UNIVERSITY OF EDUCATION, WINNEBA

ICT KNOWLEDGE, SKILLS AND USAGE AMONG TEACHERS AND STUDENTS OF CAPE COAST SCHOOL FOR THE DEAF IN CAPE COAST

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A Dissertation in the Department of SPECIAL EDUCATION, Faculty of EDUCATIONAL STUDIES, submitted to the School of Graduate Studies, University of Education, Winneba in partial fulfilment of the requirements for award of the degree of MASTER OF EDUCATION IN SPECIAL EDUCATION

DECEMBER, 2015

DECLARATION

STUDENT'S DECLARATION

I, Patience Dadzie-Bonney, declare that this Dissertation, with the exception of quotations and references contained in published works which have all been identified and 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 CERTIFICATION

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

NAME OF SUPERVISOR: DR. SAMUEL KWEKU HAYFORD

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DATE:…….

ACKNOWLEDGEMENT

A work of this nature cannot be produced without the help of God so I would like to first and foremost express my sincerest thanks to the Almighty God who gave me the strength and wisdom to complete this work successfully.

I am profoundly grateful to my supervisor, Dr. Samuel Kweku Hayford, for his encouragement, inspiration and guidance throughout the period of this research. In spite of his tight schedules, he made time to read and help put my work in good shape. Dr. God richly bless you.

I owe Mr Ephraim Quaynor Teye (Volunteer, Resource Centre for Students with Special Needs, UEW) a lot of gratitude for his tremendous assistance from the beginning of my work to the end. Mr. E.Q Teye showed great interest in my work and gave me the needed assistance from the beginning to the end.

I would also like to thank my lovely husband Pastor Herbert Dadzie-Bonney of I.C.G.C Freedom Temple, Winneba Junction, for the spiritual, moral and financial support given me throughout the period. May the good Lord take you to another level in your walk with him.

My sincere thanks also go to Engineer Godfred Mensah of E.C.G, Accra for his encouragement and financial support to me. Stay blessed.

Mr Emmanuel Baffoe of Winneba Senior High School also deserves my gratitude for his counsel and pieces of information given me for the writing of my dissertation.

Madam Emma Justina Bonney, Master Mark Addae, Madam Esther Quansah, Madam Mercy Annang, Mr Charles Adzoe and Mrs Rebecca Cudjoe, deserve my appreciation for their prayers, encouragement, and love. God richly bless you all.

DEDICATION

This Dissertation is dedicated to my beloved husband Pastor Herbert Dadzie-Bonney, my boy Victor Dadzie-Bonney, my beloved brother Engineer Godfred Mensah and Mr Ephraim Quaynor Teye whose prayers and encouragement assisted me complete this dissertation successfully.

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ABSTRACT

This study was to find out the level of ICT knowledge, skills, and utilization among teachers and students in teaching and learning at the Cape Coast School for the Deaf. Twenty-eight (28) teachers and forty (40) students were randomly sampled from the population which included all teachers and students of the school, numbering one-hundred and forty (140). A questionnaire was administered to the teachers and students, and an interview was conducted with some teachers, to collect data for the study. Descriptive and inferential statistical methods were used to analyse the data. The results of the study indicated that the level of ICT knowledge and skills of majority of the teachers was high. Also, the study revealed that the level of teachers" ICT knowledge and skills positively influence their usage of ICT for teaching. Again, it was found out that the higher the knowledge and skills, the lower the challenges faced. The study further revealed that the level of knowledge and skills among the students was relatively high. It was also found that students faced some challenges in using ICT for teaching. Finally, it emerged that the difference in the level of ICT knowledge and skills between male and female students was not statistically significant. The study concluded that the use of ICT for teaching and learning should be enhanced by providing the resources and personnel to help the teachers and students. It is recommended that the teachers and students should be given access to the use of computers and the Internet. Also, in-service training should be organized regularly for the teachers, by the Ghana Education Service.

CHAPTER ONE

INTRODUCTION

1.0 Background to the Study

Information and Communication Technology (ICT) has played a key role in shaping the global economy, and producing rapid changes in society. Within the past few decades, ICT has fundamentally changed the way people cope with the ever-changing trends in all aspects of the society. Significant transformation in various sectors of the modern world has been spearheaded through the use of ICT. ICT has generally become a powerful tool for extending educational opportunities for students in any educational system today. ICT has enabled changes in the way students acquire knowledge and has facilitated communication, increased access to information and aided deeper understanding of issues by developing problem-solving capabilities. Again, ICT transformed the nature of education by enhancing how learning takes place, and the roles of students and teachers in the learning and teaching process (Khvilon & Patru, 2002).

For students with disabilities, ICT has increased their independence, by enabling students with visual impairments to access information, because of their knowledge and skills in using ICT, by providing alternative methods (BECTA, 2001). Those with difficulties in holding a pen or using a mouse or keyboard are now able to use a combination of built-in functionality, voice recognition systems, and other ICT and assistive solutions, to interact with the computer to work. The benefits of the application of ICT in education have been enumerated in the literature. Access to quality information, through ICT, has strengthened and enhanced the quality of education for all (Adu & Olatundu, 2013; Hennesy, Onguko, Harrison, et al. 2010). In

fact, the tremendous growth of ICT has given a new outlook to how education is to be conducted – putting the students in the centre of the teaching and learning process.

However, ICT has still not completely removed barriers that students with disabilities face in their education (Kaye, 2000). Access to ICT tools and their usage, among students with disabilities, has been difficult for several reasons. The primary reason is the lack of essential knowledge and skills about ICT tools (Bordbar, 2010; Peralta & Costa, 2007), which makes it difficult for their usage (Ozcelik & Kurt, 2007). These, together with some other challenges students and teachers face in the use of ICT, have resulted in the formation of attitudes that do not ensure or promote continuous use of ICT tools, especially for educational purposes (Afari-Kumah & Acheampong, 2010).

A considerable amount of research has been conducted on the knowledge and skills that students and teachers have for the use of ICT tools in education. The context of these studies has been about teachers (Beaula & Raja, 2012; Lawrence & Veena, 2011); students (Selim, 2007; Selvi, 2010; Yusuf & Balogun, 2011); and other professionals (Hobbs, 2002; McCannon & O'Neal, 2003). However, despite the abundance of literature on these issues, there appears to be a dearth of research within the Ghanaian context, that significantly examines the essential knowledge and skills for the usage of ICT among students with disabilities and their teachers, as well as the challenges that students and their teachers face. The concern and focus of this study was to investigate these issues as they persist at the Cape Coast School for the Deaf. This is because the Ghana Education Service has made it compulsory for all basic schools in Ghana, including special schools, to study ICT as part of the school curriculum (Mangesi, 2007). This therefore requires that teachers have some

knowledge and skills in using ICT, in order to transfer these knowledge and skills to the students.

1.1 Statement of the Problem

Even though ICT has contributed immensely to access, equity and delivery of quality teaching and learning, with many studies showing how ICT can lead to improved student learning and better teaching methods (Ciroma, 2014), ICT education at the Cape Coast School for the Deaf seem to be on a slow pace. Through observations made by the researcher at the school‟s ICT laboratory, and also from conversation with some teachers and students, it appears that the scope of their ICT knowledge and skills is somewhat restricted. No empirical study has been conducted to establish whether or not teachers and students in the school have the requisite knowledge and skills in ICT. If teachers do not possess the requisite knowledge and skills, they will not teach the students effectively to enable them acquire functional knowledge in ICT as their non-disabled counterparts in the mainstream. Since the goal of educating all students including those with disabilities in Ghana is to ensure quality, it is imperative to conduct a study to investigate the level of knowledge and skills, and the use of ICT in teaching and learning.

1.2 Purpose of the Study

The purpose of the study was to find out the level of knowledge, skills and the utilization of Information and communication Technology (ICT) among teachers and students of the Cape Coast School for the Deaf, in order to determine how to improve ICT teaching and learning in the school.

1.3 Objectives of the Study

The study sought to:

- find out the level of knowledge and skills teachers and students of Cape Coast School for the Deaf have about ICT.
- examine how ICT is used by teachers and students of Cape Coast School for the Deaf in teaching and learning.
- describe the challenges teachers and students of Cape Coast School for the Deaf face in using ICT for teaching and learning.

1.4 Research Questions

The following research questions guided the study:

1. What is the level of ICT knowledge and skills of teachers of Cape Coast School for the Deaf?
2. What is the level of ICT knowledge and skills of students of Cape Coast School for the Deaf?
3. To what extent do teachers of Cape Coast School for the Deaf use ICT in teaching?
4. What challenges do teachers of Cape Coast School for the Deaf face in the use of ICT for teaching?
5. What challenges do students of Cape Coast School for the Deaf face in the use of ICT for learning?

1.5 Hypotheses

The following hypotheses were raised for the study:

$H_0$1: There is no significant difference in the level of ICT knowledge and skills between male and female teachers.

$H_0$2: There is no significant difference in the level of ICT knowledge and skills between male and female students.

1.6 Significance of the Study

The findings of this study would reveal some baseline information about the level of ICT knowledge and skills among the teachers and students of the Cape Coast School for the Deaf. In this regard, the study could inform policy decisions in the allocation and provision of ICT facilities for teachers and students in the school. It could also make decision-makers, curriculum planners and developers aware of which instructional resources and methodologies to integrate for teaching students with deafness to acquire knowledge and skills in ICT.

Also, the findings of the study would add to the body of knowledge with regards to the challenges that teachers and students face in the utilization of ICT in their teaching and learning.

1.7 Delimitation

Even though there are many teachers and students in the Cape Coast School for the Deaf, who are at different classes, this study focused on only those who are in the Junior High School. This is because they are the classes whose students use the computer laboratory in learning ICT. Also, the study focused on the teachers who teach ICT in the Cape Coast School for the Deaf.

1.8 Limitation of the Study

The study was conducted at a time when the researcher was also preoccupied with academic work and professional activities. This caused some amount of delay and difficulty in conducting the research.

1.9 Structure of the Study

The study is organized into five chapters. Chapter one focuses on the introduction to the main study. It discusses the background to the study, the statement of the problem, the purpose and the objectives of the study, and research questions. Also, the significance of the study, delimitation and limitations, and the operational definition of terminologies used in the study were also stated in chapter one. In chapter two, relevant related literature was reviewed based on themes derived from the research questions. Chapter three covers the methodology used for the study. This included research methodology, research design, population, sample size and sampling techniques. It also covered the instrumentation, procedure for data collection, validity and reliability of the measurement instrument, the pilot study, ethical considerations, and the analysis of data. Chapter four presents the analysis of the findings, and the discussion of the results of the study. In chapter five, the study is summarized, with conclusions and recommendations also presented. Finally, contributions to knowledge and suggestions for further research are offered.

1.10 Definition of Terms

Students with hearing impairment: Students who have a hearing loss that interferes with their ability to process linguistic information through auditory channels with or without amplification.

School for the Deaf: A school for children who have hearing impairment.

Information and Communication Technology (ICT): The use of technology to process information and aid communication.

ICT Devices: Devices such as computers, tablet devices and smartphones.

ICT Tools: A collection of ICT applications and services such as the Internet and e-mail systems.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of related literature for the study. The following are the subsections under the literature review:

1. Theoretical Framework - Dreyfus Model of Skill Acquisition
2. Implication of the theory to the study
3. ICT in Education
4. Level of knowledge and skills in ICT among Basic School teachers and pupils
5. The use of ICT in teaching and learning in Special Schools
6. Characteristics of students with hearing impairment
7. Challenges faced in using ICT for teaching and learning in Special Schools
8. Summary of literature review

2.1 Theoretical Framework - Dreyfus Model of Skill Acquisition

Upon reviewing similar studies in literature, a number of theories were found to be relevant to this study on ICT knowledge, skills, and usage. However, the researcher adopted the principles of the Dreyfus Model of Skill Acquisition, developed by Dreyfus and Dreyfus (1980). This model concerns itself with the issue of how people acquire skills through external instruction and experience, as a result of usage over time. It states that when individuals undergo external instruction to acquire a skill, they normally will go through several developmental stages – Novice, Advanced Beginner, Competent, Proficient, and Expert.

2.1.1 Novice Stage

According to Dreyfus and Dreyfus (1980, p. 7), the student, at this stage, has an incomplete understanding, and approaches tasks mechanically. Normally, the instruction process begins by decomposing the task environment into context-free features which the students can recognize without the benefit of experience of a particular situation in the instructional domain. The student demonstrates a rigid adherence to the rules and plans that have been taught to them, and have very little perception of situations. They do not use any form of discretionary judgment. In order to improve, the novice needs monitoring, either by self-observation or instructional feedback. This is to ensure that his or her behaviour is brought more into conformity with the rules and plans. They also require supervision to complete tasks.

2.1.2 Advance beginner Stage

Dreyfus and Dreyfus (1980, p. 7), also mention that when a student reaches the Advance beginner stage, he or she has a working understanding of key aspects of practice, and tends to see actions as a series of steps. They can also complete simpler tasks without supervision. Again, they are able to achieve some tasks using their own judgment, but with supervision needed for the entire work. They appreciate complex situations, but are only able achieve partially.

2.1.3 Competent Stage

Further, Dreyfus and Dreyfus (1980, p. 8) opine that the competent stage is when students have a good working and background understanding of their skills. They see actions, at least, partly in context, and are able to complete work independently to a standard that is acceptable, though it may lack refinement. They are able to achieve most tasks using their own judgment. Also, the students deal with complex situations

through deliberate analysis and planning, realizing that competence comes after they have had considerable prior experience coping with real situations in which they note recurrent meaningful patterns.

2.1.4 Proficient Stage

At the stage of proficiency, students exhibit a deep understanding, sees actions holistically, rather than as separation into parts (Dreyfus & Dreyfus, 1980, p. 10). At this stage the students see and appreciate what is most important in a situation, and can also perceive situations of deviation from the normal pattern. They can achieve a high standard of competence routinely, while decision-making becomes less difficult.

