creating materials for teaching and learning. Around 60 per cent of teachers find themselves to be informed around web surfing, with 71 per cent using email. Up to 78 per cent of teachers have learned how to use computers on their own. Although some teachers did not use ICT at all, they usually accepted that the machine changed the way students learned.

2.3.5 Availability of ICT Facilities in Teaching

Szeto and Cheng (2013) underscore the fact that the availability of ICT resources is important to generate situations in which teachers can make use of ICT in their classrooms with certainty and correctly. The availability of ICT resources in schools depends on whether the school has procured the resources or the Department of Education has provided the resources.

An important variable of ICTs integration in schools is availability of ICT facilities. In his doctoral dissertation, Ottesen (2006) reveals that one fundamental problem facing ICT integration in schools is the lack of computer facilities. In a related study Norris, Sullivan, Poirot and Soloway (2003) reveal that appropriate access to ICT facilities is another key factor in the effective technology integration process. The study reveals substantive correlation between technology access and use. In another study, Yildrim (2007) reveals that teachers agreed that access to ICT

facilities is one of the effective means to integrate ICT in classrooms. Together, education and employment are key building blocks of strategies to eradicate poverty. ICT is increasingly being used to improve access to education and employment. The efficacy of ICT in higher education has been proved beyond reasonable doubt. It has been known to enhance educational opportunities of individuals and groups constrained from attending traditional universities as well as the use of computers as tutors for drills and practice as well as instructional delivery (Potashnik & Capper, 1998; Umoren, 2006). The unfortunate thing is that, ICT resources are beyond the reach of teacher educators and as such, they cannot access them for the purpose instructional development. In an attempt to investigate availability and access to the internet, Kenya School Net (2003) found that email was yet to be recognised as a tool for collaboration among students and teachers. It went on to affirm that in the schools surveyed, access to the internet was severely limited and when available was only for administrative use. The study found that almost 40% of these schools had less than 10 computers, and were therefore inadequate for teaching and learning. More than 20 per cent had less than 5 computers, indicating that the computers were mostly for administrative use. Only a third of schools studied had dedicated computer laboratories. Idoko and Ademu (2010) in an investigation of the challenges of ICT for teaching/learning as perceived by agricultural science teachers in 210 secondary schools from the three educational zones in Kogi State in Nigeria also found that ICT facilities were not available in secondary schools. Similarly, Fakeye (2010) also investigated English Language teachers' knowledge and use of ICT in Ibadan Southwest LGA of Oyo State and found that availability of computers and their connectivity to the internet was non-existent in virtually all the school studied and

utilisation, which is dependent on availability, and because availability is poor, thus, usability was also found to be poor.

2.3.6 Teachers' Use of ICT Facilities in Teaching

Information, Communication and Technology has made tremendous advances which could effectively be put to advantage to enhance educational delivery. Many Ministries of Education have recognised this potential and have reformed their educational system take advantage. In a case study of some pioneer schools in ICT integration (Boakyi & Banini, 2006) discovered that some schools in both the public and private sector in the education industry had taken advantage of the ICT innovation and were making good progress. Their study identified ICT integration approaches being applied to include the use of pre-identified websites for teaching and learning right off the internet, the use of interactive CD ROMs, as well as, teaching children to do presentations or research with the help of the computer. It also involved the use of the PowerPoint software to teach as well as referring pupils and students to some radio programmes which were considered educative. The study identified some positive effects of ICT use to include "increased teacher student interaction, pupil/student-centred learning, increased level of capability on the part of students to do independent learning and the practicalisation of hitherto theoretical and abstract concepts on the part of both students and teachers".

Haughey and Anderson (1999) and Jonassen (1996), have all demonstrated that the new technology represents a unique and fascinating option in the teaching and learning process. The advantages are many in terms of flexibility, accessibility, increasing communication and interactions, as well as, a variety in the modes of teaching and learning. ICT integration results in more effective learning, improved

teaching more suited to the daily realities for the pupils, better leadership of administrators and members of the community in the school life.

According to Haddad and Drexler (2002), an effective teaching/learning process must stimulate intellectual curiosity and offer a sense of enjoyment that will move the students from the passive role of recipients of information to the active role of builders of knowledge. Yet, engaging the learner in this process can be the most challenging task for teachers. ICTs are effective instructional aides to engage students in the learning process. The Internet allows cost-effective information delivery services, collaborative and distance education, more than has ever been imagined (Clyde, 1995). The Internet has myriad websites to help teachers develop or improve lesson plans, exchange ideas, obtain information, and find free animations and simulations to enliven their lessons.

Elsewhere the computer technology has made it possible for teachers and students to interact through the Internet. ICT are resources that can be deployed to augment existing teaching and learning materials. Haddad and Drexler (2002) identify at least five levels of ICT use in education: Presentation, demonstration, drill and practice, interaction, and collaboration. Websites today abound where instructors and students can visit in order to obtain needed information and interact. This is used in most distance education programs. United Nations Institutions for Training and Research (UNITAR), for instance, uses the Internet as a medium to offer training programmes to thousands of public sector workers around the world. The computers have become motivating tools for teaching and learning in schools.

Teachers use computers to write lesson plans, prepare materials for teaching, record and calculate student grades, and communicate with other teachers. As such, computers have become a routine tool for helping teachers accomplish their

professional work (Becker, Ravitz, & Wong, 1999). However, many teachers do not facilitate substantial student use of computers for learning activities (Becker, Ravitz, & Wong, 1999).

Computer-based tests are easier to administer and are quicker to mark. Research shows that the use of computers for drill and practice, and for instructional delivery, combined with traditional instruction, results in increases in learning in the traditional curriculum and basic skills areas, as well as higher test scores in some subjects compared to traditional instruction alone (Fouts, 2000). ICT-enhanced learning mobilizes tools for examination, conclusion, and analysis of information, providing a platform for student inquiry, analysis, and construction of new information. Learners therefore learn as they do and whenever appropriate, work on real life problems in-depth, making learning less abstract and more relevant to the learner's life situation. In this way, and in contrast to memorization-based or rote learning, ICT-enhanced learning promotes increased learner engagement (Wastson, 2002).

Waite (2004) indicated that even though teachers showed great interest and motivation to learn about the potential of ICT, in practice, the use was relatively low and it was focused on a narrow range of applications, with word processing being the predominant use. Harris (2000) revealed that the highest percentage of use of computers and the internet was for preparing instructional materials. Lowest percentage of use of computers and the internet was for instructional use for students. The teachers used word processing primarily for preparing instructional materials, instructing students in the classroom and interactive lab. The second highest use was for web searching.

Many writers with an interest in the use of ICT in argue that the word processor can be a powerful tool in developing pupils' history skills (Haydn, 2001). Word processing was found by Ofsted to be the most common form of ICT use in history in schools, and its potential to develop historical thinking was also identified (Ofsted, 2002). The word processor can help pupils to organise their historical thinking, analyse and interrogate sources and structure their writing. Prior and John as cited in Ofsted (2002), describe the benefits of using a word processor to facilitate 'revelatory writing'. Here, pupils participate in historical writing and interact with its content, enabling them to take control of their own historical writing, and providing opportunities for developing different writing styles.

2.3.7 Factors that Influence the use of ICT Facilities in the Teaching

The importance of information and communication technologies in the teaching and learning process has been proven by many research studies to be an effective way of supporting teaching and learning. Although many teachers do not use new technologies as instructional tools, some are integrating information and communication technologies innovatively into their teaching. There are a number of factors which encourage these teachers to use information and communication technologies in the teaching and learning environment (Cubukcuoglu, 2013).

With the help of ICT, teachers may continue to pursue the aim of education beyond the classroom walls. Students and teachers can interact outside the classroom and outside specific classroom hours (Loveless & Ellis, 2001). The use of ICT could be helpful for teachers in reaching many goals of education and support teaching and learning in and outside the classroom. However, many teachers who are used to traditional teaching methods and do not want to change their teaching strategies may not believe in the benefits of ICT in education.

Moreover, as a result of many other factors, new technologies may not be integrated into the teaching environment by specific subject teachers. On the other hand, teachers in many countries attempt to make innovative use of these technologies since they believe in their benefits and positive effect on student learning or for other reasons. There appears to be numerous factors that influence teachers' use of ICT tools. The encouraging factors that influence teachers' innovative use of technology in the teaching of their subject can be divided into two sub-categories, namely, school factors and teacher factors.

2.3.7.1 School Factors

These factors are related to the conditions and facilities supplied for teachers and which facilitate their use of ICT in teaching (Veen, 1993). There are many such factors (Scrimshaw, 2004). For example, teachers believe that if they have their own laptop and easy access to computers, this would encourage them to integrate ICT into their teaching (Scrimshaw, 2004). Cox, Preston and Cox (1999) also discovered that teachers are of the opinion that having their own computer is one of the positive factors that influence the perceived ease of ICT use. Abdullah, Abidin, Luan, Majid and Atan (2006) argued that providing teachers with a laptop, projector, and computer software would motivate not only students but also teachers in the teaching and learning process. When teachers have easy access to computers, this might give them sufficient time to prepare materials, search the Internet, and/or review the necessary software. Furthermore, teachers may make better use of ICT when they have the opportunity to use high quality resources and have full access to hardware and software (Forgasz, 2006; Scrimshaw, 2004).

One of the factors that prevent teachers' use of ICT, namely, technical problems and inadequate technical support, demonstrates that providing high level

technical support whenever needed would enable teachers to use ICT (Forgasz, 2006; Lim and Khine, 2006; Scrimshaw, 2004; Yilmaz, 2011; Assan & Thomas, 2012). Moreover, it is important to be able to easily access the technology rooms and equipment available (Forgasz, 2006; Scrimshaw, 2004). Since, if teachers have the opportunity to access these tools and rooms at any time, they would be more eager to integrate them into their teaching (Scrimshaw, 2004).

The other most important factor that encourages teachers' technology use is adequate training on the use of ICT tools in teaching (Scrimshaw, 2004). The training should not only include basic technology skills but also provide training on improving pedagogical use of technology. This kind of training will help teachers feel confident and competent while using ICT at the right time and at the right opportunity. Moreover, when training offers real-life examples, it will help trainees to understand the best way and time to use ICT in teaching and learning. It is also discovered that commerce educators believe that professional support in teaching with ICT is also an important issue (Assan & Thomas, 2012).

Teachers also believed that having "whole school policies on using ICT across curriculum" is one of the school enablers for making effective use of ICT in the classroom (Scrimshaw 2004, p.9). The principal's positive attitude towards the use of ICT in teaching and learning and the school policy in this issue will be enablers for teachers (Forgasz, 2006; Veen, 1993). In Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012) research teachers mentioned that the support from the administrators is one of the most influential enablers in integrating technology. It could be argued that the enablers mentioned above are all interrelated with this one. This is because without a school-wide ICT policy, there would not be quality

technical support, effective timetabling of ICT rooms and/or equipment, access to ICT resources, or training on the use of ICT in subject teaching.

The factors that enable teachers to use ICT are related to their own beliefs and skills (Veen, 1993), which is why they are identified as personal factors. Since they are intrinsic to teachers, these could be more effective in enabling the use of ICT in teaching and learning than school factors. Some of the factors that influence the use of technology in teaching and learning are "teachers' attitude, teaching priority, computer skills and teaching preferences" (Bakar, 2007, p. 29). Teachers' confidence in using ICT, experience, willingness, motivation, and the perceived usefulness of ICT in teaching and learning are some other important facilitators for the use of technology in education (Cox et al., 1999; ChanLin, Hong, Chang & Chu, 2006; Mumtaz, 2000). Drent and Meelissen (2008) discovered that having strong ICT competence is an important factor in innovatively using ICT in teaching, although not more important than other factors.

2.3.7.2 Teacher Factors

The level of teachers' pedagogical skills, that is to say, whether teachers are able to integrate ICT appropriately and know exactly how they will teach with ICT, is another major enabling factor (Veen, 1993). Of course, knowing how and when to use technology in teaching is related to having adequate training in the matter. Ertmer et al. (2012) also discovered that teachers' own attitudes, beliefs and knowledge and skills were mentioned as the biggest enablers in integrating technology.

The final but no less important personal enabling factor is teachers' awareness of the educational benefits of using ICT in their teaching. When a teacher is aware of the positive effects and benefits of a new method or tool for the students, s/he may become more eager to use it in teaching. It has been demonstrated that technology use

in the teaching and learning environment motivates students (Abdullah et al., 2006). In addition, some teachers are of the opinion that technology use is useful for lesson preparation as well as for actual teaching (Cox et al., 1999). Being aware of all these benefits may thus promote the use of ICT in teaching.

Various factors encourage teachers' use of technology in their teaching as mentioned in many research studies. However, personal factors should be considered to matter more than the other factors since applying new technology is dependent on the teachers' positive attitudes and beliefs about its usefulness. Some of the enablers that promote the effective use of ICT in education as mentioned by teachers from a variety of countries were described here.

Several studies (Hadley and Sheingold, 1990; Sheingold and Hadley, 1993) used survey data to identify factors likely to be in evidence in teachers who to some extent, have integrated ICT into their teaching practices. The three major factors involved in these 'accomplished' teachers' success were: teacher motivation and commitment to their students' learning and to their own development as teachers, the support they experienced in their schools and access to sufficient quantities of technology (Mumtaz, 2000).

A study by Purohit and Bhagat (2010) also revealed that, ease of availability of ICT, upgrading teacher's ICT skills, convenience (time and place), time to upload and download (speed), improving communication between students and teachers, reliability of ICT, data security, availability of specialised IT teachers, availability of educational software, improving the presentation of the subject, providing encouragement to teachers to use technology in their teaching more often, ease of navigation of the course through an ICT device, financial readiness of the institute to support ICT and learners with training are other factors that encourage the use of ICT.

2.3.8 Challenges Teachers face on the Use of ICT Facilities in Teaching

The act of integrating ICT into teaching is a complex process and one that may encounter a number of difficulties. Schoepp (2005) defines challenges as any condition that makes it difficult to make progress or to achieve an objective. There are several factors that inhibit the use of ICT into classroom instruction. Some factors are school base (internal) while some are community base (external) and teacher's personal issue. Researches identify these factors as non-manipulative and manipulative factors. Non-manipulative refers to the factors, such as age, teaching experience, computer experience. Manipulative factors are availability of ICT infrastructures, government policy and the availability of external support; attitude, phobia, interests, skill level in using computer etc.

2.3.8.1 Teachers' Attitude towards the Use of ICT and Teachers' ICT Knowledge and Skills

Attitude is a predisposition to respond favorably or unfavorably to an object, person, or event Ajzen (1988). To successfully initiate and implement ICT in teaching depends strongly on teachers' support and attitudes. Among the factors that influence successful integration of ICT into teaching is teacher's attitudes and beliefs towards technology (Keengwe, Onchwari, & Wachira, 2008). Attitudes toward ICT influence teachers' acceptance of the usefulness of technology, and also influence whether teachers integrate ICT into their classrooms. Many theorists (e.g., van Braak, 2001b; Vannata & Fordham, 2004) have maintained that teachers' attitudinal factors have a strong impact on technology integration in teaching. Attitude is an important concept in social judgments and behaviors and thus, is one of the most important concepts in decision making, Venkatesh et al., (2003). Teacher attitude is one of the most critical factors that enhance or inhibit the integration of ICT into classroom instruction. In a

report by BECTA (2004) on ICT integration in education it was reported that negative attitude was a barrier towards integration of using ICT in teaching while Rhoda and Gerald (2000) found that positive attitudes towards ICT use are widely recognized as a necessary condition for effective ICT use in teaching. Moreover Selewyn (1999), insists that integration of ICT in teaching depends to a great extent, on teachers' attitude towards their use. Myers and Halpin (2002) assert that attitude of teachers towards ICT use is a major predictor of future classroom use.

