UNIVERSITY OF EDUCATION, WINNEBA

COLLEGE OF TECHNOLOGY EDUCATION, KUMASI

DEPARTMENT OF FASHION DESIGN AND TEXTILES

ENHANCING LEARNING AND TEACHING OF CLOTHING AND TEXTILES THROUGH ICT RESOURCES USAGE IN COLLEGES OF EDUCATION IN GHANA: A CASE OF CENTWEST ZONAL COLLEGES OF EDUCATION

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A THESIS SUBMITTED TO THE DEPARTMENT OF FASHION DESIGN AND TEXTILES EDUCATION, FACULTY OF VOCATIONAL EDUCATION

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APRIL, 2023

DECLARATION

Candidate's Declaration

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

Candidate's Signature: ..... Date: .....

Supervisors' Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Education, Winneba.

SUPERVISOR'S NAME: DR. ISAAC ABRAHAM

Supervisor's Signature: ..... Date: .....

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DEDICATION

To my daughters Adina and Aldriana and Mad. Emelia Serwaa Ampaafo.

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GLOSSARY/ABBREVIATIONS

ICT	Information Communication Technology
ICTs	Information Communication Technology Resources
ICT4AD	ICT for Accelerated Development
CRDD	Curriculum Research and Development Division
CAD/CAM	Computer-Aided Design and Manufacture (CAD/CAM)
TQ	Tutors' Questionnaire
STQ	Student Teacher Questionnaire
CoE	College of Education
CENTWEST	Central and Western zone

ABSTRACT

The main purpose of the study was to find out how ICT resources can be used to enhance learning and teaching of clothing and textiles in Colleges of Education in order to be abreast with modern style of learning and teaching. Considering the nature of the research problem and the purpose of this study, the explanatory sequential design under the mixed methods approach which includes quantitative and qualitative research was the most appropriate research methodology used for this study. Purposive sampling was used to select the colleges and stratified random sampling was used to select the respondents. Sample size of 120 student teachers in level 200 and 300 and 8 tutors from Central and Western zone in Colleges of Education in Ghana. The study employed questionnaires and interview in the data collection. The result of the study concluded that there was no significant difference between male and female tutors on ICT tools usage for teaching clothing and textiles in the Colleges of Education. The findings of the study indicated that effective use of ICT resources available enhance learning and teaching of clothing and textiles in the Colleges of Education.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Integration of Information and Communication Technology Resources (ICTs) is high on the educational reform agenda worldwide particularly in developed countries (Tilya, 2008). Often it is seen as an indispensable tool to fully participate in the knowledge society (Peeraer & Van Petegem, 2011). Information and Communication Technology Resources are therefore perceived to provide a window of opportunity for educational institutions and other organizations to harness and use technology to complement and support the learning and teaching process. Although a large body of research on factors determining the integration of ICTs in education emerges from developed countries, recent research indicates that developing countries are finding means to participate effectively in the global information society and to address challenges regarding ICTs in education (Tilya, 2008).

Ghana's efforts to use ICTs in education, clearly aimed at achieving ICT legal framework for all inhabitant and key stakeholders (Ghana ICT4AD Policy, 2015). The integration of ICTs into Ghana's educational system was formally introduced as part of educational reforms which began in September 2007 as part of the government's initiative to improve the quality of learning and teaching in schools. One major requirement of the 2007 education reform was to ensure that all students in pre-tertiary institutions in Ghana acquire basic ICTs literacy skills (including internet use) and apply these not only in their studies but also in a variety of ways in their everyday life activities (CRDD, 2007). These efforts notwithstanding, Ghana's recent participation in the latest international ICT development index revealed that the

country ranked on different measures between 100th and 140th out of 154 countries surveyed (International Telecommunication Union, 2009). This is an indication that Ghana, like many other African countries, lags integration of ICTs in Colleges of Education. For Ghana to be able to fully integrate ICTs into learning and teaching, a situational analysis of the different contexts and challenges that exist within her educational institutions regarding ICTs use is a necessary first step to explore. Most importantly, stakeholders and decision-makers must be aware of what situation exists within educational institutions as they relate to the readiness of teachers. Also, including the availability of ICT facilities and skilled human resources that will support the achievement of learning and teaching with ICTs especially vocational courses like clothing and textiles in Colleges of Education.

Integration of instructional technology in clothing and textiles in Colleges of Education is fundamental to the learning and teaching of clothing and textiles skills. Effective technology integration deepens and enhances the learning process. It supports active engagement, frequent interaction, and feedback. This further enhances the relationship between the teacher and the students. The art of teaching is not necessarily concerned with passing ideas, skills, and attitudes to the learner but also to equip learners with technological skills to be able to function effectively in society. Learning and teaching with computer technology change the ways to reach different types of learners and assesses students understanding through multiple means (Ndomi, 2005).

It is a known fact that no meaningful learning and teaching can take place in an environment that is not conducive for studying (Aboagye 2014). Observations have revealed that many Colleges of Education in Ghana, lack adequate instructional facilities. To achieve good results or output, the learning and teaching environment need to be conducive enough to be learner friendly. Use of good instructional facilities and services is a sure way of achieving this. The colleges need to be better equipped with good learning and teaching environments, workshops, and laboratories. Educational environments have a strong influence on the learning and teaching processes because effective learning takes place in an environment that is properly organized. This is especially true in learning clothing and textiles. The need to learn clothing and textiles has essentially changed during the last century. Before the coming up of the ready-to-wear apparel industries, learning clothing and textiles were acquired informally through the apprenticeship system. It was an important part of preparing young women for homemaking roles. Individuals learnt clothing and textiles at the informal level from their masters and mistresses. The advent of instructional technology brought in its wake, the application of ICTs into learning and teaching of clothing and textiles. The acquisition of clothing and textiles skills was viewed as an important job preparation in the textiles and apparel industry. Nowadays, the need to learn clothing and textiles is related more and more to creative rather than economic issues (Kean & Levin, 2009; Seitamaa-Hakkarainen & Hakkarainen, 2009).

For the past decade, Ghana has been staggering under the effective integration of information and communication tools in the educational curriculum. This has made the country lag behind in the massive digital revolution (Boateng, 2009). All Colleges

of Education have, however, made noteworthy progress towards harnessing computer technology for learning and teaching. It has been reported generally that some departments within Colleges of Education have failed to harness suitable ICT resources for learning and teaching including clothing and textiles (Abubakar, 2011). Clothing and Textiles programs in Colleges of Education are vocational degree programs that combine the study of every aspect related to the textiles and apparel industry (Mason, 2012). Clothing and Textile degree programs in Ghanaian universities include bachelor's, master's and doctorate degrees in Clothing, Fashion Design, Textiles Design and Technology. These programs are highly needed in Ghana as they play a key role in generating the new technological knowledge needed in the textiles and apparel industry. The demands on the teaching of such programs in Colleges of Education, occasioned by globalisation, are that the programs should not only provide students with merely the necessary cognitive skills and competencies but also equip them with technological, critical thinking and collaborative skills for working in a knowledge society through integrating different forms of information and communication technology in learning and teaching.

Mediowiki (2009) opined that learning of clothing and textiles can be achieved using ICT. Information and communication technology incorporate a diverse set of technology to identify, collect, organize, create, and disseminate data and information. The information and communication technology include a wide range of technologies including telecommunication technologies such as telephone, cable, satellite, television, and radio, computer-mediated conferencing and video conferencing, as well as digital technologies, such as computers information networks (internet, world wide web and intranet) and software application (Kumar, 2011).

A large body of research has shown that rapid integration of ICT into learning environment demands the development of effective ICT policy (Latchem & Jung, 2010; Kozma 2008; Sawchuk, 2008; Shin & Harman, 2009). Thus, an ICT policy implementation strategy or framework for a nation's education sector is very essential to revolutionizing learning and teaching processes and open new learning opportunities. The ICTs need to be enhanced by an ICT policy that ensures people can use it to source and assimilate information and transform it into useful knowledge (Tilya, 2008). Unless a specific policy exists and decision-makers have a clear strategy in place, it is difficult to integrate ICT effectively and bring about desired improvements in the reach and quality of education (UNESCO, 2007).

The latest Ghanaian Education Reform that was launched in 2007, highlights ICTs as an important cross-cutting issue in the sector, and seeks to address this through several strategies including: equipping all educational institutions with computer equipment and ICT tools in a prioritized manner; implementing ICT programs at the pre-tertiary level in a phased one. A study conducted by Sipil (2011), found that teachers frequently use ICT for informative, organizational, recreational, lesson planning purposes.

1.2 Statement of the Problem

Integration of ICTs into learning and teaching is seen as a priority by many governments and educational institutions worldwide. Many governments have developed master plans dealing with ICTs in education (Pelgrum & Anderson, 2009) as well as spent millions of dollars on educational infrastructure and professional development of teachers and other categories of staff. However, despite all these

investments, evidence suggests that ICT has not been effectively integrated into learning and teaching activities (Grabe & Grabe, 2008; Player-Koro, 2012).

In Ghana, despite the efforts of the governments and other stakeholders to make effective use of ICT in education to train tutors and student teachers in the Colleges of Education, there is still the minimal application of ICT in teaching and instructional activities (Hare, 2007). Most Colleges have ICT facilities, but the application of ICTs is limited to basic applications such as administration, the teaching of computer literacy and internet skills (Issa, 2008). In most cases, ICT is not used as a medium of instruction to enhance curriculum delivery (Hare, 2007). A study by Issa (2008) on ICTs use in learning and teaching in public colleges in Tanzania found that even if tutors have attended several sessions of training in ICT still, they are not effectively integrating ICTs in learning and teaching. Mswanyama (2004) on the role of ICT on learning and training student teachers in colleges found that ineffective training in ICTs for tutors hinders the effective use of ICTs in learning and teaching.

Colleges of Education as institutions of higher learning have made strides in acquiring computers for research purposes and instructional practices by tutors and student teachers. These computers are however not being used effectively (Swarts 2006).

For the past few years, there have been several studies into how ICTs is being integrated into learning and teaching activities at both secondary and tertiary levels in subjects such as science, mathematics, physical education and social studies (Acquaviva, Beaudet, & Maina, 2013; Agyei & Voogt, 2012). However, enhancing ICT usage in clothing and textiles instructions at College of Education have been given little attention especially in Ghanaian context. It is therefore imperative for the

researcher to find out how ICTs resources usage enhances learning and teaching of clothing and textiles in Colleges of Education in Ghana. This will serve as the basis for other researchers to do so at the lower level such as JHS. A study by Adwoa-Oppong, Biney-Aidoo and Antiaye (2013) found that insufficient computers and inadequate finances to purchase the requisite software packages were challenges confronting the clothing and textiles departments in colleges of education. This prompted the researcher to also explore challenges militating against full utilisation of ICT resources by tutors and student teachers in learning and teaching of clothing and textiles in the Colleges of Education.

1.3 Purpose of the Study

The main purpose of the study is to find out how ICT resources can be used to enhance learning and teaching of clothing and textiles in Colleges of Education in order to be abreast with modern style of learning.

1.4 Objectives of the Study

The researcher seeks to achieve the following specific objectives:

1. To establish the availability of ICT resources usage in learning and teaching of clothing and textiles in Colleges of Education.
2. To determine the extent to which ICT resources usage affect learning and teaching of clothing and textiles in College of Education.
3. To determine the challenges encountered by tutors and student teachers in using ICT resources in learning and teaching of clothing and textiles.

1.5 Research Questions

Based on the objectives of the study, the following research questions were formulated to guide the study:

1. Are the ICT resources available for usage in learning and teaching of clothing and textiles in the College of Education?
2. What is the effect of ICTs usage on learning and teaching of clothing and textiles in Colleges of Education?
3. What challenges do tutors and student teachers of Colleges of Education encounter in using ICTs in the learning and teaching of clothing and textiles?

1.6 Research Hypothesis

Null Hypothesis (Ho).

There is no statistically significant effect of ICT resources usage on learning and teaching of clothing and textiles in males and females' tutors in Colleges of Education.

Alternate Hypothesis (H1)

There is a statistically significant effect of ICT resources usage on learning and teaching of clothing and textiles in males and females' tutor in Colleges of Education.

1.7 Significance of the Study

The findings of this study will add to the benefit of society considering that ICTs play a vital role in education today. The significance of this study lies in the fact that it will add to a body of already existing information in the field of ICT and education after the work is published. The findings of this study will bring to light the quantity and

quality of ICT resources available in the Colleges of Education for learning and teaching of clothing and textiles. The findings of this study will also enable practitioners, policymakers, principals, educational administrators and other educational stakeholders to know the major challenges tutors and student teachers encounter in using ICT resources in learning and teaching in clothing and textiles in Colleges of Education. This will allow them to come out with immediate response to these challenges.

The findings again will help clothing and textiles tutors to be aware of the various ways they can use ICT resources in teaching. The study will also assist student teachers in how they can use different ICT resources in learning clothing and textiles in other to enhance their performance.

1.8 Limitation of the study

One limitation of the study is that the results might not be 100% true representation of the situation in all the Colleges of Education because only tutors and student teachers of a sample of colleges was used as respondents of the study. This might affect the generalizability of the findings; it might not be appropriate to generalize the results of all the colleges in two regions.

Another limitation in relation to the design is that some participants might misrepresent the facts in order to present to the researcher a favourable impression or to save the image of their college.

This might distort the true nature of the existing state of affairs thus affecting internal validity.

Lastly, a limitation of the measuring instrument; questionnaire and interview are that there were low return rate thus not getting the representation of the originally selected sample.

1.9 Delimitations of the Study

The study focused on ICTs usage in Colleges of Education offering clothing and textiles as an elective course in Home Economics program. There are 46 Colleges of Education in Ghana which have been grouped into zones but, in this study, the researcher only focused on one zone out of the five zones which is Central and Western Zone (CENTWEST). CENTWEST has seven colleges five out of the seven is mixed and two single sex colleges and four colleges were selected. The participant were **238** student teachers and 8 clothing and textiles tutors from the selected colleges in CENTWEST.

The study was also delimited to only ICTs usage in enhancing learning and teaching of clothing and textiles. The study was again delimited to only level 200 and 300 student teachers learning clothing and textiles in the selected Colleges of Education in CENTWEST

1.9 Definition of Key Terms

1.9.1 Clothing and Textiles

Clothing and Textiles is a subject that allows students to understand the knowledge and skills needed in pattern making, garment construction, clothing care, and the clothing or fashion and textile industry.

1.9.2 Information and Communication Technology

An umbrella term referring to a wide range of software technology component such as computer, telecommunication equipment, internet video and digital cameras that can be used by teachers and learners to support their work and learning.