2.1.5 Expert Stage

At the expert stage, Dreyfus and Dreyfus (1980, p. 14) state that students have an authoritative or deep understanding of the skills they possess and implement. They no longer rely on rules and guidelines. They deal with routine matters intuitively, and are able to go beyond existing interpretations to achieve excellence with ease. At this point, students are able to take responsibility for going beyond existing standards, and create their own interpretations. Further, the have a holistic understanding and comprehension of complex situations. Also, they have the ability to see the overall idea of a situation, and alternative approaches and visions of what may be possible.

The Dreyfus model is used fairly widely to provide a means of measuring and supporting progress in the development of skills, and also to provide a definition of an acceptable level for the assessment of skills. The model suggests that as students become skilled, they depend less on abstract principles, and more on concrete experiences. It further concludes that any skill-training procedure must be based on some model of skill acquisition at each stage of training, so that it can address the

appropriate issues involved in facilitating advancement and attainment of skills (Dreyfus & Dreyfus, 1980, p. 15). The justification for choosing this theory is based on the fact that ICT usage in the teaching and learning process requires some skills on the part of both teachers and students. These skills are based on the persons knowledge and usage experience over time, which results in some desired level of expertise in the use of ICT. To the extent that skill acquisition is a process that moves from one stage or level to another, the Dreyfus model of skill acquisition is considered to be appropriate for the study, given that it provides a framework that underpins this process.

2.2 Implication of the Theory to the Research

Using the Dreyfus model of skill acquisition, the study was placed within a context that made it possible to investigate the level of knowledge and skills that the participants of the study possess, for using ICT. In its fullness, the model supported the suggestion that the acquisition of ICT knowledge and skills is not an end in itself, but rather a point in the middle – a level that must be experienced in order to achieve proficiency and expertise, whiles improving upon one‟s performance with experience (Bottino, 2003; Noor-Ul-Amin, 2012). The establishment of this definition informed the focus of the study by ensuring that the levels of ICT knowledge and skills of the participants were not considered as the end points of what they can actually achieve, but rather as snapshots of their current competency levels, which are subject to change at a particular point in time. This understanding supported the choice of research design. Again, it provided a framework on how best students with deafness could be guided to acquire skills in the use of ICT for learning and self-development.

2.3 ICT in Education

The use of ICT has the potential for reform and advancement in education (Tinio, 2003). When used appropriately, ICT can help to expand access to education, strengthen the relevance of education, and raise educational quality by helping to make teaching and learning an interactive and engaging process (Higgins & Moseley, 2001). Concerning how ICT tools have been used for teaching and learning, Richmond (2002) have noted that there are three general approaches to the instructional use of computers and the Internet, namely: learning about computers and the Internet, in which technological literacy is the end goal; learning with computers and the Internet, in which the technology facilitates learning across the curriculum; and learning through computers and the Internet, by integrating technological skills development with curriculum applications. According to Richmond, learning about computers and the Internet typically includes the understanding of basic terms, concepts and operations, the use of productivity tools such as word processing, spreadsheets, database and graphics programs, the use of research and collaboration tools such as search engines and email, and the development of an awareness of the social impact of technological change. This implies that learning with the technology includes the use of presentation, demonstration, and the manipulation of data using productivity tools, the use of curriculum-specific applications types such as educational games, drill and practice, simulations, tutorials, and the use of information and resources on CD/DVD-ROM or online such as encyclopedia, interactive maps and atlases, electronic journals and others. Finally, learning through computers and the Internet is described to mean learning the technological skills which are required by a learner as he or she engages in a curriculum-related activity (Ibid, 2002).

A case study by Gulbahar (2008) using questionnaire from 305 individuals at a school of education in a private university in Turkey, examined factors that contribute to preservice teachers‟ utilization of technology and suggest recommendations regarding its effective use. Gulbahar found out that teacher education programmes fail to provide appropriate instructional technologies and computer facilities for both in and out of class activities. Furthermore, three factors that appear to have a significant influence on the effective use of technology were found to be the quantity and quality of the lessons addressing technology in the curriculum, incompetent teachers, lack of in-service training, and insufficient technological infrastructure. This result endorsed the findings by Bauer and Kenton (2005), who stated that although teachers were having sufficient skills, were innovative and easily overcome obstacles, they did not integrate technology consistently, both as a teaching and learning tool.

Mingaine (2013) underlined the continuing problems in the adoption of ICT by teachers and stated the need for further research on how ICT can improve education. He recommended that teachers should possess the skills and competencies essential for using ICTs in teaching, since the successful integration and utilization of technology requires not only the knowledge, but also the skill to plan and execute a good lesson with the technology (Richardson, 2009). Therefore, it is important for teachers to situate the use of ICT in education within the context of their work in the classroom (Ilomaki, 2008; UNESCO, 2013).

Gulbahar (2008) recommended that technology experts be contacted and collaborated with as advisors and role models. Indeed, the pre-service teachers who participated in the study underscored the inadequacy of lessons to facilitate acquisition of necessary skills to become technology-competent teachers. Also, almost all of the academic

staff (99%) involved in the study were willing and ready to participate in any course, seminar, and workshop about technology usage. Furthermore, Patahuddin (2008) have asserted that usage of the Internet as a learning tool has not been realized by both teachers and students because of the difficulties in infusing Internet use into curriculum due to the lack of appropriate teacher professional development. Again, Sabzian, Gilakjani and Sodouri (2013) argued that competence in the use of technology in the classroom proved to be a direct function of the degree of technology utilization, as a result of teachers‟ skills training and development. It can be deduced from the above-mentioned statements that successful integration and utilization of ICT tools and resources in Education, to a large extent, depends on the skills possessed by teachers, and the availability and collaboration with technology experts.

Similarly, Amenyedzi, Lartey, and Dzomeku (2011) conducted a case study to assess the use of computers and Internet as supplementary source of educational material in three Senior High Schools in Ghana. Using the stratified sampling method, sixty (60) teachers and one hundred and twenty (120) students were selected to participate in the study. A set of questionnaires were used to collect data for the study. The results showed that although 92% of the teachers were computer literate, less than 15% of them used the computer and the internet as an innovative way of improving teaching and learning. Over 30% of the teachers used the computer mainly for research work. According to Amenyedzi et al., the challenges the respondents faced were limited number of computers in the computer laboratories in the schools, and limited Internet service connectivity in the schools‟ computer laboratories.

Another study conducted on Malaysian teachers‟ technology acceptance and readiness in teaching via mobile phones (Ismail, Bokhare, Azizan, & Azman, 2013) used the

case study design, and used a questionnaire to collect data from 38 teachers who taught IT subjects at different primary schools. The results on the acceptance of technology among respondents were categorized into four components - Awareness and motivation, Training and courses, Training design, and Supports and facilities. Under awareness and motivation, it was revealed that most of the respondents agreed on the benefit of technology in gathering students‟ interest, and thus expressed their willingness to adopt new technologies into their classrooms. Also, the analyses indicated that the teachers were aware and felt motivated to use technology in the teaching and learning processes (p. 11). This finding supports the opinion of Solomon (2003), which stated that when users are aware of the value of a tool, they will be motivated toward the use of it. It also agrees with the view that teachers‟ motivation is positively related to ICT use in the classroom (Karsenti, Villeneuve, & Goyer 2006).

On the issue of training and courses, the study reported that all the respondents agreed that they were willing to attend necessary training and courses on technology to increase their knowledge and skills. Previous studies had asserted that ICT-related training programmes help to influence teachers‟ acceptance towards technology in classrooms (Hew & Brush, 2007; Keengwe & Onchwari, 2008). Also, Lawless and Pellegrino (2007) have suggested that if a training programme is effective, educators will be eager to involve it in pedagogical activities. Therefore, it can be inferred from the literature that with appropriate training, teachers may adopt and integrate ICT into their teaching. Again, it emerged that all the respondents perceived that the design of content for their training was a crucial factor that determines their acceptance of technology. They all agreed that they needed training which related to their profession, matched their needs, reasonable to their time and condition, and being conducted by experienced trainers. Finally, the result on supports and facilities

revealed that most respondents gave positive responses regarding the technological supports and facilities they received. Most of the teachers agreed that the supports and facilities were supportive and effective to increase their credibility and to assist them in practicing new methods, even though the physical facilities needed upgrading.

Although the advantages of using ICT in education has been widely reported by several researchers (Bushati, Barolli, Dibra, & Haveri 2012), including the elimination of barriers to education for students and for teachers (Bhattacharya & Sharma, 2007; Cross & Adam, 2007), allowing the use of new methods of education (Sanyal, 2001), and improving upon the process of teaching and learning (Barolli & Sevrani, 2009), many disadvantages exist that make the integration of ICT in education not entirely positive. ICT can create a partition, digital gap within the classroom, where students who are more familiar with ICT will have more benefits, and will learn faster than others who are unfamiliar to the technology. Another disadvantage that ICT may present to the education sector, especially in developing countries, is the high cost of hardware and software (Bushati, et al., 2012).

In their survey which used a questionnaire to collect data from management staff, lecturers and students of Albanian public universities, Bushati, et al. found out that the respondents perceived that ICT in education reduces face-to-face communication, and is more costly than traditional education, among others. In line with these demerits, it was suggested by Keengwe and Onchwari (2008), that educational institutions should be provided with enough funding to manage and implement ICT-related policies in education; again, specialized staff who will foster ICT integration in education should be employed to help in avoiding, reducing, or eliminating the main obstacles that may be encountered by teachers and students who are not familiar with ICTs.

2.4 Level of Knowledge and skills in ICT among Basic School teachers and pupils

The use of Information and Communication Technology in education has undoubtedly influenced and enhanced teaching and learning processes (Rather & Kuraishy, 2015), and is expected to improve educational outcomes and also improve the quality and effectiveness of teaching and learning (Jaffer, Ng‟ambi & Czerniewicz, 2007). However, Oliver (2000) argues that the possession of a wide variety of ICT knowledge and skills is required for both academic and career success. Cretchley (2007) reported that students need to have some level of knowledge and experience in using ICT in order to achieve some level of technology competence.

A number of studies have been conducted to examine the level of knowledge and skills in ICT among different individuals. One of such studies was conducted by Peterson and Palmer (2011), on level of technology competence among 1500 pre-service students. The study established that majority of respondents felt that they were competent enough to integrate technology into their teaching, and also to use such technology in their future teaching. Also, Albion (2007) conducted a study involving 516 student teachers about their technology competence in finding information on the internet. The findings revealed that the respondents exhibited high levels of confidence and competence, as a result of their high ICT knowledge and familiarity. This implied that when an individual‟s knowledge and skill level in ICT is high, they normally feel competent and confident in using the technology. A related study found that students with higher computer literacy were more inclined to use computers and online library resources (Tella & Mutula, 2008). Furthermore, Yu, Kim and Roh‟s (2001) survey of 257 students concluded that, the ICT knowledge and skills of the participants were not sufficient. They argued that the lack of knowledge about

computers creates anxiety on its use, whereas increasing knowledge and familiarity with computers is important for ICT usage. Finally, they advocated for the provision of some fundamental knowledge and skills in ICT, to facilitate learning.

In order to ascertain the veracity of the claim that taking a course in ICT would enhance the knowledge and skills of individuals, a study was conducted by Edwards, Portman and Bethea (2012). Through an experiment with 26 students who completed a survey, the study concluded that students increased their ICT knowledge and skills based on completing a computer course. The results indicates that computer competency is a developmental skill which can be enhanced with knowledge acquired from an introductory computer course. These outcome is in support with and Wu and Yeh (2012) whose study of 443 students from the departments of Chinese Literature, Sociology, and Computer Science revealed that the Computer Science students were more confident to master ICT competences than students of other subject fields. According to Wu and Yeh, Computer Science students more heavily depend on computers, and therefore are more computer literate because of the subject knowledge. This outcome implies that people who take courses in ICT-related fields, are more likely to use ICT for their daily activities, including teaching and learning.

It is clear that people‟s ICT competencies depend on the type and/or quality of their functional skills. According to the Association of College and Research Libraries (2005), functional skills enhance an individual‟s capabilities of using ICT resources such as computers, software applications, databases, and other technologies to achieve a variety of goals. Elder and Koehn (2009) have shown that the lack of skills may lead to a delay in learning or increase in frustration among students. For this reason, some basic ICT skills are highly required in order for both teachers and students to be able to cope with the current trends in education (De Wit, Heerwegh, & Verhoeven, 2012).

Several studies have investigated the level of ICT skills possessed by different professionals and individuals in the educational sector (Masood, Khan, & Waheed, 2010; Nwachuku, 2004). In a case study of 20 teachers to determine the competency in the use of ICT, Peralta and Costa (2007) found that ICT skills which were needed to make the teachers competent users of ICT in their teaching were low. They further revealed that teachers with more experience with computers and other ICT tools, have greater confidence in their ability to use them effectively. Tasir, Abour, Halim, and Harun (2012) point also that teachers‟ competence in using ICT tools in the classroom relates directly to their confidence and perceptions of level of their skills. Similarly, Callinan (2005) observed that students‟ lack of ICT skills on one hand, and their unfamiliarity with library computer systems on the other, has created some difficulty for them in finding course-related materials in library electronic catalogues. These findings agreed with earlier conclusions made by researchers such as Majid and Abazova (1999), and Shelstad and Clevenger (1996), who reported that individuals with higher computer self-efficacy appeared to be more competent in computer-related activities than those with low computer self-efficacy.