Furthermore, a study by Bullock (2004) found that teachers' perceptions are a major enabling/disabling factor in the implementation of ICT based teaching approach. Similarly, a study by Kersaint et al., (2003) found that teachers, who have positive attitude towards ICT based teaching feel more comfortable with using it and usually exploit it in their teaching. Essentially, Woodrow (1992) asserts that any successful implementation of ICT based teaching and learning approach requires the development of positive teacher's attitude toward information and communication technology.

2.3.8.2 Teacher Competence and Confidence

ICT competence is defined as being able to handle a wide range of varying technologies for various purposes. According to Prestride (2012) ICT aided teaching is the most appropriate skill required of a teacher, unfortunately, it is the least possessed by many. This may be because it is barely been part of their training course. Prestride (2012) outlined some of ICT packages required of a secondary school teacher as data processing, word processing, use of internet, use of spreadsheet, use of presentation software like PowerPoint and e-mail.

These ICT packages are important to teachers because they assist in creating lesson plans, analysing and setting students' tests, acquiring new knowledge and

presenting lesson in a clear way among others. According to Bordbar (2005) teachers' computer competence is a major predictor of integrating ICT in teaching. According to Al-Oteawi (2002) majority of teachers who reported negative or neutral attitude towards the integration of ICT into teaching and learning processes lacked knowledge and skills that would allow them to make "informed decision". A study by Peralta and Costa, (2007) suggest that teachers with more experience with computers have greater confidence in their ability to use them effectively. To conclude, Bordbar (2005) reported that teachers competence relates directly to confidence. Teachers' confidence also relates to their perceptions of their ability to use computers in the classroom, particularly in relation to their children's perceived competence.

A very significant determinant of teachers' levels of engagement in ICT is their level of confidence in using the technology. Teachers who have little or no confidence in using computers in their work will try to avoid them altogether, Dawes (2000). According to BECTA (2004), much of the research proposes that this is a major barrier to the uptake of ICT by teachers in the classroom.

Some studies have investigated the reasons for teachers' lack of confidence with the use of ICT. Beggs (2000) asserted that teachers' "fear of failure" caused a lack of confidence. On the other hand, Balanskat et al., (2006) found that limitations in teachers' ICT knowledge makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do. On the other hand, teachers who confidently use technologies in their classrooms understand the usefulness of ICT. 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 they need to extend their use further in the future.

Another barrier, which is directly related to teacher confidence, is teachers' competence in integrating ICT into pedagogical practice BECTA (2004). In Australian research, Newhouse (2002) found that many teachers lacked the knowledge and skills to use computers and were not enthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practices. Current research has shown that the level of this barrier differs from country to country. In the developing countries, research reported that teachers' lack of technological competence is a main barrier to their acceptance and adoption of ICT Pelgrum (2001). In Syria, for example, teachers' lack of technological competence has been cited as the main barrier, Albirini (2006).

Likewise, in Saudi Arabia, a lack of ICT skills is a serious obstacle to the integration of technologies into science education Al-Alwani (2005). Muriithi (2005) has argued that in Kenya like most developing countries ICT usage is still limited to computer literacy training. Both the findings show that teachers who do not use computers in classrooms claim that "lack of ICT skills" is a constraining factor preventing teachers from using ICT for teaching. Hence, lack of teacher competence may be one of the strong barriers to the integration of technologies into education. It may also be one of the factors involved in resistance to change.

2.3.8.3 Limited access to ICT facilities

Access to ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education. Inaccessibility or unavailability of ICT, a school level barrier, has been identified as a key obstacle that impedes teachers from using ICT in teaching. Shortage of resources includes different factors, such as lack of

access to hardware and software, poor quality hardware and inappropriate software. Effective adoption and integration of ICT into teaching in schools depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Obviously, if teachers cannot access ICT resources, then they will not use them. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology.

Several research studies indicate that lack of access to resources, including home access, is another complex barrier that discourages teachers from integrating new technologies into classrooms, Bingimlas (2009). A study by Yildrim (2007) found that access to technological resources is one of the effective ways to teachers' pedagogical use of ICT in teaching. Access to hardware and software is not only important, but also the use of suitable kind of tools and programme to support teaching and learning (Tondeur et al., 2012).

The inaccessibility of ICT resources is not always merely due to the non-availability of the hardware and software or other ICT materials within the school. It may be the result of one of a number of factors such as poor organisation of resources, poor quality hardware, inappropriate software, or lack of personal access for teachers. The level of access to ICT at school is defined as teachers' access to infrastructure, provision shortages and inadequacy, and teaching time using ICT.

2.3.8.4 Teaching Experience

Though some research reported that teachers' experience in teaching did not influence their use of computer technology in teaching (Neidarhauser, & Stoddart, 2001) most research showed that teaching experience influence the successful use of ICT in classrooms Wong et al., (2008). In her study Gorder, (2008) revealed that effective use of computer related to technological comfort levels and the liberty to

shape instruction to teacher -perceived student needs. Also, Tondeur, et al., (2012) claimed that experienced teachers are less ready to integrate ICT into their teaching. Similarly, in United States, the (U.S National Centre for Education Statistics, 2000) reported that teachers with less experience in teaching were more likely to integrate computers in their teaching than teachers with more experience in teaching. The reason to this disparity may be that fresh teachers are more experienced in using the technology. Furthermore, a meta-analysis and review of 81 research studies by Hennessy et al, (2010) concluded that teachers teaching experience does not eliminate computer phobias and many experienced teachers display some wariness, discomfort and/or mild anxiety in relation to computers.

2.3.8.5 Inadequate ICT Infrastructure

West African Countries such as Ghana suffer the inadequacy of technological infrastructure, such as hardware, software, limited internet access, poor bandwidth, sporadic electricity, geographical factors, such as country size, mountains, demographic factors, such as high population, increased density, and extreme poverty, HIV/AIDS, lack of teachers' participation in curriculum development and evaluation, lack of pre-service and in-service training, teachers' brain drain to the western countries, poor teachers' welfare and morale, lack of parent and community participation in schools, poor school vision, mission and leadership. Behrane (2012). According to Hennessy et al., (2010), relatively few teachers identified infrastructure problems, such as the lack of computers in working condition, unreliable electricity or lack of access to the internet, although these varied by country.

2.3.8.6 Professional Development

Teachers' professional development is a key factor to successful integration of computers into classroom teaching. In their study Bauer and Ketton (2005) revealed that whether beginner or experienced, ICT related training programmes develop teachers' competences in computer use, influence teachers' attitudes towards computers as well as assisting teachers reorganize the task of technology and how new technology tools are significant in teaching. Ertmer et al., (2003) indicated that beginning teachers wanted to use technology and have adequate technical skills, but teachers lacked knowledge on how to integrate technology in teaching. Clearly, it is imperative to allow teacher trainees to apply ICT in their programmes when in school in order to be able to use the technology to supplement their teaching activities. Teachers when given time to practice with the technology, learn, share and collaborate with peers, it is likely that they will integrate the technology into their teaching. Training programmes so for teachers that embraces educational practices and strategies to address beliefs, skills and knowledge improve teachers' awareness and insights in advance.

The barrier most frequently referred to in the literature is lack of effective training. In order to achieve high levels of teacher competence in ICT, there is a need to provide training, and perhaps unsurprisingly, there is a great deal of literature evidence to suggest that effective training is crucial if teachers are to implement ICT effectively in their teaching Kirkwood et al., (2000). Recent research in Turkey found that the main problem with the implementation of new ICT in science was the insufficient amount of in-service training programmes for science teachers, Özden (2007), and Toprakci (2006) concluded that limited teacher training in the use of ICT in Turkish schools is an obstacle.

2.3.8.7 Lack of Technical Support

Without both good technical support in the classroom and whole-school resources, teachers cannot be expected to overcome the barriers preventing them from using ICT Lewis (2003). Pelgrum (2001) found that in the view of primary and secondary teachers, one of the top barriers to ICT use in education was lack of technical assistance.

Technical problems were found to be a major barrier for teachers. These technical barriers included waiting for websites to open, failing to connect to the Internet, printers not printing, malfunctioning computers, and teachers having to work on old computers. “Technical barriers impeded the smooth delivery of the lesson or the natural flow of the classroom activity” Sicilia, (2005). ICT support in schools helps teachers to use ICT in teaching without losing time through having to fix software and hardware problems. BECTA (2004) reports that clearly, there is a close relationship between two technical barriers; the more frequently that actual breakdowns occur (perhaps due to the lack of preventative technical maintenance), the more likely teachers are to avoid using the technology in the first place. The report proceeds, it was found that teachers who tried to carry out a task on a computer, but who were unsuccessful due to technical problems, would then avoid using the computer for several days. This, then, further highlights the need for adequate technical support in schools. In general, several studies have identified a range of the following or similar factors as widespread barriers: lack of computers, lack of quality software, lack of time, technical problems, teachers’ attitudes towards computers, poor funding, lack of teacher confidence, resistance to change, poor administrative support, lack of computer skills, poor fit with the curriculum, lack of incentives,

scheduling difficulties, poor training opportunities, and lack of skills on how to integrate ICT in education.

2.4 Conceptual Framework

The conceptual framework of the study serves as a theoretical underpinning that guides the investigation into the utilization of Information and Communication Technologies (ICTs) in the implementation of the Standards-Based Curriculum within the Sefwi-Wiawso municipality. The framework is constructed around key factors that are believed to influence the extent and effectiveness of ICT integration in educational practices. These factors include ICTs availability, teachers' proficiency in using ICTs, teachers' actual utilization of ICTs, and the challenges they encounter in incorporating ICTs into the teaching and learning process. The conceptual framework is shown in Figure 2.2.

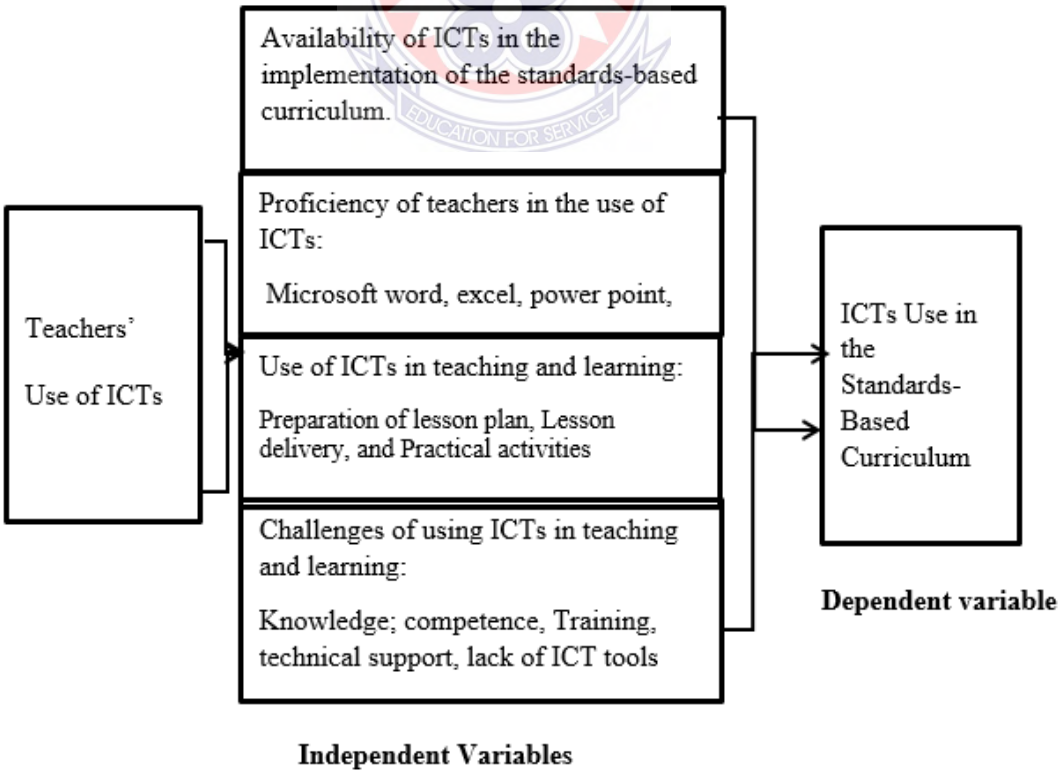

Figure 2.2: Self-Designed Construct of the Study

ICTs Availability: This factor pertains to the presence and accessibility of ICT resources within educational institutions in the Sefwi-Wiawso municipality. It encompasses the availability of hardware (computers, tablets, etc.), software (educational applications, digital content), and connectivity (internet access). The degree to which these resources are accessible and functional shapes the potential for teachers to integrate ICTs into their teaching methods.

Proficiency of Teachers in Using ICTs: Teachers' proficiency in using ICTs refers to their skills, knowledge, and comfort level in effectively utilizing technological tools for educational purposes. It encompasses their ability to navigate digital platforms, use educational software, create digital content, and troubleshoot technical issues. Proficient teachers are more likely to incorporate ICTs seamlessly into their teaching practices, enhancing the overall learning experience.

Teachers' Use of ICTs: This aspect focuses on the actual integration of ICTs by teachers in their instructional practices. It examines how teachers incorporate digital resources, tools, and platforms to enhance content delivery, student engagement, and learning outcomes. Teachers' decisions to use ICTs are influenced by their perception of the benefits, alignment with curriculum goals, and their own pedagogical preferences.

Challenges Teachers Face in Using ICTs: This factor encompasses the barriers and obstacles that teachers encounter when attempting to integrate ICTs into their teaching routines. These challenges may include inadequate training, limited access to resources, technical difficulties, time constraints, and resistance to change. Understanding these challenges provides insights into the factors that hinder effective ICT integration and helps in devising strategies to overcome them.

The relationship among these factors forms the core of the conceptual framework. It is hypothesized that the availability of ICT resources and teachers' proficiency in using them will positively influence teachers' utilization of ICTs in their teaching practices. Conversely, the challenges teachers face in using ICTs may act as barriers to their effective integration. The framework suggests that as teachers' proficiency and the availability of ICTs increase, the likelihood of successful integration rises, whereas challenges may impede this process. The interactions and effects of these factors provides a comprehensive understanding of the dynamics influencing the use of ICTs in implementing the Standards-Based Curriculum in the Sefwi-Wiawso municipality. The insights derived from the conceptual framework guided the analysis of data, the formulation of recommendations, and the enhancement of ICT integration strategies for improved educational outcomes.

2.5 Empirical Review

Availability of ICT Facilities in Teaching

Yusuf, Bashir and Dare (2013) conducted a study on assessment of the availability, utilization and management of ICT facilities in teaching English language in secondary schools in Kaduna State, Nigeria. The study adopted a descriptive survey research design. A questionnaire titled “Availability, Utilization and Management of Information and Communication Technology in teaching English Language in Secondary Schools” was used for data collection. Twenty randomly selected secondary schools from Kaduna metropolis were used for the study. A total of 100 teachers participated by responding to the items on the questionnaire. The findings of the study revealed that there is a dearth of ICT facilities in secondary schools in Kaduna as there are only very few of such facilities available in most of the schools visited. This indicates that ICT facilities are not readily available in schools. Teachers

do not have enough computers, no interactive boards educational softwares or multimedia facilities. Projectors and e-libraries are available only in a few schools.

Ayebi-Arthur, Aidoo and Wilson (2009) conducted a study on utilization of the Internet in senior high schools in the Cape Coast Metropolis in the Central Region of Ghana. The sample consisted of 100 students and 25 teachers in three Senior High Schools. The stratified random sampling technique was used to select the three schools to represent the school types (co-ed, girls, boys, schools) with one school in each stratum, respectively. For each stratum, respondents were selected using the simple random technique. Structured questionnaires consisting of closed items were used to collect the data from the sample. Both student and teachers were asked whether they have access to the internet. The findings show that majority of the teachers had access to the internet. Again, 70% of the students had access to the internet. This shows that majority of the students and teachers had access to the internet.