1.9.3 Teaching

Teaching is a form of sharing ideas, knowledge, transferring information and skills to learner(s) in a given environment

1.10 Organization of the Rest of the Study

This research was organized into six chapters as follows.

Chapter one discussed the background of the study where concerns and issues on how tutors and student teachers integrate ICTs into learning and teaching of clothing and textiles in Colleges of Education were raised. This section further discussed the statement of the research problem, the purpose of the study and the objectives of the study. It also presented the research questions as well as the hypotheses and significance of the study. The delimitation for the study, definition of terms and the summary were also outlined in this chapter.

Chapter two was divided into three parts. The first part focuses on the review of related literature which include the following: technology integration in clothing and textiles. The Second part discussed theoretical framework which guide the study. The last part focused on conceptual framework of the study.

Chapter three takes a critical look at the research design, the population, sample of the study, the sampling procedure, the data collection instruments, the data collection procedure, the data processing and analysis, ethical consideration and the summary of the methodology.

Results and findings were presented in Chapter Four. In Chapter Five, significant and novel findings were identified, interpreted and discussed. The summary of findings, recommendations and suggestions for further studies into the problem, were itemized in Chapter Six.

1.11 Chapter One Summary

Chapter One has laid the foundation for the present research study. It has introduced the research problem, objectives and the questions to be investigated. The benefits of the study towards national development have also been outlined. The chapter ends with the delimitation of the study.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Overview

This chapter was broken down into three sections. The first section covered a review of related literature, which was divided into subsections based on the general literature on ICT concepts and their importance in education, integration of ICT resources in education, availability of ICT resources for teaching and learning clothing and textiles, challenges faced by tutors and student teachers in using ICT resources for teaching and learning clothing and textiles, and how ICT resources usage enhances the teaching and learning of clothing and textiles.

The study's theories are also discussed in the second section (theoretical framework). The following are some of the theories: learning discovery theory by Jerome Bruner and Social Constructivist learning theory by Lev Vygotsky (1962). The last part also looked at the conceptual framework that conceptualized the study.

2.2 Related Literature

This section examines and covers significant worldwide and national literature that addresses the issues that contribute to the formulation of the stated problem, objectives, and research questions.

2.3 Concepts of ICT and their importance in Education

The term ICT was coined around the turn of the century (Tlhoaele, 2005), when the virtual World Wide Web (www) was introduced to the educational sphere (Ul-Amin, 2013). According to Goktas (2006), information and communication technology (ICT) refers to the use of a computer and the internet, and it includes all facilities,

services, and equipment related to information technology, the internet, libraries, broadcasting, and network-based information, as stated in the United Nations Report (Ul-Amin, 2013). According to Blurton (2009), information and communication technology (ICT) refers to a set of technological tools and resources that are used to communicate, create, manage, disseminate, and save data. The word is also used by the International Society for Technology in Education (ISTE) to refer to all equipment and technologies that transfer information into generic digital formats (Moursund & Bielefeld, 2009). In addition to the foregoing, UNESCO (2002) defines ICT as a combination of communication and informatics technologies. Capturing, storage, display, and processing technologies are among these technologies (Torero & Braun, 2006).

ICT (information and communication technology) refers to any system that can record, save, retrieve, alter, transmit, or receive data or information in general. In a broad sense, these gadgets include television sets, bulletin boards, radios, record players, disc players, still cameras, video camera projectors, computers, interactive whiteboards, the internet, and internet resources. Electronic and non-electronic technologies, as well as infrastructural systems, are utilized to create, store, alter, retrieve, convey, and disseminate information, according to Mejiuni & Obilade (2006). Computer-based tools are known as information and communication technology (ICT).

In today's world, information and communication technology (ICT) has become an integral aspect of almost all organizations and businesses (Zhang & Aikman, 2007). In the early 1980s, schools began to install computers, and numerous scholars believe that ICT will be a significant aspect of education for the next generation (Bransford, Brown, & Cocking, 2000; Grimus, 2000; Yelland, 2001). Modern technology has the

potential to improve classroom teaching and learning (Lefebvre, Deaudelin & Loiselle, 2006).

New technologies, according to Dawes (2001), have the potential to assist education across the curriculum and give chances for successful communication between teachers and students in ways that were previously unavailable. In education, information and communication technology (ICT) has the ability to influence teaching methods. This promise, however, may not be readily achieved, as Dawes (2001) pointed out when he remarked that challenges arise when teachers are expected to make adjustments in potentially bad circumstances.

Not only do student-teachers need technology skills, but they also need the ability to serve as technological leaders and peer advisers so that they can support instructors as they try to keep up with the quality and quantity of technology, according to LeCompte (2004). When student-teachers are equipped to teach with technology, they not only improve their teaching talents, but also function as a tool for giving guided training to in-service instructors. According to Watson (2007), integrating technology into classrooms is critical to providing the education required for current students' success, and it is the most effective way of changing the educational process and teachers' thinking. Technology-enabled classrooms improve the teaching and learning process by reorienting classroom instruction away from traditional approaches and toward a more constructive approach that apparently improves student and instructor learning (Matzen & Edmunds, 2007).

Several academics have pointed out the critical role that technology plays in this new era of education. According to Savas (2011), the fundamental benefit of technology in education is that it empowers students to become independent learners who can modify their learning pace to their own pace through the use of ICTs. This means that,

unlike traditional classrooms, where students' efficiency is based on the teacher's ability and the pace of classroom engagement, the use of technology in education assures that students are proficient and rely on own abilities.

According to Matray and Proulx (2015), technology encourages students to be more active in class and encourages teamwork. Because most youngsters play with most of these technologies, student teachers' participation in the instructional process is increased when the lesson is influenced by technology. Becta (2002) cites increased motivation, increased self-esteem and confidence, improved questioning abilities, and increasing initiative and independent learning as benefits of employing technology in education. It also includes things like improving presentations, problem-solving abilities, fostering improved information handling skills, increasing time on task, and boosting social and communication skills.

According to Roschelle, Abrahamson, and Penuel (2004), using technology in the teaching and learning process can help students learn in four ways: active involvement, collaborative learning, real-world situations, and frequent and quick feedback. Technology also aids student-teacher learning by encouraging higher-order thinking and metacognitive skills, both of which are necessary for effective learning (Wang, Kinzie, McGuire, & Pan, 2010). Wang et al. (2010) go on to say that technology can help students learn by increasing their interest and motivation, providing access to knowledge, and tactically and strategically structuring the learning process. When it comes to internet use in education, Brandstrom (2011) claims that it aids learning, teaching, and communicating. In the role of technology in the classroom, Savas (2011) believes that teachers gain from ICT since it allows them to keep track of and organize information on their students. While doing so, they will be able to spend more time on educational activities. Education technology enhances

the teaching and learning process by allowing teachers to communicate with students at any time and from any location. As a result of the usage of educational technologies, teaching and learning are no longer limited to the classroom, as they were in the past. The use of technology also allows teachers to be more creative and provide more engaging teaching materials by utilizing the features of ICT (Matray & Proulx, 2015). This means that when technology is used to help teaching and learning, it becomes more meaningful and entertaining.

Traditional design processes such as manual flat pattern fabrication, draping, and line drawing are still taught in most technical universities that offer clothing and textile programs (Aderogba, 2012). Without a doubt, studying these approaches is necessary for gaining a thorough understanding of garment manufacturing skills, but the concentrate should be on computer-aided design software. This may make it much easier for pupils to draw, weave textures, drape models to create patterns, change proportions, and even choose fabric colors. By incorporating ICT tools into the acquisition of garment construction skills, students have a deeper understanding of the subject and are able to experiment with different combinations in their designs. This also saves time, and the expected learning is accomplished. Though manual design approaches should not be completely ignored, ICT should be viewed as critical in the learning of clothes creation abilities. Since it gives students a solid understanding of the procedures used to make clothes and textiles, it allows them to participate in global clothing production activities (Aderogba, 2012). Clothing construction abilities include pre-washing, obtaining body measurements, pattern creating, laying, cutting, assembling, finishing, pressing, and packing, according to Okpara (2004). These can be accomplished more effectively with the use of ICT as a teaching tool.

Furthermore, the use of ICT improves both practical and theoretical teaching and learning of clothes and textiles. For example, a 3D full-body scanner takes full-body measurements in 12 seconds, and iPhone, iPad, YouTube, and fashion reviews educate comprehensive clothing production. Computers are also utilized to design clothing items, draft, and print designs, according to Igbo and Iloeje (2013), because they make clothes construction fun and intriguing.

2.4 Integration of ICT resources in Education

Although teaching and learning are two sides of the same coin, it is assumed that teaching will lead to learning. Many different tactics and strategies have been employed in the classroom to attain the desired classroom learning objectives. The traditional style of delivery, which is face-to-face, is widely used in Ghanaian Colleges of Education. This form of traditional delivery has been criticized for failing to match the demands of learning in a technologically advanced era. Because it is the teacher's role to communicate the content knowledge, the student in this learning environment is passive (Anderson, 2013; Thiagarajan, 2005). In this learning environment, shallow learning is emphasized in the sense that most assessments are dependent on memory and repetition of data.

The introduction of ICTs into the classroom is meant to herald a paradigm change, signaling the end of the teacher's role as the primary repository of information. Especially with the abundance of information available on the Internet and the www. A detailed examination of how tutors give instruction in today's institutions reveals that, it’s still a long way from establishing successful ICT-based learning and teaching. Because of the introduction of ICTs into learning and teaching, a paradigm change from the classic teacher-centered method to the modern learner-centered

method has become necessary (Trucano, 2005). Buabeng-Andoh (2012), who supports the enormous powers of ICTs in sharing knowledge, making education more real, and producing more efficient educational services, applauds the benefits of such a new approach.

Information Communication and Technology, as per Abolade and Yusuf (2005), are crucial tools in any educational system because they may be used to satisfy the learning needs of individual students. Support educational equity and provide high-quality learning materials. Increase student self-efficacy and learning independent, as well as teachers' professional growth. The use of ICTs in the classroom produces a more inclusive learning environment that encourages involvement and eliminates apathy (Ibeh, Adamu, and Owoseni, 2007).

Effective instructional delivery includes all human interpersonal talents utilized by the teacher to aid learning in the classroom. It is a teaching approach in which only professors communicate with and interact with students about academic issues using a range of instructional tactics. In addition, in order to increase learning outcomes, students should be encouraged to participate. Information Communication Technology has been adopted by many institutions, and enormous quantities of money have been spent to computerize them. Other researchers, on the other hand, believe that these large investments in making learning more effective have had little influence (Stool, 2009). This can be explained by the fact that teachers who are supposed to use such devices in the classroom have no initial instruction on how to do so (Ojo, 2005; Jegede, 2009). It is proving to be a difficult circumstance for these teachers to acquire the skills and content that are inherent in ICT. As a result, it is vital to include the supply of instructional models for classroom application of ICT in the teacher education program as a required component of the course (Diem, 2010;

Haywood, and Norman, 2012; Novak and Knowles, 2014). Yalcin, Yalcin, Sagirli, Yalcin, and Koc (2011) argue that while using technology in a classroom of pre-service teachers, it is critical to utilize suitable pedagogy. They contend that lecturers must learn how to use technology efficiently in their classes and classrooms in addition to using it to learn. Thus, even if a lecturer is utilizing ICT to find materials for research, teaching materials, and word processing his lecture notes, he has not fully incorporated it into learning. Because the students had no contact with or use of ICT in their studying, this ICT usage has had no impact on their learning.

Today, development has prompted an assessment of information and communication technology (ICT), which is rapidly expanding and touching every part of human endeavor (Abifarina, 2003). As a result, the teacher who uses ICT in the classroom will be able to deliver a well-planned set of lessons to the pupils, who will learn in an engaging atmosphere. The idea that the computer will replace the instructor and so leave them redundant does not exist, according to Ojo (2005); all the computer does is complement and enrich the teacher's lessons. ICT can assist students in becoming self-directed learners capable of critical thinking and problem-solving skills, collaborative projects, and inquiry. Information searches, computer modeling, teamwork, brainstorming, and revision are all possible with it. Teachers can use computers to enhance students' learning experiences by providing them with a variety of learning tools, expert opinions, and alternate perspectives (Quarshie, 2015).

Lesson production in computer-assisted education is guided by the learners' knowledge, skills, comprehension, expectations, and motivation, according to Idahosa and Ero (2005). This implies that a computer is merely a vehicle for instruction rather than an instructor. It's apparent that computers provide a lot of useful capabilities for making learning easier. Telecommunication and teleconferencing, according to Utor

and Agbi (2006), are another useful advancement in ICT that allows students to participate in instruction without having to go to each other's classrooms or research facilities. Ghana's government has created comprehensive programs to promote the use of ICT in the educational sector. The implementation and use of information and communication technology (ICT) in education will aid in the transformation of the educational system and, as a result, the lives of Ghanaians. Traditional memory-based learning culture and practice will be converted into education that fosters critical thinking and creativity, which will be required to tackle the challenges of the twenty-first century (Ministry of Education, 2008).

The Ministry of Education, through the GES, its development partners, and other private-sector entities, has been working to incorporate ICTs into the sector for over ten (10) years. The distribution of computers and the construction of ICT laboratories have been the mainstays of efforts to bring ICTs to these facilities. However, access remains below the required standards and numbers. In addition, it was recognized that, in order to be successful and long-lasting, ICT in Education projects should be centered on supporting distinct educational objectives rather than on increasing the number of computers. The Ghanaian government introduced ICT studies at both the primary and secondary levels of education in 2004, posing a challenge to our teacher-trainees to appropriately equip them to teach this topic wherever they find themselves teaching. Because they are responsible for teacher preparation, Ghanaian colleges of education should be the first site where ICT education should begin. When compared to other tertiary institutions such as universities and polytechnics, colleges of education are tertiary institutions. They lag behind in a number of areas, including ICT infrastructure. The Forum for Education Reform put it succinctly: "Improvement in this area is badly needed" (FFER). The FFER identified enhancing infrastructure,

updating the quality of instruction, infusing technology, and updating teaching methods and models as some of the ways to improve the quality of Ghana's 46 colleges of education (Nyavor, 2013).

2.5 Clothing and Textiles Education in Ghana

Clothing and textiles are one of the subjects studied in Home Economics program at all levels of schooling in Ghana (basic, secondary, and tertiary). Basic Design and Technology (BDT) incorporates principles and processes in many parts of Pre-technical Skills, Home Economics, and Visual Arts at the most basic level (GES, 2007). Catering and sewing are included in the Home Economics option, and learners are expected to study these fundamentals of Home Economics before moving on to secondary school, where they can choose between Clothing and Textiles or Food and Nutrition. The clothes and textiles teachers' jobs are to provide pupils with the skills they need to learn the topic at all levels of school, from elementary to postsecondary. This subject provides the framework for additional studies at the tertiary level, leading to a variety of high-level vocations and various degrees of occupational skills at the elementary and secondary levels. Clothing and textiles (also known as fashion design in some institutions) is a tertiary level topic that provides learners with some essentials as well as advanced level job opportunities.