Also, Danner and Pessu (2013) investigated the ICT usage habits and perceived skillfulness of 100 university students in Nigeria. They found out that there was a low level of ICT usage among the students, as a result of their low level of computer skills, and confirms the outcome of Ozoemelem‟s (2010) study, which also found out that there was a low level of skillfulness in the use of ICT among Nigerian university students. Ozoemelem randomly sampled 300 students who responded to a questionnaire. Similarly, Yusuf (2005) reported that teachers in Nigerian secondary schools did not possess basic computer skills necessary to make them competent. These outcomes suggest that the use of ICT tools for teaching and learning, to a large

extent, is influenced by the skills that an individual possesses. However, a contrary opinion was expressed by Oyeronke and Fagbohun (2013), in their assessment of computer and ICT skills among secondary school teachers in Nigeria. Whereas the aforementioned studies revealed that majority of teachers and students lacked ICT skills, Oyeronke and Fagbohun reported in their study that majority of the teachers sampled were computer and ICT literate. They further noted that although this is a very good indication, so much still needs to be done.

Besides, Ademodi and Adepoju (2009) conducted a study on the ICT skills of academic librarians in Nigeria. Using both questionnaire and interview to collect data from 24 respondents, it was found that few librarians used ICT tools to carry out library functions because the level of their ICT and computer skills was low. The study recommended that training workshops should be organized for the librarians, for the acquisition of basic ICT skills. This recommendation was similar to those by several other researchers (Diso & Njoku, 2007; Itsekor & Ugwunna, 2014; Manir, 2011; Ochogwu, 2009) who advised that new library professionals should be trained to maintain some appreciable level of ICT skills. These suggestions support the views of Abubakar and Hassan (2010), and Megnigbeto (2007), that practical ICT skills must be incorporated into the curriculum for training librarians, and many other professionals in the educational sector.

The acquisition of ICT skills is very important for ensuring the continuous use of modern technologies. Several studies back this idea. These include the study of Khalid, Nawawi and Roslan (2009). They sought to find out what conditions influence the use of ICT in secondary schools in Malaysia. The study revealed that the presence of knowledge and skills for using computers and ICT tools influence

teachers‟ decision to implementation educational technology innovations. This is endorsed by Yong (2011) who found out that his respondents demonstrated capacity and willingness to update their technical skills in order to achieve some degree of competence in implementing educational technology innovations. The results of these studies provide a basis to the idea that effective use of ICT for teaching and learning is influenced largely by the willingness and the capacity of individuals to possess and update the ICT skills. In this way, differing amounts of skills training could be delivered according to individual teacher‟s needs, leading to an improvement in their computer competency.

The current study focused on students with deafness, and teachers of students with disabilities, whiles the existing literature (Itsekor & Ugwunna, 2014; Kaminski, Seel, & Cullen, 2003; Khalid, Nawawi & Roslan, 2009; Snoeyink & Ertmer, 2001) focused on teachers, students, and other professionals in mainstream institutions.

2.5 The use of ICT in teaching and learning in Special Schools

The use of ICT has become increasingly important in the educational system, and has affected teaching, learning, and research (Yusuf, 2005). Recognizing the effect of ICT on everyday life, educational institutions try to restructure their educational curricula and classroom facilities, in order to bridge the existing technology gap in teaching and learning to promote meaningful teaching and learning (Tomei, 2005). One of the most vital contributions of ICT in the field of education is the ease of accessibility to learning (Noor-Ul-Amin, 2012). With the help of ICT, students can have access to resource persons, mentors, experts, researchers, professionals, as well as peers all over the world. This flexibility has provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002). ICT has

made the sharing of information, such as best practices and best course materials, which can foster better teaching available.

A number of researchers have conducted studies on how ICT is used in either teaching or learning in various contexts, and have reported different findings, with some suggesting that ICT is widely used to enhance teaching and learning (Koert, 2000; Watson, 2002), whiles others report the opposite (Office for Standards in Education, [OFSTED], 2004), and still others reporting mixed findings (Amenyedzi, Lartey & Dzomeku 2011)). The InterActive Education project examined ways in which ICT can be used in schools to enhance teaching and learning with ICT as it affects the learner and the whole class, and looked at the learner in settings outside school. The study found that 70% of teacher partners used ICT successfully to enhance student learning (Sutherland, 2006). This result is significant, considering that earlier, OFSTED (2004) presented overwhelming evidence from the UK and elsewhere that the vast majority of teachers are not using ICT to enhance student learning.

A study conducted by Amenyedzi, Lartey and Dzomeku (2011) in Ghana, revealed that less than 25% of the students surveyed, used ICT for research and learning. This outcome is alarming, considering the fact that students are better motivated to learn when they work with computers (Koert, 2000), and also that ICT-enhanced learning promotes increased learner engagement (Wastson, 2002). Nonetheless, Amenyedzi et al. reported that the students who used ICT facilities stated that it has helped them to achieve new things which they could not have done, including the timely finishing of assignments, help in solving questions, the use of search engines to retrieve information, increased typing skills, communicating with friends, and increased scope

of research. The students also noted that the introduction of ICTs in their educational institutions has had impact both on them and on their teachers. According to the students, ICT was enhancing their learning process. These outcomes agree with that made by several researchers to the effect that the use of ICT in education helps students to develop higher order skills such as collaborating across time and place and solving complex real world problems, and also improves their perception and understanding of the world (Bhattacharya & Sharma, 2007; Bottino, 2003; Mason, 2000; Noor-Ul-Amin, 2012).

Furthermore, less than 5% of teachers who participated in the survey used ICTs as TLMs. When asked the reasons for not using ICT tools for teaching, respondents indicated that the facilities were limited and not connected to the internet. Some also indicated that they did not know how to use it in relation to their subject. However, the few respondents who mentioned that they used the facility have been able to achieve new things they could not do earlier. Some of these were: access to detailed information on issues, information from other books, improved access to further areas in their subjects, ease in planning of scheme of work, among others. Despite the fact that some teachers do not use ICT at all, teachers generally agreed that the computer had changed the way students learn, with about 96% responding that computers significantly changed the way students learn. This corroborates the point made that although most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, they value its potential quite significantly (Smeets, 2005). Similar findings were reported by Boakye and Banini (2008). Boakye and Banini found out that only 24% of the teachers had received some form of training on using the computer, and suggested that this could have contributed to the low level of ICT usage among teachers who participated in the study. This agrees with findings by

other researchers which state that teacher training is required in order to create new learning environments (Jimoyiannis & Komis, 2007), and to impart the necessary ICT skills required (Kozma, 2005).

A recent survey conducted by the European Union (2013) on benchmarking access, use and attitudes to technology in schools in Europe revealed that around 50% of students at grades eight (8) and eleven (11) in general education use a desktop or a laptop during lessons at school at least weekly, but around 20% of the students at the same grades never or almost never use a computer during lessons. This is because although most of the teachers are familiar with ICT for teaching and learning for some years, only a few use it to work with students during lessons.

Furthermore, the European Union (2013) survey reports wide variations in the degree of use of the ICT equipment available. It was found that Grade 11 vocational students are likely to be in a school where teachers use ICT equipment in the majority of lessons. Also, it emerged that about 80% of Grade 8 students in the European Union always or almost always use a computer, and 50% of Grade 8 and 11 students always use an interactive whiteboard, and 75% of students are in a school where the teacher uses ICT in more than one in 20 lessons. Additionally, the survey mentions that on average, more than 50% of secondary school students use desktop computers at least once a week. Thus students appear to be increasingly and frequently having access to ICT facilities in school, and using them for learning.

Tella, Tella, Toboyo, Adika and Adeyinka (2009) examined Nigeria secondary school teachers‟ uses of ICT tools and its implications for further development of ICT use in Nigerian secondary schools. Data was collected from 700 teachers who were randomly selected from twenty-five (25) private schools for the survey. The study

found that generally, apart from other identified ICT tools, it is only the Internet and e-mail facilities that the respondents did not have access to. This result may be due to the fact these facilities are not available for access or perhaps the teachers lack the skills to access them. On frequency of access to ICT facilities, the results generally revealed that a considerable number of teachers access ICT between 11- 15 hours per week. This outcome suggests that ICT usage by teachers was relatively high, corroborating the viewpoint that teachers are positive with regards to the use of ICTs (Gray & Souter 2003). Tella and colleagues further noted that teachers perceived ICT as being very useful, and suggested that this outcome may be connected to the fact that teachers perceived ICT as improving learner‟s performance. This is consistent with an assertion in the Technology Acceptance Model (TAM) developed by Davis, Bagozzi and Warshaw (1989) that states that if a user perceives a particular technology as useful, they better engage in its use.

2.6 Characteristics of students with hearing impairment

Students with hearing impairments who receive special education services are a diverse group who vary in their level of hearing loss, family and demographic characteristics, school experiences, and outcomes (Blackorby & Knokey, 2006). Hearing impairment is a very common problem and a severe handicap in many developing countries and are therefore unable to communicate by verbal means (Amusa, Adegbenro, Ogunniyi, & Olarinoye, 2013). Yet ability to take part in normal conversations is essential for social survival (Yust, 2000). It had been documented in the literature that two thirds of the world‟s populations with hearing impairment are in the developing countries.

Blackorby and Knokey (2006) conducted a longitudinal survey to provide a profile of students with hearing impairments in elementary and middle school in the USA. The sample for the survey was about 1000 students between the ages of eight (8) – fifteen (15) years. The survey reported that more than 40% of students with hearing impairments had severe or profound hearing loss. Slightly more than 30% had moderate hearing loss, and fewer than 20% of the students with hearing impairments were reported to have mild hearing loss. In Nigeria, however, Amusa et al. (2013) found that ninety-two percent (92%) students with hearing impairment had profound or severe hearing loss, while only 8% had moderate hearing loss. Under communication functioning, the data revealed that significant numbers of students with hearing impairments did not communicate as effectively as other students of the same age group. It stated that 43% to 80% of students with hearing impairments, depending on level of hearing loss, have at least a little trouble speaking clearly. This assertion is supported by the claim that people with hearing impairment may have their speech not easily understood by others (Accessibility Directorate of Ontario, 2009). Also, depending on the level of hearing loss, fewer than 25% - 50% students with hearing impairments are reported to have trouble understanding what others say.

This observation by the Accessibility Directorate of Ontario, (2009) is upheld by the National Association of Deafened People [NADP], (2013), which states that people with severe or profound hearing loss may not be able to hear voice well and may be unsure whether the person talking is speaking too softly, too loudly or perhaps not clear enough. Similarly, Wayner (2011) states that if a person has a hearing loss, sounds may seem loud enough, but not clear for them. She further mentions that people may seem to be mumbling or talking too quickly. Furthermore, the National Health Service of UK (2009) stated that people with hearing impairment may have

difficulty hearing other people clearly and misunderstand what they say, miss bits of conversation, especially in groups or when there is background noise, or even asking people to repeat something. Also, it has been noted that the inability of children who are deaf or hard of hearing to understand spoken communication hinders the social, emotional and familial interaction and relationship (El-Zraigat & Al-Emam, 2005). Researchers suggest that positive parent-child interaction is a very good predictor of linguistic development (Calderon & Naidu, 2000; Moeller, 2000). These communication problems and differences in modes of communication often adversely impact the ability of students who are deaf or hard of hearing to develop friendships (Luckner, Schauermann, & Robb, 1994, cited in Luckner, 2008).

Another characteristic of hearing impaired people is the difficulty in understanding what is being said in a group, especially when there is any background noise. This makes group conversations are more and more difficult to follow (Wayner, 2011). On the mode of communication employed by students with hearing impairments, Blackorby and Knokey (2006) reported that majority of these students use oral speech as a communication mode, in addition to other forms of communication, such as sign language, lip reading, cued speech, and communication boards.

However, the claim that oral speech was used by a majority of the students is not supported by Amusa‟s et al. (2013), who found out that all the children failed to develop spoken speech. Again, it was found out that lip-reading was a much more common aid to receptive communication for students with severe or profound hearing impairment (79%), or moderate hearing impairment (58%). Also, sign language was noted to be common among students with severe or profound hearing loss (70%). This finding is corroborated by Amusa et al., who reported that sign language was the mode of communication at the school for the deaf Children in Ife-Ijesha Senatorial

District of Osun State, Nigeria. Communication boards are much less commonly used than other communication modes and are most commonly used by students with severe or profound hearing loss. Other forms of features of students with hearing impairments are their ability to read and write. Researchers have demonstrated that many people who are deaf or hard of hearing are able to acquire the skills to access and use print. Conversely, many students who are deaf or hard of hearing have significant problems in this area (Traxler, 2000). These challenges have impacted on the students‟ ability to master content subject material, learn independently, and use technology.

2.7 Challenges faced in using ICT for teaching and learning in Special Schools

The process of using ICT in everyday education is very complicated. The opportunities provided by ICT to support teaching and learning are not problem-free, and has resulted in the situation where computers are used less often in the classroom than in other organizations (Vrasidas, et al. 2010). This is a result of a number of barriers that make teachers‟ use of ICT in the classroom somewhat difficult. In order for education innovations to succeed, systemic approaches and the collaboration of all stakeholders, including teachers, are required (Cuban, 2001) to overcome these barriers. Researchers have grouped challenges relating to ICT into two: extrinsic and intrinsic. However, what is meant by extrinsic or intrinsic differs from one researcher to another. Whiles Ertmer (1999, p. 48) defines extrinsic challenges as difficulties which arise as a result of access, time, support, resources and training; and intrinsic challenges as those related to attitudes, beliefs, and practices, whiles Al-Alwani (2005) views extrinsic challenges as pertaining to organizations rather than individuals, and intrinsic challenges as pertaining to teachers, administrators and individuals.

Besides, BECTA (2004) provides another classification, in which it grouped the challenges according to whether they related to the individual, (such as lack of time, lack of confidence, and resistance to change), or whether it related to the institution, (such as lack of effective training, and lack of access to resources). It is important to note that the challenges pertaining to ICT acceptance and usage for teaching and learning primarily includes the lack of commitment in funding, staff training and stable power supply (Ijeoma, Joseph, & Franca, 2010; Oye, Iahad, & Rahim, 2012; Oye, Salleh, & Iahad; 2011) Additionally, another group of researchers refer to the challenges as those pertaining to two types of conditions: material and non-material. As Pelgrum (2001) classifies, the material conditions refer to the insufficient number of computers or copies of software, whiles the non-material challenges refer to teachers‟ insufficient ICT knowledge and skills, the difficulty of integrating ICT in instruction, and insufficient teacher time.