Adebi-Caesar (2012) conducted a descriptive study on assessment of ICT situation in Senior High Schools in the Lower Manya Krobo District. A total sample of 154 teachers took part in the studies. The four (4) schools were considered as strata. The main instrument used for the study was a questionnaire Proportional allocation was then used in calculating the number of respondents to be selected from each school. With the help of the headmaster and his assistants the teachers of all the schools used in the study were called to their staff common room and with a simple random sampling the questionnaire was administered. Teachers were questioned on extent of availability of ICT tools or equipments in the schools. The study revealed that 97.9% of the teachers in all the schools had insufficient computers and resources and only 2.1% agreed they had enough computers. Again, when teachers questioned

whether they use computers in their school 90.7% responded they never made use of computers in their school and only 9.3% agreed they made use of them. This clearly reveals that all the schools used in the study do not have enough computers for studies.

Agyei and Voogt (2011) conducted a study on ICT use in the teaching of mathematics: Implications for professional development of pre-service teachers in Ghana. In-service teachers were asked if certain ICT facilities were available. Interviews and survey were used for data collection. A total of 180 educators constituting of 60 in-service mathematics teachers and 120 pre-service mathematics teachers participated in the study. About 98% of the in-service teachers from the 16 SHS reported having at least one computer laboratory in their schools. Some teachers also indicated that Parents-Teachers Association (PTA) had been helpful in providing computers in their schools. Further questions were asked to ascertain how accessible these facilities were. Relatively low figures: (access to computers (office/computer lab) was 21%, access to computers (staff common room/Library) was 13% and internet connectivity was 46%) indicating low accessibilities of computer facilities were observed. The teachers indicated further that computer laboratories were used mainly for information technology (IT) lessons which were compulsory for all students; making it difficult to access facilities in computer lab for personal use or other purposes.

Teachers' Use of ICT Facilities in Teaching

Ocak and Akdemir (2008) in Turkey conducted a study on primary school science teachers' use of computer applications. The snowball sampling was utilized to identify participants for the study. The total of 63 science teachers agreed to participate in the study. A survey developed by Demiraslan and Usluel (2005) was

adapted for the data collection in this study. Results demonstrated that improving the computer literacy of science teachers seemed to increase science teachers' computer use and consequently increase their integration of computer applications as an instructional tool. Internet, email and educational software, Compact Discs (CDs) were found to be used frequently in the classrooms.

Ayebi-Arthur, Aidoo and Wilson (2009) conducted a study on utilization of the Internet in senior high schools in the Cape Coast Metropolis in the Central Region of Ghana. The sample consisted of 100 students and 25 teachers in three Senior High Schools. The stratified random sampling technique was used to select the three schools to represent the school types (co-ed, girls, boys, schools) with one school in each stratum, respectively. For each stratum, respondents were selected using the simple random technique. Structured questionnaires consisting of closed items were used to collect the data from the sample. Teachers were asked how they use the available internet. The findings showed that majority of teachers did have access to the internet but hardly used it. For the few who used it, very often used it for personal development. Also 28% often used it for communicating with other teachers and making lesson presentations.

A study conducted by Amenyedzi, Lartey and Dzomeku (2011) on the use of computers and internet as supplementary source of educational material: a case study of the senior high schools in the Tema metropolis in Ghana. The study utilized quantitative and qualitative methodology for data collection. Stratified sampling method was used to select students and teachers. Three different sets of questionnaires were used for data collection from students, teachers and heads of schools. A total of 120 students were selected from the three schools. Sixty tutors were also selected from the three schools for the study. Respondents (students and teachers) from each

program offered in the selected schools were chosen randomly. The study used structured questionnaires and interviews. Teachers were questioned on their use of computers in teaching. The study revealed that about 24% of teachers use the computer for collection of academic data of the students; about 11% type test items of their students with the computer, about 13% use it in teaching as Teaching and Learning Materials (TLMs), practical demonstration or for drill and practice. Less than 35% of teachers use ICT for research work whereas about 16% use the facility for entertainment.

Teachers-Factors that Influence the use of ICT Facilities in the Teaching

Hadley and Sheingold (1993) reported the results of a survey conducted in the USA during 1989. Data were obtained from over 600 teachers in almost as many schools who had been nominated by principals as being "known for their efforts in integrating computer technology into their teaching". As many as 88% of the teachers indicated that computers had made a difference to their teaching. Overall, the changes included higher expectations for students' work, greater opportunity to support students working individually and independently and a change from teacher-centred to student-centred classrooms with the teacher acting more as a coach than as information dispenser. The data showed discernible patterns in the evolution of teachers' practices with computers over time. Overall, the pattern appeared to be one in which teachers began with approaches that were similar to familiar practices like the use of printed workbooks and, as they gained experience, decreased these uses in favour of approaches that afforded more opportunity for self-generated learning by students.

In summarising their results, Hadley and Sheingold (1993) noted that the achievements of these teachers appeared to be the result of a combination of factors,

namely, the teachers' own motivation and commitment, peer support for their efforts and access to technology. Multiple profiles of accomplishment emerged, suggesting that "integration of computers into classrooms is a local phenomenon that is highly influenced by the particular context" (p. 299) despite being influenced by the same key factors. The implication seemed to be that there is no simple formula for computer integration and that typically it may require five to six years for a teacher to adapt to teaching with computers.

In Ghana a study was conducted by Mereku, Yidana, Hordzi, Tete-Mensah and Williams (2009) on Ghana's Report on ICT. Five institutions which were representative of the nation's pre-tertiary and tertiary educational institutions were purposively selected for the study. The study utilized quantitative and qualitative methodology for data collection. The study made use of structured questionnaire and interview schedules for students, educators, and school administrators. The study revealed that, availability of ICT syllabuses/manual, ICT teachers who are willing to provide educators and learners with training and availability of computers and computer laboratories that can be accessed periodically are some of the factors that encourage the usage of ICT in tertiary institutions.

Challenges Teachers' face on the Use of ICT Facilities in Teaching

Olufemi, Olukayode and Oladele (2013) conducted a study to investigate the Challenges of Information and Communication Technology (ICT) in secondary schools in Ondo state. It sought to find out the level of access to ICT among secondary school teachers and students. Also, the study investigated the level of utilization of ICT for instructional purposes and the attitude of teachers and students towards ICT utilization of ICT in secondary schools. The study adopted the descriptive survey design. The sample for the study consisted of 450 teachers

randomly selected from two hundred and ninety-six (296) secondary schools in the eighteen Local Government Areas of Ondo State. A combination of multistage, stratified and simple random sampling technique was used in selecting the sample. Research instrument employed was the questionnaire.

The data obtained were analysed using frequency counts, percentages, mean and bar chart. The result showed that the majority of the respondents agreed on the whole that teacher's lack of ICT skills, lack of confidence in using ICT, Insufficient knowledge of how to use ICT equipment, unavailability of infrastructure, lack of knowledge of how to evaluate the use and the role played by ICT in teaching and learning and insufficient knowledge of appropriate software are factors hindering the effective utilization of ICT facilities for instructional purposes.

Adebi-Caesar (2012) conducted a descriptive study on assessment of ICT situation in Senior High Schools in the Lower Manya Krobo District. A total sample of 154 teachers took part in the studies. The four (4) schools were considered as strata. The main instrument used for the study was a questionnaire Proportional allocation was then used in calculating the number of respondents to be selected from each school. With the help of the headmaster and his assistants the teachers of all the schools used in the study were called to their staff common room and with a simple random sampling the questionnaire was administered.

Teachers were questioned on the barriers that hindered them from integrating ICT in their teaching. The study revealed that 128 (12.4%) responses each respectively went in favour of lack of knowledge about computers and the lack of training as the reasons that is preventing the respondents from using or introducing the use of ICTs in their teaching and learning. 126 (12.2% and 102 (9.9%) of the response also went in favour of little previous experience with computers and their

age respectively as the factors restraining respondents from using ICTs to teach. 101 (9.8%) and 98 (9.5%) responses respectively went to the fear in the use of the ICTs and the lack of confidence as the inhibiting factors in the use of ICTs in the classrooms. 83 (8.1%) and 77 (7.5%) responses went in favour of lack of time to use the computers and not being sure of how useful computers can be as the factors that hinder the use of ICT in the classroom. Another 71 (6.9%) and 68 (6.6%) of the responses went to 'no support if something goes wrong with the computer and their headmasters or management not being concern about whether computers are used to teach or not as some of the inhibiting factors. The study revealed that three (3) major barriers prevented the use of ICTs in Senior High Schools classrooms are the lack of training in the usage of the ICTs, lack of knowledge about the computers or the ICTs and finally the little or no previous experience in the use of the ICTs. On the other hand, two (2) factors that do not prevent teachers from using the ICTs in the classrooms are computer equipment is reliable and computer not accessible.

A study was conducted by Afful-Dadzie (2010) on the use of ICT by students and teachers in senior high schools in the Sekondi-Takoradi Metropolis. The study employed a descriptive survey as the research design. The data collection instrument for the study was a questionnaire for students and teachers and an observation checklist. Population of the study was derived from students and teachers of all the eleven public senior high schools in the Sekondi-Takoradi Metropolis. Sampling selection of the teachers and student used the lottery method.

With regard to the barriers to the use of ICT in the senior high schools in the catchment area, the teachers agreed that the integration of ICT is associated with uncertainty. They did not know how to incorporate ICT into the normal teaching process. The study also revealed that teacher did not want to change their habit of

teaching in the traditional way to the use of ICT as they agreed that force of habit is a hindrance to the interrogation of ICT. Moreover, the study revealed that inadequate support network is a barrier to the integration of ICT. Inadequate follow- up support was also seen to be a hindrance to the integration of ICT in the teaching and learning process. On the part of the students, there was agreement on all the issues raised here as being the barriers to the integration of ICT.

2.6 Literature Gaps

The present study sought to address several critical gaps in the existing literature pertaining to the integration of Information and Communication Technologies (ICTs) in the implementation of the primary school standards-based curriculum within the Sefwi-Wiawso municipality. While research in the broader field of educational technology and ICT integration has provided valuable insights, there remains a distinct lack of comprehensive investigation into the specific nuances of this integration within the unique context of the Sefwi-Wiawso municipality.

Despite the substantial body of research on ICT availability in educational settings, there is a dearth of studies that specifically focus on the availability and accessibility of ICT resources within the context of the primary school standards-based curriculum in the Sefwi-Wiawso municipality. The existing literature discussed ICT access and facilities in a broader sense, but it did not adequately capture the intricacies of ICT availability that are crucial for effective curriculum implementation in this specific geographic and educational setting.

While prior research has explored teachers' ICT proficiency in various educational contexts, there is a distinct lack of studies that delve deeply into the actual skills and competencies of teachers within the Sefwi-Wiawso municipality. The existing literature often discusses general trends and challenges related to teachers'

ICT skills, but it fails to provide a comprehensive assessment of teachers' actual abilities to effectively use ICTs to deliver the primary school curriculum within this specific municipality.

While research has explored ICT integration and pedagogical practices in education, there is a gap in the literature when it comes to understanding the specific ways in which ICTs are being integrated into the implementation of the primary school standards-based curriculum within the Sefwi-Wiawso municipality. The existing body of work may provide overarching theories and approaches, but it lacks the detailed examination of how teachers are utilizing ICT tools, resources, and strategies to enhance curriculum delivery in this specific educational context.

Although challenges related to ICT integration have been studied extensively, the literature lacks an in-depth exploration of the unique and context-specific challenges faced by teachers within the Sefwi-Wiawso municipality. While existing studies may identify general obstacles, they fail to capture the nuanced difficulties and constraints that teachers encounter in utilizing ICTs to implement the primary school standards-based curriculum in this specific geographic and educational environment.

In addressing these critical gaps, this study aims to contribute significantly to the understanding of ICT integration in primary education within the Sefwi-Wiawso municipality. By providing contextually relevant insights into ICT availability, teacher proficiency, pedagogical practices, and challenges, this research endeavors to offer valuable recommendations and strategies for enhancing the integration of ICTs within the primary school standards-based curriculum in this specific locality.

2.7 Chapter Summary

This chapter reviewed literature related to the study. It was done in three sections, the theoretical review, conceptual review, and the review of empirical

studies. The theoretical, conceptual and the empirical reviews were combined to provide a strong framework (foundation) and good source of principles to guide the present study. The literature reviewed has also helped in filling the gaps in previous studies relating to the current study.

CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter contains information about methodology. Specifically, it covers the research philosophy or paradigm, research approach, research design, study area, study population, the sample size and sampling procedures, research instruments, validity and reliability, procedures for data collection and data analysis procedure and ethical consideration.

3.1 Research Paradigm

The researcher had considered the pragmatic paradigm to be relevant for this study. In its simplest terms, the pragmatic paradigm is committed to no single system of philosophy and reality. This approach to research applies to mixed methods research in that researchers openly rely on both quantitative and qualitative premises when engaging in their research (Creswell, 2014). Pragmatism seeks to belief concepts such as truth and reality and instead focuses on what works as the truth to explore the research questions (Creswell and Plano-Clark, 2017). The nature of the problem (thesis topic) (i.e., teachers use of ICTs in the implementation of the standards-based curriculum) supports the use of the pragmatist paradigm (mixed-methods). This is because the pragmatist paradigm is most applicable in circumstances where a researcher needs to focus attention on the research problem in social science research and then use pluralistic approaches to extract information about the problem (Tashakkori & Teddlie, 2003).

This study represents the pragmatic paradigm in that it utilises both quantitative and qualitative methods to gather data and thus accepts the notion of non-singular facts that no single truth exists. Every individual has his or her unique

interpretations of reality (ontology) with the assumptions that we intend to trust something meaningful or real, or the very description or essence of the common phenomenon we are investigating (Kivunja & Kuyini, 2017). Second, knowledge is based on the participants' subjective views as depicted in the results of the interview (epistemology) (Cooksey & McDonald, 2011). Third, by acknowledging the interpretation of the researcher in consonance with that of the participants, and biases present in the study. The nature of the research, that is, it reflects what importance we are going to accredit to the different facets of our study, the participants, the data (statistics) and the audience to which we are going to report our research (axiology) findings (Corbetta, 2003). Last, the research process used highlights the logic and flow of the systematic processes followed in conducting research, in ordering to gain knowledge about a research problem (methodology). It asks the question: How will the researcher obtain the desired data, knowledge and understanding to allow the researcher to address his or her research question and thus contributes to knowledge? (Kivunja & Kuyini, 2017). Therefore, it is prudent to make it clear to the audience that paradigm as positions on epistemology, ontology and axiology, exercise significant influence on the research methodology to be used (Morgan, 2007).

Because each paradigm is guided by specific suppositions as discussed above, choosing a paradigm for one's research means that the research will be nested in particular epistemology, ontology, and axiology and that these elements will thus direct the researcher towards a particular methodology. Thus, choosing a paradigm implies certainty regarding specific methodologies that flow from that paradigm. This relationship is significant since the methodological implications of paradigm choice permeate the research question(s), choice of participants, data collection instruments and collection procedures, as well as data analysis. Thus, the research located in any

of the four primary paradigms has extensive research methodologies from which a researcher can choose a method that best suits his or her research. It is also worth noticing that, in one research paradigm, it is entirely possible to combine many research methodologies. However, the right methodologies of choice need to be informed by a good understanding of the varied aspects of research paradigms. This research is inbred to the pragmatic worldview as it is formulated around research questions with the intent of answering them in the various ways that were believed appropriate and utilised the results in various ways that could have positive consequences for the stakeholders benefiting from this research (Onwuegbuzie & Johnson, 2006).