Clothing and textiles are developed around six basic principles, according to Arubayi (2004). Fabrics, garment manufacture, clothing maintenance, consumer education, ornamental techniques, and wardrobe design are all examples of talents that can be acquired for positions in society. Fabric manufacture, garment design, and the selection, sale, use, and care of finished goods are all part of the clothing and textiles industry. Appeal for schools, requires attention in order to enhance enrolment in

schools and employment rates goes high in the manufacturing of apparel sectors. Many instructors and students, according to Maduaka (2007), regard apparel and textiles as a challenging area of Home Economics. According to Obrifor (1993) and Aiyede (1995), 55 percent and 70 percent of Home Economics teachers preferred to emphasize food and nutrition over clothing and textiles, respectively.

Textiles are defined as the process of manufacturing fabrics, which includes the twisting of fibers into skeins, interlacing or otherwise of yarns to make fabrics, ornamentation, finishing, and how to care for the fabrics, according to the Teaching Syllabus for Textiles (CRDD, 2010). Textiles, according to Sackey (2002), are the act of producing, decorating, and improving the efficiency and value of fibers, yarns, and fabrics to serve man's needs, whereas Adjekum (2010) defines textiles as fabrics made by weaving. Textiles, according to Adu-Akwaboah (2010), include the fabrication of clothing as well as all materials that can be made into threads or fashioned into cloth.

2.6 Availability of ICT resources for learning and Teaching of Clothing and Textiles in colleges of education.

According to Watson, Guerin, and Ginthner (2003), modern computer-aided design and manufacture (CAD/CAM) software packages that are specifically for textiles, clothing, and fashion designing and manufacturing should be included in clothing and textile programs. AutoCAD, OptiTex, Lectra, and Gerber are some examples of modern CAD software packages used in the textiles, clothing, and fashion industries that need to be incorporated into the teaching and learning of clothing and textile programs (Adwoa-Oppong, Biney-Aidoo, and Antiaye, 2013). In the teaching and learning of clothing and textiles, such software applications are necessary to accomplish tasks and activities required at various phases of the design process. such

as conceptual design, design document preparation, and cost estimates. However, in many Ghanaian schools and institutions, these software packages are not widely available for teaching and learning (Adwoa-Oppong, Biney-Aidoo, and Antiaye 2013). As a result, finding out what ICT resources are accessible in colleges for training clothes and textiles student-teachers is critical, as they will be enabling clothing and textiles instruction in diverse schools.

AutoCAD is a computer-aided design (CAD) tool used for 2-Dimensional (2D) and 3-Dimensional (3D) design, drafting, and building of Textiles and Clothing designs and artifacts, according to Al-Mousa (2013). AutoCAD, according to Ding (2008), is useful software that design students can use to shape design creations since it can develop shapes and forms that are beyond the designer's ability. However, it is unknown whether this software is available in various colleges to meet their needs. As a result, the researcher investigates the ICT resources available in colleges of education for teaching and studying clothes and textiles. AutoCAD software can also be used by teachers and students in the clothes and textiles industries to calculate the most effective fabric cut and alter the pattern scale for different sizes. Johnson (2005) looked at undergraduate design students and practitioners in the fields of fashion, architecture, graphic, product, and general design, and found that AutoCAD is not simply a drafting tool, but also a conceptual tool that may help students come up with new ways to think about design. Yazıcıoglu (2011) agrees, stating that AutoCAD can document design progress and allow for independent evaluation of different stages of the design process.

According to Adwoa-Oppong et al. (2013), OptiTex software should be used in the teaching and learning of clothes and textiles. OptiTex software, according to Park and Lee (2011), can be used for two-dimensional pattern design as well as three-

dimensional design and manufacturing. The software includes 3D models, virtual prototyping, and a pattern design option that simplifies pattern cutting instruction. The availability and use of this software in numerous educational institutions, however, is still a mirage because only a few numbers used them. This study aims to identify the ICT tools available in colleges for teaching and learning clothing and textiles in order to address this flaw. For the textiles and garment industries, OptiTex has been acknowledged as a prominent provider of 3D Virtual prototyping and 2D CAD/CAM software solutions. It also develops an avatar based on one's exact measurements, which can be tried on with various outfits to select the best fit. OptiTex also makes it simple to digitalize curves, build a customized working environment, and create a variety of patterns. Lectra is another CAD/CAM software program that needs to be integrated into apparel and textiles education and learning. The Lectra software packages, according to Park and Lee (2010), include 2D and 3D design, drafting, and virtual construction programs.

According to Park and Lee (2011), Lectra software allows students studying apparel and textiles to make technical drawings of fashion designs. Lectra allows you to digitize paper patterns, adjust designs, define grade rules, and more. They went on to say that the software package's 3D component enables for texture mapping and sample garment visualization. Through 3D/2D simulation, students and lecturers can experiment and test their designs multiple times. Individuals should not employ high-end fashion-specific software programs like Lectra (Van der Merwe and an Ryneveld, 2012). Per the studies conducted in Africa, the usage of relevant software for learning and teaching clothing and textiles in colleges of education is restricted. According to Wambau-Kamau (2012), the limited use is due to the high cost of the software packages, which prevents lecturers and students from using them. In another study,

Adwoa-Oppong et al. (2013) discovered that the apparel and textiles departments in Ghanaian universities and colleges face obstacles such as a lack of computers and funds to purchase the necessary software packages. According to African studies, the usage of relevant software for studying and teaching clothing and textiles in educational institutions is minimal. The limited utilization, according to Wambau-Kamau (2012), is due to the high cost of the software packages, which restricts access to instructors and students. In a separate study, Adwoa-Oppong et al. (2013) discovered that the clothing and textiles departments in Ghanaian universities and colleges face challenges such as a lack of computers and a lack of funds to purchase the necessary software packages. This means that, despite the fact that the majority of this software is available on the market, most institutions are unable to purchase it. Finding out what ICT resources are available in Ghanaian institutions of education is crucial because it will reveal whether these colleges have enough of these ICT resources for teaching and learning about clothes and textiles.

The availability of ICT resources is critical for integrating technology into classroom settings (Tezci, 2011; Szeto & Cheng, 2013). The availability of ICT infrastructure is a significant factor in ICT integration in schools. This suggests that, despite the fact that the majority of this software is available on the market, most institutions are unable to obtain it. Finding out what ICT resources are available in Ghanaian colleges of education is crucial because it will reveal whether these colleges are adequately equipped to teach and learn about clothing and textiles.

The availability of ICT infrastructure and resources in schools is a prerequisite for ICT integration in education (Japhet & Usman, 2018). The availability and accessibility of ICT resources, such as hardware and software, is critical for effective adoption and integration of ICT into teaching in schools. As a result, having access to

computers, updated software, and hardware is critical to successful technology adoption and integration. Teachers will not use ICT resources if they cannot access them. As a result, teachers in schools must have access to hardware, software, and network infrastructure. Per a study conducted by Wastiau and Pagano (2013) on the effect of teachers on the use of ICT in the classroom, a smaller proportion of teachers work in classrooms with high access to ICT. According to a comparable survey done by the European Commission (2013), the most significant barrier to teachers' use of ICT in the classroom is access to ICT. Access to technology resources does not only refer to the availability of tools and programs, but also to their suitability for supporting teaching and learning (Tondeur, Valcke, & van Braak, 2008). Teachers with the required technological resources are more inclined to include ICT into their classroom activities (Japhet & Usman, 2018). Many studies have demonstrated, however, that providing ICT resources in classrooms does not guarantee that instructors would use them (Gulbahar, 2008; Ertmer, 2005).

Technology can be utilized to help and enhance learning in a variety of ways. In classrooms, everything from video content and digital moviemaking to laptop computers and mobile devices has been employed. Similarly, new technological applications, such as podcasting, are continually being developed (Marshall, 2002). Various technologies, according to Marshall, deliver different types of content and serve different purposes in the classroom.

Word processing and e-mail help with communication; database and spreadsheet programs help with organizing; and modeling software helps with understanding science and math subjects. It's crucial to evaluate how various electronic devices differ and what qualities make them useful as educational tools (Becker, 2004). Today's classroom technologies range from simple tool-based programs (such as word

processors) to online scientific data repositories. Primary historical documents, pocket computers, closed-circuit video channels, and two-way distant learning classrooms are among the other options. According to Prensky (2005), even the cell phones that many people today carry with them can be utilized to learn. Each technology, according to Lei and Zhao (2006), is likely to play a different role in students' learning. Researchers should consider what types of technologies are being used in the classroom and for what purposes, rather than attempting to describe the impact of all technologies as if they were the same. From the literature, two general distinctions could be drawn. Students can learn from computers where technology is used essentially as tutors and serve to increase student's basic skills and knowledge. Moreover, they can learn with computers where technology is used as a tool that can be applied to a variety of goals in the learning process and can serve as a resource to help develop higher-order thinking, creativity, and research skills (Reeves, 2008; Ringstaff and Kelley, 2002).

2.7 Challenges of Integrating ICT resources in Learning and Teaching Clothing and Textiles

Integrating ICT into learning and teaching is a complex process that can be fraught with challenges. Challenges are the names given to these problems (Schoepp, 2005). Any circumstance that makes progress or achievement of an objective difficult is referred to as a challenge (Schoepp, 2005). The following are some of the major obstacles in learning and teaching of clothing and textiles that have been identified in the literature.

2.7.1 Access to ICT devices and resources in Clothing and Textiles

Access to technology is one of the most fundamental issues that many parts of the world face when it comes to education. According to Fu (2013), the availability and accessibility of ICT technology is critical to the learning and teaching of clothes and textiles in educational institutions. It is simpler to manage with it when there is enough provision, according to Fu (2013). Billy (2015) shares this viewpoint and states that in the United States of America, 30% of households do not have access to a computer, which has an impact on their children's academic achievement. Not only does giving equipment suffice, but Gyamfi and Gyaase (2015) argue that providing internet connection to students outside of the institution or school is also a barrier. In response to this issue, Albugami and Ahmed (2015) discuss the government's responsibilities to address it. The government occasionally supports the integration of ICTs into education, but this is insufficient. For example, Albugami and Ahmed discuss the Saudi Arabian government's efforts to integrate ICTs into schools, although they lack sufficient supply and opportunities to do so. To guarantee the achievement of the Master Data Governance (MDG) targets, teacher education institutes are tasked with producing teachers with the necessary ICT capabilities. Without the necessary and relevant ICT resources, this position is difficult to play. However, multiple recent research findings reveal that needed ICT resources for instruction are not always available in our educational institutions, which is disheartening (Jude & Dankaro, 2012; Fakeye, 2010; Idoko & Adamu, 2010). Since information and communication technology (ICT) has become a vital part of most organizations and businesses in today's world (Zhang & Aikman, 2007). Finding out the amount of availability of ICT resources for the achievement of educational objectives has become crucial in teaching and learning. Also, at the College of

Education, learning about the problems of integrating ICTs into the teaching and learning of clothes and textiles.

Teachers' ability in integrating ICT in their educational practices is based on teacher education and training on the one hand, and teacher educators on the other (Garba, 2014). This is also dependent on the availability and sufficiency of ICT resources and infrastructure in educational institutions. According to the National Policy for Information Technology, it is the government's responsibility to provide provisions for ICT resources and infrastructural needs of our educational institutions so that they can be used effectively in instruction (FRN, 2001). To enable the achievement of the applicable MDGs, teachers at all levels of the education system should be able to use ICT resources to educate. These ICT resources, according to Osborne and Hennessy (2003), include data capture tools, multimedia software for simulation, publication, and presentation tools. Tutors and students in colleges of education also do not have easy access to digital recording equipment, computer projection technology, or a computer-controlled microscope.

2.7.2 Inadequate knowledge and skills training courses

Another issue is a lack of technological knowledge and abilities, as well as a shortage of training courses for tutors and pupils. While using technology in the learning and teaching of clothes and textiles, tutors and student – teachers at colleges of education may require training. According to Livingstone (2012), some teachers have difficulty using ICTs due to a lack of knowledge. As a result, they must be educated and trained in the use of ICTs. According to Blake (2009), the challenge is greater for teachers than for others because knowing how to use technology is not intuitive. Some teachers may be uninterested in ICTs since they are unfamiliar with how to use them, yet they

must nonetheless participate. These teachers should be well-informed and prepared, and their work should be valued by students and their colleagues. Mirriahi, Alonzo, McIntyre, Kligyte, and Fox (2015) discuss the lack of digital or IT literacy among teaching professionals in educational institutions. They propose that teachers and other teaching staff should value ICTs and become literate in order to provide better ICT-assisted instruction. If teachers have a high level of IT competency or are true ICT literates, they will not have negative views toward it. As a result, teachers' perceptions of the importance of technology to enhance student learning are influenced by their unfamiliarity with the tools that concern the availability of technological support. Negative attitudes, beliefs, and behaviors toward ICT resources, according to Fu (2013) and Albugami and Ahmed (2015), are the most serious challenges that impede the success of teaching and learning clothing and textiles in teacher education institutions.

There are many different types of ICT resources and apps available, particularly on websites, which makes it difficult for students to figure out how to use them. Some are simple to operate, while others are rather difficult. Another issue related to this problem is that students, instructors, and parents may not be aware of the problem. Although electronic devices such as smartphones and camcorders have developed, according to Liakin, Cardoso, and Liakina (2015), parents and instructors may view these phenomena as a source of distraction in the classroom. This is because of their ignorance of technology's capabilities in textile learning and teaching. People should be informed of what ICTs can do, according to Billy (2015). They strive to raise people's knowledge of the benefits of using ICTs. According to Kukulska-Hulme and Shield (2008), utilizing technology gadgets to teach clothing and textiles is a new concept. It hasn't been widely adopted, and it hasn't received enough attention to

realize its full potential as a pedagogical technique. As a result, they asserted that using technology takes time to become fully integrated and useful. To make technology useful, it may take a long time to embed it.