The successful use of ICT in the classroom of students with deafness has been noted to have the potential of making them acquire ICT skills (Ali, Haolader, & Muhammad, 2013), which motivates learning by providing regular access to the educational resources and hands-on computer instruction and practice. These consistent practical training sessions instill in them the necessary skills required for the world of work (Kozma 2005). Unfortunately, many obstacles exist, which makes it difficult for teachers and students to use ICT and related technological tools in the classroom. Some of the major themes that have emerged from literature on the various challenges that hinder the successful use of ICT in the school environment include the lack of confidence among the teachers (Balanskat, Blamire, & Kefala, 2006; Dawes, 2001) and the lack of teachers‟ competence in dealing with the technology (Albirini, 2006; Almohaissin, 2006).

Adoption and use of ICT in schools requires skilled teaching staffs that are knowledgeable about ICT in teaching and learning in schools. If the requisite knowledge and skills are lacking among the teachers, policies formulated by government and huge investments made towards implementation of ICT in schools will not to realize the desired school reforms (Higgins & Moseley, 2001). A major challenge identified in many developing countries regarding adoption and use of ICT in schools is that there are very few teachers who are qualified and experienced enough to make use of ICT in teaching and learning. In order to correct this situation and to harness ICT for school purposes, Jimoyiannis and Komis (2007) advice that sustained investments in supporting teacher training is required in order to create new learning environments. This is because teachers play a critical role in the implementation and use of ICT at school level, due to their central role in curriculum implementation and innovation. However, many schools face a challenge of shortages of ICT teachers and other IT professional that support adoption and use of it in classroom. Adebi-Caesar (2012) has pointed that in order to effectively integrate and use ICT in teaching and learning, there must be high quality and frequent training to all the people who must drive this innovation. Without this, he contends that any attempt to employ ICT successfully for teaching will not be fruitful.

The lack of effective training for teachers in the use of ICT has been noted by many researchers, including Albirini (2006), Beggs (2000), Ozden, 2007, Scheopp (2005), Sicilia (2005), and Toprakci (2006) as a major challenge. Beggs (2000) indicated that among the many challenges to teachers‟ use of computers for teaching, the lack of training ranked very highly. Pelgrum (2001) corroborated this point, reporting that there were not enough training opportunities for teachers in the use of ICT. Several other researchers found that the main problems with teachers‟ use of ICT resources

was the insufficient number of in-service training programmes, (Ozden, 2007; Toprakci, 2006). Although the enumerated above may have been resolved over the years, the case still exists within the Ghanaian context (Addy & Ofori-Boateng, 2015, p. 26).

A number of studies have discussed the type and quality of training teachers must receive, to enhance their use of ICT in teaching. BECTA (2004) postulated that it is very important to provide teachers with pedagogical training rather than simply training them to use computers and ICT tools. This point buttresses an earlier argument by Cox, Preston and Cox (1999, cited in Bingimlas, 2009), that if teachers are to be convinced of the value of using ICT resources and computers in their teaching, then the focus of their training should be on pedagogical issues. Adebi-Caesar (2012) argued that much emphasis is not placed on acquiring pedagogical skills in how to incorporate ICT into the curriculum. This affected teachers‟ ability to use ICT in teaching their students to acquire basic ICT knowledge and skills.

Literature on ICT training indicates that it is important to organize a purposeful training in ICT for teachers at the pre-service level, with continuous professional development at the in-service level (Tan & Wong, 2014). These forms of teacher training are essential if the teachers are to ensure the integration and utilization of ICT tools and approaches in their teaching (Osborne & Hennessy, 2003). The idea that teachers become more appreciative of the use of ICT tools such as computers, as a pedagogical aid, has been established by a study conducted by Jegede, Dibu-Ojerinde and Llori (2007). They claim that teachers‟ appreciation of the use of ICT tools make them form positive attitudes and interests which help in making their use of ICT for

teaching easier. This ensures that teachers instruct and assist their students to acquire the relevant and necessary computer knowledge and skills.

As Drent and Meelissen, (2008) also observed, the level and quality of teachers training has a positive influence on how effective ICT is adopted and used in classrooms. Based on this observation, Hennessy, Onguko, Harrison, Ang‟ondi, Namalefe, Naseem, et al. (2010) established that most programmes towards teacher training in ICT focused on basic literacy skills rather than on adoption and use in teaching. Andoh (2012) also noted that teacher-training institutions have continued to emphasize on teaching about the technology rather than on how to use the technology to teach. For their part, Andoh (2012), and Ananiadou and Rizza (2010) argued that continued and sustained training is important to make teacher-trainees become effective and comfortable in adoption and using the technology once they start practicing. They also mentioned that teacher training institutions need to change their strategy on how they train teachers with a view of giving them an opportunity to practice using technology before they are posted to schools. Also, Rozell and Gardiner (2000) argued that there was the need for teacher-trainees to meet the requirements for ICT skills in colleges, so that once they are practicing, they do not need to spend time learning. Again, it is noted that allowing teacher-trainees to use ICT during their training creates another opportunity for them to acquire technology skills in other courses. According to Higgins and Moseley (2001), the inability of teachers to understand why they should use ICTs and how exactly they should use them in their teaching is a challenge to the implementation of ICT in schools.

A survey by Kandiri (2012) indicated that the number of teachers skilled in ICT in secondary schools in Kenya was low. The survey was on ICT access and use in Kenya

secondary schools. Kandiri reported that only 900 (40%) out of 2250 ICT teachers that graduated from universities and tertiary institutions in 2010, went to teach ICT in various educational institutions. This indicates that there is a relatively small number of qualified ICT teachers in Kenyan schools. According to Kandiri, of the number of teachers available to teach, few had ICT training effective in adoption and use of the technology in classroom. Another study by Ayere, Odera and Agak (2010) on E-learning in secondary Schools in Kenya, reported that a number of teachers in schools had not received any training in ICT use during their formative years at teacher training institutions before joining the profession. Again, 55% of the sampled teachers stated that they did not receive any ICT training at all. However, the study found that 51% of the teachers had ICT training during the last three years. This suggests that the teachers realize and acknowledge the fact that training is very important for the successful integration of ICT in their teaching.

Another major challenge in using ICT for teaching and learning is the lack of accessibility. Several research findings have suggested that lack of access to resources is a complex challenge to the utilization of ICT, especially among students with disabilities (Adebi-Caesar, 0212; Bingimlas, oi2inidr022 .)0 22S,aili iS; 0222BECTA (2004), the inaccessibility of ICT resources is not always merely due to the non-availability of the hardware and software or other ICT materials. Sometimes, it may be the result of factors such as poor organization of resources, poor quality hardware or inappropriate software. This challenge is noted to be the most enormous in the use of ICT (Empirica, 2006). Al-Alwani (2005) had revealed that lack of computers and hardware resources, and no access to the internet impeded technology integration and use in Saudi Arabian schools. Also, Toprakci (2006) found that fewer numbers of

computers, and the oldness or slowness of ICT systems greatly affected the use of computers in schools. Similarly, Albirini (2006) noted that insufficient computers and technological resources were one of the greatest impediments to technology integration and use in schools. Gomes (2005) also mentioned that the challenges relating to the lack of access to ICT are not wholly about lack of computer hardware and software resources, but also about the lack of appropriate infrastructure. This implies that the lack of computer laboratories, internet services, and network systems also affect the utilization of ICT in schools.

Also, technical support has been cited by many researchers as one of the major challenges teachers and students face in the attempt to adopt and use ICT for both teaching and learning (Gomes, 2005; Pelgrum, 2001; Sicilia, 2005; Toprakci, 2006). Without good technical support, technology users who wish to acquire computer skills cannot overcome the challenges that prevent them from doing so (Lewis, 2003). Sicilia (2005) revealed that technical problems were a major challenge for teachers, in their quest to integrate and use ICT resources. These technical challenges included waiting for websites to open, failing to connect to the Internet, computer peripherals failing to function, and teachers having to work on old and outdated computers. Korte and Husing (2007) have argued that ICT support or maintenance by ICT technicians help teachers to use ICTs and computers without losing time through having to fix some problems. This helps the teachers to have the time to teach their students the requisite ICT skills that must be taught.

Jones (2004) reported that the breakdown of computers cause interruptions in the teaching process. The absence of technical assistance may result in the lack of regular repairs of the computers, leading to teachers not using computers in teaching. The effect is that teachers will be discouraged from using computers because of fear of

equipment failure since no one would give them technical support in case there is technical problem. BECTA (2004) agreed with Jones, in stating that the lack of technical support in a school, may lead to the likelihood that technical maintenance will not be carried out regularly, resulting in a higher risk of technical breakdowns. Yilmaz (2011) advices that that in providing schools with hardware and internet connections, it is also crucial to provide the schools with technical support with regard to repair and maintenance for the continuous use of ICT in schools. Also, Tong and Trinidad (2005) stated that if there is no technical support for teachers, they become frustrated, resulting in their unwillingness to use ICT. A study by Korte and Husing (2007) revealed the importance of technical support to the integration and use of ICT in schools. They argued that ICT support in schools influence teachers to apply ICT in classrooms without wasting time troubleshooting hardware and software problems.

Furthermore, many studies have revealed that the amount of work teachers have to do influence their acceptance of technology in classrooms (Buabeng-Andoh, 2012). Samarawickrema and Stacey (2007) investigated factors related to the use of learning management system in a university in Australia, and found that increased workload coupled with using ICT tools for teaching was critical to the participants of the study. Factors reported to contribute to increased workload were course maintenance and constant upgrades, student emails, the learning of new skills and the continuous search of sustainable strategies. Similarly, Neyland (2011) conducted research on factors influencing the integration of online learning in high schools in Sydney. The study involved 26 computer coordinators. It was revealed that the increasing workload of teachers was alarming.

2.8 Summary of Literature Review

Related literature on the issues that center on the knowledge and skills for ICT usage among students and teachers was reviewed. Several studies which formed part of the review acknowledged that the integration and use of ICT in education has significantly enhanced the ways in which teaching and learning take place. It revealed that the use of ICTs for teaching and learning, and for other administrative activities in the education sector has been widely researched. However, the review established that the level of knowledge and skills in ICT among teachers and students has also been observed to be relative low. Furthermore, numerous challenges that hinder the use of ICT tools in the teaching and learning process were found in the literature. However, the review revealed that there is a huge dearth of literature on how knowledgeable and skillful students with hearing impairment and their teachers are, in the use of ICTs for teaching and learning. This current study aims at filling this gap.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discusses the methods that were used in collecting data for the study. It consists of the research design, the population, sample and sampling techniques, research instrument, validity and reliability of the instrument, procedures for data collection, ethical considerations, and data analysis.

3.1 Research Design

The research design used in this study was a cross-sectional survey. According to Robson (2003), descriptive cross-sectional surveys are useful when a researcher intends to describe the views of the study"s participants exactly how they were expressed. This design allows researchers to describe and provide an understanding of a phenomenon using simple descriptive statistics in presenting data (Bell, 2003). Bell further pointed out that, survey is primarily for describing, observing and documenting aspects of a situation as they naturally occur. The advantage of using survey is that responses can be collected from a very wide range of people. The design allowed the researcher to collect data from the sample used for this study, thereby presenting what had been gathered. The study adopted the survey design because it allows for quicker collection of large amounts of quantifiable data from all members of the sample at a reasonably lower cost (Muijs, 2004), which helped to describe the issues surrounding the phenomenon under study.

Another reason for choosing this research design is that it made it easier to guarantee the anonymity and confidentiality of the participants of the study. Also it gave the respondents the opportunity to complete the questionnaires in their own time (O'Leary, 2004), thereby obtaining data which could be described as accurate and authentic. Again, the survey design was used for the study because it provided all the respondents with standardized questions which made measurement more precise, and also eliminated the researcher's own biases and prejudices (Sincero, 2012).

3.2 Population

The population involved in the study included all the teachers and students at the Junior High School of the Cape Coast School for the Deaf. The entire population involved in the study is presented in Table 1 below:

Table 3.1: Targeted Population

Type of Participant	Number	Percentage (%)
Teachers	28	20.0
Students	112	80.0
Total	**140**	**100.0**

Source: Field Data (2015)

3.3 Sample Size

Sample is a group on which information is obtained (Creswell, 2005). All twenty-eight (28) teachers were selected to form part of the study‟s sample. Also, out of one hundred and twelve (112) students, forty (40) were selected to form part of the participants for the study, making the sample size sixty-eight (68).

3.3.1 Sampling Technique

Sampling technique is the process by which a portion of the population is selected to represent the entire population (Fraenkel & Wallen, 2000; Muijs, 2004). In this study, the simple random sampling technique was used to sample sixty-eight (68) individuals - forty (40) students and twenty-eight (28) teachers - to participate in the survey. This sampling technique is conducted where each member of the population has an equal opportunity to become part of the sample. In order to conduct this sampling strategy, the students population was first defined by categorizing them according to their classes, and listing down the names of all members in alphabetical order, with surnames first. The researcher decided to randomly select ten (10) students from each class by asking the students to ballot for a position to participate in the study. This was to ensure that there is an equal representation of students from all classes. Below is a breakdown of the students according to their classes:

Table 3.2: Breakdown of Students Population

Class	Population F (%)	Number Selected F (%)
Pre-JHS	25 (22.3)	10 (25.0)
JHS 1	28 (25.0)	10 (25.0)
JHS 2	29 (25.9)	10 (25.0)
JHS 3	30 (26.8)	10 (25.0)
Total	**112**	**40**

Source: Field Data (2015)

Table 2 presented the breakdown of the students‟ population and the selected participants for the study. The frequency distributions show the percentages of respondents according to their classes.