According to Morgan (2007), pragmatism is an alternative to positivism and metaphysical thinking. Pragmatism concerns itself with results and concerned with determining the meaning of things (Johnson & Onwuegbuzie, as cited in Shannon-Baker, 2016). According to Tashakkori and Teddlie (as cited in Shannon-Baker, 2016), in order to create practical solutions to social problems, pragmatism emphasises communication and shared meaning making. Its primary importance rest on the research question raised (Onwuegbuzie & Johnson, 2006). In Shannon-Baker's (2016) terms, pragmatism is grounded on the principle that theories can be both contextual and generalisable by examining them for "transferability" to another circumstance. The researcher who is inbred in pragmatism is likely to retain both subjectivities in their judgements on research and objectivity in the collection of data and analysis. It has been notably known as an "approach" rather than a paradigm (Morgan, as cited in Shannon-Baker, 2016). This discrepancy is imperative as pragmatism has been portrayed as offering precise ideas as to what constitutes

knowledge, but does not seem to give an entire encompassing worldview (Biesta, 2010).

Pragmatism accepts the existence and importance of the natural or physical world as well as the evolving social and psychological world that involves language, culture, social organisations, and subjective thoughts (Johnson & Onwuegbuzie, 2004). The project on pragmatism has been to find a middle ground between philosophical dogmatisms and scepticism, and to find a feasible solution (sometimes including outright rejection) to many longstanding philosophical dichotomies that have not been historically agreed on (Johnson & Onwuegbuzie, 2004). This paradigm aims at finding and reinforcing the weaknesses in the study by using the mix method approach (Johnson & Onwuegbuzie, 2004). An advocate of this paradigm believes that the mix method approach can attain real knowledge. Instead of the method being critical, the problem is most important, and researchers should use all approaches to understand the problem statement (Tashakkori & Teddlie, mentioned in Rahi, 2017). Pragmatism is not affiliated with any system or philosophy. Researchers are free to apply both quantitative and qualitative approaches; the key is to find the best research techniques and procedure that will help solve the problem statement.

Pragmatism is also perceived as "a means of bridging the gap between the empirical singular scientific approach to research and the newer "freewheeling" inquiry of qualitative research theories" (Tashakkori & Teddlie, 2003, p. 52). It draws on many ideas, including the use of "what works," different approaches, and the assessment of both objective and subjective knowledge (Creswell, 2014). Johnson and Onwuegbuzie (2004) rely on the pragmatism philosophy to argue that in a single study, quantitative and qualitative approaches can efficiently synchronise. According to Teddlie and Tashakkori (2003), taking a pragmatic and balanced or pluralist

position in research would help improve communication among researchers from diverse paradigms as they try to advance knowledge. Pragmatism also tends to shed light on how the research approaches can be fruitfully combined. For the mixed methods researcher, pragmatism thus gives room in a mixed-method study to multiple methods, diverse worldviews, assumptions and varied forms of data collection and analysis. With this approach, all types of data are obtained at the same time as one type plays a more significant role in the study than another. In this study, the dominant research approach was quantitative and supported by qualitative data (Corbetta, 2003). The focus or purpose (investigation into the teachers' use of ICTs in implementing the standards-based curriculum) of the present study has motivated the researcher to employ pragmatism as the most appropriate paradigm to underpin the study.

3.2 Research Approach

This study adopted the mixed-method approach, that is to say, the mixture of qualitative and quantitative approaches (Tashakkori & Teddlie, 2003). Mixed method is a research design which focuses on collecting, analysing and combining quantitative and qualitative data in single research or series of researches. Its central assumption is that the interactive application of quantitative and qualitative methods provides a better understanding of research issues than either approach alone (Creswell & Plano Clark, 2011). The purpose of mixed methods research, according to Creswell and Plana-Clark (2017), is not to replace either qualitative or quantitative research, but to pull out the strengths and diminish the weaknesses in both approaches within a specific study.

However, Creswell, Plano Clark, Gutmann, and Hanson (2003) point out that a principal challenge for mixed methods research is the clear explanation of several

critical aspects such as classifying the main purposes of using a mixed design and clarifying the factors examined when determining the type of mixed design. Once again, they drew attention to the fact that a researcher has to explain the decisions made when applying the respective weight (equal or different) to each methodological part of the research. Researchers should specify when implementing data collection, whether the mixed design is sequential or simultaneous.

The justification for mixing both types of methods and data is that neither quantitative nor qualitative method could adequately cover the scopes and depths of the "what", "how" and "why" questions about programme evaluation within themselves. When combining the two methods, quantitative and qualitative complement, each other provides a holistic and an in-depth view of the research problem, taking advantage of each one's strengths (Descombe, 2002).

This research used the mixed methods explanatory sequential design that consists of two distinct quantitative and qualitative phases (Creswell, 2014). Within this design, first, quantitative numeric data is collected and analysed, followed by the qualitative text data collected and subsequently analysed in the sequence. The qualitative method is to clarify and elaborate on the quantitative results collected in the first phase. The quantitative data in this study is to find out teachers use of ICTs in the implementation of the standards-based curriculum. Some respondents were then selected as participants for the second qualitative phase. The explanatory sequential mixed method is one in which the researcher first conducts quantitative research, analyses the data and then build on the results to describe them using qualitative research in greater detail. It is considered explanatory because the initial quantitative data results are further explained with the qualitative data, and it is considered sequential as the qualitative phase follows the initial quantitative phase (Creswell,

2014). The study's first phase consisted of a quantitative description of teachers' use of ICTs in the implementation of the standards-based curriculum. A comprehensive qualitative study then accompanied the quantitative results that explained the initial quantitative results, such as significant results, outlier results, or unexpected results (Creswell & Plano Clark, 2011). The quantitative method will receive greater emphasis than the qualitative method.

3.3 Research Design

The research design refers to the overall strategy chosen to integrate the different components of the study in a coherent and logical way, thereby, ensuring the research problem is effectively addressed; it constitutes the blueprint for the collection, measurement, and analysis of data (Cohen, Manion & Morrison, 2018). As per the problem of the study, this research used the mixed methods explanatory sequential design that consists of two distinct quantitative and qualitative phases (Creswell, 2014). Within this design, first, quantitative numeric data is collected and analysed, followed by the qualitative text data collected and subsequently analysed in the sequence. The qualitative method is to clarify and elaborate on the quantitative results collected in the first phase. The quantitative data in this study is to investigate teachers use of ICTs in the implementation of the standards-based curriculum. Some respondents were then selected as participants for the second qualitative phase.

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description of teachers' use of ICTs in the implementation of the standards-based curriculum. A comprehensive qualitative study then accompanied the quantitative results that explained the initial quantitative results, such as significant results, outlier results, or unexpected results (Creswell & Plano Clark, 2011). The quantitative method will receive greater emphasis than the qualitative method.

Creswell (2003) suggests that a survey study may be conducted in a short time in which the researcher administers a survey (questionnaire) to a sample or the entire population of people to describe the attitudes, opinions, behaviours or physical characteristics. Therefore, a survey was considered appropriate for the study as the students and graduates' viewpoints, attitudes and opinions required to be collected and clarified. Nevertheless, Creswell (2003) acknowledged that survey data were self-reported information, reporting only what the population think and not what they do. Thus, issues arising from the quantitative phase contributed to the development of a qualitative instrument (semi-structured interview) related to programme implementation. These researchers (Cohen et al., 2007; Descombe, 2002) are of the opinion that there are certain strengths in the explanatory sequential mixed-method design. Explanatory sequential mixed-method design situates both quantitative and qualitative methods in a single study; the method aims to provide more precious insights and poses more interesting questions for future research than just one set of study.

Creswell (2014) is of the view that explanatory sequential mixed-method design is concerned with seeing what the data itself indicates with some facts, which provides a better understanding of the problem than can be done by either approach alone. The mixed-method research design is capable of compensating for weakness of both quantitative and qualitative research design used independently in research and

also offers researchers with the ability to draw on a wide range of tools of data collection methods to analyse and understand a problem in depth. Its benefits include straightforwardness and opportunities for the exploration of the quantitative results in further detail. This is a solid reason for the adoption of this explanatory sequential design for the study.

3.4 Settings

The study was conducted at selected public basic schools in Sefwi-Wiawso Municipality in the Western North Region. Sefwi-Wiawso Municipal is one of the nine districts in the Western North Region of Ghana. Originally created as an ordinary district assembly in 1988 when it was known as Sefwi-Wiawso District, until the southwest part of the district was split off to create Sefwi-Akontombra District on 29 February 2008; thus the remaining part has been retained as Sefwi-Wiawso District, which was later elevated to municipal district assembly status in March 2012 (effectively 28 June 2012) to become Sefwi-Wiawso Municipal. The municipality is located in the northeast part of Western North Region and has Wiawso as its capital town. The municipality has 83 Kindergarten schools and 86 primary schools.

The choice of the Sefwi-Wiawso municipality as the study's geographical focus is grounded in several compelling justifications that enhance the relevance and significance of the research. This includes practical accessibility and localized contextual factors. Thus, conducting this study in Sefwi-Wiawso municipality offers practical advantages in terms of accessibility to schools, teachers, and relevant educational stakeholders since the researcher teaches in the Municipality. This allows the researcher to more easily engage with local schools and teachers, facilitating data collection, interviews, observations, and surveys. This proximity enhances the

feasibility of the research process and potentially allows for more in-depth data collection.

3.5 Population

The population of a study includes all groups of individuals, objects, items, cases, articles or things with common characteristic that exist at a particular point in time in a given area (Cohen, et al., 2007). The population for the study included all public Basic School teachers in the western north region. The targeted population refers to the entire group of individuals or objects to which researchers are interested in gathering data for the study (Cohen, et al., 2018). This study targeted all primary teachers in public basic schools in the Sefwi-Wiawso Municipality of the Western North Region of Ghana. The targeted population was 682; consisting of 166 Kindergarten teachers and 516 primary school teachers.

3.6 Sample Size and Sampling Techniques

A sample of a study refers to any portion of a population selected for the study and on whom information needed for the study is obtained (Babbie, 2015). In this study, the researcher sampled 208 Primary School teachers using stratified and simple random sampling technique. The stratified sampling was used to group the teachers into 13 strata (each circuit represents a stratum). From each stratum, two (2) schools were selected using the simple random sampling technique. All Kindergarten School and Primary School teachers in the two schools selected were selected using census sampling technique. The census sampling technique was used because the researcher deemed it appropriate to use the whole population since it was in the capacity of the researcher to solicit information from each member of the sample. One advantage census sampling survey over the other types of surveys is accuracy. However, it has

been criticized for being time-consuming (Creswell, 2014). The sample was made up of fifty-two (52) Kindergarten teachers and one-hundred and fifty-six (156) basic 1-6 teachers. The sample size for the study represents 30.5% of the target population.

After the quantitative phase, ten (10) teachers were purposively selected for the interview using the maximum variation sampling technique. Maximum Variation Sampling, also known as heterogeneity sampling, involves selecting participants who represent a wide range of characteristics, experiences, or perspectives related to the research topic. This ensured that the researcher gather insights from a diverse group of teachers who may have different levels of ICT proficiency, teaching experience, school settings, subject specialties, and perspectives on the Standards-Based Curriculum in order to obtain a comprehensive understanding of how teachers from various backgrounds and contexts are using ICTs in curriculum implementation.

Also, six (6) teachers out of the sample were conveniently selected for observation. According to (Mertens, 2019) a sample size of at least 10-20% or more is an adequate sample for a quantitative study.

3.7 Data Collection Instruments

Using three (3) different instruments involving quantitative and qualitative data collection instruments, this study gathered the needed data to address the research questions. These are questionnaire, a schedule for interviews and observation guide. The questionnaire, interview guide and observation guide were developed by the researcher.

3.7.1 Questionnaire

A questionnaire was used to survey the participants selected in the study. This method was selected for several reasons including (a) they are suitable for measuring

attitudes and originating other content from respondents; (b) they are cheap to administer; (c) they can provide information about the internal meanings and ways of thinking of the respondents; (d) they are quick to control and turnaround; (e) they can be administered to sample groups. The rest is the perceived anonymity by respondents that is likely to be high and thus boosts open and frank participation; they are also generally regarded as having high measurement validity (high reliability as well as validity) where they are better constructed and validated. Finally, closed-ended items in the questionnaire can provide the exact information needed by a researcher; also closed-ended items can be easily analysed, and they are generally viewed as useful for exploratory purposes as well as confirmatory purposes.

However, there were some cons associated with the use of the questionnaire, as noted here. These included: (a) they are required to be kept brief, and this brevity could preclude all the necessary information from being received; (b) reactive effects may occur in that, respondents may feel compelled to respond in ways they find socially or contextually appropriate; (c) responses may be selective and not complete. Other disadvantages include respondents leaving out or failing to recall relevant information, open-ended items may indicate differences in written or verbal ability and therefore, complicate issues of interest and significance; and finally, data analysis can be very time-consuming for open-ended items. On balance, the researcher considered that questionnaire was most likely to serve best his research purposes concerning the teachers, given a large number of participants, the specific issues to be discussed, the time available to do so and the detailed analysis that was necessary after that.

The questionnaire was designed to cover items that measured teachers use of ICTs in the implementation of the standards-based curriculum. The questionnaire

comprised closed-ended items on which respondents were asked to indicate to what extent they agreed or disagreed with certain views about teachers' knowledge, attitude and use of improvised instructional materials in the standards-based curriculum. Cohen et al. (2007) were of the view that close-ended questions are easy to compile and straightforward to code, and not discriminate unduly by how the respondents articulate. The questionnaire was structured into five sections; Section A provided information on the background of the respondents. Section B captured information on the availability of ICTs. Section C captured information on the proficiency of teachers in using ICTs in the implementation of the primary school standards-based curriculum. Section D collected information on the use of ICTs in the implementation of the primary school standards-based curriculum. Section E captured information on challenges teachers face in using ICTs in the implementation of the primary school standards-based curriculum. The questions were assessed on a 4-point Likert scale as "Strongly Disagree = 1" "Disagree = 2", "Agree =3", and "Strongly Agree = 4".

3.7.2 Semi-Structured Interview Guide

A semi-structured interview guide was used for all the interviews that were conducted in the qualitative stage after quantitative data were collected. All interview questions were framed around the research questions guiding the study. Probes were used to encourage elaboration and to clarify responses where needed. All interviews were audiotaped for later transcription and analyses. Interviewees picked available dates and the place for their interviews. There are many and different ways to use interviews. They can be used as the primary means of collecting information related to research goals (Creswell, 2014). It can also be used as analytical tools to help identify variables and relationships (Barker & Johnson, 1998). Again, they could be used to track unanticipated results, or to support other approaches, or to go deeper into

respondents' motives and reasons for reacting as they do (Descombe, 2002). It is more versatile and descriptive, stressing categories and definitions instead of using pure frequencies, and defining the relationship(s) between variables (Patton, 2002). Finally, in some respects, they are to evaluate individuals; to check or establish hypotheses; to gather data; and to survey the opinions of the respondents (Cohen et al., 2007).

However, there are specific problems with conducting interviews. Though experiments of studies have shown in some cases, race, ethnicity, class, sexual orientations, social status and age can be significant causes of prejudice in certain situations. In interview situations, both interviewers and interviewees bring in their own experiences and emotions (Cohen et al., 2007). In other words, the sources of bias are most often the characteristics of the interviewer, the characteristics of the respondents, and the substantive contents of the questions (Cohen et al., 2007). In this study, the interview helped to gather different types of information about teachers' use of ICTs in the implementation of the standards-based curriculum.

3.7.3 Observation Guide

A 27-item observation guide which was developed by the researcher was used in observing teachers use of ICTs in implanting the standards-based curriculum. There are different ways of entering data onto a structured observation schedule as well as a number of checklists for planning a structured observation (Dyer). The observation guide (schedule) was structured into five main sections, Sections A, B, C, D, and E. The observation guide focused on the following details:

Section "A": Particulars of school and Personal data of the teachers (items1- 6).