Jones (2004) discovered seven hurdles to using ICTs into classrooms. These barriers include I a lack of confidence among teachers during integration (21.2 percent), (ii) a lack of resources (20.8 percent), (iii) a lack of time for integration (16.4%), (iv) a lack of effective training (15.0 percent), (v) technical issues while in use (13.3 percent), (v) a lack of personal access during lesson preparation (4.9 percent), and (vii) the teachers' age (1.8 percent). Six key impediments to integration were discovered in a study on the use of ICT in clothing and textile training among colleges of education students in Selangor and Chong (2005). These barriers include I a lack of confidence among teachers during integration (21.2 percent), (ii) a lack of resources (20.8 percent), (iii) a lack of time for integration (16.4%), (iv) a lack of effective training (15.0 percent), (v) technical issues while in use (13.3 percent), (v) a lack of personal access during lesson preparation (4.9 percent), and (vii) the teachers' age (1.8 percent). Six key impediments to integration were discovered in a study on the use of ICT in clothes and textile training among college students in Selangor and Chong (2005).

2.7.3. Inadequate of time

In several surveys, many instructors are competent and confident in utilizing computers in the classroom, yet they still utilize them infrequently due to a lack of time. Time constraints and the difficulty in organizing enough computer time for courses were noted by a large number of researchers as a barrier to instructors' use of ICT in their classrooms (Al-Alwani, 2005; Becta, 2004; Beggs, 2000; Schoepp, 2005;

Sicilia, 2005). According to Sicilia (2005), the most common problem that teachers mentioned was a lack of time to organize technology lessons, examine numerous Internet sites, or investigate various features of educational software. According to Becta's study (2004), teachers have a shortage of time problem in many elements of their profession, affecting their capacity to accomplish tasks, with some of the participants noting which aspects of ICT demand more time. These factors include the time spent looking for Internet assistance, preparing courses, exploring and practicing with the technology, dealing with technical issues, and receiving proper training. Studies demonstrate that a shortage of time is a major impediment to the adoption of new technology in the clothes and textiles industries (Al-Alwani, 2005). Due to hectic schedules, according to Al-Alwani (2005), a lack of time is a barrier preventing the usage of ICTs in Saudi Arabia. Because Saudi teachers work from roughly 7:00 a.m. to 2:00 p.m., and clothing and textiles teachers teach an average of 18 class sessions each week, both teachers and students have a limited number of hours during the day to work on integrating ICT into clothes and textiles instruction, he explained. Similarly, Sicilia (2005) found that teachers spend significantly more time designing projects that include modern ICTs than they do preparing regular classes in Canada. The constraints of a distinct class schedule contributed to the lack of time they spent together organizing classroom activities. (Sicilia, 2005). Lack of time was cited by 86–88 percent of secondary and college of education apparel and textiles teachers questioned by Dillon, Osborne, Fairbrother, and Kurina (2000) as the most significant restraint on use. One of the main reasons clothes and textiles teachers do not use ICT in the classroom, according to Gomes (2005), is a lack of time to complete preparations.

2.7.4 Inadequate of Technical Support

Teachers will not be able to overcome the barriers to ICT use without both competent technical support in the classroom and whole-school resources (Lewis, 2003). According to Pelgrum (2001), one of the major impediments to ICTs adoption in education, according to primary and secondary teachers, is a lack of technical assistance. Technical issues were identified as a major impediment for teachers in Sicilia's (2005) study. Waiting for websites to load, being unable to connect to the Internet, printers not printing, computers malfunctioning, and teachers having to work on antiquated computers were all examples of technical hurdles. The smooth delivery of the lesson or the natural flow of classroom activity were hampered by technical impediments (Sicilia, 2005).

According to Korte and Hüsing (2007), ICT support or maintenance contracts in schools allow teachers to use ICT in the classroom without losing time fixing software and hardware issues. According to the Becta (2004) research, if a school lacks technical support, it is more probable that technical maintenance will not be performed on a regular basis, increasing the risk of technical breakdowns. Many of the respondents to Becta's study (2004) said that technical problems would deter them from utilizing ICT in their classroom because they are afraid of equipment breaking down in the middle of a session. Several studies have found that the biggest hurdle to using technologies in clothes and textiles education is a lack of technical support.

Information Communication Technology integration in clothing and textiles teaching, according to Gomes (2005), requires a technician, and if one is not available, a lack of technical support can be a barrier. Toprakci (2006) discovered that one of two important impediments to the incorporation of ICTs into clothing and textiles teaching in schools in Turkey was a lack of technical support. Teachers of apparel and textiles

in Saudi Arabia would agree to use computers in their classrooms if they didn't think they'd run into issues with technical support or hardware (Almohaissin, 2006). Technical problems provide impediments to teachers' smooth delivery of classes, according to Sicilia (2005), regardless of the type of technical support and access they have, and whether they have twenty years of experience or are new to the profession. Despite the fact that teachers may be unable to adequately integrate ICTs into teaching and learning due to a lack of technical support. Korte and Hüsing (2007) found that several countries (such as the United Kingdom, the Netherlands, Latvia, Malta, and the Czech Republic) have recognized the necessity of technical support to help teachers use ICT in the classroom. Several studies have identified a number of typical impediments, including a shortage of computers, a lack of decent software, a lack of time, and technical difficulties.

2.8 Enhancing Learning and Teaching of Clothing and Textiles Through ICT Tools Usage

Clothing and textiles, as a skill-oriented subject, has the ability to provide individuals with the fundamental skills and knowledge needed to work for themselves. In light of this, ICT tools can be used to learn about clothing and textiles. Radio, television, the internet, search engines, cameras, video, e-mail, computers, CD-roms, and DVDs, for example, are all examples of ICT resources. The computer is one of the instruments mentioned, and it has become vital in the realm of ICTs. Any computer-literate Clothing and Textiles instructor should find the computer highly beneficial in the classroom. When a computer is connected to the internet, it becomes a powerful tool for analyzing data. The internet is brimming with current and up-to-date information on all aspects of clothing and textiles, both practical and theoretical. Finally, when

teaching such a curriculum, the researcher underlines the advantages of employing technology as a teaching aid to boost students' interest in the subject, make the learning process more fun, and, as a result, produce more well-informed students. As a result, a slew of essential and inspirational technical inventions has emerged to complement these advancements and help solve a variety of educational issues. According to Nwosu (2003), the use of ICTs in education can lead to cost-effective learning, bridge the gap between teachers and students, and significantly improve learning and teaching quality. Multiple sensory delivery, greater communication skill, cooperative learning, increasing critical thinking, and increased self-expression and active learning are some of the benefits of ICTs in education, according to Bam and Orwig (2015). According to Nwosu (2003), the use of ICTs in education can result in cost-effective learning, bridge the gap between teachers and students, and improve overall learning and teaching quality. Bam and Orwig (2015), on the other hand, highlighted some of the advantages of ICTs in education, such as multiple sensory delivery, improved communication skills, cooperative learning, critical thinking promotion, and increased self-expression and active learning. More succinctly, Osborne & Hennessy (2003) summarized the potential of ICTs in education by stating that they aid in expediting and improving course work production; improving motivation and engagement; supporting exploration and experimentation; and fostering self-regulated and collaborative learning.

The role of the instructor is to provide a conducive learning atmosphere for the pupils as well as to guide them in the appropriate route (Owusu, 2014). Teachers must be aware of the potential of technology to assist them in facilitating effective teaching and learning, rather than relying solely on traditional techniques to fulfill this function (Owusu 2014). The instructor must not only be familiar with specific technology, but

also with its affordances and restrictions, as well as how to apply adaptive tactics in conjunction with these technological aspects to increase holistic learning (Chai, Koh, & Tsai, 2010; Kereluik, Kristen, & Koehler, 2011). Due to the growth of new information technology, the new era of ICTs in education should be created quickly and to an acceptable amount in order to match the competence of students and teachers in educational experience.

This feature was also utilized to explore how tutors use technology in the classroom and the many ways in which they do so. This will also help to emphasize the differences between teaching with and without technology. Tutors can employ technology in a variety of ways in the classroom. Technology, for example, can be used to make clothing and textiles lessons more engaging, providing feedback, assessment tools, evaluation, and exploration, among other things. This part focuses on the use of technology in the classroom by Ghanaian basic school clothing and textiles tutors. According to Hennessy, Deaney, and Ruthven (2005), using ICTs allows students and teachers to check, trial, and revise their work, implying that ICT allows for fast feedback and fosters self-correction.

Using technology to perform physical labor such as computations or sketching frees the student and teacher to concentrate on techniques and enables a trial-and-error approach (Hennessy et al., 2005; Jarrett et al., 1968). The graphing process is sped up by technology, allowing students to focus on analyzing and reflecting on data correlations (Hennessy et al., 2005).

2.9 Theoretical Framework

This research used two key theories: Jerome Bruner's Discovery Learning Theory (1915) and Ley Vygotsky's Social Constructivist Learning Theory (1962).

2.9.1 Discovery Learning Theory

Discovery learning is a constructivist inquiry-based learning theory that occurs in problem-solving settings and involves the learner drawing on his or her own prior experience and knowledge to find facts, relationships, and new truths. Children learn through personal experience and experimentation through exploration learning. The discovery learning philosophy holds that learners are best educated when they discover knowledge about their world for themselves and are presented with real-life circumstances in which they must solve difficulties on their own.

Jerome Bruner is often credited with originating discovery learning in the 1960s. Bruner argues that "Practice in discovering for oneself teaches one to acquire information in a way that makes that information more readily viable in problem solving". In this study, student teachers will discover new ideas and knowledge through manipulating of ICT resources for research, experiments, cutting patterns, designing and sewing garments. The use of these ICT resources through discovery learning will help promote collaboration, critical thinking, interaction and interest which will help enhance their learning of clothing and textiles in the colleges.

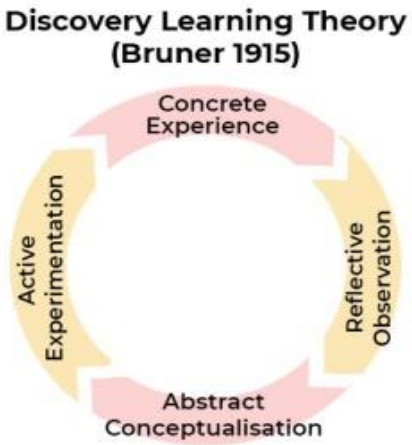

Figure 2.1: Jerome Bruner's Discovery Learning Theory
Source: (Bruner, 1915)

2.9.2 Social Constructivist Learning theory

Ley Vygotsky is among those who believe that children construct their own knowledge. Vygotsky viewed cognitive development as a result of a logically reasoned process where the child learns through shared problem-solving experiences with someone knowledgeable, such as teachers, friends, parents, and siblings. Vygotsky also emphasizes the social contexts of learning and the fact that knowledge is mutually built and formulated. He also emphasized the benefits of collaboration in groups and with a more skilled tutor, as an individual who will facilitate the transition from learner to zone of proximal development to new levels of skills and competence. Vygotsky (1962), also proposed that in a practical lesson, the teacher is expected to sensitize learners to their environment, develop critical thinking, encourage creative thinking and encourage exploration that will enhance self-directed and cooperative learning among the learners. In this study, social constructivism theory was used in enhancing tutors and student-teachers learning and teaching of ICT of clothing and textiles through the use of ICT resources that serve as scaffolds in assisting tutors and student-teachers in their learning and teaching.

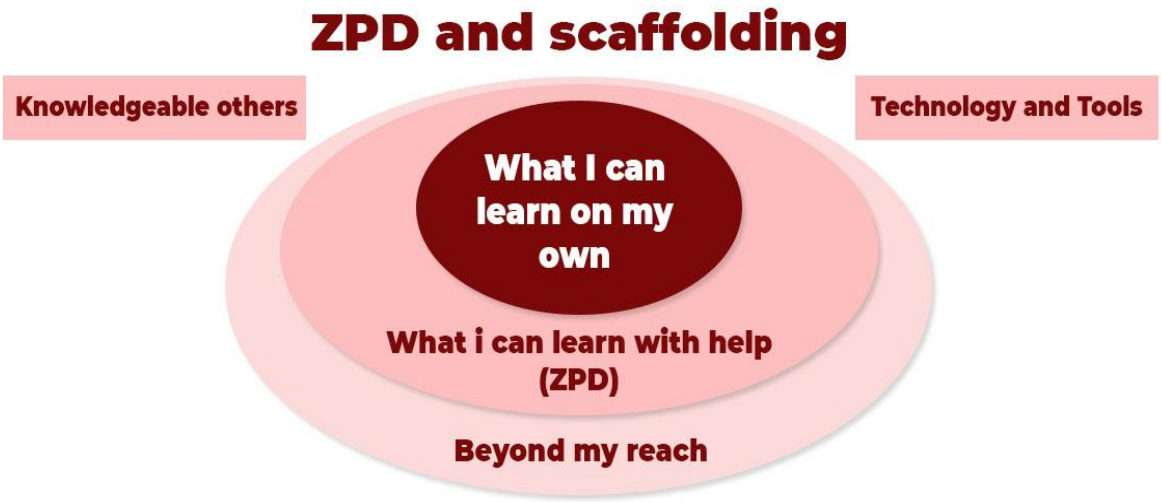

Figure: 2.2 Ley Vygotsky's Social Constructivist Learning Theory

Source: (Vygotsky, 1962)

2.10 Conceptual Framework

The dependent variable (Enhancing Learning and Teaching of clothing and textiles using ICT resources) and independent variables (Availability of ICT resources, Usage of ICT resources, and Challenges Faced in Using ICT Tools in Learning and Teaching Clothing and Textiles in Colleges of Education), comprise the conceptual framework of this study. After a thorough review of the literature, three main variables: availability of ICT resources, usage of ICT resources, and challenges faced in ICT resources usage are the main predictors and determining factors that affect how ICT resources can enhance Learning and Teaching of clothing and textiles in Colleges of Education. The types of ICT resources available for Learning and Teaching about clothing and textiles are directly proportional to how well they enhance Learning and Teaching about clothing and textiles in colleges. When the needed ICT resources are available, tutors and student-teachers can use them to enhance their Learning and Teaching, but when they are not available, tutors and student-teachers become handicapped and their clothing and textile lessons cannot be enhanced using ICT resources. The full integration of ICT resources into clothing and textiles lessons will also enhance the Learning and Teaching of the subject, and vice versa. When the factors that affect ICT resources usage are favourable, tutors and teachers will be encouraged to use them in their lessons, which will then enhance their lessons and vice-versa. The manipulation of the independent variable against the dependent variable resulted in a final model shown in the figure above.