In order to select the required number of students from each class, pieces of ballot papers numbering the same number of students in each class were presented. Out of the ballot papers, ten (10) were marked, whiles the others were unmarked. The number of unmarked ballot papers were fifteen (15) for the Pre-JHS, eighteen (18) for JHS 1, nineteen (19) for JHS 2, and twenty (20) for JHS 3. Students who picked any of the marked ballot papers were selected to participate in the study. This strategy was used to ensure that pure chance dictated the choice of each participant for the study. In cases where the selected number of students in a class was not up to ten, the procedure was repeated until ten students were selected from each class. The researcher used this method to randomly select ten students from each of the four classes. In selecting the teachers to participate in the study, the researcher decided that all the teachers in the school should be part of the study. This was in line with

guidance given by Krejcie and Morgan (1970), cited by Cohen, Manion and Morrison (2007) that, where the population of the study is few (up to 100) then it is well advised to include the whole of the wider population as the sample. Therefore all twenty-eight (28) teachers were selected for this study. Also, three (3) teachers were purposefully sampled to be interviewed. The researcher decided that the ICT teacher and the head teacher must be selected. This is due to the fact that the researcher believed they possessed some significant amount of data about the issue under study. One other teacher was randomly selected to be part of the sample. The method of selection followed the same procedure as that used to select the students. In all, the sample was selected using a technique that ensured fairness and equity for all members of the population.

3.4 Research Instrument

After a careful review of appropriate literature and expert judgment, a decision was made to select two instruments to gather the data for this study – questionnaire and interview.

3.4.1 Questionnaire

The general benefits of a questionnaire which include consistency of presentation of questions to the participants of the study, the assurance of anonymity, and the less time it takes to administer (Fraenkel & Wallen, 2000; Muijs, 2004) made it appropriate for a study of this nature and form. The questionnaire was also found to be appropriate for this study because the study employed a cross-sectional survey design (Fraenkel & Wallen) and also it is probably the most common data collection instrument used in educational research which is more familiar to participants (Muijs, 2004). The questionnaire was a close-ended type in the form of a likert scale which

was built on the key themes raised in the research questions. These were: the level of ICT knowledge and skills of teachers and students, ICT usage by teachers and students in teaching and learning and the challenges faced in using ICT for teaching and learning. The questionnaire was in three parts, with response levels based on a range from Strongly Agree (SA) = 5, Agree (A) = 4, Neutral (N) = 3, Strongly Disagree (SD) = 2, and Disagree (D) = 1.

3.4.2 Interview

Also, an interview was used for the data collection procedure. The nature of the interview was semi-structured. In the interview, the researcher included probes and prompts to aid further exploration of the line of questioning. This helped to explore and develop views of the participants and to prevent them from going off the main line of questioning. The interview was guided by questions that were based on the research questions formulated. This is in line with what Robson (2003) opined, that an interview should be used when gathering information or collecting data which has direct link or bearing on the research objectives. The interview was conducted for the purpose of triangulation, thus obtaining information from multiple sources or processes to find evidence to support a theme. This ensures that the study will be accurate and credible (Creswell, 2012 p. 259)

3.5 Procedure for Data Collection

Before the researcher set out to collect data, permission was sought from the school‟s head teacher, who subsequently informed the teachers about the study in order to solicit their cooperation and assistance. This is consistent with Creswell‟s (2005) advice that it is important to respect the site where a research takes place. This respect, according to Creswell, is shown by gaining permission before entering the

site. This was facilitated by an introductory letter obtained from the Department of Special Education, UEW (Appendix D). The researcher explained the purpose of the study, and assured the participants of the necessary confidentiality on the information to be gathered. Scheduled meetings were communicated to the participants" ahead of time. In addition to the introductory letter, another letter was written to the school requesting for permission from the teachers and students who were involved in the study. The letter helped to gain access and establish rapport with the participants of the study.

With permission from the participants, the questionnaire was administered personally to help improve the collection and response rate. The items in the questionnaire were explained to the participants to ensure that they understood clearly what the questions sought to find. In cases where the respondents were gathered together at a central location, no communication between the participants was allowed during the answering of the questionnaire. This was done to ensure that responses were not affected by views of persons other than the participants. The questionnaire was collected as soon as it was completed.

One-on-one interviews were also used to gather data. In this approach, the researcher interviewed one participant at a time. Robson (2003) says that interviews typically involve the researcher asking questions and hopefully receiving answers from those who are interviewed. Creswell (2005) also shares the same view and says that one-on-one interview is ideal for interviewing participants who are willing to speak, articulate and share freely their ideas. All the three teachers who were scheduled to be interviewed were given a fair opportunity to respond to the interview questions. The interviews began with an introduction that explained the purpose, the ground rules and the duration.

In conducting the interviews, the researcher included probes and prompts which aided further exploration of the questions. The researcher wrote notes whilst conducting the interviews. This is in line with Neuman"s (2000) assertion that note-taking helps the interviewer to formulate new questions as the interview progresses, especially where it may be appropriate to cross check what has been said earlier, and also facilitate later analyses including important quotations. Neuman further mentioned that failure on the researcher"s part to take notes gives an impression to the participants that nothing important is being said. In order to avoid such situations, the researcher took notes during the interview. These written notes included findings and interpretations on key issues, major themes and impression of the setting and participants. This was done to help the researcher during the data analyses.

3.6 Pilot testing of Instruments

A pilot study was conducted on some students and teachers of the Cape Coast School for the Deaf who are not participating in the study. This was to decipher any difficulty or ambiguities that may be identified, and for their rectification before administering them to the sample that was to participate in the actual study. The purpose of the piloting was to establish the validity and reliability of the instruments by checking for clarity of items, instructions and layout as well as to gain feedback on the appropriateness of the instruments (Cohen, Manion, & Morrison, 2007). The pilot study was conducted to determine whether the instruments would be understood by the sample. Twelve (12) students participated in the piloting, with a response rate of 100%. Results from the pilot study informed the researcher on whether the participants understood the questions in the instrument. This offered the researcher an opportunity to modify the instruments. This resulted in making changes to some items of the questionnaire which needed further clarification, to fine-tune it for the main

study.

A one-on-one interview, lasting for about 20 minutes was conducted with two teachers at separate times and days. This was to ascertain the efficacy of the interview questions.

3.7 Validity

To ensure that the questionnaire items have the adequate validity, a number of procedures were adopted. First, content related evidence was used, where the questionnaire items were carefully designed and built on the key themes raised in the research questions. Second, the items were given out for peer judgment that involved two colleagues who looked at the clarity of statements, appropriateness of language, and clarity of the instructions. Suggestions offered in terms of corrections were taken on board. The items were further presented to the research supervisor for expert judgment. The supervisor looked at the appropriateness of the items in the questionnaire and gave an approval.

3.8 Reliability

The reliability of an instrument is a major concern in research (Miner, 2006, p. 24). It is the extent to which measurements are repeatable, when different persons perform the measurements, on different occasions, under different conditions, with supposedly alternative instruments which measure the same thing (Drost, 2011). Also, Weiner (2007, p. 6) describes it as the degree to which a measurement technique can be depended upon to secure consistent results upon repeated application. To determine the reliability of the instruments, a pilot study was conducted on a sample of twelve (12) teachers and twelve (12) students. The reliability scores for the themes identified from the pilot study ranged from 0.84 to 0.95 for the questionnaire for teachers, and

also from 0.83 to 0.93 for the questionnaire for students. The overall Cronbach"s alpha value, which was calculated to determine the reliability of the questionnaire for teachers, was 0.90, whiles that of the questionnaire for students was 0.86, which is higher than the 0.80 generally accepted value in social science research (Webb, Shavelson & Haertel, 2006). Therefore, the instrument can be said to be highly reliable.

Table 3.3: Reliability Scores of the Pilot Study using Questionnaire for teachers

Factors	Cronbach's Alpha	Number of Items	Number of Cases
Level of ICT Knowledge and skills among teachers	0.92	15	12
ICT usage for teaching	0.95	10	12
Challenges faced in using ICT for teaching	0.84	15	12

Source: Field Data (2015)

Table 3.4: Reliability Scores of the Pilot Study using Questionnaire for students

Factors	Cronbach's Alpha	Number of Items	Number of Cases
Level of ICT Knowledge and skills among teachers	0.83	9	12
ICT usage for learning	0.89	7	12
Challenges faced in using ICT for learning	0.93	9	12

Source: Field Data (2015)

3.9 Ethical Considerations

In research, ethical issues are of high relevance and therefore require due concerns. The ethical concern in research is about creating a relationship which upholds mutual respectful and responsibility, in which participants are pleased to candidly respond, in order to obtain valid results. Considering the above, the researcher sought approval by personally meeting with participants and explaining the purpose of the study to them. Verbal assurances of confidentiality and anonymity were also given to the participants before the commencement of the data collection. Participants were also informed of the right to withdraw from the study at any point in time, if they deemed it necessary.

3.10 Data Analysis

The responses from the questionnaire items were coded and analyzed through the use of IBM Statistical Package for Social Science (SPSS) Statistics. The SPSS software was chosen for the data analysis because it is reasonably user friendly and does most of the data analysis one needs as far as quantitative analysis is concerned. SPSS is also by far the most common statistical data analysis tool used in educational research (Muijs, 2004). The data entries were done by the researcher in order the check the accuracy of the data. The study adopted the cross sectional design and used descriptive statistics (frequencies and percentages) to analyze the data collected, and also to answer the research questions raised. Inferential statistical methods (t-test) were also used to test the hypotheses for statistical significance. The Pearson product-moment correlation analysis was also conducted to test the direction and strength of the relationships that exist between the level of ICT knowledge and skills of the teachers, and the level of ICT usage, and the challenges they face. For the purpose of the discussions, the responses to “Strongly Agree” (SA) and “Agree” (A) on the

Likert-scale were combined as having the same idea and, those for "Strongly Disagree" (SA) and "Disagree" (D) were also combined to have the same idea. This was done to simplify the data for easier analysis and discussion. The results were subsequently discussed and supported with evidence from related literature. The interview data was analyzed by narration using the themes developed. The choice of thematic analysis was made because it offers a flexible approach to analyzing qualitative data (Braun & Clarke, 2006). Verbatim expressions of the participants were also used where necessary. The researcher identified the major categories of data and the issues that fall into these categories in the research topic.

CHAPTER FOUR

RESULTS AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter presents the results and discussions of the findings of the study. The analysis was grouped into two sections. Section A focused on the background information of the respondents, whiles Section B focused on the responses to the research questions posed. Also, data gathered from the interviews was also analyzed to reflect the key themes that emerged from the interview.

SECTION A

This section dealt with data obtained from the background information of the respondents. It covered areas including gender, age, pre-entry qualification, and the level at which the teachers first used computers. Also it covered the gender, age, class and how long students have been using ICT devices. Below are the findings:

Table 4.1: Distribution of respondents by Gender

Gender	Teachers F (%)	Students F (%)
Female	15 (53.6)	17 (42.5)
Male	13 (46.4)	23 (57.5)
Total	**28 (100.0)**	**40 (100.0)**

* F = Frequency, ** % = Percentage

Source: Field Data (2015)

Table 4.1 shows the frequency distribution of respondents by gender. From the analysis, it was found out that 53.6% of the teachers are female, whiles 46.4% are male. Also, it emerged that 42.5% of the students were female, whereas 57.5% were

male. This showed that the female teachers were in a slight majority, whiles male students were also slightly more than the females.

Table 4.2: Distribution of Teachers by Age

Age Range	Frequency	Percentage
20 – 29	4	14.3
30 – 39	13	46.4
40 – 49	8	28.6
50 – 59	3	10.7
Total	**28**	**100.0**

Source: Field Data (2015)

Table 4.2 shows the frequency distribution of teachers according to their age ranges. The analysis revealed that four (4) teachers, representing 14.3%, were aged between 20 and 29 years. Thirteen (13) of the teachers were aged between 30 and 39, representing 46.4%, whiles eight (8) of them, which represented 28.6% were found to be between the ages of 40–49. Finally, it was found out that three (3) teachers with ages above 50 years represented 10.7%. This showed that the majority of the teachers were in the age range of 30–39 years old. Again, the analysis revealed that the mean of the ages of the teachers was 37 years.

Table 4.3: Distribution of students by Age

Age Range	Frequency	Percentage
10 – 15	5	12.5
16 – 20	29	72.5
21 – 25	6	15.0
Total	**40**	**100.0**

Source: Field Data (2015)

Table 4.3 shows the frequency distribution of students by age. It was found that 12.5%, of the students were between the ages of 10 and 15 years. A large majority of them (72.5%) were also found to be between ages 16 and 20, whiles 15.0% were found to be above age 20. Also, the analysis revealed that the mean age of the students was 17 years.

Table 4.4: Distribution of Teachers by Pre-entry qualifications

Pre-entry Qualification	Frequency	Percentage
SSSCE/WASSCE	1	3.6
Teachers Certificate „A"	4	14.3
Diploma	7	25.0
HND	0	0.0
Degree	16	57.1
Other	0	0.0
Total	**28**	**100.0**

Source: Field Data (2015)

Table 4.4 shows the frequency distribution of teachers according to their pre-entry qualifications. It emerged from the analysis that only one teacher (3.6%) joined the school with the SSSCE/WASSCE qualification. Four other teachers (14.3%) also came in with qualification from the College of Education level. It was also found out that seven (25.0%) teachers have Diplomas at the time of entry, whiles the remaining sixteen (57.1%) joined with Degree level qualifications. This result showed that majority of the teachers (57.1%) joined the school with Degree qualifications.

Table 4.5: Distribution of students by Class

Class	Frequency	Percentage
Pre-JHS	12	30.0
JHS 1	7	17.5
JHS 2	11	27.5
JHS 3	10	25.0
Total	**40**	**100.0**

Source: Field Data (2015)

Table 4.5 shows the frequency distribution of students according to their classes. Again, the analysis showed that 30.0% of the students were in the Pre-JHS class, with 17.5% being in the JHS 1 class. Another 27.5% were found to be in the JHS 2 class, whiles the remaining 25.0% were in the JHS 3 class. These results showed that majority of the students are in the Pre-JHS class.