Section "B": Availability of ICTs in teaching and learning (items 7-12).

Section "B": Proficiency in the use of ICTs in teaching and learning (items 13-17).

Section "C": ICTs use in teaching and learning (item 18-22).

Section "D": Challenges of using ICTs in teaching and learning (items 23- 27).

Observations can be of facts, such as the number of textbooks in the classroom, it can focus on events as they happen in a classroom, and they can also focus on behaviours or qualities. Observation can be a very useful research tool. In this study, observations enabled me to gather data on: the physical setting (the physical environment of the classrooms); the human setting (characteristics and the make-up of the teachers and pupils observed); the interactional setting (the interactions that took place among pupils and teachers) as well as the programme setting (availability and usage of resources and other classroom practices). It is for this reason that Moyles (2002) has suggested to researchers to record the physical and contextual setting of the observation such as the number, who they are, what they do and what are their roles; the time of the day of observation, the layout of the setting (seating arrangements and arrangements of desks); the chronology of the events observed; and any critical incidents that happen.

3.8 Pre-Testing of Instrument

The questionnaire was pre-tested on 20 primary school teachers in the Akontombra District of the Western North Region of Ghana. The respondents for the pretest were not to be used as part of the main sample for the study. However, they have similar characteristics to identify problems related to question design, flow or interpretation. The pilot testing of the questionnaire was meant to enable the determination of ambiguities in the questionnaire and the questions improved. The responses helped the researcher to test the reliability of the questionnaire output with the use of Cronbach's Alpha.

3.9 Validity and Reliability of Instrument

Validity refers to the extent to which inferences made on the basis of numerical scores are appropriate, meaningful and useful to the sample (Babbie, 2015). Validity also checks whether the instrument provides an adequate sample of items that represent that concept. In this study, both construct and content validity were used in this study to check if the test really measured the concepts that the researcher assumed it measured.

The reliability of a test or instrument refers to the extent to which it consistently measures what it is supposed to measure (Creswell, 2014). To ensure reliability, a pilot test of the instruments was carried out by administering the pretest items. The overall Cronbach's Alpha calculated at an alpha value of 0.79. According to Cohen et al., (2018), a Cronbach's alpha value of range of 0.7 to 0.8 suggested a good strength of association. Hence, the questionnaire was considered reliable and appropriate to collect the relevant data to answer the research questions for the study.

3.10 Trustworthiness of Interview

Creswell and Plano-Clark (2017) was of the opinion that the words reliability and validity can be replaced with the term trustworthiness when conducting qualitative research. They also opined that steps to ensure rigor in a qualitative study should be carried out during the research process, and outlined the following strategies, among others: ensuring methodological coherence, researcher responsiveness, ensuring appropriateness of sample, and active analytical stance. To ensure trustworthiness in this study, the researcher adhered to the constructs proposed by Guba (1981), namely credibility, dependability, transferability and confirmability. The manner of doing this is discussed next.

3.10.1 Credibility

Credibility in qualitative research deals with the extent to which the findings from the study measure reality (Morrow, 2005). According to Gasson (2004), it implied "how we ensure rigor in the research process and how we communicate to others that we have done so" (p. 95). In essence, it deals with the methods of ensuring that the researcher has analysed the data correctly. To ensure credibility, the researcher became familiar with the participants by building a rapport with them at the beginning of each interview session and presented to them an informed consent form which explained in detail the essence of the study and their right to voluntary participation and withdrawal. The researcher also included direct quotations from the text in the presentation of the findings, which according to Graneheim and Lundman (2004) also reflected the credibility of a study. Also, throughout the period of the study there were regular discussions between the researcher and the research supervisor, and during these sessions, they deliberated on the best approach and methodology for the study as well as the instruments for data collection. At the end of the transcription process, data were also presented to the research supervisor to add his expert knowledge.

3.10.2 Dependability

According to Lincoln and Guba (1981), dependability "seeks means for taking into account both factors of instability and factors of phenomenal or design induced changes"; this means taking note of the changes in data and those made by the researcher during the process of data analysis (p. 299). In other words, it means description of the research process, to allow for replication (Marrow, 2005), even though the intent is not to generate the same results (Shenton, 2004). Ensuring dependability of the study implies that the researcher would take cognisance of the extent to which necessary research ethics and practices are observed (Shenton, 2004).

To achieve dependability for the study, the researcher planned the instruments used for data collection, and the method and general design for the study at the beginning of this chapter. To ensure research ethics, the researcher obtained clearance for the study from the research Head of Educational Foundation, as well as permission from the Sefwi-Wiawso Municipal Educational Directorate. These gave the researcher a nod to proceed with the research and access to the schools.

3.10.3 Transferability

According to Morrow (2005), this implied the extent to which the findings from a particular study can be applied to wider situations. Shenton (2004) however, contended that since qualitative studies consider only a small population, it is difficult to say that that their findings can be applied to wider situations. Guba (1981) posited that the findings can only be applied when the situations and populations are considered to be similar to those used in the study. To determine this, Shenton (2004) suggested that the researcher provided adequate information on the general design and approach of the research, so as to guide readers to make informed decisions on its transference. In line with this, Graneheim and Lundman (2004) proposed that there should be a clear description of the context, sample and sampling procedure, processes of data collection and analysis, as well as explicit and intense presentation of findings of the research, which may be done by way of inserting direct quotations from the transcribed data into the research report.

In view of this, earlier in this chapter, the researcher provided details of the context, sample, sampling technique, data collection and analysis of the study, which made it easy for the reader to decide on its transferability. Also, the researcher included direct quotes from the transcribed text, so as to add to the richness of the findings that were presented. While the researcher stated as part of the limitations of the study that its

findings may not be generalized to other situations, as suggested by Morrow (2005), the steps as proposed guided the reader to determine the transferability or otherwise of the study.

3.10.4 Confirmability

Confirmability of qualitative research means ensuring that the findings reflect the experiences of the participants and not the prejudices or bias of the researcher (Shenton, 2004). In order words, "findings should represent, as far as is (humanly) possible, the situation being researched rather than the beliefs, pet theories, or biases of the researcher" (Gasson, 2004, p. 93). This construct assumes that the strength of the research findings lie in the ability of the researcher to link together the data, process of analysis and findings in such a way that gives room for confirmation of the accuracy of findings (Morrow, 2005). Thus, in ensuring confirmability, the researcher ensured that she puts aside her opinion in the analysis of the data by reading the transcripts over and over again, such that the researcher became familiar with the ideas therein, which was evident in the description of the data analysis process, which was presented in the report. Also, the researcher provided a justification for the methodology used for the study by referencing appropriate authors and gave a clear description of the manner in which the data were collected and analyzed, such that the reader finds it easy to decide on the acceptability of the findings. Furthermore, the researcher used triangulation by varying the sources of the data that were collected.

3.11 Data Collection Procedure

In order to successfully collect data for the study, an introductory letter was obtained from the school of graduate studies introducing the researcher and the purpose of the research to the authorities in the selected schools in the Sefwi-Wiawso Municipality. Before the administration of the questionnaire, the researcher made

preliminary enquiry in the schools to obtain permission from head teachers and teachers to conduct the study. In each school, the selected respondents were grouped together and the purpose of the study was made known to them. The respondents were guided as to how to answer the questionnaire. In order not to skip some of the responses, respondents were encouraged to read the questionnaire before selecting the appropriate responses. Respondents were given the opportunity to ask any questions that baffles them in order to complete the questionnaire.

3.11 Data Analysis Procedure

Both quantitative and qualitative data analysis procedures were employed to analyse the data and information collected. Quantitative analysis involved the use of descriptive statistics (frequencies, percentages, mean, and standard deviation). The data were initially coded and processed using version 20 of Statistical Product for Service Solutions (SPSS) software. The data file was reviewed before any analysis was conducted to check for any anomalies. The results were presented according to the four dimensions on which respondents' opinions were evaluated. On the following 4-point Likert scale, the questionnaire items were scored: 1 = Strongly disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly agree.

The qualitative analysis stage was done using thematic analysis. The researcher analysed the interview data manually into themes. Thematic analysis is a process by which themes or trends within the dataset are identified, analysed and reported (Braun & Clarke, 2006). The transcriptions were checked by matching what was transcribed to what was heard on the recordings and making corrections where they were identified. Each interview was transcribed and coded as soon as possible after the interviews when the information presented in the interview was fresh in the evaluator's mind. The data were analyzed based on themes taking into account

important comments, common trends, as well as the commonalities and thematic differences. The data analysis is highly interpretative in qualitative data, in the sense that it is more of a reflexive, reactive interaction between the researcher and the decontextualized data that is already interpretations of a social encounter (Creswell, 2014)).

In research, triangulation refers to the use of more than one method to research a phenomenon (Cohen et al., 2018). Triangulation seeks to increase confidence in the results of a study by using two or more different methods to confirm a proposition (Bryman, 2012). According to Cohen et al., (2013), triangulation will make it possible to overcome the limitations of each method by comparing results from different viewpoints on a single research question. In order to address the difficulties of reliability and validity in the data sources, methods, the quantitative and qualitative data collected were triangulated (merged) to provide detailed findings of participants' views analyzed, expressed or observed (Babbie, 2015). The results helped address the research questions by guaranteeing credibility, conformability, transferability, and dependability. According to Byman and Cramer (2012), triangulation helps the researcher to obtain a variety of knowledge on the same issue; to utilize the strength or power of each method to resolve the limitations of the other; to reach a higher degree of validity and reliability, and to resolve the limitations of single-method studies. In this study, care has been taken about ethical considerations such as confidentiality and anonymity. The data were grouped together and ultimately arranged into themes.

3.12 Ethical Considerations

The study was undertaken in line with qualitative and quantitative research ethics outlined by Creswell (2014). He argued that ethical consideration is an

important component of writing qualitative research since individual respondents like to expand exactly what causes or effect a phenomenon has. Based on this argument by Creswell and Plano-Clark, (2017), ethical issues in research included specifically, informed consent, confidentiality and anonymity. The informed consent aimed to reassure the participants of the essence of the study and the right to withdraw if they so desire at any time (Bryman, 2012). The participants gave their consent to the study because, confidentiality was guaranteed for them. This was to prevent disappointment and to encourage continuity. As mentioned by Bell (cited in Cohen et al., 2007), researchers are advised to early gain permission, with fully informed consent, and to indicate the potential benefits of the research to participants. Hence, confidentiality issues were dealt with under four stages in this study. Again, the respondents were assured that every bit of their personality information they provided would be kept in secret. Respondents were asked to prevent the possibility of impressing the researcher with their responses. Finally, with regard to anonymity, respondents were assured that no reference would be made to individual participants when reporting the findings and that pseudonyms would be used when necessary to quote participants.

3.13 Chapter Summary

This chapter delivered a description of the research methodology used for this study. The purpose of this mixed-method design and the rationale for selecting this design have been restated, and the research questions and objectives have been reiterated. It also provided a summary of the research paradigm, research approach, research design, population and sampling procedures. The instrumentation process varied from the generation of the initial questionnaire items and interview guide, the piloting and the establishment of the instrument reliability. The chapter also

described data sources, data collection, and a plan for analysis to answer the research questions.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Overview

This chapter presents analysis and discussion of the data collected. The analysis was divided into two-folds. The first fold deals with the analysis of the background information of the respondents and the second part deals with the analysis of the main data aimed at answering the research questions of the study.

4.1 Demographic Characteristics of Respondents

The background information of the respondents was analysed. These include the Gender, Age bracket, highest academic qualification and teaching experience, is presented on figure 1 below.

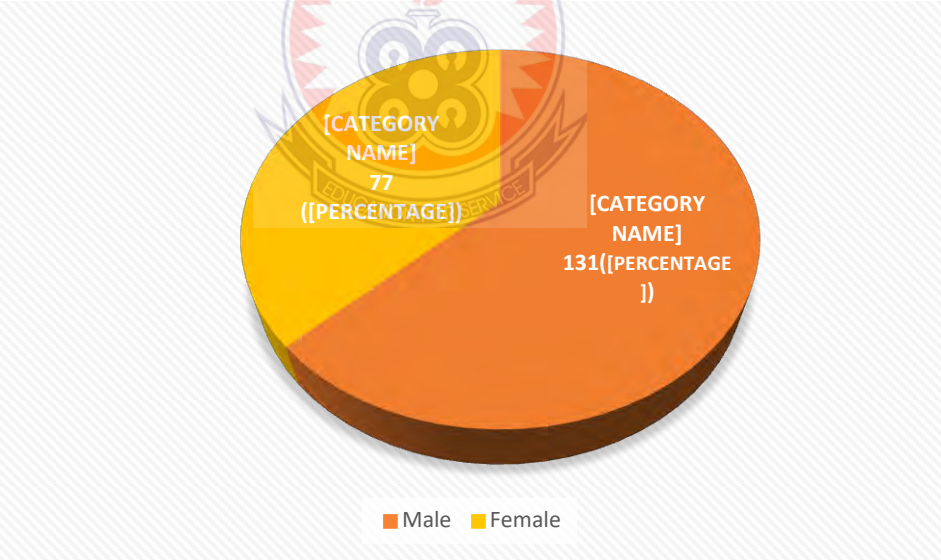

Figure 4.1: Pie Chart Showing Gender Distribution of Respondents

Source: Field Survey (2022)

Figure 4.1 presents results on the gender of respondents who participated in the study. The results show that 131 (63%) of the respondents were males while 77 (37%) were females. This implies that majority of the respondents were males.

Table 4.1: Age Distribution of Respondents

Age Bracket	Frequency	Percentage (%)
Below 30 years	54	26.0
31-40 years	114	54.8
41 to 50 years	24	11.5
51-60 years	16	7.7
Total	208	100.0

Source: Field Survey (2022)

Results on Table 4.1 show that 54 (26%) of the respondents were within the age range of 21-30 years while the respondents within the age range 31-40 years were 114 (54.8%). Also, 24 (11.5%) of the respondents were within the age range 41 to 50 years and 16 (7.7%) were 51-60 years. This implies that majority of the respondents are between 31-40 years. Since a greater number of the respondents belong to the youthful section of the teaching profession, it is expected that they will bring their youthful exuberance and ICT skills to bare on their work as teachers. This will improve their use of ICTs in implementing the primary school standards-based curriculum.

Table 4.2: Academic Qualification of Respondents

Qualification	Frequency	Percentage (%)
Certificate A	10	4.8
Diploma	58	27.9
Degree	124	59.6
Masters	16	7.7
Others	0	0.0
Total	208	100.0

Source: Field Survey, 2022

Table 4.2 presents results on the academic qualification of respondents. From the table, 10 (4.8%) of the respondents were certificate "A" holders, 58(27.9%) were Diploma holders while, 124 (59.6%) were degree holders. Master's degree holders were 16 (7.7%) and none (0%) of the respondents holds other academic qualifications.

This means that the academic qualification of majority of the respondents is degree. This suggests that the majority of primary school teachers in the Sefwi-Wiawso Municipality are degree holders and have the needed content and pedagogical knowledge to implement the primary school standard based curriculum.

Figure 4.2: Bar Chart Showing Years of teaching experience

Figure 4.2 provides the results of years of teaching experience by the respondents. The result revealed that 20 (9.6%) of the respondents have below 5 years of teaching experience, 76 (36.5%) had 6-10 years teaching experience. The number of respondents who have 11-20 years of teaching experience were 82 (39.4%) while 30 (13.4%) had above 20 years of teaching experience. This result indicates that most of the teachers have much experience in teaching and they would know the benefits of integrating ICT in the teaching of the subjects.

4.2.1 Phase I: Analysis of Questionnaire Data

This section presents the results for the analysis of the main data. The results of the main data have been presented according to the research questions of the study. Again, the responses for each research question were presented in this section. The results are presented in Table 4.3, 4.4, 4.5 and4.6.