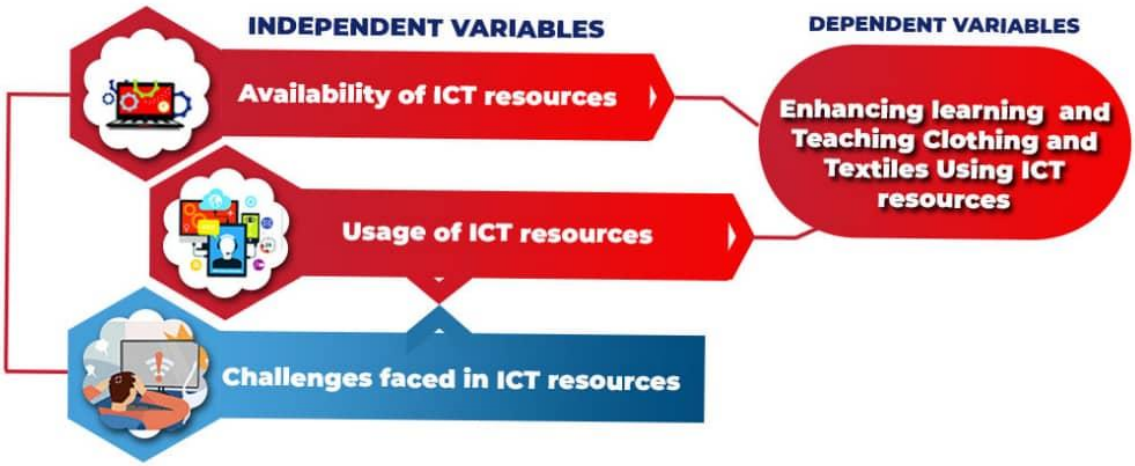

Figure: 2.3 Conceptual Framework

Source: (Field work, 2022)

2.11 Chapter Two Summary

This chapter reviewed literature on a variety of issues raised in the research questions, including the availability of ICT resources for Learning and Teaching clothing and textiles, the challenges faced by tutors and student-teachers in using ICT resources for Learning and Teaching clothing and textiles, and how the use of ICT resources enhances the Learning and Teaching of clothing and textiles in Ghanaian colleges of education. The theoretical framework that guided the research was discussed in the next section. The social constructivism theory was employed in this study to improve tutors and student-teachers' teaching and learning of clothing and textiles using ICT technologies that served as scaffolds. In this study, social constructivism theory was used in enhancing tutors and student-teachers teaching and learning of clothing and textiles through the use of ICT tools that serve as scaffolds in supporting tutors and student-teachers in their teaching and learning. Also, in discovering theory, student-teachers will uncover new concepts and information through the manipulation of ICT tools for research, experiments, cutting patterns, designing, and sewing garments.

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter focuses on explaining procedures that the researcher used in gathering and analyzing data on the integration of Information and Communication Technology tools into learning and teaching Clothing and Textiles in Colleges of Education. The elements covered in this chapter are the study area, research design, target population, sample and sampling techniques, research instruments, Validity and Reliability of Research Instruments**,** data collection procedures and data analysis and procedures, and ethical consideration.

3.2 Research Paradigm

Research paradigm refer to the philosophical ground for the research work and constitutes researcher's worldview, abstract beliefs and principles that shape how the researcher sees the world, and how she or he interprets and acts within that world (Zukauskas, Vvinhardt, & Andriukaitiene, 2018). In a similar mood, Kivunja & Kuyini, (2017) mention that paradigms are thus important because they provide beliefs and dictates, which, for scholars in a particular discipline, influence what should be studied, how it should be studied, and how the results of the study should be interpreted. Therefore, before a researcher defines an appropriate research paradigm, it is important to study its philosophical assumptions and clarify that it is suitable for his/her research. The choice of paradigm is very important as it sets down the intent, and provides a theoretical framework for the methodologies employed in research (Kivunja, & Kuyini, 2017). A paradigm can either be positivist, constructivist, interpretive, transformative or pragmatic.

This study is underpinned by the pragmatism paradigm which refers to a worldview that emphases on "what works best" rather than what might be measured categorically and accurately "true". Pragmatism accepts a flexible approach to solving research problems (Kaushik & Walsh, 2019). According to pragmatism there cannot be one way to solve a problem but a mix of approach can better help solve a problem and discovery the truth. Pragmatists believe that there cannot be a single realism but numerous realities (Collins, 2017). The pragmatism paradigm tracks both positivism and interpretivism to pursue the responses to the problems. Therefore, this research paradigm would propose a mixed-method approach. A mixed method approach means that such research will use both qualitative and quantitative methodology in a chronological way.

The mixed methods approach falls under the pragmatism paradigm (Fraenkel, Wallen, & Hyun, 2012; Gibson, 2017) which holds the view that knowledge is constructed based on the realities of our experience in the world as well as being socially constructed (Gibson, 2017). The core rationale of using mixed methods is that the combined use of both qualitative and quantitative methods can provide a better understanding of research issues than a single method (Creswell & Plano, 2018)

This worldview is different from the positivists‟ who believe that knowledge is objective and outside the world of the researcher and also different from the interpretivists‟ who opine that knowledge is basically constructed. The pragmatic worldview takes a midway between the two extreme worldviews of quantitative and qualitative paradigms. Pragmatists believe that the duty of the researcher is to use whatever works (within the realms of academic rigor and appropriateness) to conduct their research (Fraenkel et al., 2012) which therefore presupposes that the researcher

should look out for methods that will help them answer their research question(s) rather than being dogmatic (Fraenkel et al., 2012; Gibson, 2017).

3.3 Research Design

Katundu (2008) stated that, the purpose of research and its objectives determine the type of research design employed for a study. Considering the nature of the research problem and the purpose of this study, the most appropriate research methodology that was used is the explanatory sequential design under the mixed methods approach, since it involves both quantitative and qualitative research approach.

Convergent parallel design, explanatory sequential design, exploratory sequential design, embedded design, transformative design and multiphase design are the six major mixed methods designs advocated by (Creswell & Plano, 2011). They urged researchers to use a design that is best suited to their research problem. They recommended that their classifications provide a framework that can guide the researcher in selecting the appropriate research methods which will yield a high quality and rigorous research design. This study adopted the explanatory sequential design and this is briefly explained in this study.

3.3.1Explanatory Sequential Mixed Methods Design

An explanatory sequential mixed methods research design rendering to Plano (2011) comprises of first collecting quantitative data and then collecting qualitative data to help clarify or intricate on the quantitative results. The rationale for this method is that the quantitative data and results carry out a general representation of the research problem; more analysis, specifically through qualitative data collection is required to improve, extend or clarify the general picture (Wong, 2012). An explanatory design is

generally used when researchers need qualitative data to explain quantitative significant or nonsignificant results; or when researchers want to form groups based on quantitative results and follow up with the groups through subsequent qualitative research (Wong, 2012; Creswell & Plano, 2018). An explanatory sequential mixed methods design was employed in this study (Quantitative → qualitative = explanation), which included a preliminary quantitative survey and the follow-up qualitative interview with the priority on the quantitative phase. The qualitative results will lead to a better understanding of the significant and nonsignificant quantitative findings. An explanatory design was suitable for this study because 1) the researchers wanted to further understand the survey results in-depth through a follow-up interview, and 2) the researchers needed to purposefully select participants for the interview according to the preliminary quantitative results. The procedure was illustrated in Figure 3.4.

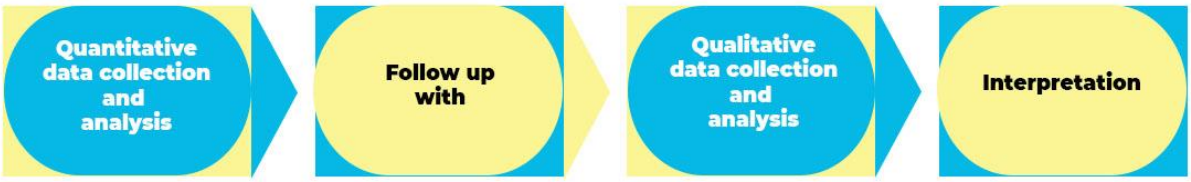

Figure 3.4: Explanatory Sequential Mixed Method Design (Creswell & Plano, 2011).

3.4 Population

A study population or target population, refers to the group about which the research informed and draw conclusions (Tuckman, 2001). The population of the study consisted of two hundred and thirty (230) of level 200 and level 300 student teachers offering clothing and textile and all 8 tutors teaching clothing and textiles in the four selected Colleges of Education. The population was made up of fifty-seven (57)

student teachers for college A (27 level 200 and 30 level 300). Sixty (60) student teachers from college B (30 level 200 and 30 level 300). Fifty-six (56) student teachers also from college C (28 level 200 and 28 level 300) and fifty-seven (57) student teachers from college D (30 level 200 and 27 level 300). A total of 8 tutors; two from each of the selected colleges also constituted the tutor's population. This is shown in Table 3.1

Table 3.1: Population of Respondents

Population	Target Population (Student teachers)	Accessible Population Tutors (Student teachers)	Sample Size (Student teachers)
College A	57	30	30 2
College B	60	30	30 2
College C	56	30	30 2
College D	57	30	30 2
Total	230	120	120 8

Source: (Field Data, 2023)

3.5 Sample of the study

The sample of the study was made up of 120 level 200 and 300 student teachers randomly selected from the four selected colleges within the CENTWEST zonal Colleges of Education. The sample consisted of 30 student teachers from school A (15 level 200 and 15 level 300). Thirty student teachers from school B (15 level 200 and 15 level 300). Thirty student teachers from school C (15 level 200 and 15 level 300). Thirty student teachers from school D (15 level 200 and 15 level 300). All the 8 clothing and textile tutors of the selected colleges also constituted the sample for the tutors. In all, the sample consisted of 60 level 200 and 60 level 300 clothing and textile student teachers and 8 clothing and textiles tutors. Thirty student teachers were

selected from each college and 15 within each level because 15 out of the total student teacher population at each level represent more than 50% of the total student teacher's population of each level in the selected colleges. This therefore makes the sample a true representation of the population. The researcher calculated the sample size using Krejcie and Morgan's table, which found that the sample size was 120.

3.6 Sampling Procedures

Sampling is a procedure of selecting a part of a population on which research or study can be conducted. These samples are normally supposed to be selected in such a way that conclusions or inferences which were drawn from the study can be generalized for the entire population (Etikan & Bala, 2017). Berndt (2020) describes sampling as the process of selecting a representative sample, a group about which a generalized statement is made so that selected parts represent the total group. Sampling description is not a technique for getting information but it ensures that any technique used will help in getting information from a smaller group, which could accurately represent the entire group (Berndt, 2020).

The names of all the colleges within the CENTWEST zone were collected from the zonal office. Out of the seven colleges within the zone, the researcher used purposive sampling technique to select all the four colleges within the zone offering clothing and textiles as an elective course. The purposive sampling was used because some of the colleges do not offer clothing and textiles as an elective course. The sampled colleges were coded: Wiawso College of Education as College A, Holy Child College of Education as college B, OLA College of Education as college C and Komenda College of Education as college D. The colleges were coded for easy identification and handling.

The sample for the study was selected using the stratified random sampling. In each college, student teachers were grouped into strata namely level 200 and 300. Simple balloting was used to select the number of student teachers who picked papers with serial numbers ranging from 1to15 in each level which formed the sample for that college. These numbers remain their serial numbers throughout the study. Stratified random sampling was used because it provides greater precision and ensure that each subgroup within the population receives proper representing within the sample.

Table 3.2: Stratified Sampling

Groups Colleges	Subgroup Level 200	Subgroup Level 300	Subgroup Tutors
College A	15	15	2
College B	15	15	2
College C	15	15	2
College D	15	15	2
Total	60	60	8

Source: (Field Data, 2023)

3.7 Data Collection Instruments

The study employed two (2) data collection instruments namely: questionnaire and interview.

3.7.1 Questionnaires

Base on Khan (2008), a questionnaire is a method of collecting data about respondents by asking them rather than observing and sampling their behavior. The questionnaire was important in this study because it helped to generate answers to

some of the research questions that required responses from many participants who could not be reached through interviews.

A questionnaire was used to collect data for this study. This is because large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost-effective way (Creswell, 2013). The results of the questionnaires can usually be quickly and easily quantified by either a researcher or through the use of a software package, can be analyzed more 'scientifically' and objectively than other forms of research instruments, Positivists believe that quantitative data can be used to create new theories and/or test existing hypotheses (Creswell, 2013).

The questionnaire used were student teacher questionnaire (STQ) and tutor's questionnaire (TQ). Each STQ was divided into four main sections. Sections A collected data on student teachers' demographics (gender, age and level). Section B collected data on availability of ICT tool use in learning clothing and textiles. Section C also collected data on the challenges encountered by student teacher in using ICTs for learning clothing and textiles. Section D collected data on how ICT resources enhance student teachers learning of clothing and textiles. Section A consisted of 3 items, section B consisted of 10 items, section C consisted of 10 items and section D 10 respectively.

The tutors' questionnaire (TQ) was also divided into four main sections. Sections A collected data on tutors' demographics (gender, age and level). Section B collected data on availability of ICT resources use in teaching clothing and textiles. Section C also collected data on the challenges encountered by tutors in using ICTs for teaching clothing and textiles. Section D collected data on how ICT resources enhance tutors

teaching of clothing and textiles. Section A was made up of 4 items, section B was made up of 10, section C 10 items and section D was also made up of 10 items.

3.7.2 Interview

Interview were prepared for both tutors and student teachers. Each interview consisted of five items.

3.8 Validity of Research Instrument

To determine the content and facial validity of the items, the questionnaire: student teacher questionnaire (STQ) and Tutor questionnaire (TQ) and the interview guide were given to experience clothing and textiles tutor, ICT tutor and the supervisor to vet them. The items were vetted in terms of clarity of purpose, relevance of subject area, coverage of content area and appropriateness of language usage.

3.9 Pilot Study

Running a pilot study is very useful before carrying out the main study. Apuke (2017) cited (Van Teijlingen and Hundley, 2002) stated that a pilot study has several merits such as reducing the number of treatment errors, providing knowledge not foreseen before the pilot study, and obtaining feedback. In terms of the questionnaire, it provides the researcher with the opportunity to revise item wording, design, layout, length, sequence, and timing (Artino, Rochelle, Dezee, & Gehlbach, 2014).

Having refined the questionnaire and assessed its content validity, the questionnaire was pilot-tested. The instruments were pilot tested on representative sample in a selected college in Asante and Brong Ahafo Zone (ASHBA) of Colleges of Education. Pilot testing was performed by the researcher personally. The selected

college was used because it was not part of the selected colleges of this study. The results of the pilot testing were subjected to SPSS (version 21) analyzes to determine reliability co-efficient of the instruments. The pilot-test subjects provided feedback regarding the clarity of the instructions, items and response choices, grammar, spelling, and the relevance of the items. The questionnaire was further revised based on the feedback received from pilot-test subjects.