Table 4.6: Distribution of Teachers according to the stage at which they first used computers

Stage	Frequency	Percentage
Basic School Level	4	14.3
Junior High School Level	1	3.6
Senior High School Level	5	17.9
Post-Secondary School Level	6	21.4
Polytechnic Level	0	0.0
Degree Level	10	35.7
Others	2	7.1
Total	**28**	**100.0**

Source: Field Data (2015)

Table 4.6 shows the frequency distribution of teachers according to their pre-entry qualifications. The analysis revealed that four teachers (14.3%) first used a computer at the Basic School level, whiles only one (3.6%) used a computer for the first time at the Junior High School level. Again, it was found out that five teachers (17.9%) noted that they first used computers at the Senior High school level. Another six teachers (21.4%) stated that they started to use computers for the first time at the Post-secondary school level, whiles ten of them (35.7%) mentioned that the first used computers at the Degree level. Finally, two of the teachers (7.1%) also noted that their first time of using computers was at the other levels, such as the graduate level. A critical look at the results showed that majority of the teachers first used computers at a later stage of their education – after the Senior High school level. This is indicated by the fact that about 64.2% of the respondents‟ first time use of computers occurred at the Post-Secondary level and beyond.

Table 4.7: Distribution of students according to number of years in using ICT devices

Years	Frequency	Percentage
1 - 4	22	55.0
5 - 8	18	45.0
Total	**40**	**100.0**

Source: Field Data (2015)

Table 4.7 shows the frequency distribution of students according to the number of years they have been using ICT devices. From the table, it is shown that majority of the students (55.0%) have been using ICT devices for between 1 and 4 years, whiles 45.0% have also been using ICT devices for more than 5 years. This result indicates

that many of the students have only a few years of ICT usage experience. However, it shows that all the students have been using ICT devices before reaching their current classes.

SECTION B

This section covered data obtained from the items relating to the research questions. It included data on ICT knowledge and skills, ICT usage for teaching and learning, and challenges faced in teaching and learning with ICT. The findings are presented below:

4.1: Research Question 1

What is the level of ICT knowledge and skills of teachers of Cape Coast School for the Deaf?

To answer this research question, the opinions expressed by the teachers on questionnaire items 1–15 were used. These items sought to address issues concerning the knowledge and skills that the teachers have about ICT. The responses to these statements are shown in Table 4.8.

Table 4.8: Responses of teachers on their ICT Knowledge and skills

Statement	Agree F (%)	Neutral F (%)	Disagree F (%)
1. I can switch ICT devices on or off.	28 (100.0%)	0 (0.0%)	0 (0.0%)
2. I can launch software applications on ICT devices.	21 (75.0%)	3 (10.7%)	4 (14.3%)
3. I can design a lesson that requires the use of the Internet.	20 (71.4%)	4 (14.3%)	4 (14.3%)
4. I can differentiate between different types of icons on a computer.	27 (96.4%)	1 (3.6%)	0 (0.0%)
5. I can create folders and organize files on a computer.	25 (89.2%)	2 (7.2%)	1 (3.6%)
6. I can create documents with ICT devices.	22 (78.5%)	4 (14.3%)	2 (7.2%)
7. I can save documents on storage devices, such as pen drives.	23 (82.1%)	2 (7.2%)	3 (10.7%)
8. I can open files from storage devices such as pen drives and CD/DVDs.	22 (78.5%)	4 (14.3%)	2 (7.2%)
9. I can use a computer to format texts in a document (Highlight, Bold, Italics, Underline, Justify).	23 (82.1%)	3 (10.7%)	2 (7.2%)
10. I can use a computer to change the text in a document to either uppercase or lowercase.	18 (64.3%)	7 (25.0%)	3 (10.7%)
11. I can insert page numbers unto documents on a computer.	17 (60.7%)	4 (14.3%)	7 (25.0%)
12. I can communicate with others through the use of e-mails.	23 (82.1%)	2 (7.2%)	3 (10.7%)
13. I can send files as attachments to an e-mail message.	19 (67.9%)	4 (14.3%)	5 (17.8%)
14. I can search for and locate information on the Internet.	21 (75.0%)	3 (10.7%)	4 (14.3%)
15. I can download documents from the Internet.	20 (71.4%)	2 (7.2%)	6 (21.4%)

* F = Frequency, ** % = Percentage

Source: Field Data (2015)

Table 4.8 shows the responses of teachers about their ICT knowledge and skills. All the teachers (100.0%) affirmed that they can switch ICT devices on or off. Also, a large number of the teachers (75.0%) noted that they can launch software applications on ICT devices. On the other hand, 14.3% disagreed to this statement, whiles the remaining 10.7% were not sure. Also, a significant number of respondents (96.4%) stated that could differentiate between types of icons, (such as files, folders, programs) on a computer. This is perhaps due to the fact that majority of them have some knowledge on how to launch software applications. It was also revealed that 89.2% of the teachers made the claim that they could create folders and organize files on a computer, with another majority of 78.5% claiming that they could create documents with ICT devices. Furthermore, the analysis showed that 82.1% of the teachers were of the view that they could save documents on pen drives and other storage devices, whiles 10.7% disagreed, and 7.2% remained neutral with their responses. Again, it was found that majority (78.5%) had knowledge and skills for opening files from storage devices, with 14.3% being unsure, whiles 7.2% noted they could not perform such tasks.

Again, Table 4.8 shows that majority of the teachers (82.1%) claimed to have knowledge and skills in formatting (highlight, bold, italics, underline, justify) texts in a document. This outcome arises as a result of the knowledge that many of the respondents have about creating documents with ICT devices. It also emerged from the analysis that majority of the teachers (64.3%), and (60.7%) could change text in a document to either uppercase or lowercase, and insert page numbers unto documents, respectively. On the issue of using ICT for communication, it was found that 82.1% of respondents agreed that they could communicate through e-mails, whiles 67.9% also noted that they could send files as e-mail attachments. Again, the result shows

that 75.0% of the respondents claimed to be able to search and locate information on the Internet, whiles another 71.4% of respondents noted that they could download documents from the Internet.

Overall, the results of the analysis revealed that many of the teachers noted that they had knowledge and skills about ICT. This claim by the teachers supports the outcome of a survey by Peterson and Palmer (2011) which reported that many teachers are of the opinion that they have knowledge and skills about ICT. The outcome also provides a basis for the teachers to enhance their competence in ICT, as noted by Cretchley (2007), who stated that some knowledge and experience is required if an individual is to gain competence in using computers.

4.2: Research Question 2

What is the level of ICT knowledge and skills of students of Cape Coast School for the Deaf?

In answering research question 2, frequency distributions and percentages of the students‟ views on the questionnaire items 1–9 were generated and used. These items were used to gather data about the ICT knowledge and skills of the students. Table 4.9 highlights the responses from the respondents.

Table 4.9: Responses of students on their ICT knowledge and skills

Statement	Agree F (%)	Neutral F (%)	Disagree F (%)
1. My school has a well-equipped computer laboratory.	35 (87.5%)	4 (10.0%)	1 (2.5%)
2. I have access to functional computers in my school.	33 (82.5%)	5 (12.5%)	2 (5.0%)
3. My teachers have been using computers to teach us at school.	36 (90.0%)	3 (7.5%)	1 (2.5%)
4. I can switch on a computer and shut it down by myself.	33 (82.5%)	2 (5.0%)	5 (12.5%)
5. I can use a computer with the guidance of my teacher.	31 (77.5%)	3 (7.5%)	6 (15.0%)
6. I can browse the Internet for information to do my assignment.	25 (62.5%)	4 (10.0%)	11 (27.5%)
7. I can communicate with others through the use of e-mails.	24 (60.0%)	4 (10.0%)	12 (30.0%)
8. I can download documents from the Internet.	24 (60.0%)	5 (12.5%)	11 (27.5%)
9. I can save documents on storage devices, such as pen drives.	28 (70.0%)	5 (12.5%)	7 (17.5%)

* F = Frequency, ** % = Percentage

Source: Field Data (2015)

Table 4.9 shows the frequency distribution of responses to Items 1–9 on the questionnaire for students. From the analysis, 87.5% of the students noted that their school had a well-equipped computer laboratory. When asked whether they had access to functional computers in the school, the majority (82.5%) agreed. Again, on the issue of teachers using computers to teach, most of the respondents (90.0%) agreed. The majority (82.5%) further stated that they could switch a computer on and off by themselves, whiles another 77.5% of the students noted that they could use a computer with some guidance from a teacher. Item 6 sought from the students their

knowledge and skills for browsing the internet for information. It emerged that 62.5% of them agreed that they had the skills required. Furthermore, 60.0% of the students noted that they could use the Internet to communicate with people by using e-mails. Also, another 60.0% of the students indicated that they could download documents from the Internet. This suggests that the students‟ knowledge about the Internet, somehow translate into skills for using the Internet. The outcome contradicts the views of Hilberg and Meiselwitz (2008) and Maughan (2001) who noted that students are not as fluent in using the Internet as they perceive themselves to be.

Again, the data analysis shows that 70.0% of the students agreed that they could save documents unto storage devices like pen drives. This shows that majority of the students do not require external instruction or supervision in order to perform such tasks. It implies that they have reached the expert stage of skill acquisition (Dreyfus & Dreyfus, 1980), where they have an intuitive understanding of how such activities are performed, and have attained mastery in these activities.

4.3: Research Question 3

To what extent do teachers of Cape Coast School for the Deaf use ICT in teaching?

Research question 3 was concerned with the extent to which teachers of Cape Coast School for the Deaf use ICT in teaching. Questionnaire Items 16 – 25 were used to generate frequency distributions and percentages of the teachers‟ opinions. The responses to these statements are presented in Table 4.10.

Table 4.10: Responses of Teachers on the use of ICT in teaching

Statement	Agree F (%)	Neutral F (%)	Disagree F (%)
16. I use ICT devices in preparing my lessons.	9 (32.1%)	7 (25.0%)	12 (42.9%)
17. I design lessons that require the use of ICT devices.	12 (42.9%)	5 (17.9%)	11 (39.3%)
18. I use ICT devices to teach my lessons.	12 (42.9%)	9 (32.1%)	7 (25.0%)
19. ICT has enhanced my teaching methodology.	14 (50.0%)	6 (21.4%)	8 (28.6%)
20. ICT has made my lessons very interesting.	14 (50.0%)	6 (21.4%)	8 (28.6%)
21. Using ICT devices make me highly motivated to teach.	15 (53.6%)	9 (32.1%)	4 (14.3%)
22. ICT devices help me to sustain the attention of my students.	13 (46.4%)	8 (28.6%)	7 (25.0%)
23. I use ICT in keeping my students engaged in lessons.	12 (42.9%)	7 (25.0%)	9 (32.1%)
24. I use ICTs as Teaching/Learning materials.	12 (42.9%)	7 (25.0%)	9 (32.1%)
25. I will use ICT tools more often, if they were available in my classroom.	16 (57.1%)	8 (28.6%)	4 (14.3%)

* F = Frequency, ** % = Percentage

Source: Field Data (2015)

From Table 4.10, it was shown that majority of the teachers (42.9%) revealed that they did not use ICT devices in preparing their lessons, compared to 32.1% who agreed, and 25.0% were neutral. Also, 42.9% of the teachers indicated that they design lessons that require the use of ICT devices, whiles 32.1 disagreed. This observation is interesting, considering the fact that many more teachers claim to design lessons that require the use of ICT, compared to those who use ICT devices in preparing their lessons. Again, majority of the teachers (42.9%) noted that they use ICT devices to teach their lessons. 32.1% were neutral with their responses, whiles 25.0% disagreed. When asked whether ICT has enhanced their teaching

methodologies, 50.0% of the respondents agreed, 21.4% were neutral, whiles 28.6% disagreed. Similarly, 50.0% agreed that ICT made their lessons interesting, whiles 28.6% disagreed.

Data from the interview supports the results obtained from the questionnaire. The following observations were made:

> "ICT tools help the deaf to make meaning out of a lot of things they see. E.g. the use of the projector, laptop. In the exams, they picture what they have seen to be able to write something." **(Verbatim expression from Teacher A).**
>
> "using ICT tools in teaching the deaf help them to understand it better." **(Verbatim expression from Teacher B).**
>
> "I have never used ICT in teaching so I can"t differentiate between using and without using ICT tools in teaching." **(Verbatim expression from Teacher C)**

On the subject of teachers being motivated by ICT to teach, 53.6% agreed and 14.3% disagreed. Again, 46.4% of the teachers noted that ICT devices help in sustaining the attention of their students, whiles 25.0% disagreed. This finding is consistent with Amenyedzi"s, et al., (2011), who mentioned that many teachers agree that the computer has changed the way students learn. Also, majority of the teachers (42.9%) reported that they use ICT to keep their students engaged in lessons. However, 32.1% of them disagree, and 25.0% were neutral. Similar findings were recorded for Item 24, which sought to find out whether the teachers use ICT devices as Teaching and Learning materials. Finally, majority of the teachers (57.1%) agreed to use ICT

devices more often, if they were available in their classrooms, compared with 28.6% who were neutral in their responses, and 14.3% who did not agree. These results imply that many of the teachers make use of ICT devices in their teaching.

The interview data also revealed the following comments:

> "I think it is a key that helps them in learning because most of the things can be put in software and you can project them to get a lot of meaning out of it." **(Verbatim expression from Teacher A)**
>
> "Using ICT tools in teaching the deaf help them in the learning and also using the Internet on their own." **(Verbatim expression from Teacher B)**
>
> "To me using ICT in teaching the deaf is not all that appropriate because there are some ICT terms you sign to the deaf and is very difficult for them to get the understanding." **(Verbatim expression from Teacher C)**

4.4: Research Question 4

What challenges do teachers of Cape Coast School for the Deaf face in the use of ICT for teaching?