Research Question 1: What ICTs are available for the implementation of the primary school standards-based curriculum?

The main purpose of the research question was to assess whether ICT facilities were available for implementing the primary school standards-based curriculum. The data were analysed using frequencies and percentage. The result is presented in Table 4.3.

Table 4.3: Participants' Responses on availability of ICT facilities

Item	Available F (%)	Unavailable F (%)
Desktop Computers	30 (14.4%)	178 (85.6%)
Personal Laptops	156 (75%)	52 (25%)
Internet System	10 (4.8%)	198 (95.2%)
Radios	134 (64.4%)	74 (35.6%)
Television	44 (21.2%)	164 (78.8%)
Photocopier	22 (10.6%)	186 (89.4%)
Educational Software	5 (2.4%)	203 (97.6%)
Overhead Projectors	45 (21.6%)	163 (78.4%)
Printers	33 (15.9%)	175 (84.1%)
Digital Video Recorder	2 (1.0%)	206 (99%)
Telephone	198 (95.2%)	10 (4.8%)
Digital Cameras	19 (9.1%)	189 (90.9%)

Source: Field Data (2022)

Table 4.3 presents the results of the available ICT facilities for implementing the primary school standards-based curriculum in the Sefwi-WiawsoMunicipality. From the results, 30 (14.4%) of the respondents said Desktop computers were available in their schools while 178 (85.6%) of them said Desktop computers were

unavailable. While 156 (75%) of the respondents concurs to the availability of personal laptops, 52 (25%) of them indicated its unavailability. According to 10 (4.8%) of the respondents, Internet system was available in their schools. In contrast, 198 (95.2%) indicated that internet systems are unavailable. Also, 134 (64.4%) of the respondents indicated that radios were available in their school while the remaining 74 (35.6%) of them indicated that radios were unavailable.

Again, 22 (10.6%) said photocopier machines were available while 186 (89.4%) of them said it is unavailable. While 5 (2.4%) of the respondents said educational software is available in their school, an overwhelming majority, 203 (97.6%) said it is unavailable. Responding to the item on the availability or unavailability of overhead projector, 45 (21.6%) of the respondents concurs to its availability, while remaining 175 (84.1%) of them said overhead projectors were unavailable. Few of the respondents, 33 (15.95) said printers were available while175 (84.1%) of them indicated that printers were unavailable in their schools.

Furthermore, few of the respondents, 2 (1.0%) of them said digital video recorder was available. However, 206 (99%) of them said digital recorder was unavailable. Also, 198 (95.2%) of the respondents said they have telephone while 10 (4.8%) of them said, it was unavailable. Finally, 19 (9.1%) of the respondents indicated that digital cameras were available in their school while 189 (90.9%) of them said digital cameras were unavailable.

The results of the observation also revealed information about the availability of ICT facilities for the implementation of the standards-based curriculum. The results show the absence of majority of the ICT facilities. Majority of the schools (except S6) observed do not have desktop computers. Similarly, majority of the schools (except S5) do not have personal laptops. Similarly, out of the 6 schools observed, 5 did not

have phone. In reference to the availability of radio, 3 out of 6 schools were observed to have the radio. It was observed that only 1 school out of the 6 schools observed have a television. It was observed that, all the 6 schools did not have photocopier, educational software and overhead projector. However, it was observed that 2 out the 6 schools observed had printers. ICT facilities such as digital video recorder, internet system and digital cameras were observed not to be available.

Research Question 2: How proficient are teachers in using ICTs in the implementation of the primary school standards-based curriculum?

Research question 2 sought to solicit data on how proficient teachers are in using ICTs in the implementation of the primary school standards-based curriculum. In answering this question, some statements were provided which respondents had to indicate their degree of agreement or disagreement. The data were analyzed and discussed using mean and standard deviation. A mean score of 3.0 and above indicates agreement while a mean score of below 3.0 indicates disagreement. Also, a standard deviation of below 1.0 indicates similarity of responses while a standard deviation of 1.0 or above indicates difference in responses. The results are presented in Table 4.4.

Table 4.4: Teacher proficiency in the use of ICTs

Item	N	Mean	Std. Dev
I received ICT training before joining the teaching profession	208	4.58	.92
I received in-service training in ICT education	208	4.49	.69
I am very good at using Microsoft Word for Word-processing and instruction	208	4.45	.72
I am very good at using Microsoft PowerPoint for implementation	208	4.20	1.10
I am very good at using internet/email for research and instruction	208	4.01	.78
I am good at using Microsoft Excel/ Access for instruction and assessment	208	3.93	1.07
I am very good at using Microsoft word for lesson plan preparation	208	3.70	1.05
I am good at using ICTs to show educational videos to sustain interest and reinforce learning.	208	2.88	.75
Means of means / Standard Deviation		4.03	.89

Source: Field Survey (2022)

Table 4.4 presents the results of how proficient teachers are in using ICTs in implementing the primary school standards-based curriculum. Results from Table 4 indicate that most of the respondents agreed (M=4.58, SD=0.92) that they received ICT training before joining the teaching profession. The standard deviation of 0.92 means that the responses of the respondents were homogeneous; that is, they did not differ from each other. Similarly, most of the respondents agreed (M=4.49, SD=0.99) that they received in-service training in ICT education. The standard deviation of 0.99 shows that the responses of the teachers did not differ from each other. Also, most of the teachers agreed (M=4.45, SD=0.72) that they are very good at using Microsoft Word for word-processing and instruction. The standard deviation of 0.72 confirmed that the responses of the teachers did not differ from each other.

Responding to the statement, "I am very good at using Microsoft PowerPoint for teaching, the majority of the respondents agreed (M=4.20, SD=1.10) most of the

respondents agreed. The standard deviation of 1.10 shows that the responses differ. The statement "I am very good at using internet/email for research and instruction" had a mean and standard deviation of 4.08 and 0.78. The mean score of 4.08 shows that the respondents agreed to the statement. The similarity of responses was established by the standard deviation of 0.78. The majority of respondents agreed (M=3.93, SD=1.07) that they are good at using Microsoft Excel/ Access for instruction and assessment. The standard deviation of 1.07 show that the responses differ.

Similarly, most of the respondents agreed (M=3.70, SD=1.05) that they are very good at using Microsoft word for lesson plan preparation. The standard deviation of 1.05 means that the responses of the teachers did not differ from each other. Finally, most of the respondent disagreed (M=2.88, SD=0.75) that they are good at using ICTs to sure educational videos to sustain interest and reinforce learning. The homogeneity or similarity of responses is indicated by the standard deviation score of 0.75. The mean of means of 4.03 means that the respondents are very proficient in the use of ICT in teaching. And the mean standard deviation of 0.89 suggests that the responses did not differ from each other.

The results of the observation revealed information about the proficiency results of teachers in the use of ICTs. It was observed that majority of the participants observed are proficient. This confirms the results of the quantitative analysis which demonstrated that ICTs were not available for use in teaching and learning. From the results, all the participants (T1-T6) observed were good at using Microsoft Word for word-processing and instruction. Aside a participant (T1) all the others observed are good at using Microsoft PowerPoint for implementation. Similarly, all the participants (T1-T6) observed are good at using internet/email for research and instruction except

a participant (T3). Furthermore, the results indicates that all the participants observed are good at using Microsoft Excel/ Access for instruction and assessment. It was also observed that all the participants (T1-T6) observed are good at using Microsoft word for lesson plan preparation except a participant (T4). Similarly, all the participants (T1-T6) are good at using ICTs to sure educational videos to sustain interest and reinforce learning.

Research Question 3: How are ICTs used in the implementation of the primary school standards-based curriculum?

Research question 3 sought to solicit data on how teachers use ICTs in the implementation of the primary school standards-based curriculum. In answering this question, some statements were provided which respondents had to indicate their degree of agreement or disagreement. The data were analysed and discussed using mean and standard deviation. A mean score of 3.0 and above indicates agreement while a mean score of below 3.0 indicates disagreement. Also, a standard deviation of below 1.0 indicates similarity of responses while a standard deviation of 1.0 or above indicates difference in responses. The results are presented in Table 4.5.

Table 4.5: Results of the use of ICTs in curriculum implementation

Item	N	Mean	Std. Dev.
I use ICTs for lesson plan preparation	208	2.89	.92
I use ICTs to prepare teaching and learning materials	208	2.77	.69
I use internet/email for research and instruction	208	3.14	.72
I use Microsoft Excel for recording and grading students	208	3.20	.70
I use ICTs to simulate real experience of students to make lesson lively	208	3.93	.73
I use Microsoft Excel to draw a graphical or pictorial representation of students' performance.	208	2.70	.53
I use ICTs for drill and practice to promote students learning	208	2.88	.75
Means of means / Standard Deviation		2.51	.72

Source: Field Survey (2022)

Table 4.5 presents the results of how ICTs are used in implementing the primary school standards-based curriculum. The results indicate that most of the

respondents disagreed (M=2.89, SD=0.92) that they use ICT for lesson plan preparation. This result is not surprising because of the unavailability of computers in the schools. This also seems to suggest that most of the respondents do not also have personal laptops. This will undoubtedly limit their ability to use ICTs (laptop or computers) to prepare lesson notes. The standard deviation of 0.92 indicates the similarity of responses. Similarly, most of the respondents disagreed (M=2.77, SD=0.69) that they use ICTs to prepare teaching and learning materials. Again, the standard deviation of 0.69 shows that the responses did not differ. Most of the respondents agreed (M=3.14, SD=0.72) that they use internet/email for research and instruction. This is good news because teaching methodologies keeps changing in the world and as professionals it is important that these new techniques, methods or pedagogical approaches are explored in achieving teaching and learning goals. The internet, thus provides support towards this end. It is interesting to note that the respondents agreed that there is no internet system in schools but agreed that they use internet for research. This seems to suggest that the respondents use their own internet system for research. The standard deviation of 0.72 shows that the responses were similar. Also, the majority the respondents agreed (M=3.20, SD=0.70) that they use Microsoft Excel for recording and grading students. The standard deviation of 0.86 shows that the responses were homogeneous.

Responding to the statement "I use ICT to simulate real experience of students to make lesson lively", most of the respondent agreed (M=3.93, SD=0.73). The standard deviation of 0.86 indicates that the responses are homogeneous. Similarly, the majority of respondent agreed (M=2.70, SD=0.53) to the statements, I use Microsoft Excel to draw a graphical or pictorial representation of students' performance". The standard deviation of 0.53 shows the responses did not differ. The

responses to the statement, "I use ICT for drill and practice to promote students learning" had a mean and standard score of 2.88 and 0.75 respectively. The mean score of 3.84 shows that the respondents agreed to the statement. The standard deviation of 0.75 means that the responses were similar. The mean of mean score of 2.51 shows that the respondents are not effectively using ICTs in implementing the primary school standard based curriculum despite their proficiency in the use of ICTs. The mean standard deviation of 0.72 shows that the responses were similar.

Teachers were also observed to ascertain their usage of ICTs in teaching and learning. The results indicate that all the participants (T1-T6) observed used ICTs for lesson plan preparation. The result also shows that 5 out of 6 of the participants observed use ICTs to prepare teaching and learning materials. It is evident from the results that 4 out of 6 of the participants observed use internet/email for research and instruction. Similarly, 4 out of 6 of the participants observed use Microsoft Excel for recording and grading students. Similarly, aside from T3 and T4, the rest of the participants observed use ICTs to simulate real experience of students to make lesson lively. All the participants (T1-T6) observed use Microsoft Excel to draw a graphical or pictorial.

Finally, 5 out of the 6 participants observed use ICTs for drill and practice to promote students learning representation of students' performance.

Research Question 4: What challenges do teachers face in using ICTs in the implementation of the primary school standards-based curriculum?

Research question 4 sought to solicit data on challenges teachers face in using ICTs in the implementation of the primary school standards-based curriculum. In answering this question, some statements were provided which respondents had to indicate their degree of agreement or disagreement. The data were analysed and

discussed using mean and standard deviation. A mean score of 3.0 and above indicates agreement while a mean score of below 3.0 indicates disagreement.

Also, a standard deviation of below 1.0 indicates similarity of responses while a standard deviation of 1.0 or above indicates difference in responses. The results are presented in Table 4.6.

Table 4.6: Results of challenges teachers face in the use of ICTs in curriculum implementation

Item	N	Mean	Std. Dev.
Using ICTs for teaching is time consuming and requires a lot of efforts	208	4.57	.47
There are no projectors in my school	208	3.77	.69
There is inadequate technical support	208	3.14	.73
Teaching time schedules prevent maximum utilization of ICTs for teaching and learning	208	3.89	.62
There are inadequate computers for teaching and learning	208	4.43	.59
There is unreliable or no internet connectivity in my school	208	4.67	.53
I am not competent and confident to use wide range of varying technologies for various purposes	208	2.38	.73
I lack the needed knowledge to operate ICT tools in Teaching and learning	208	2.68	.81
Means of means/Standard Deviation		3.71	.65

Source: Field Survey (2022)

Table 6 presents the results of the challenges teachers face in using ICTs in the implementation of the primary school standards-based curriculum. The results indicate that most of the teachers agreed (M=4.57, SD=0.47) that using ICTs for teaching is time consuming and requires a lot of efforts. This was in line with the study by Mumtaz (2000), who argued that insufficient time is a factor preventing the integration of technology in schools. The standard deviation of 0.47 means that the responses of teachers were similar. Most of the respondents agreed (M=3.77, SD=0.69) that there are no projectors in their school. Again, the standard deviation of 0.69 shows that the responses were homogeneous.

Similarly, most of the teachers agreed (M=3.14, SD=0.73) that there is inadequate technical support. This also supported the findings of Bitner and Bitner (2002) who posited that barriers to ICT could be centred on the support networks that are available to the school. The similarity of the responses is evident in the standard deviation of 0.73. Responding to the statement, "Teaching time schedules prevent maximum utilization of ICT for teaching and learning", most of the respondents agreed (M=3.89, SD=0.62).

The standard deviation of 0.62 means that the responses were similar. The statement, "There are inadequate computers for teaching and learning" had a mean and standard deviation of 4.43 and 0.59 respectively. The mean score means that the respondents agreed to the statement and the similarity of the responses is represented by the standard deviation. Most of the respondents agreed (M=4.67, SD=0.53) that there exists the problem of unreliable or no internet connectivity in my school. The standard deviation of .53 means that the responses of the teachers were homogeneous. The respondent disagreed (M=2.38, SD=0.73) to the statement, "I am competent and confident to use wide range of varying technologies for various purpose". The standard deviation of 0.73 shows that the responses were similar. Most of the respondents disagreed (M=2.68, SD=0.81) that they lack the needed knowledge to operate ICT tools in teaching and learning. This means the respondents have the needed knowledge on the use of ICTs for teaching. The standard deviation of 0.81 showed that the responses of the teachers did not differ from each other. The mean of means of 3.71 means that the respondents agreed that indeed some challenges prevent teachers from using ICTs in teaching. The mean standard deviation of 0.65 means that there was no difference in the response of the teachers.

The results of the researchers' observation on the challenges teachers face in the use of ICTs in the implementation of the standards-based curriculum. The results show that 4 out 6 of the participants observed have negative attitude towards ICT integration into teaching and learning. The results show that all the participants (T1-T6) observed have inadequate technical support. Inadequate ICTs infrastructure for teaching and learning was a challenge that teachers face in the use of ICTs in the implementation of the standard based curriculum. Unreliable or no internet connectivity is also another challenge observed in 5 out of the 6 schools observed. Furthermore, 2 out of 6 participants observed were unable to use wide range of varying technologies for various purposes. Similarly, 2 out of 6 participants observed lacks the needed knowledge to operate ICTs in teaching and learning.