3.10 Reliability

The reliability of the instruments (Tutor's questionnaire and student teacher questionnaire) determined using the Cronbach Alpha. It has been suggested that for an item to be considered reliable, an accepted value of Cronbach Alpha should be 0.7 or more Kline, 2000). The reliability value for the tutor's questionnaire was 0.80 and student questionnaire was 0.82 respectively. Since the reliability co-efficient of the various questionnaires were more than 0.7 the items on the questionnaire were all the items considered reliable.

3.11 Data Collection Procedures

Before going to the field, the researcher obtained permission from the University of Education Winneba, Kumasi Campus- Fashion department authorizing the study to be carried out. The researcher then visited the sampled colleges to establish rapport, got permission from the college principals, and arranged with the tutors when to administer the questionnaires. The researcher used four days to collect data from the sampled colleges. A college was visited a day for data collection.

On the day of data collection in each college, the researcher met the clothing and textiles tutors to organize the sampled student teachers. After the student teachers

were seated, the questionnaires were given to them. The researcher explains the rationale behind the research to the student teacher and asked for their maximum cooperation. The student teachers were given 30 minutes to respond to the questionnaire after which the questionnaires were collected by the researcher.

The course representative for each level (200 & 300) were interviewed to probe further into how they integrate ICTs into their learning of clothing and textiles. The same thing was done in all the sampled colleges. In all, a total of sixteen student teachers were interviewed two representatives from each level making eight level 200 and eight level 300 from the four selected colleges.

The tutor's questionnaire was also administered to the tutors. Tutors were also given 30 minutes to respond to the questionnaire after which the researcher collected them. The tutors were also interviewed to probe further into how they use ICT resources in enhancing their teaching. The same thing was done for all the clothing and textiles tutors in the sampled colleges**.** The researcher thanked the tutors and the student teachers for their support.

3.12 Data Analysis Procedures

The data were exported to the Statistical Package for the Social Sciences (SPSS) version 21. Only responses from completed questionnaires were analyzed. Before the analyses of the data were done, the researcher did preliminary data screening. This involved checking for missing values, checking for assumptions of outliers and normality. The data entries were done by the researcher in order to check the accuracy of the data. Data was cleaned before running any analysis. Cleaning the data helped the researcher to get rid of errors that could result from coding, recording, missing information, influential cases or outliers.

Research question one was analyzed using descriptive statistics such as means and standard deviations to determine the availability of ICT resources for learning and teaching clothing and textiles.

Research question two was also analyzed using descriptive statistics such as means and standard deviations to determine challenges tutors and student teachers faced in using ICT resources for learning and teaching clothing and textiles in Colleges of Education.

Research question three was also analysed using descriptive statistics such as means, mode and standard deviations to determine how ICT resources enhance learning and teaching clothing and textiles in Colleges of Education. In-depended sample t-test was used to test the research hypothesis. The set alpha value for the test was set at $p < 0.05$ confidence level.

3.13 Ethical Consideration

According to Mugenda (2011), research ethics focus on the application of ethical standards in the planning of the study, data collection and analyses, dissemination, and use of the results. The researcher sought the consent of the participants to collect the data and equally explained the purpose of the study to the participants. The participants were given equal chance to participate in the study. Confidentiality was achieved by not asking participants to write their names or contacts on the questionnaire. Besides, the respondents in this research study were not exposed to any harm. The information that the researcher sought from the respondents was not biased or sensitive about their status. The researcher reached an agreement with the participants about the use of the data, and how its findings were to be reported and

disseminated. All references and sources where materials were collected for this study were dully acknowledged to prevent plagiarism (Mugenda, 2011).

3.14 Chapter Three Summary

The methodology adopted in this chapter was informed by the research questions, and the purpose of the research. The aim of the research is to find out how tutors and student teachers use ICTs in enhancing learning and teaching of clothing and textiles in Colleges of Education. Therefore, the pragmatic paradigm proposed a mixed-method research approach for the study. This was achieved through the use of a survey. The respondents were given questionnaires and interview to fill by the researcher. The data generated from the survey was analyzed to find the responses for each of the item constructed. The ethics in conducting research was also followed prior to the data collection.

CHAPTER FOUR

RESULTS AND ANALYSIS

4.1 Overview

This chapter presents data analysis and study findings. The purpose of this research was to find out how ICT resources can be used to enhance learning and teaching of Clothing and Textiles in Colleges of Education in Central and Western zones, in order to be abreast with modern trend of learning. The findings of the study are presented based on the following research objectives: To establish the availability of ICT resources usage in learning and teaching of clothing and textiles in Colleges of Education, to determine the challenges encountered by tutors and student teachers in using ICT resources in learning and teaching of clothing and textiles, and to determine the extent to which ICT resources usage affect learning and teaching of clothing and textiles in the selected colleges.

This chapter has been divided into two parts, student teacher respondents and tutor respondents. Each part has been put into four sections. The first section presents the demographic characteristics of respondents. This presents attributes such as gender, college, level and educational level for tutors. The second section discusses the availability of ICT resources in the learning and teaching of Clothing and Textiles, the third section dealt with challenges encountered in using ICTs for learning and teaching of Clothing and Textiles and the last section describes effect of ICTs usage on learning and teaching of clothing and textiles in the Colleges of Education.

Data for this study were gathered through questionnaires and interview schedules for both student teachers and tutors. These comprises of 120 for both level 200 and 300 student teachers and eight (8) tutors for questionnaires. Likewise, 16 student teachers 2 representatives from each level (200 and 300) and 8 tutors 2 from each college

making a total of 24 responded to the interview. The results obtained were presented using frequency distribution tables, pie chart and bar chart.

4.2 Demographic Characteristics of Tutor Respondents

The tutors' demographic information comprised of their gender, academic qualification, teaching experience, and college type. Table 4.2 shows the demographic information of the tutors.

Table 4.1: Demographic Information of the Tutors

	Frequency	Percentage
Gender:		
Male	2	25
Female	6	75
Academic Qualification:		
Bachelor's Degree		
Master's Degree (without Research)	1	12.5
Master's Degree (with Research)	7	87.5
PhD	0	0
Teaching Experience:		
Less than 3 years	0	0
3 - 5 years	0	0
6 - 8 years	3	37.5
Over 8 years	5	62.5
College type:		
Single sex college	4	50
Mixed College	4	50

Source: (Field Data, 2020)

Data obtained on the gender of tutors revealed that six (6) representing (75%) were females and two (2) representing (25%) being male. The results show that there were more female tutors handling Clothing and Textiles in the Colleges of Education than their male counterparts.

With reference to academic qualification, data obtained from tutor respondents revealed that one (1) tutor representing 12.5% had Master's Degree (without research) while seven (7) tutors representing 87.5% had Master's Degree (with research). The findings indicate that most tutors were academically qualified with Master's Degree with research work. Table 4.2 showed that three (3) tutors had taught between 6 to 8 years teaching experience. This represents 37.5% of the tutors selected for this study. Five tutors representing 62.5% have over 8 years' experience of teaching Clothing and Textiles at the colleges. This means that most of the tutors have taught in clothing and textiles in the colleges for quite a number of years and have gained the necessary experience in teaching pre-service teachers. It was important to look at the college type of tutors. Thus, whether a tutor was teaching in a mixed college or a single sex college. From Table 4.1, the results revealed that 4 tutors representing 50% were teaching in a single sex college while 4 tutors also representing 50% were teaching in mixed colleges. It was found that all the two male tutors who took part in the study were tutors of a mixed college whiles the single sex colleges have all their tutors being female. This means that most female tutors teaching clothing and textiles prefer to teach in the single female colleges than in mixed colleges.

4.3 Demographic Information of Student Teacher Respondents

Demographic background information of student teachers considered in this study included gender, level and school type. Items one and two of student teachers'

questionnaire asks them to indicate their gender, level and college type. The responses obtained are shown in Table 4.2

Table 4.2: Demographic Information of Student Teacher Respondents

Demography	Frequency	Percentage (%)
Gender:		
Male	7	5.8
Female	113	94.2
College type:		
Single sex college	2	50
Mixed college	2	50
Level:		
Level 200	80	50
Level 300	80	50

Source: Field Data, 2020

Table 4.2 shows the data on the gender, level and college type of student teachers who responded to the questionnaire. Out of the 120 student teachers, 113 representing (94.2%) were females while 7 representing (5.8%) were males. This means that clothing and textiles is a course dominated by females with some few males.

Like tutor respondents, female student- teachers are more inclined to clothing and textiles education as opposed to their male counterparts. This agrees with the observation of other researchers (Arubayi, 2004; Dzikite, Chimbindi, & Dandira, 2013) that Home Economics is generally viewed as the domain of females. Anderson (2013) explained that though there is male dominance in the fashion industry the males prefer to learn garment production through apprenticeship training to avoid being mocked by their peers for offering a female subject in school. This is similar to the finding by Opoku-Asare et al (2014) that more girls prefer to offer Fashion which they perceive as a girl-friendly subject.

The results from the student teachers level as seen in Table 4.2 revealed that 60 out of the 120 respondents representing 50% of the total sample were level 200 while the rest 60 representing (50%) were also found to be level 300 student teachers. This means that student-teachers doing clothing and textiles at all levels were given equal opportunity to express their views on how ICT resources are being used in enhancing their teaching and learning.

The results also show that out of the total four (4) schools selected for the study, two (2) representing (50%) were single sex colleges and the remaining two (2) representing (50%) were also mixed colleges. The researcher wanted to give equal chance to all colleges in expressing their thoughts on how ICT resources usage help enhance their teaching and learning of clothing and textiles.

4.4 Analysis and Results Based on Research Questions

The following section focuses on the analysis and discussion of the findings of the study based on the research questions and objectives of the study.

4.4.1 Research Question One!

Are ICT resources available for usage in learning and teaching of clothing and textiles in the Colleges of Education?

The first objective of the study examined the extent of the availability of ICT resources for usage in the learning and teaching of clothing and textiles by both tutors and student teachers in the colleges of education. The ICT resources available for learning and teaching of clothing and textiles in the colleges were categorized into four, namely: hardware resources, software resources, storage resources and internet/WIFI availability in the college. The hardware resources included laptops,

desktop computers, tablets, smart phones, projectors and printers, the software resources consisted of cutting and designing software such as AUTOCAD, Lactra and Optex, storage resources considered in the study included pen drives, CD/DVD ROMS, and internet resources included constant internet, WIFI, moderns and other network providers.

4.4.1.1 Availability of Hardware Resources

On the availability of hardware resources, tutors and student-teachers were asked to indicate whether hardware resources were adequate, inadequate, and unavailable in the college for teaching and learning of clothing and textiles in their colleges. The response of student teachers

are shown in figure 4.1

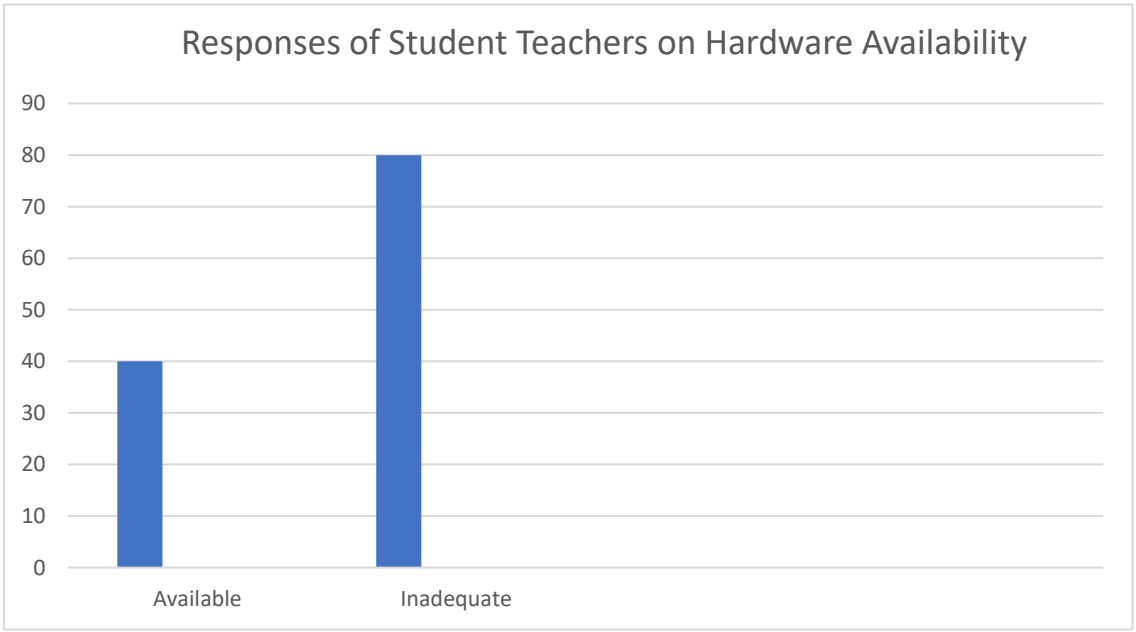

Figure 4.1: Responses of student teachers on hardware availability in Colleges of Education

From Figure 4.1, it can be seen that 40 student teachers representing 33.3% believe that hardware resources are adequate in their respective colleges for the learning and teaching of clothing and textiles. This means that hardware resources such as laptops, desktop computers, projectors and printers are available in all the colleges for learning and teaching of clothing and textiles and other subjects. This implies that ICT resources are present in colleges of education for both student teachers and tutors to use in enhancing their learning and teaching activities on campus. From Figure 4.1, it can be deduced that 80 student-teachers representing 66.7% are on the view that hardware resources are inadequate. This means that although these resources are present in the colleges, not all student teachers are able to get access to them due to their limited in number.