To answer research question 4, Items 16–25 on the questionnaire for teachers were used to collect data on the challenges teachers face in using ICT for teaching. Frequency distributions and percentages of the responses were generated and used for the analysis. The responses to these Items are presented in Table 4.11.

Table 4.11: Responses of teachers about the challenges they face in using ICT for teaching.

Statement	Agree F (%)	Neutral F (%)	Disagree F (%)
26. I do not have access to ICT devices for teaching.	13 (46.4%)	2 (7.1%)	13 (46.4%)
27. There are insufficient ICT facilities for teaching.	18 (64.3%)	3 (10.7%)	7 (25.0%)
28. Frequent breakdown of ICT devices makes it difficult for me to use in teaching.	17 (60.7%)	8 (28.6%)	3 (10.7%)
29. The availability of funding for the use of ICT is low.	17 (60.7%)	6 (21.4%)	5 (17.9%)
30. Lack of access to Internet service poses a challenge.	11 (39.3%)	5 (17.9%)	12 (42.9%)
31. I lack the competence in the use of ICT devices in teaching.	10 (35.7%)	5 (17.9%)	13 (46.4%)
32. Lack of motivation to use ICT devices in teaching is a challenge for me.	12 (42.9%)	6 (21.4%)	10 (35.7%)
33. I have not been trained on how to use ICT devices.	8 (28.6%)	0 (0.0%)	20 (71.4%)
34. There are no in-service training on how to use ICT devices for teaching.	13 (46.4%)	2 (7.1%)	13 (46.4%)
35. The frequency of in-service training is insufficient.	21 (75.0%)	3 (10.7%)	4 (14.3%)
36. The quality of training is not good enough.	18 (64.3%)	7 (25.0%)	3 (10.7%)
37. There are no technical support staff to help in using ICT devices.	17 (60.7%)	4 (14.3%)	7 (25.0%)
38. Available software for teaching is inappropriate.	19 (67.9%)	4 (14.3%)	5 (17.9%)
39. The quality of available ICT devices is poor.	18 (64.3%)	3 (10.7%)	7 (25.0%)
40. My workload leaves me with insufficient time to develop instructional materials for teaching.	12 (42.9%)	4 (14.3%)	12 (42.9%)

* F = Frequency, ** % = Percentage

Source: Field Data (2015)

For Item 26, which found out whether the respondents have access to ICT devices for teaching, 46.4% agreed, and another 46.4% disagreed. Also, majority of the teachers (64.3%) agreed that there are insufficient ICT facilities, compared to 25.0% who disagreed with the assertion. Furthermore, 60.7% of the respondents noted that frequent breakdown of ICT devices makes it difficult for use in teaching, whiles 10.7% disagreed, and 28.6% were neutral. This finding is consistent with Jones (2004) who stated that the breakdown of computers causes interruptions in the teaching process. Again, 60.7% of the teachers were of the view that funding for the use of ICT devices for teaching is low. Bushati, et al., (2012) found out in an earlier study that the availability of funding to manage and implement ICT-related policies in education was a major challenge in the integration of ICT in teaching. This observation is confirmed by this current finding. It is therefore advised that educational administrators and managers should make funding available for the successful investment into the integration of ICT in education.

Also, Item 30 sought to find out whether access to the Internet posed a challenge to the respondents. It was observed by majority of the teachers (42.9%) that they had access to the Internet, whiles 39.3% noted that lack of Internet access was a challenge for them. This does not support the claim by Amenyedzi et al. (2011) who reported that among the challenges faced by teachers in using ICT for teaching was limited Internet service connectivity in schools. Again, Item 31 found out if lack of competence in the use of ICT devices in teaching was a challenge for the teachers. Majority of the teachers (46.4%) noted that they were competent in using ICT devices for teaching, compared to 35.7% who agreed that they were not competent. The teachers‟ responses suggest that majority of them have reached they competent stage of the Dreyfus model of skill acquisition, where they have a good working

understanding of their skills (Dreyfus & Dreyfus, 1980). It also contradicts Gulbahar‟s (2008) finding that many teachers report that teachers‟ incompetence in using ICT significantly affects the effective use of technology in education. Likewise, majority of the teachers (42.9%) agreed that lack of motivation to use ICT was a challenge to them. However, 35.7% disagreed to the statement.

Furthermore, 71.4% of the teachers pointed to the fact that they have been trained on the use of ICT in teaching. This finding varies from that of Amenyedzi et al. (2011) in which it was reported that only 25% of teachers have received some form of training in the use of computers. The fact that majority of the teachers have been trained in using ICT suggests that they will be willing to accept and use it for teaching, as noted by Hew and Brush (2007), and Keengwe and Onchwari (2008).

Data collected from the interview on the training programmes attended by teachers indicated that they have received some training on how to use ICT in teaching. This was revealed from the following comments:

> “I had computer classes in the past” **(Verbatim expression from Teacher A)**
>
> “I have been to a computer school and also attended ICT workshop from RLG”. **(Verbatim expression from Teacher B)**
>
> “I have no training” **(Verbatim expression from Teacher C)**

Interestingly, 46.4% of the teachers noted that there is no in-service training on how to use ICT devices for teaching, with 46.4% also responding in the negative. The lack of in-service training affects teachers willingness to adopt and use ICT in teaching. This

has been noted by Ozden (2007) and Toprakci (2006) who found out that the main problems with teachers‟ use of ICT resources was the insufficient number of in-service training programmes. Also, 75.0% of the teachers pointed out that the frequency of in-service training is insufficient, and 64.3% also noted that the quality of training is not good enough.

Again, the interview data confirms the results of the questionnaire: the following comments were made by the teachers regarding in-service training and workshops:

> "I have attended only twice. It is not enough" **(Verbatim expression from Teacher A)**
>
> "I have attended only one workshop - RLG". **(Verbatim expression from Teacher B)**
>
> "I have not attended any workshop" **(Verbatim expression from Teacher C).**

These outcomes bring to bear the assertion that the quality of teachers‟ training has a strong influence on how effective ICT is adopted and used in teaching (Drent & Meelissen, 2008). Therefore, it is important to provide teachers with quality in-service training that covers pedagogical training rather than simply training them to use computers and ICT tools (BECTA, 2004).

Item 37 sought to find out whether the absence of technical support staff was a challenge. It emerged from 60.7% of the respondents that there were no technical support staff to help in using ICT devices. This implies that when majority of the teachers had difficulties in the use of ICT in their teaching, there was no support staff available to assist them. This agrees with the claims by many researchers (Gomes,

2005; Pelgrum, 2001; Sicilia, 2005; Toprakci, 2006) that lack of technical support is one of the major challenges teachers face in the attempt to adopt and use ICT for teaching. Lewis (2003) has noted that without good technical support, technology users who wish to acquire computer skills cannot overcome the challenges that prevent them from doing so. It further buttresses the point by Tong and Trinidad (2005), that if there is no technical support for teachers, they become frustrated and unwilling to use ICT.

Furthermore, 67.9% of the respondents reported that the available software for teaching was inappropriate, whiles 64.3% reported that the quality of available ICT devices was poor. BECTA (2004) has noted that poor quality hardware or inappropriate software are major challenges to the use of ICT in education. This current finding supports the above statement. Finally, it was observed, from the analysis that 42.9% agreed that their workload leaves them with insufficient time to develop instructional materials for teaching. Another 42.9% disagreed. The current finding backs the outcome of Neyland"s (2011) study which revealed that the increasing workload of teachers was alarming, and posed a challenge to the use of ICT in teaching.

4.5 Research Question 5

What challenges do students of Cape Coast School for the Deaf face in the use of ICT for learning?

To answer this research question, the opinions expressed by the students on questionnaire items 17 – 25 were used. The responses to these statements are shown in Table 4.12.

Table 4.12: Responses of students about the challenges they face in using ICT for learning.

Statement	Agree F (%)	Neutral F (%)	Disagree F (%)
17. I do not have access to computers.	39 (97.5%)	0 (0.0%)	1 (2.5%)
18. The computers in my school breakdown frequently.	21 (52.5%)	15 (37.5%)	4 (10.0%)
19. I do not have access to the Internet.	19 (47.5%)	5 (12.5%)	16 (40.0%)
20. I do not know how to use a computer for learning.	26 (65.0%)	3 (7.5%)	11 (27.5%)
21. I have not been trained to use computers for learning.	27 (67.5%)	3 (7.5%)	10 (25.0%)
22. We have limited time to learn how to use computers.	2 (5.0%)	4 (10.0%)	34 (85.0%)
23. I am not interested in using a computer for learning.	38 (95.0%)	0 (0.0%)	2 (5.0%)
24. My school does not have learning software such as Mavis Beacon and Microsoft Encarta.	37 (92.5%)	0 (0.0%)	3 (7.5%)
25. The computers in my school are not of good quality.	38 (95.0%)	0 (0.0%)	2 (5.0%)

* F = Frequency, ** % = Percentage

Source: Field Data (2015)

Table 4.12 shows the responses of students about the challenges they face in using ICT for learning. Many of them (97.5%) claim that they do not have access to computers.

Responses from the teachers in the interview confirm the opinions expressed by the students:

> "There are not enough computers for every student" **(Verbatim expression from Teacher A).**

"They are not enough, because two or more students share a computer". **(Verbatim expression from Teacher B)**

"Not enough computers" **(Verbatim expression from Teacher C).**

This confirms the assertion that lack of access to resources is a challenge to the utilization of ICT (Adebi-Caesar, [illegible] 0200 [illegible] learning. Also, 52.5% agree that the computers in the school breakdown frequently, compared to 37.5% who remained neutral, and 10% who disagreed. These frequent breakdowns may be as a result of the lack of regular technical maintenance (BECTA, 2004). Again, a slight majority of the students (47.5%) mentioned that they do not have access to the Internet, compared with 40.0% who disagreed. This implies that access and use of the Internet among students has not been encouraging, corroborating the opinion that the use of the Internet as a learning tool has not been realized by students.

Furthermore, 65.0% of the students posited that they do not know how to use a computer for learning, whiles 67.5% of them reported that they have not been trained to use computers for learning. This result confirms the findings by Amenyedzi, and colleagues (2011) who revealed that less than 25% of the students they surveyed used ICT for research and learning. On the issue of having time to learn how to use computers, majority (85.0%) noted that the time for learning how to use computers is enough. However, 95.0% stated that they are not interested in using computers for learning. This situation may well be attributed to teachers not facilitating the use of computers for learning activities among students (Becker, Ravitz, & Wong, 1999). Also, it may be due to the fact that the school does not have learning software for the students to use. This was revealed from the analysis, which shows that 92.5% of the

students are of the opinion that they do not have learning software such as Mavis Beacon and Microsoft Encarta. It could also be from the revelation by 95.0% of the students that computers in the school are not of good quality. This outcome provides support to the viewpoint that challenges faced in using ICT for learning include factors such as poor organization of resources, poor quality hardware or inappropriate software (Al-Alwani, 2005; BECTA, 2004; Empirica, 2006).

4.6: Testing for Hypotheses 1

The study posed a hypothesis which stated that male teachers will be more knowledgeable and skillful in ICT than female teachers. An independent-samples t-test was conducted to compare the level of ICT knowledge and skills among the two groups. The outcome of the test is presented in table 4.13.

Table 4.13: Independent Samples t-test result for hypothesis 1

Gender			
Male M (SD)	**Female M (SD)**	*t*	*df*
4.56 (.575)	3.81 (.697)	-3.056	26

*** M = Mean ** SD = Standard Deviation**

Source: IBM SPSS Analysis

Table 4.13 shows the results of the independent samples t-test analysis on the level of ICT knowledge and skills of teachers.

4.7: Findings for Hypothesis 1

The Null hypothesis ($H_0$1) stated that:

There is no significant difference in the level of ICT knowledge and skills between male and female teachers**.**

The Alternate hypothesis ($H_1$1) stated that:

Male teachers will be more knowledgeable and skillful in ICT than female teachers.

From the result of the test, there was a statistically significant difference in level of ICT knowledge and skills for male teachers (M = 4.56, SD = .57) and female teachers [M = 3.81, SD = .69; t (26) = -3.05, p = .005, p < .05]. Therefore, the null hypothesis ($H_0$1) was rejected, thus the alternate hypothesis ($H_1$1) was retained.

4.8: Testing for Hypotheses 2

The study posed a hypothesis which stated that male students will be more knowledgeable and skillful in ICT than female students. An independent-samples t-test was conducted to compare the level of ICT knowledge and skills among the two groups. The result is presented in table 4.14.

Table 4.14: Independent Samples t-test result for hypothesis 2

Gender			
Male M (SD)	**Female M (SD)**	*t*	*df*
3.88 (.715)	4.22 (.603)	1.600	38

*** M = Mean ** SD = Standard Deviation**

Source: IBM SPSS Analysis

Table 4.14 shows the results of the independent samples t-test analysis on the level of ICT knowledge and skills of students.

4.9: Findings for Hypothesis 2

The Null hypothesis ($H_0$2) stated that:

There is no significant difference in the level of ICT knowledge and skills between male and female students**.**

The Alternate hypothesis ($H_1$2) stated that:

Male students will be more knowledgeable and skillful in ICT than female students.

From the result of the test, there was no statistically significant difference in level of ICT knowledge and skills for male students (M = 3.88, SD = .715) and female students [M = 4.22, SD = .603; t (38) = 1.60, p = .174, p > .05]. Therefore, the null hypothesis ($H_0$2) was retained, thus the alternate hypothesis ($H_1$2) was rejected.

4.10: Pearson Product-Moment Correlation Analysis

In order to find out the direction and strength of the relationships that exist between the Level of ICT knowledge and skills, and the ICT usage of the teachers, the Pearson product-moment correlation analysis was conducted. Table 4.15 displays the result of the test.