4.2.2 Phase II: Thematic Analysis of Interview

The information obtained from the interview and observation is presented below. This section provides the experiences of some respondents used for the survey and observations made by the researcher. The interview results aimed at presenting the voice of the participants in the study, to add strength to the quantitative data, and to in the process of presentation, the stories of the participants are interspersed with essential quotations to expound their personal views to the extent as their behaviour is concerned. The data sought not only to explore and explain the qualitative findings but added depth and richness to the study. It is worthy of note that only vital responses are provided for the analysis. All names provided in the analysis are participants' pseudonyms and not their real names. The data had been analysed based on themes (thematic analysis). The analysis was based on four (4) research questions. What characterizes the data is the widespread agreement of the respondents on the issues. There was absolute unanimity in the responses to several of the questions or

items, and this degree of unanimity gave much power to the results. The observation results provide information about the six 6) participants observed. The results were used to validate the questionnaire and interview data collected. The purpose of the study was to find out teachers' use of information and communication technologies in the implementation of the standards-based curriculum. Participants views on the topic based on the four research questions were classified into themes.

Research Question 1: What ICTs are available for the implementation of the primary school standards-based curriculum?

Theme 1: Availability of ICTs for Teaching and Learning

The availability of ICTs constitutes one of the main factors that influence the implementation of the standards-based curriculum. This is because abstract concepts or ideas are given concrete form and made real to learners if resources are employed in the teaching and learning process. As a result, one of the objectives of the study was to find out ICTs which are available to teachers in their quest to implement the standards-based curriculum. The following extracts indicate their views of the participant on the availability of ICTs in the implementation of the standard-based curriculum. The participants have this to say:

Sub-Theme 1: Personal Laptops

> *Sir, you see that small laptop? Hmmm…is my laptop that I have being using small small. That id the little way I can support these children" (Yao, Interview Data, 2022). "I use the Mahama Laptop oooo. Even though it is small, I manage it" (Efua, Interview Data,* 2022).

Sub-Theme 2: Phone

> "*Me, is my phone I use for showing them videos and games. The phone is big so we all manage since I don't have a laptop. There are no computers in this school" (Yao, Interview Data, 2022).*

> *I download education games, plays and other stuff with my phone. I use the phone in form of a computer ok. But my phone is no longer functioning so I stopped. Some of my colleague teachers still do same though" (Yao, Interview Data, 2022).*

From the foregoing extract, it is clear that ICT Facilities were not available in the schools. Meanwhile, Norris, Sullivan, Poirot and Soloway (2003) revealed that appropriate access to ICT facilities is another key factor in the effective technology integration process. However, the excerpts from teachers shows that ICTs are not available. Those available were personal laptops and phones. The unfortunate thing is that, ICT resources are beyond the reach of teachers and as such, they cannot access them for the purpose of instructional development.

Research Question 2: How proficient are teachers in using ICTs in the implementation of the primary school standards-based curriculum?

Theme 1: Teacher Proficiency in the use of ICTs

Proficiency of Teachers in the use of ICTs are professionally independent in the application of skills vital to the teaching and learning process. They provide focused teaching programs that meet curriculum and assessment requirements. They display skills in planning, implementing and managing learning programs. Some participants were asked to tell how proficient they are.

Theme 1: Teacher Proficiency in Spreadsheet

> *"I am proficient in the use of spreadsheet, Microsoft words and power point presentations. I can use the ICTs tools like the computer for typing" (Efua, Interview Data, 2022).*
> *"I can use these ICT tools for teaching. For example, if am teaching something concerning spreadsheet like this, you can't start from abstract, because they need to see the spreadsheet and you explain certain things that are linkage concerning the spreadsheet" (Kwaku, Interview Data, 2022).*

Sub-Theme 2: Proficiency in Microsoft word and PowerPoint

> *I can use ICT tools in delivering a lesson. For instance, when I am teaching a topic that demands the use of ICTs, I go for it because I can use them for anything like, power point presentation, typing, recording students' grades, plotting graphs etc" (Abena, Interview Data, 2022).*
> *"I can use power point in my class, email to communicate with other teachers and students, creating document in Microsoft word" (Abena, Interview Data, 2022).*
> *"I can print a document in Microsoft word, use formula in spreadsheet and I can teach my students creating newsletter using desktop publishing" (Abena, Interview Data, 2022).*

Sub-Theme 3: Proficiency in the use of educational Software

> *I can select appropriate software to use in my teaching but no computers. Me, I am good at IT oooo…. I can teach my students how can they make their own web pages (Kojo, Interview Data, 2022).*
> *I can use internet in my class to meet certain learning goals. But the internet must be reliable oooo. For creating pictures, oh…small koraa. I can teach students to use graphics software to create pictures, teach students use scanners to capture graphics, photos and/or text. Even browsing the net.*

Sub-Theme 4: Proficiency in the use of Internet

> *"I am able to use internet to play audio, download videos for teaching and learning" (Ekua, Interview Data, 2022).*
> *"I can download educational materials, videos, games and apps for use in teaching. You know these children that is what the like" (Ekua, Interview Data, 2022).*

It is clear from the comments from the teachers that, they are proficient in the use of ICTs in teaching and learning. As reported, teachers are proficient in the use of spreadsheet, use of Microsoft word and PowerPoint, use of educational software and the use of the internet. This is good news because it will enhance teachers' ability to

find, evaluate, and communicate information through typing and other media on various digital platforms.

Research Question 3: How are ICTs used in the implementation of the primary school standards-based curriculum?

Theme 1: Use of CTs in Teaching and Learning

ICTs such as computers support learning across the curriculum and communication networks provide learners with searchable access to vast amounts of information. It also supports a wide range of broader educational objectives including independent learning, collaboration with others and communication skills. This section presents the views of participant on the use of ICTs in implementing the standard based curriculum. The excerpts below represent the views of participants.

Sub Theme 1: For Teaching and Learning

> *"I make use of ICT tools for teaching and learning in the classroom" (Efua, Interview Data, 2022).*
> *"To prepare and deliver lessons and making presentation" (Yaa, Interview Data, 2022).*
> *"I use ICT tools for showing videos of abstract concepts when teaching" (Kwabena, Interview Data, 2022).*
> *"I use ICTs to show videos of concepts, make teaching and learning enjoyable and to sustain students' interest" (Kwabena, Interview Data, 2022).*
> *Making use of it for Practical demonstration teaching learning materials (TLMs) (Yaa, Interview Data, 2022).*

Sub Theme 2: Record Keeping

> *Finding information and keeping records of students' Scores (Abena, Interview Data, 2022).*
> *I also use it to store vital data or information (Kofi, Interview Data, 2022).*

From the forgoing extract, it is clear that Information, Communication and Technology has made tremendous advances which could effectively be put to advantage to enhance educational delivery. It is good news because the use of ICTs will stimulate good and enjoyable learning.

From the excerpts, teacher use ICTs to teach, learn, download educational materials, and for record keeping.

Research Question 4: What challenges do teachers face in using ICTs in the implementation of the primary school standards-based curriculum?

Theme 1: Challenges Teachers face in the use of ICTs

The act of integrating the use of ICT into teaching and learning is a complex process and one may encounter a number of difficulties. The major barriers were lack of genuine software, inadequate computer in the classroom, low speed internet, lack of motivation from both teacher and student side to use ICTs, lack of proper training skills, unavailability of latest ICT equipment, lack of expert technical staff, poor administrative support, etc. Some participants have these to say:

Sub-Theme 1: Lack of Computers, Laptops and Digital Recorders

> *Oh Sir, there are no computers. Even there is poor internet connection at school so searching things online is, eeer…. stressful (Ama, Interview Data, 2022).*

> *Sir, you, see? We are all doing this work together. Educational software in in this school? We don't have it. Yes! we don't have anything so I don't bother myself about this ICTs stuff. We don't even have common cathode ray tube computer (Yao, Interview Data, 2022).*

> *This laptop government is sharing too hasn't gotten to primary schools yet. My phone is not also good for showing videos. Not even recording. In fact, we have no equipment available in this school. (Kwame, Interview Data, 2022)*

> *Sometimes, I want to show some video to students but there are no computers and digital cameras. This a big challenge. I have to use my small Mahama's laptop for these things (Ekua, Interview Data, 2022).*

Sub-Theme 2: Lack of Educational Software

> *As you can see, there are no ICT gadgets in here, so I use my phones, the phone is even not good. See, see,*

you, see? For educational software, hmmmm…forgerit. (Akosua, Interview Data, 2022).
Eeeeeiiiii……. Educational software paaaaaa? This laptop government is sharing too hasn't gotten to primary schools yet (Kwesi, Interview Data, 2022).

Sub-Theme 3: Lack of Printers, Photocopiers and Projectors

Sir, there is no printer in this school you that small store there, that is where me I do my printer. Oh, we all print there (Kodjo, Interview Data, 2022).

There is no photocopier. I brought one and we all depended on it. It got spoilt last 2 years and nobody said anything up to now. You see, this school we don't set exams or print questions here. We take question from outside for our students so nobody cares for printer and photocopiers. See, the thing is we need one but who will provide it? (Kwabena, Interview Data, 2022).
"We don't have projector, no internet and even that old computer some. I use my laptop as and when is needed because if it develops a fault, that is it. My problem oooo" (Kodjo, Interview Data, 2022

"You know, all this is worrying. We dot even have projectors, computers, and other ICT gadget" (Abena, Interview Data, 2022).

Sub-Theme 4: Poor Internet Network

"We have a lot of challenges we face. One of them is the lack of ICT tools and network. This reduces the interest in teaching and learning ICT. This really affects students understanding" (Yaa, Interview Data, 2022).

"Sometimes too, is a next network problem. Sometimes you have to download something in order to show to them but because of the poor network, you can't download them"" (Ekua, Interview Data, 2022).

"Sir, network problem and lack of ICT facilities. This makes teaching and learning very slow" (Ekua, Interview Data, 2022).

Theme 5: Unstable Electricity

> *"Sometimes, you may be teaching with these ICT tools and they will be light off. Since we are not having any generator, it means the lesson will end" (Kwabena, Interview Data, 2022).*
>
> *"Sir, there are two desktop computers in the head masters' office but there is no one to fix them. (Ama, Interview Data, 2022).*
>
> *"The challenge I do face is eeerrr…one of them is electricity. We don't have electricity because sometimes when you come to the classroom and there is light off, learning becomes difficult. Others are lack of ICT tools themselves" (Kofi, Interview Data, 2022).*

The comments from the teachers show that they do face challenge in the use of ICTs for teaching and learning. Some major challenges mentioned by teachers were poor or no internet system, unstable electricity, lack of computers, laptops, and digital recorders, lack of educational software and lack of projectors, printers and photocopiers.

4.3 Discussion of Results

This study sought to investigate teachers' use of ICTs in the implementation of the Standards-based curriculum in the Sefwi-Wiawso Municipality. The results were discussed in line with relevant literature and according to the research questions.

4.3.1 ICTs Available for the Implementation of the Standards-Based Curriculum

Research question 1 sought to find out ICTs available for the implementation of the standards-based curriculum. The results suggest that ICTs such as desktop computers, printers, overhead projectors, educational software, photocopier, television, digital recorders and digital cameras, were unavailable for teaching. This will demotivate teachers and students since the use of ICTs make teaching and

learning enjoyable. The availability of ICTs plays a significant role in the curriculum implementation process. Especially when one of the core competencies of the standards-based curriculum is to develop pupils to become digital literates. Abdullah, Abidin, Luan, Majid and Atan (2006) argued that providing teachers with a laptop, projector, and computer software would motivate not only students but also teachers in the teaching and learning process. When teachers have easy access to computers, this might give them sufficient time to prepare materials, search the Internet, and/or review the necessary software. Furthermore, teachers may make better use of ICT when they have the opportunity to use high quality resources and have full access to hardware and software (Forgasz, 2006; Scrimshaw, 2004). Szeto and Cheng (2013) underscore the fact that the availability of ICT resources is important to generate situations in which teachers can make use of ICT in their classrooms correctly and with certainty. The availability of ICT resources in schools depends on whether the school has procured the resources. The result of this study contradicts the findings of Amenyedzi, Lartey and Dzomeku (2011) which revealed that the ICT resources or facilities that are available in the schools for teaching includes computers, internet connections, televisions and radios, photocopier, overheads projectors and printers. The results also confirmed the study of Yunus (2007) who reports that ICT facilities available in schools include telecoms, TV and radio broadcasting, hardware and software, computer services and electronic media.

Also, the findings confirm the findings of the quantitative analysis and concurs with the finding of Idoko and Ademu (2010) that ICT facilities were not available in schools. Also, the findings collaborate with Fakeye (2010) that availability of computers and their connectivity to the internet was non-existent in virtually all the school studied and utilization, which is dependent on availability, and because

availability is poor, thus, usability was also found to be poor. Again, the findings concur with Ottesen (2006) who revealed that one fundamental problem facing ICT integration in schools is the lack of computer facilities.

4.3.2 Teachers' Proficiency in Using ICTs in the Implementation of the Standards-Based Curriculum

Research question 2 sought to ascertain Teachers' Proficiency in using ICTs in the implementation of the standards-based curriculum. The results indicates that the participants observed are proficient in the use of ICTs for teaching and learning. From the discussion above, it can be seen that majority of the teachers were proficient in the use of ICTs in teaching, as most of them agreed that they were and used ICTs in teaching. This confirmed the findings of the study that was conducted by Amenyedzi, Lartey and Dzomeku (2011) on the use of computers and the internet as a supplementary source of educational materials in Ghana. The study found that a substantially high percentage of respondent teachers (92%) were computer-proficient and were currently using ICTs in their teaching. The findings confirm the results of the quantitative analysis. Modern technology provides numerous ways to improve classroom instruction both education and learning (Ghavifekr et al., 2014). The introduction of computers in classrooms and numerous academics believe that ICT will play a significant role in educating the next generation (Bransford, Brown, & Cocking, 2000). According to Amenyedzi et al. (2011) substantially high percentage of teachers (92%) were computer-proficient and were using ICT in their teaching.

4.3.3 The Use of ICTs in the Implementation of the Standards-Based Curriculum

Research question 3 sought to the Use of ICTs in the implementation of the standards-based curriculum. The results revealed that teachers use internet/email for

research and instruction, use Microsoft Excel for recording and grading students and they also use ICTs to simulate real experience of students to make lesson lively. Even though this is a good step, it is not encouraging enough because Information, Communication and Technologies (ICTs) has made tremendous advances which could effectively be put to advantage to enhance educational delivery.

This finding collaborates with Becker, Ravitz, & Wong, (1999) who posited that teachers use computers to write lesson plans, prepare materials for teaching, record and calculate student grades, and communicate with other teachers. As such, computers have become a routine tool for helping teachers accomplish their professional work. According to Haddad and Drexler (2002), an effective teaching/learning process must stimulate intellectual curiosity and offer a sense of enjoyment that will move the students from the passive role of recipients of information to the active role of builders of knowledge. Also, the results of this study confirm what Waite (2004) indicated that even though teachers showed great interest and motivation to learn about the potential of ICT, in practice, the use was relatively low and it was focused on a narrow range of applications, with word processing being the predominant use.

4.3.4 Challenges Teachers Face in Using ICTs in the Implementation of the Standards-Based Curriculum.

Research question 4 sought to examine challenges teachers face in using ICTs in the implementation of the standards-based curriculum. It is clear from the results that teachers face challenges in the use of ICTs for teaching and learning. This finding supports the results of the quantitative analysis which revealed challenges such as lack of computers, poor network connectivity, lack of projectors and other ICTs. In teaching, several studies indicated that lack of technical support is

a main barrier to using technologies. From the discussion above it can be seen that problems of lack of computers, unreliable telecommunication connectivity/ network access, teaching time schedules preventing maximum utilization of ICT/ computer technology for teaching and learning and inadequate technical support are some of the significant problems that prevent teachers from incorporating ICT in their teaching.