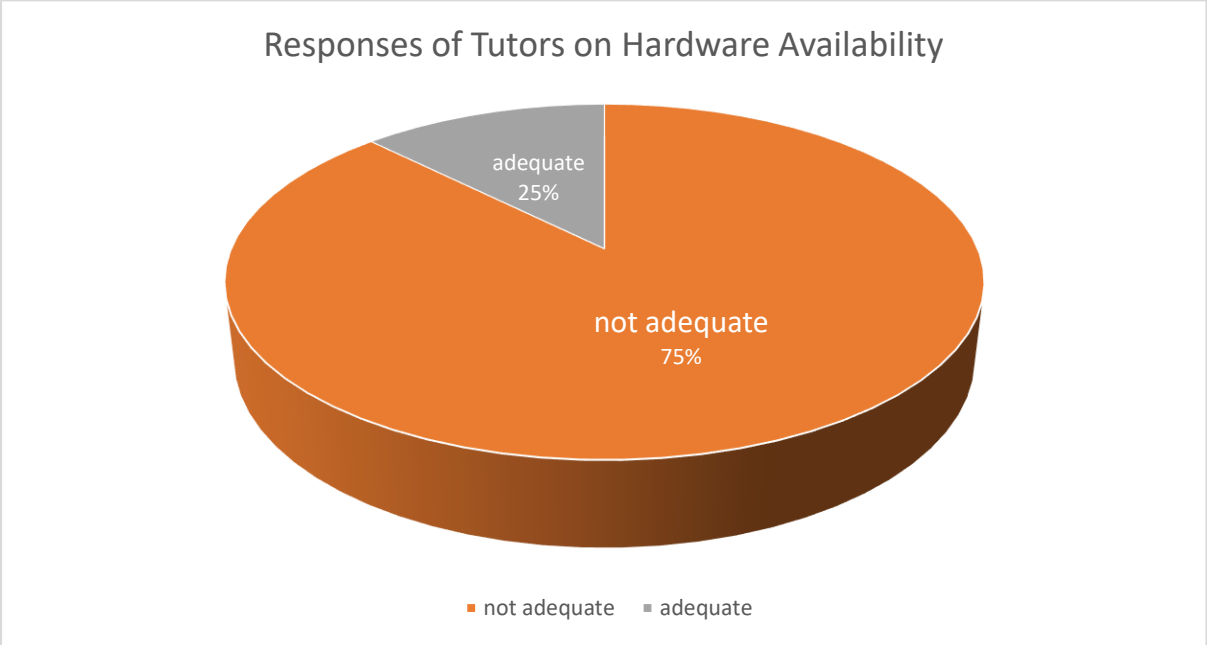

Figure 4.2: Responses of tutors on hardware availability in colleges of education

From Figure 4.2, it can be seen that tutors and student teachers share similar views on availability of hardware resources in the colleges. The result show that six (6) out of the total eight (8) tutors representing 75% of the total tutors are of the view that

hardware resources are available in the colleges but they are inadequate for both tutors and student tutors. This means that hardware resources are in limited supply in colleges of education.

4.4.1.2 Availability of Software Resources

The researcher further sought from tutors and student teachers, the availability of software resources available for learning and teaching of clothing and textiles in the Colleges of Education. The software resources intended to establish availability or otherwise include AutoCAD, OptTex, CAD/CAM and Lectra. In doing this, tutors and student teachers were asked to indicate whether the software resources were adequate, inadequate and unavailable in the college. The result of the analysis is shown in Figure 4.3 and Figure 4.4 respectively.

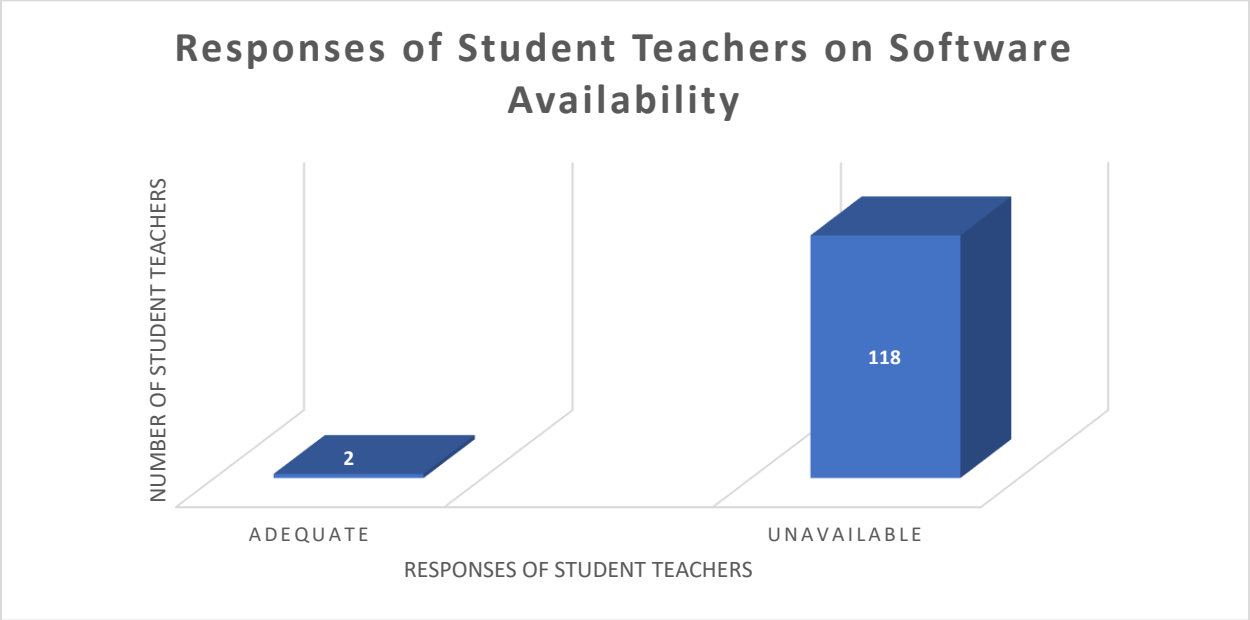

Figure 4.3 shows a response of student teachers on software availability in their various colleges

From Figure 4.3, it can be deduced that 118 student teachers representing 98.3% of the total respondent said that software resources are not available in their colleges for learning and teaching of clothing and textiles. This means that most of the colleges lack software programs and patterns at the Home Economic department for teaching the subject.

Tutors teaching clothing and textiles were also asked to comment on the availability of software in their colleges for teaching clothing and textiles. The result of tutors on software availability is shown in Figure 4.4

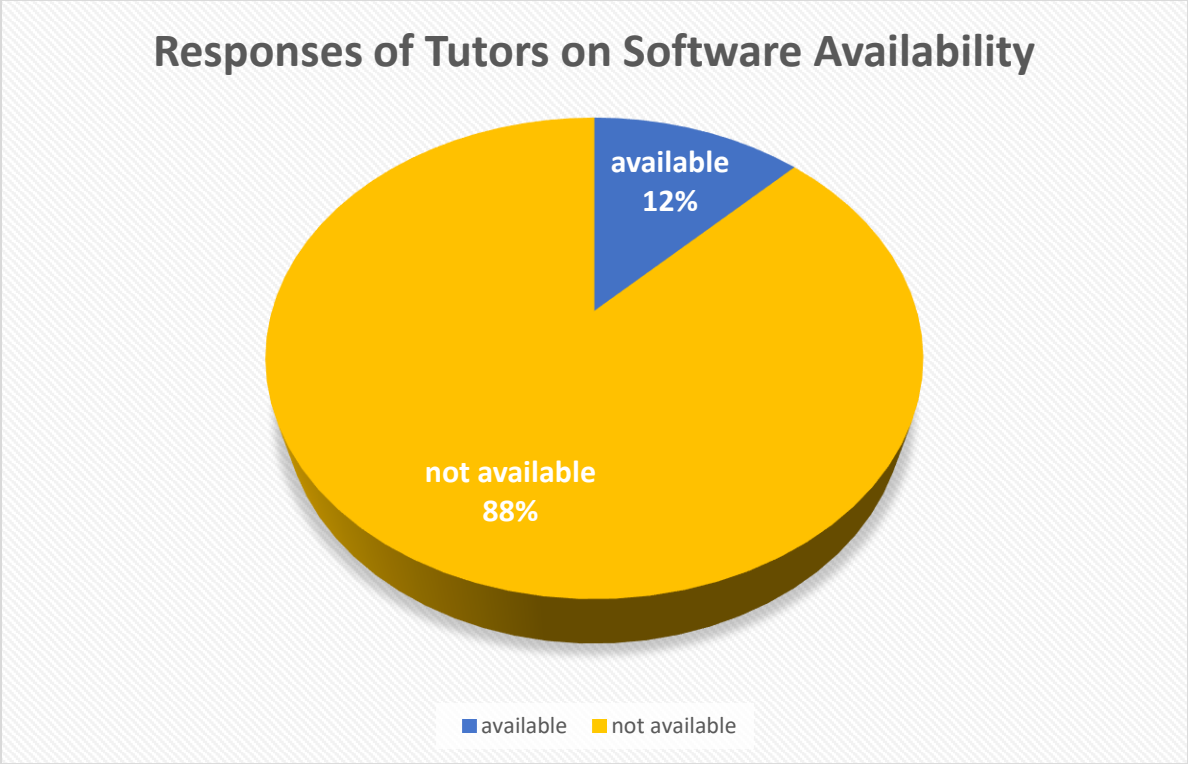

Figure 4.4: Response of tutors on software availability in Colleges of Education

Tutors in the selected Colleges of Education were asked to comment on the availability of ICT facilities in their institutions. Majority of tutors representing 88% of the total respondent commented that software resources are not available in their colleges for learning and teaching of clothing and textiles. Only twelve percent (12%) of the total respondents stated that software resources are available for teaching

clothing and textiles. However, none of the tutors said that software resources were available and adequate in their colleges. This means that the resources cannot be found in their colleges. The other six tutors reported that the software resources were not adequate. They further revealed that even the few computers available were not fully utilized due to a lack of appropriate software and skills.

4.4.1.3 Storage resources

Effective learning and teaching of clothing and textiles require modern technologies such as CD players for recording and storing course contents for student teachers' use. Some CD players have huge capacity and are very useful for storing training courses in video format. The researcher enquired from the respondents whether they have adequate CD players for learning and teaching clothing and textile in their colleges. The result of the interaction is shown in Figure 4.5

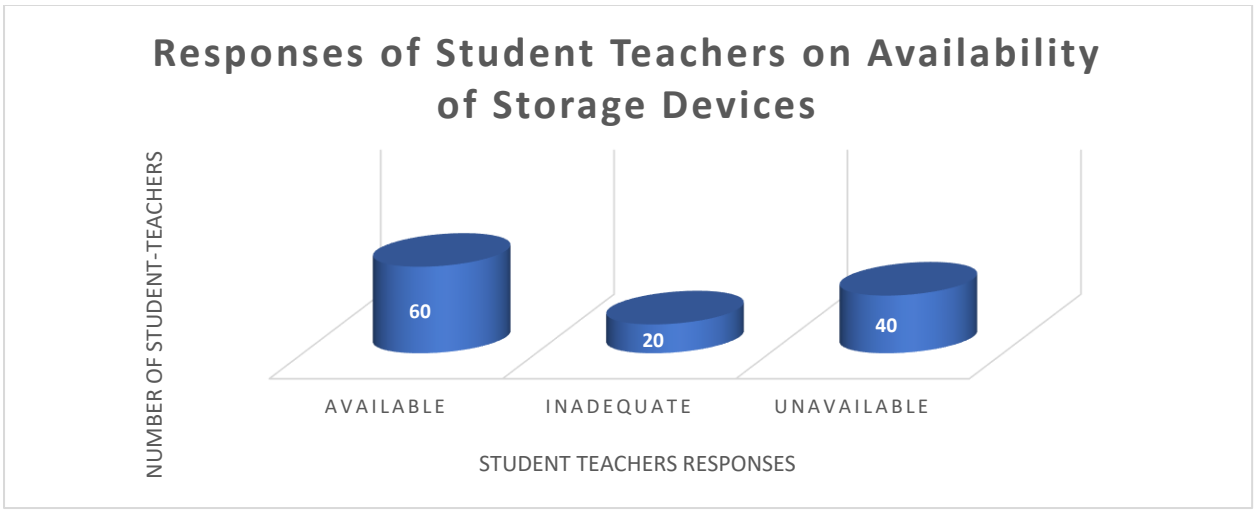

Figure 4.5: Responses of student teachers on availability of storage devices

From Figure 4.5, it can be realized that 60 student teachers representing 50% out of the total respondent agreed that storage devices are available in their colleges for storing information on clothing and textiles and other courses. Twenty (20) student

teachers representing 16.7% of the total respondent attested to the fact that storage devices are available in their colleges but these devices are not adequate for student teachers use. However, 40 student teachers representing 33.3% also believe that storage devices are not available in their colleges for student teachers use. This might be that the college ICT laboratory lacks some of these devices hence inability for student teachers to use for storing their information.

Tutors were also asked to comment on whether storage resources are available in the colleges for storing information on clothing and textiles. The results from their view shown in Figure 4.6

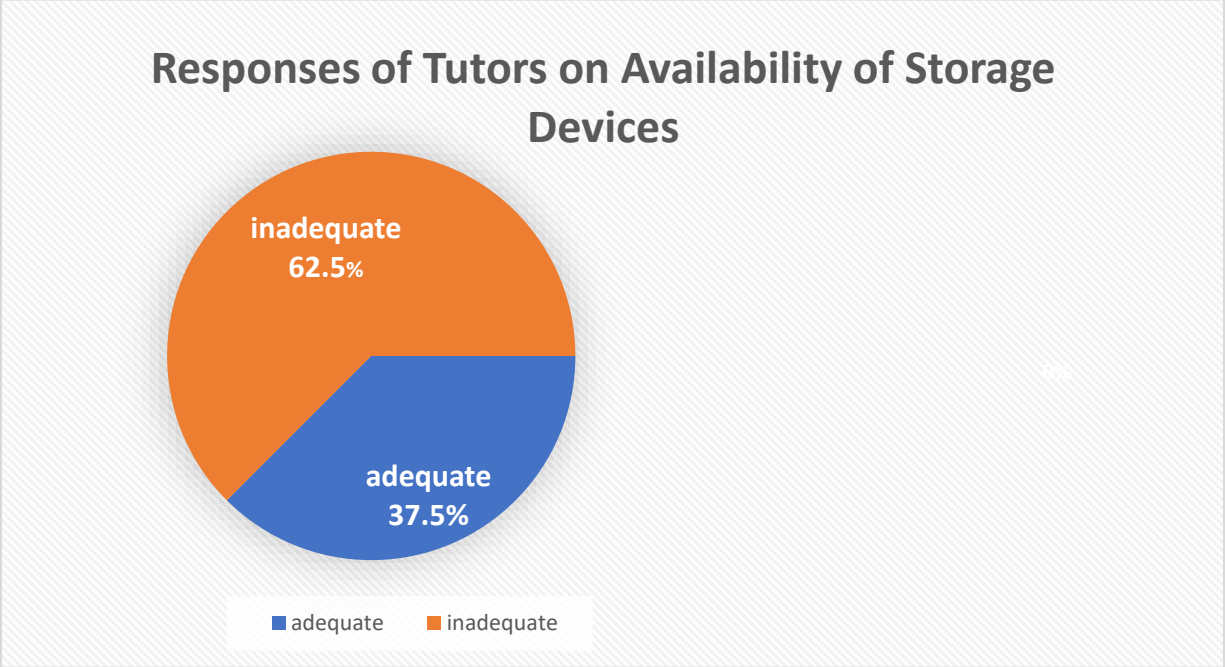

Figure 4.6: Responses of tutors on availability of storage devices in Colleges of Education

From Figure 4.6, it can be inferred that 37.5% of the total respondent accepted that storage materials are available in their colleges for storing information. This might be that the ICT laboratories in the college has some of these storage devices for use by both tutors and student teachers. Although some storage devices such as pen drive, CD ROM, CD RAM, and other storage devices are available in the college, 62.5% of

the total respondents think that these storage materials are not adequate for the use by both tutors and student teachers. This means that the high enrollment of Colleges of Education has put pressure on the technological devices and resources available in the Colleges of Education.