Table 4.15: Pearson product-moment correlation analysis

		Knowledge and Skills	Usage for Teaching	Challenges faced
Knowledge and Skills	Pearson Correlation	1	.547**	-.224
	Sig. (2-tailed)		.003	.252
	N	28	28	28
Usage for Teaching	Pearson Correlation	.547**	1	-.370
	Sig. (2-tailed)	.003		.053
	N	28	28	28
Challenges faced	Pearson Correlation	-.224	-.370	1
	Sig. (2-tailed)	.252	.053	
	N	28	28	28

**. Correlation is significant at the 0.01 level (2-tailed).

Source: IBM SPSS Analysis

Table 4.15 shows the results of the Pearson product-moment correlation analysis.

First, to assess the relationship between ICT knowledge and skills, and ICT Usage for teaching, the Pearson product-moment correlation coefficient was computed. There was a positive correlation between the two variables, r = .547, N = 28, p > .001. This implies that as the level of knowledge and skills increase, the usage for teaching will also increase. Also, the relationship between knowledge and skills, and challenges faced was computed using the Pearson product-moment correlation coefficient. The result indicated a negative correlation, r = -.224, N = 28, p > .001. The analysis revealed that increase in the level of ICT knowledge and skills will result in decrease in the challenges faced in using ICT for teaching. Finally, the strength and relationship between the usage of ICT for teaching, and the challenges faced was measured. The result proved a negative correlation between the variables, r = -.307, N

= 28, p > .001. This suggested that as teacher‟s use of ICT for teaching increases, the challenges they face decrease.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0: Introduction

This chapter presents the summary, conclusions, and recommendations of the study. It also presents the contribution to knowledge, and suggestions for future research.

5.1: Summary of major findings

The purpose of the study was to investigate the ICT knowledge, skills and usage among teachers and students of Cape Coast School for the Deaf. The specific objectives of the study was first to find out the level of ICT knowledge and skills that teachers and students have. Secondly, the study sought to examine how ICT was used in teaching and learning. The third objective was to describe the challenges that teachers and students face in using ICT for teaching and learning. The Dreyfus model of skill acquisition (1980) was used as the theory underpinning the study.

The study used the cross sectional survey as the research design. The population of interest for the study included all the teachers and students at the Junior High School of the Cape Coast School for the Deaf. A total of 28 teachers and 40 students were randomly sampled to participate in the study. Data collection instruments used were questionnaire and interview. Data analysis was done by the use of descriptive statistical methods, involving the generation of percentages on frequency counts. The independent samples t-test and the Pearson product-moment correlation analyses were also used for inferential statistical analyses.

The major findings of the study are as follows:

1. Majority of the teachers perceived and rated themselves as being knowledgeable and skillful in the use of ICT.
2. There was a positive correlation between the level of ICT knowledge and skills, and the use of ICT for teaching. This resulted in the situation where majority of the teachers used ICT device for teaching.
3. The relationship between ICT knowledge and skills, and the challenges faced in using ICT for teaching was negative. This shows that when the knowledge and skills go high, challenges faced are reduced.
4. Majority of the teachers are of the view that ICT helps students to understand lessons very well. This has motivated them to use ICT devices for their lessons.
5. A number of challenges exist in using ICT for teaching and also for learning. These include funding, quality of hardware, availability of software, availability of technical support staff, and access to Internet connectivity.
6. Another outcome of the study was that the more teachers and students use ICT devices in the teaching and learning, the more likely it is that the challenges they face will be reduced.
7. Also, the study revealed that the level of ICT knowledge and skills in male teachers was higher compared to female teachers. However, the level of ICT knowledge and skills in male students was not higher compared to female students.

5.2: Conclusion

The use of ICT in education is very important for all teachers and students. It is even more important for students with hearing impairments, who acquire much of their information through visual cues. However, in order for them to enjoy the various advantages that ICT offers to assist them in education, they must attain some level of knowledge and skills in ICT. These skills can be learnt from teachers whose level of ICT knowledge and skills is high. The study was therefore conducted to find out the level of knowledge, skills and the use of ICT among the teachers and the students. This was to help in determining how ICT has improved the teaching and learning in the school. The study concludes that when teachers" knowledge and skills in ICT are enhanced through regular ICT training workshops, their usage of the technology in teaching will be improved, whiles the challenges they face is reduced. Again, when technical support staff are available to assist teachers in using ICT for teaching, the teachers will be motivated to use ICT for teaching. This will encourage and equip the students with the knowledge and skills for learning through the use of ICT.

5.3: Recommendations

The following recommendations were made based on the findings of the study:

1. In-service training should be organized regularly for the teachers, on the use of ICT for teaching.

2. Teachers should be encouraged and motivated to use ICT for teaching. This can be done by providing the needed resources and the support from technically competent staff.

3. Teachers should help their students in making use of ICT devices for learning, by teaching the students to use educational software, such as Mavis Beacon and Microsoft Encarta.

4. School computer laboratories should be equipped with high quality computers and other ICT devices that will make teachers and students feel safe and secure to use them for their teaching and learning.

5. School computer laboratories should have access to the Internet, so that teachers and students can have access to other teaching and learning materials that will enhance their teaching and learning.

5.4: Contributions to Knowledge

Research evidence showed that several studies have been conducted on knowledge and skills in ICT, with various respondents. In some cases, these studies focused on teachers, students, and other professionals within the education sector, including librarians and administrators. However, there are very few, or no studies that specifically studied ICT knowledge, skills and utilization among students who are hearing impaired, and their teachers, as the focus of this study was. The results of this study contributes to knowledge by revealing that the students with hearing impairment at the Cape Coast school for the Deaf, understand lessons better when their teachers use ICT. Also, it revealed that the gender of students does not affect the level of knowledge and skills that they will have about ICT. It also showed that the challenges that students with hearing impairments face in using ICT are similar to those that other students and individuals face. Again, the findings of the study provide a framework for stakeholders and policy makers in making provisions for the education of students with hearing impairments. Also, this study lends support to

already existing research findings on the use of ICT for teaching and learning, and goes a step further to provide information specifically on Ghanaian students with hearing impairments.

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APPENDIX A

ICT FOR TEACHING SURVEY

QUESTIONNAIRE FOR TEACHERS

INTRODUCTION

Thank you for taking time to complete this questionnaire. Please answer each question to the best of your knowledge. Your thoughtful and truthful responses will be greatly appreciated. **Your individual name or identification number is not required and will not at any time be associated with your responses**. Your responses will be kept completely **confidential** and **anonymous**.

INSTRUCTION

Please read the following statements and provide the information required by ticking the appropriate space provided, and supply answers where required.

A. BACKGROUND INFORMATION

1. Gender: Female [ ] Male [ ]

2. Age: ……

3. What is your pre-entry qualification? *(Please tick only one level).*

SSSCE/WASSCE	
TEACHERS‟ CERT „A‟	
DIPLOMA	
HND	
DEGREE	
OTHER (SPECIFY)	

4. At what stage of your education did you first use a computer? *(Please tick only one level).*

BASIC SCHOOL	
JUNIOR HIGH SCHOOL	
SENIOR HIGH SCHOOL	
POST-SECONDARY SCHOOL	
POLYTECHNIC	
DEGREE	
OTHER (SPECIFY)	

B. ICT KNOWLEDGE AND SKILLS

Please tick the option that best reflects how you associate with each of the following statements.

Rating Scale: SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree.

ICT KNOWLEDGE AND SKILLS	SA	A	N	D	SD
1. I can switch ICT devices on or off.					
2. I can launch software applications on ICT devices.					
3. I can design a lesson that requires the use of the Internet.					
4. I can differentiate between different types of icons on a computer.					
5. I can create folders and organized files on a computer.					
6. I can create documents with ICT devices.					
7. I can save documents on storage devices, such as pen drives.					
8. I can open files from storage devices such as pen drives and CD/DVDs.					
9. I can use a computer to format texts in a document (Highlight, Bold, Italics, Underline, Justify).					
10. I can use a computer to change the text in a document to either uppercase or lowercase.					
11. I can insert page numbers unto documents on a computer.					
12. I can communicate with others through the use of e-mails.					
13. I can send files as attachments to an e-mail message.					
14. I can search for and locate information on the Internet.					
15. I can download documents from the Internet.					

ICT USAGE FOR TEACHING	SA	A	N	D	SD
16. I use ICT devices in preparing my lessons.					
17. I design lessons that require the use of ICT devices.					
18. I use ICT devices to teach my lessons.					
19. ICT has enhanced my teaching methodology.					
20. ICT has made my lessons very interesting.					
21. Using ICT devices make me highly motivated to teach.					
22. ICT devices help me to sustain the attention of my students.					
23. I use ICT in keeping my students engaged in lessons.					
24. I use ICTs as Teaching/Learning materials.					
25. I will use ICT tools more often, if they were available in my classroom.					
CHALLENGES FACED IN USING ICT FOR TEACHING	**SA**	**A**	**N**	**D**	**SD**
26. I do not have access to ICT devices for teaching.					
27. There are insufficient ICT facilities for teaching.					
28. Frequent breakdown of ICT devices makes it difficult for me to use in teaching.					
29. The availability of funding for the use of ICT is low.					
30. Lack of access to Internet service poses a challenge.					
31. I lack the competence in the use of ICT devices in teaching.					
32. Lack of motivation to use ICT devices in teaching is a challenge for me.					

33. I have not been trained on how to use ICT devices.					
34. There are no in-service training on how to use ICT devices for teaching.					
35. The frequency of in-service training is insufficient.					
36. The quality of training is not good enough.					
37. There are no technical support staff members to help in using ICT devices.					
38. Available software for teaching is inappropriate.					
39. The quality of available ICT devices is poor.					
40. My workload leaves me with insufficient time to develop instructional materials for teaching.					

APPENDIX B

ICT FOR LEARNING SURVEY

QUESTIONNAIRE FOR STUDENTS

INTRODUCTION

Thank you for taking time to complete this questionnaire. Please answer each question to the best of your knowledge. Your thoughtful and truthful responses will be greatly appreciated. **Your individual name or identification number is not required and will not at any time be associated with your responses**. Your responses will be kept completely **confidential** and **anonymous**.

INSTRUCTION

Please read the following statements and provide the information required by ticking the appropriate space provided, and supply answers where required.

A. BACKGROUND INFORMATION

1. Gender: Female [ ] Male [ ]

2. Age: ……

3. What class are you in? *(Please tick only one level).*

PRE-JHS	
JHS 1	
JHS 2	
JHS 3	

4. How long have you been using ICT devices?
   ……...

B. ICT KNOWLEDGE AND SKILLS

Please tick the option that best reflects how you associate with each of the following statements.

Rating Scale: SA=Strongly Agree, A=Agree, N=Neutral, D=Disagree, SD=Strongly Disagree.

ICT KNOWLEDGE AND SKILLS	SA	A	N	D	SD
1. My school has a well-equipped computer laboratory.					
2. I have access to functional computers in my school.					
3. My teachers have been using computers to teach us at school.					
4. I can switch on a computer and shut it down by myself.					
5. I can use a computer with the guidance of my teacher.					
6. I can browse the Internet for information to do my assignment.					
7. I can communicate with others through the use of e-mails.					
8. I can download documents from the Internet.					
9. I can save documents on storage devices, such as pen drives.					
ICT USAGE FOR LEARNING	**SA**	**A**	**N**	**D**	**SD**
10. I have been using a computer to learn at school.					
11. I can use a computer to type a document.					
12. I use computers to do my research.					
13. I use a computer to do my assignments.					

14. Computers make learning very interesting for me.					
15. I feel happy when I use a computer to learn new things.					
16. I pay attention in class when the teachers use a computer.					
CHALLENGES FACED IN USING ICT FOR LEARNING	**SA**	**A**	**N**	**D**	**SD**
17. I do not have access to computers.					
18. The computers in my school breakdown frequently.					
19. I do not have access to the Internet.					
20. I do not know how to use a computer for learning.					
21. I have not been trained to use computers for learning.					
22. We have limited time to learn how to use computers.					
23. I am not interested in using a computer for learning.					
24. My school does not have learning software such as Mavis Beacon and Microsoft Encarta.					
25. The computers in my school are not of good quality.					

APPENDIX C

INTERVIEW GUIDE

VIEWS OF TEACHERS ON THE USE OF ICT IN TEACHING PUPILS WITH HEARING IMPAIRMENT

1. What subject do you teach?
2. How long have you been in the school?
3. What training do you have on the use of ICT in teaching?
4. Is ICT laboratory available in your school?
5. If yes, are there enough computers for every student to use?
6. Which of the computer programmes are you familiar with?
7. What difference does it make when using ICT tools in teaching as compared to teaching without ICT tools?
8. How often do you attend ICT workshops?
9. Is ICT part of the subject you teach in the school?
10. What other things would you say about the use of ICT in teaching in schools for the deaf?

APPENDIX D

INTRODUCTORY LETTER

DEPARTMENT OF SPECIAL EDUCATION
UNIVERSITY OF EDUCATION, WINNEBA
(UEW)
OFFICE OF THE HEAD OF DEPARTMENT

July 13, 2015

The Headmaster
Cape Coast School for Deaf
Cape Coast

Dear Sir,

LETTER OF INTRODUCTION

I write to introduce to you, Miss Patience Dadzie-Bonney is an M.Ed student of Department of Special Education of the University of Education, Winneba, with registration number 7130150014.

She is currently working on her thesis on the topic: *ICT Knowledge, Skills and Usage among Teachers and Students of School for the Deaf in Cape Coast.*

I should be grateful if you could give her the needed assistance to enable her carry out her studies.

Thank you.

Yours faithfully,

HEAD
DEPARTMENT OF SPECIAL EDUCATION
UNIVERSITY OF EDUCATION
P. O. BOX 25, WINNEBA

.....
SAMUEL K. HAYFORD (PHD)
AG. HEAD OF DEPARTMENT