These findings concur with the assertion of Balanskat, Blamire, and Kefala (2006), which posited that teachers continue encountering challenges or obstacles during the processes of adopting technologies into their teaching and learning since ICTs needed for successful and meaningful learning are absent in most classrooms. Also, the findings corroborate many research that has reported challenges that teachers face in incorporating ICT in their teaching (Hutchison & Reinking, 2011. The Becta (2004) report stated "if there is a lack of technical support available in a school, then it is likely that technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns" (p. 16). Korte and Hüsing (2007) argued that ICT support or maintenance contracts in schools help teachers to use ICT in teaching without losing time fixing software and hardware problems. According to Becta (2004), technical faults might discourage them from using ICT in their teaching because of the fear of equipment breaking down during a lesson. According to Gomes (2005), ICT integration in teaching needs a technician and if one is unavailable the lack of technical support can be an obstacle. Toprakci (2006) found that the lack of technical support was one of two significant barriers to ICT integration in science education in schools and might be considered "serious".

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter consists of the summary of the study, key findings, conclusions, recommendations and suggestions for further studies.

5.1 Summary of the Study

This study sought to investigate teachers use of ICTs in the implementation of the Standards-based curriculum in the Sefwi-Wiawso Municipality. The specific objectives of the study were to:

1. Find out ICTs availability for the implementation of the primary school standards-based curriculum in Sefwi-Wiawso Municipal.
2. Ascertain the proficiency of teachers in using ICTs in the implementation of the primary school standards-based curriculum in Sefwi-Wiawso Municipal.
3. Examine the use of ICTs in the implementation of the primary school standards-based curriculum in Sefwi-Wiawso Municipal.
4. Find out challenges teachers face in using ICTs in the implementation of the primary school standards-based curriculum in Sefwi-Wiawso Municipal.

Literature was reviewed based on the topic. It was done in three sections, the theoretical review, conceptual review, and the review of empirical studies. The theoretical, conceptual and the empirical reviews were combined to provide a strong framework (foundation) and good source of principles to guide the present study. The literature reviewed has also helped in filling the gaps in previous studies relating to the current study. The study was anchored in the pragmatist paradigm, motivated by the mixed method approach and directed by the explanatory sequential mixed method

design. Questionnaire, interview guide and observation checklist were the instruments used for data collection. Data were analysed using frequency counts, percentages, means and standard deviations. Ethical issues governing the conduct of mixed method research were considered.

5.2 Key Findings

From the study, it was found out that:

1. Personal laptops, phones and tape/radio were the ICT facilities available in schools in the Sefwi-Wiawso Municipality.
2. Majority of the teachers in the Sefwi-Wiawso Municipality were proficient in the use of ICTs in teaching, as most of them agreed that they were and used ICTs in teaching. Teachers are proficient in the use of spreadsheet, use of Microsoft word and PowerPoint, use of educational software and the use of the internet.
3. Teachers use ICTs such as internet/email for research and instruction, Microsoft Excel for recording and grading students and to simulate real experience of students in order to make lesson lively. They also use ICTs to learn, download educational materials, and to keep records.
4. Some major challenges mentioned by teachers in the Sefwi-Wiawso Municipality were poor or no internet system, unstable electricity, lack of computers, laptops, and digital recorders, lack of educational software and lack of projectors, printers and photocopiers, teaching time schedules preventing maximum utilization of ICT/ computer technology and inadequate technical support.

5.3 Limitations of the Study

The study was limited to 208 primary school teachers in the Sefwi-Wiawso Municipality. To solve this the researcher ensured that the sample was representative. Also, lack of resources limited the number of schools the researcher observed. To address this limitation, the schools observed were sampled randomly for observation. Furthermore, there are conundrums in contending with the rate at which technology changes. As a result of blistering technological changes, the use of ICT facilities requires availability and training to enable the use of the equipment. So, by the time the study ended, it is possible that there already may have been the provision of ICT facilities. Thus, some of the findings may not hold as a result of the changing pace in the field of integrating information and communication technology into education.

5.4 Conclusions

Based on the key findings of the study, several conclusions can be drawn regarding the use of ICTs in the implementation of the Standards-Based Curriculum in the Sefwi-Wiawso Municipality:

The study revealed that the ICT facilities available in schools within the Sefwi-Wiawso Municipality are somewhat limited, primarily consisting of personal laptops, phones, and tape/radio. This suggests a need for substantial improvements and investments in ICT infrastructure within schools to support effective curriculum implementation.

A positive finding is that a majority of teachers in the municipality demonstrated proficiency in the use of ICTs, particularly in the areas of Microsoft Word, PowerPoint, educational software, and internet/email usage. This proficiency

provides a foundation for incorporating ICTs effectively into teaching and learning processes.

Teachers reported using ICTs for various purposes, including research, instruction, student assessment, and accessing educational resources. The utilization of ICTs to simulate real-life experiences for students is a promising practice that can enhance the engagement and quality of lessons.

The study identified several challenges that hinder the optimal use of ICTs in curriculum implementation. These challenges include inadequate access to the internet, unstable electricity supply, insufficient availability of computers and digital tools, lack of educational software, and limited technical support. Additionally, the constraints of teaching time schedules impact the full integration of ICTs into teaching methodologies.

5.5 Recommendations

Based on the conclusions drawn from the study, the following recommendations are proposed to address the challenges and enhance the effective use of ICTs in the implementation of the Standards-Based Curriculum in the Sefwi-Wiawso Municipality.

1. Educational authorities should prioritize the provision of essential ICT infrastructure, such as computers, laptops, projectors, printers, and stable internet connectivity, to all schools in the municipality. Adequate availability of these resources is essential to fully leverage ICTs in teaching and learning.
2. Continuous and targeted professional development programmes should be offered to teachers to enhance their ICT proficiency further. These programmes can focus on advanced software usage, integration of ICTs in

different subjects, and effective teaching strategies that incorporate technology.

3. Schools should be equipped with a variety of educational software that aligns with the curriculum. Teachers can be trained to effectively utilize these tools to create engaging and interactive learning experiences for students.
4. Establishing a dedicated technical support team or partnering with external organizations can provide timely assistance to teachers in addressing technical challenges. This support will ensure a smoother integration of ICTs into daily teaching activities. Also, schools and educational policymakers should consider revising teaching schedules to allow for dedicated time slots for ICT-based lessons. This will enable teachers to make optimal use of ICT resources without being constrained by time limitations. Furthermore, involving parents, community members, and local organizations in supporting ICT initiatives can help in sourcing additional resources and advocating for improved infrastructure.

5.6 Suggestion for Further Studies

1. A similar study needs to be done in other districts, municipalities in the region or other regions of Ghana for a more generalized conclusion to be made on teachers' use of ICTs towards the implementation of the standards-based curriculum.
2. A further study can focus on private school teachers use of ICTs for implementation of the standards-based curriculum.

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APPENDICES

APPENDIX A

QUESTIONNAIRE FOR TEACHERS

Dear Sir/Madam,

This questionnaire is designed to elicit information from teachers in order to find out teachers use of Information and Communication Technologies (ICTs) in the implementation of the standards-based curriculum. You have been selected because you are one of the teachers involved in the implementation of the standards-based curriculum. If you answer the following questions as frankly and truly as possible, you will be contributing immensely towards the successful implementation of the standards-based curriculum through the use of Information Communication and Technologies. Your name is not required, and any information you give will be treated as confidential. Thank you in anticipation of your co-operation.

Do you consent to voluntarily participating in this study? Yes [ ] No [ ]

SECTION A: TEACHER'S DEMOGRAPHIC INFORMATION

Tick **(✓)** in one of the spaces provided to answer each question posed.

1. What is your gender? A. Male [ ] B. Female [ ]
2. What is your age bracket?
   A. Below 30 years [ ] B. 41-50years [ ] C. 31-40years [ ] D. 51-60years [ ]
3. What is your highest qualification?
   A. Certificate [ ] B. Degree [ ] C. Diploma [ ] D. Masters [ ] E. Others [ ]
4. How many years have you been teaching?
   A. Below 5 years [ ] 6-10years [ ] 10-20 years [ ]Above 20 years [ ]

SECTION B: AVAILABILITY OF ICTS IN IMPLEMENTING THE STANDARDS-BASED CURRICULUM

Please indicate by ticking (√) the availability of the following ICTs implementing the primary school standards-based curriculum. Indicate your response by ticking the appropriate column.

SN	**What are the available ICT facilities for teaching in the Sefwi Wiawso Municipality?**	**Available**	**Unavailable**
8	Computers		
9	Internet System		
10	Televisions and radios.		
11	Photocopier		
12	Educational Software		
13	Overhead projectors		
14	Printers		
15	Digital Video Recorder		
16	Telephone		
17	Digital cameras		

SECTION C: PROFICIENCY OF TEACHERS IN USING ICTS IN THE IMPLEMENTATION OF THE PRIMARY SCHOOL STANDARD-BASED CURRICULUM

Please respond to all items given below by putting a tick [ ] in the appropriate space using the following scale: 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Uncertain (U), 2 = Disagree (D), and1 = Strongly Disagree (SD). Please indicate your respond to each of the following statements by ticking(√) the number that represents your level of agreement or disagreement with it. Thank you for your cooperation.

SN	**How proficient are you in using ICTS in the implementation of the primary school standards-based curriculum?**	**Strongly Agree**	**Agree**	**Undecided**	**Strongly Disagree**	**Dis-agree**
18	I received ICT training before joining the teaching profession					
19	I received in-service training in ICT education					
20	I am very good at using Microsoft Word for word-processing and instruction					
21	I am very good at using Microsoft PowerPoint for teaching					
22	I am very good at using internet/email for research and instruction					
23	I am good at using Microsoft Excel/ Access for instruction and assessment					
24	I am very good at using Microsoft word for lesson plan preparation					
25	I am good at using ICTs to sure educational videos to sustain interest and reinforce learning.					

SECTION D: USE OF ICT IN THE IMPLEMENTATION OF THE PRIMARY SCHOOL STANDARDS-BASED CURRICULUM

Please respond to all items given below by putting a tick [ ] in the appropriate space using the following scale: 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Uncertain (U), 2 = Disagree (D), and1 = Strongly Disagree (SD). Please indicate your respond to each of the following statements by ticking(√) the number that represents your level of agreement or disagreement with it. Thank you for your cooperation.

SN	**How do you use ICTs in the implementation of the primary school standards-based curriculum?**	**Strongly Agree**	**Agree**	**Undecided**	**Strongly Disagree**	**Dis-agree**
26	I use ICT for lesson plan preparation					
27	I use ICT to prepare teaching and learning materials					
28	I use internet/email for research and instruction					
29	I use Microsoft Excel for recording and grading students					
30	I use ICT to simulate real experience of students to make lesson lively					
31	I use Microsoft Excel to draw a graphical or pictorial representation of students' performance.					
32	I use ICT for drill and practice to promote students learning					

SECTION E: CHALLENGES TEACHERS FACE IN USING ICTS IN THE IMPLEMENTATION OF THE PRIMARY SCHOOL STANDARDS-BASED CURRICULUM

Please respond to all items given below by putting a tick [ ] in the appropriate space using the following scale: 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Uncertain (U), 2 = Disagree (D), and1 = Strongly Disagree (SD). Please indicate your respond to each of the following statements by ticking(√) the number that represents your level of agreement or disagreement with it. Thank you for your cooperation.

SN	**What challenges do you face in using ICTs in the implementation of the primary school standards-based curriculum?**	**Strongly Agree**	**Agree**	**Undecided**	**Strongly Disagree**	**Dis-agree**
33	I have negative attitude towards ICT integration into teaching and learning					
34	There is inadequate technical support					
35	Teaching time schedules prevent maximum utilization of ICT for teaching and learning					
36	There is in adequate ICT s infrastructure for teaching and learning					
37	There is unreliable or no internet connectivity in my school					
38	I am competent and confident to use wide range of varying technologies for various purposes					
39	I lack the needed knowledge to operate ICT tools in teaching and learning					

Thank you for your time!

APPENDIX B

INTERVIEW GUIDE

This semi-structured interview guide is intended to investigate "**Teachers Use of ICTs In The Implementation Of The Standards-Based Curriculum"**. The information gathered will be used for academic research purposes only. You are requested to provide answers that correspond to each question as frankly as you can. This exercise shall take about 20 minutes. Thank you for taking time off to contribute to this study.

SECTION A: Teacher's Demographic Information

Tick **(✓)** in one of the boxes provided to answer each question posed.

1.What is your gender? A. Male [ ] B. Female [ ]

2. What is your age bracket?

   A. Below 30 years [ ]

   B. 41-50years [ ]

   C. 31-40years [ ]

   D. 51-60years [ ]

3. What is your highest qualification?

A. Certificate [ ] B. Degree [ ] C. Diploma [ ] D. Masters [ ] E. Others [ ]

4. How many years have you been teaching?

   A. Below 5 years [ ] 6-10years [ ] 15-20 years [ ] 20 years and above [ ]

SECTION B: INTERVIEW QUESTIONS TO TEACHERS

1. a. Are you proficient in using ICTS in teaching and learning?

   _____

   b. How proficient are you in using ICTS in in teaching and learning?

   _____

   c. Does your proficiency or otherwise influence your use of ICTs in teaching and learning?

   _____

2. a. Do you think the use of ICTS promote digital literacy in your pupils?

   _____

   b. How do you use ICTS in teaching and learning in your classroom?

   _____

   c. Why do you make use of ICT in your classroom?

   _____

3. a. What challenges do teachers face in using ICTS in teaching and learning?

   _____

   b. How does this/these challenges affect(s) your use of ICTs in teaching and learning?

   _____

   c. Why do you think this/these is/are challenge(s)?

   _____

APPENDIX C

OBSERVATION GUIDE

SECTION A: BIOGRAPHIC DATA

1. Date and Day ……

2. Class……

3. Topic……

4. Number on Roll…… Boys…… Girls……

5. Time of Observation……Start……End…… …

6. Teachers' Gender…… Male [ ] …….. Female [ ]……

SECTION B: NATURE OF THE PHYSICAL ENVIRONMENT

Classroom Context: Rate the adequacy of the physical environment.

7. Classroom Space:

   Very crowded [ ]

   Crowded space [ ]

   Adequate space [ ]

   Very Adequate [ ]

8. Classroom Resources:

   Very Sparsely [ ]

   Sparsely Equipped [ ]

   Rich in resources [ ]

   Very Rich in resources [ ]

SECTION C: VERIFICATION OF ICT PROFICIENCY

S/N		Observed	Not Observed
9	Good at using Microsoft Word for word-processing and instruction		
10	Good at using Microsoft PowerPoint for implementation		
11	Good at using internet/email for research and instruction		
12	Good at using Microsoft Excel/ Access for instruction and assessment		
13	Good at using Microsoft word for lesson plan preparation		
14	Good at using ICTs to sure educational videos to sustain interest and reinforce learning.		

SECTION D: VERIFICATION OF THE USE OF ICTS

S/N		Yes	NO
15	Teacher uses ICT for lesson plan preparation		
16	Teacher uses ICT to prepare teaching and learning materials		
17	Teacher uses internet/email for research and instruction		
18	Teacher uses Microsoft Excel for recording and grading students		
19	Teacher uses ICT to simulate real experience of students to make lesson lively		
20	Teacher uses Microsoft Excel to draw a graphical or pictorial representation of students' performance.		
21	Teacher uses ICT for drill and practice to promote students learning		

SECTION E: VERIFICATION OF THE CHALLENGES TEACERS FACE IN THE USE OF ICTS

S/N		Observed	Not Observed
22	Negative attitude towards ICT integration into teaching and learning		
23	Inadequate technical support		
24	Adequate ICT s infrastructure for teaching and learning		
25	Unreliable or no internet connectivity in my school		
26	Competency in the use of wide range of varying technologies for various purposes		
27	Lacks the needed knowledge to operate ICT tools in teaching and learning		