4.4.1.4 Internet Resources

These are resources that provide the college with internet facilities and connectivity. These resources may include internet connectivity, routers, modems and Wifi connectivity. These resources help in doing extensive research by both tutors and student teachers. Student teachers were asked to indicate whether the internet facilities were available or unavailable in their collages and if they are adequate or inadequate in their colleges for learning and teaching of clothing and textiles. The result of student teachers is shown in the Figure 4.7

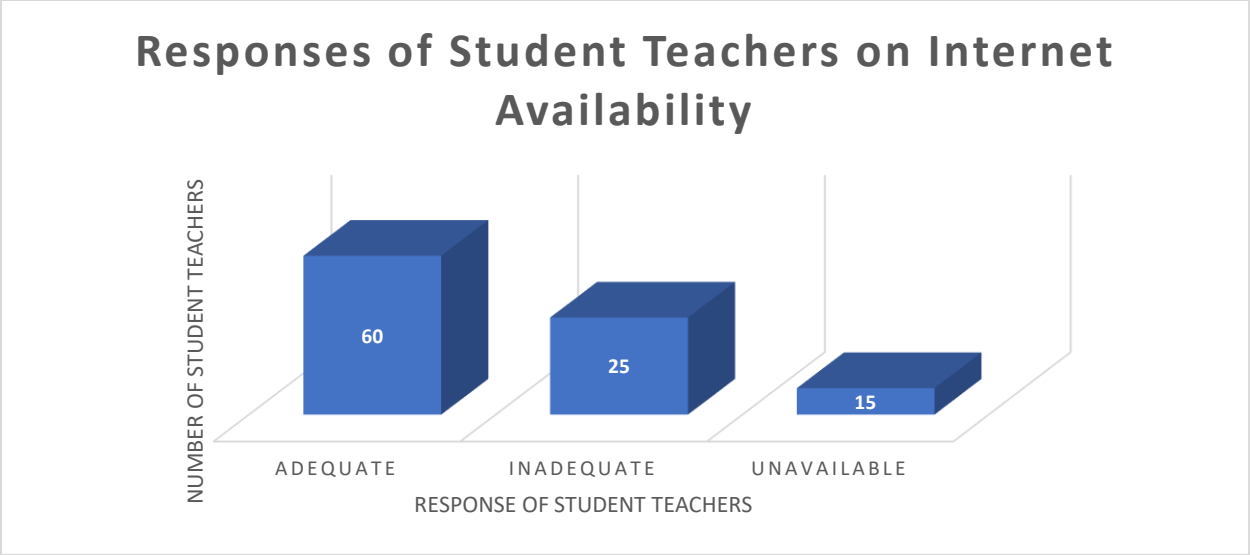

Figure 4.7: Responses of student teachers on internet availability

From Figure 4.7, it can be assumed that 70 student-teachers representing 58.3% of the total respondents responded that internet resources are available for learning and teaching in their colleges. Although these facilities are present in the colleges, 35 of

the total respondents representing 29.2% belief that these facilities are not adequate for both tutors and student teachers. This might be that lack of finances in some colleges has prevented them from installing proper internet facilities in the colleges. However, 15 student teachers' respondents representing 12.5% agreed to the fact that internet resources are adequate in their colleges for clothing and textile lessons.

Tutors teaching clothing and textiles were also asked to indicate whether or not internet facilities available in their colleges for teaching and learning clothing and textiles. The results of tutors response is shown in Figure 4.8

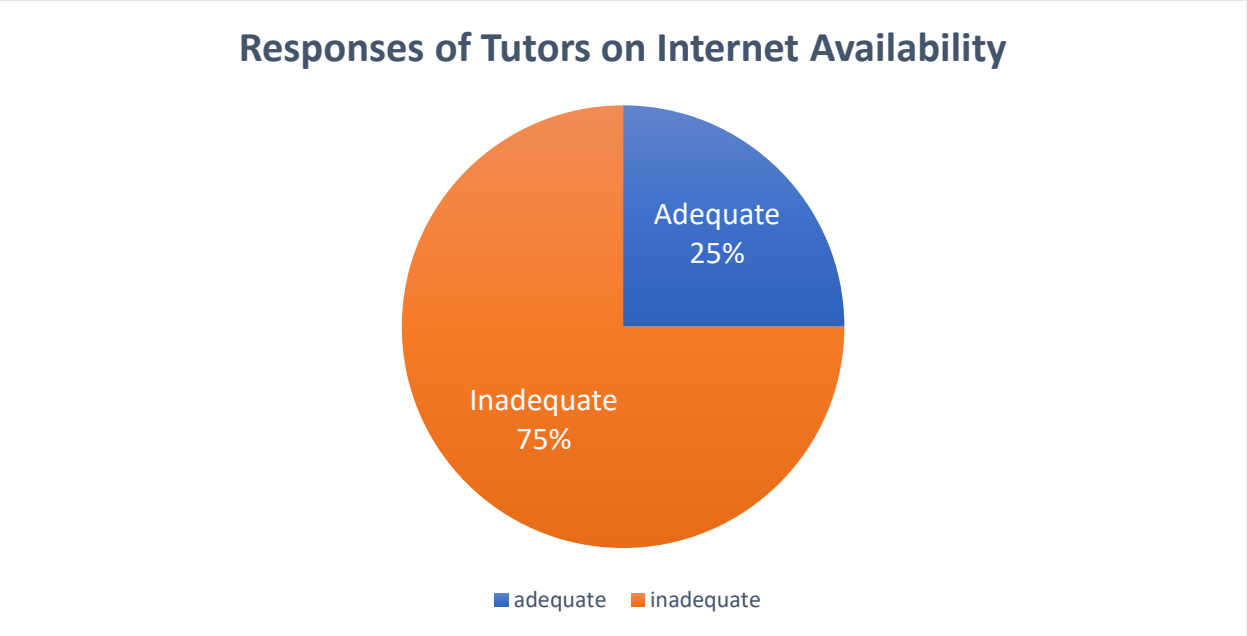

Figure 4.8: Response of tutors on internet availability

When tutors were asked to comment on the availability of internet resources in the college for teaching clothing and textiles, 75% of the tutors who responded to the items said that internet resources are not adequate whiles 25% of the respondents commented that these internet resources are available in their colleges. This might be that internet connectivity is unavailable at these places and also the college may not have enough money to provide Wi-Fi connectivity.

4.4.2 Research Question Two

What is the effect of ICTs usage on learning and teaching of clothing and textiles in Colleges of Education?

Table 4.3: Response of student- teachers on effect of ICTs usage on learning clothing and Textiles

Statement	SA mean SD	AG Mean SD	UN Mean SD	DA mean SD	SD mean SD
Using ICTs make my learning easier	4.58 0.49	0.79 0.39	0.00 0.00	0.63 0.12	0.00 0.00
Using ICTs enhances my critical thinking	1.30 0.42	3.65 0.48	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs promote my problem-solving skills	0.67 0.49	3.65 0.31	0.00 0.00	0.45 0.14	0.23 0.08
Using ICTs enhance collaborative learning	0.23 0.16	1.66 0.36	0.00 0.00	3.11 0.48	0.00 0.00
ICTs promote research-based learning	4.03 0.49	0.89 0.43	0.00 0.00	0.08 0.08	0.00 0.00
Using ICTs for learning is more tedious and time consuming	0.00 0.00	0.35 0.13	0.00 0.00	3.89 0.48	0.76 0.39
Using ICTs make my learning more practical	1.60 0.31	2.95 0.49	0.00 0.00	0.45 0.20	0.00 0.00
Using ICTs make my learning more interesting	3.11 0.47	1.45 0.34	0.00 0.00	0.00 0.00	0.47 0.19
Using ICTs in my	3.74	1.14	0.00	0.12	0.00

learning help me to understand concept faster	0.49	0.44	0.00	0.07	0.00
ICTs facilitates	0.47	3.78	0.00	0.38	0.36
problem-based learning	0.26	0.44	0.00	0.17	0.13

Number of respondents (N) = 120 (Field Work)

Using ICTs make my learning easier

From Table 4.3 a high mean score of 4.58 with a standard deviation of 0.49 for strongly agree as compared to a low mean score of 0.79 for agree and 0.63 for disagree indicates that majority of the student teachers strongly agree to the fact that using ICT resources make their learning of clothing and Textiles easier. Some of them also agree to the fact that using ICT resources for learning Clothing and Textiles makes their learning easier. Only few people disagree to the fact that ICT resources usage makes their learning easier. This might be that these people have low knowledge in ICT resources usage hence they are unable to make effective use of these ICT resources to enhance their learning.

Using ICTs enhances my critical thinking

When student teachers were asked whether ICT tools usage enhances their critical thinking, from Table 4.3 a higher mean score of 3.65 and a standard deviation of 0.48 for agree and a high mean score of 1.30 for strongly agree indicates that majority of the student teachers agree with the statement that ICT resources usage enhances their critical thinking when used in learning clothing and Textiles. This means that most of the student teachers are able to use ICT resources and the availability of internet to

make better research into courses they learn in clothing and Textiles and this help to improve their thinking.

Using ICTs promote my problem-solving skills

In finding out whether ICT resources usage promote problem-solving skills of learners in their learning of Clothing and Textiles, from Table 4.3 shown a higher mean score of 3.65 with a standard deviation of 0.49 and 0.67 for agree and strongly agree and a lower mean score of 0.45 and 0.23 for disagree and strongly disagree was recorded. This means that most of the student-teachers agree to the statement that using ICT resources for learning clothing and Textiles help to promote their problem-solving skills when learning Clothing and Textiles concepts with few of them disagreeing to the said statement. This means that majority of student-teachers are able to use ICT in solving conceptual problems during their learning of clothing and Textiles.

Using ICTs enhance collaborative learning

In finding out how ICT resources usage affect students learning of clothing and textiles in the colleges of education, students were asked to indicate whether ICT resources usage enhance collaborative learning among them. From Table 4.3 indicated a mean score of 3.11 and a standard deviation of 0.48 for disagree, 1.66 for agree and 0.23 for strongly agree was recorded. This means that student teachers share divided views on this statement. Whiles some of them agree to the fact that using ICT resources enhance their collaborative learning, most of them disagree to the fact that ICT resources usage help to enhance collaborative learning among them. This might be that some are able to use ICT resources during group studies, doing

group assignments and group presentations whiles others prefer to use their ICTs individually for their personal studies.

ICTs promote research-based learning

In finding out the effect of ICT resources usage on student-teachers, student-teachers were asked to state whether ICT resources usage help to promote research-based learning among them in their various colleges. From Table 4.3 a mean score of 4.03 with a standard deviation of 0.49 for strongly, 0.89 for agree and a low mean score of 0.08 for disagree was recorded. This means that majority of the student teachers strongly support the idea that ICT resources usage promote research-based learning among them. This might be that most of the student teachers make good use of ICT resources for effective research work in their studies.

Using ICTs for learning is more tedious and time consuming

in finding out how ICT tools usage affect the learning of student-teachers, student teachers were asked to indicate whether they agree or disagree to the statement ICT resources usage is more tedious and time consuming. In responding to this from Table 4.3 it can be deduced that, a mean score of 3.89 and a standard deviation of 0.48 for disagree, 0.76 for strongly disagree and 0.35 for disagree was recorded. This means that majority of the student teachers do not support the fact that using ICT resources for learning is tedious and time consuming. This might be that majority of the student teachers have good hardware and software resources with better internet connection which allows them to easily do their research and other academic work without any difficulties.

Using ICTs make my learning more practical

In finding out from student-teachers whether ICT resources usage make their learning more practical or not, the response indicated from Table 4.3 a high mean score of 1.60 and 2.95 for strongly agree and agree respectively and a low mean score of 0.45 for disagree. This means that majority of the student teachers agree to the fact that using ICT resources for learning clothing and Textile makes their learning more practical. This might be that student-teachers enjoy interacting with ICT resources during clothing and textile lessons. A mean score of 0.45 for disagree shows that only few student teachers do not see the practicality in using ICT resources for learning clothing and textiles.

Using ICTs make my learning more interesting

In order to find out how ICT resources usage affect the learning of student teachers during clothing and textiles. A mean score of 3.11 and 1.45 for strongly agree and agree and a lower mean score of 0.47 for disagree was obtained. This means that most of the student-teachers who took part in the study massively agree with the fact that using ICT resources make their learning more interesting with an insignificant number of them disagreeing to the statement that ICT resources make their learning more interesting.

Using ICTs in my learning help me to understand concept faster

To find out from student-teachers if using ICT resources help them to understand concept faster or not, from Table 4.3 shown a mean score of 3.74 with a standard deviation of 0.49 for strongly agree, 1.14 with 0.44 standard deviation for agree and a mean score of 0.12 for disagree was recorded. This means that majority of student

teachers agree with that statement that using ICTs in learning clothing and textiles helps them understand concept faster than without ICT resources

ICTs facilitates problem-based learning

When student teachers were asked whether ICT resources usage help to facilitate problem-based learning among them from Table 4.3, a mean score of 1.47 and 2.78 for strongly agree and agree and a mean score of 0.38 and 0.36 for disagree and strongly disagree was recorded. This means that whiles some agree to the statement, others also disagree with the fact that ICT resources usage facilitate problem-based learning when used in their studies.

Table 4.4: Response of tutors on effect of ICTs usage on teaching clothing and Textiles

Statement	SA mean SD	AG Mean SD	UN Mean SD	DA mean SD	SD mean SD
Using ICTs make my teaching easier	4.57 0.49	0.40 0.36	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs enhances my learner's critical thinking	3.39 0.49	1.56 0.45	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs promote problem-solving skills	3.50 0.49	1.50 0.47	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs enhance collaborative teaching and learning	3.85 0.49	1.13 0.46	0.00 0.00	0.00 0.00	0.00 0.00
ICTs usage enhances my learner's understanding of concept	3.42 0.49	1.56 0.47	0.00 0.00	0.00 0.00	0.00 0.00
ICTs integration in lesson is more tedious and time consuming	4.12 0.49	0.86 0.45	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs make my lessons more practical	5.00 0.49	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs make my lessons more interesting	5.00 0.49	0.00 0.00	0.00 0.00	0.00 0.00	0.00 0.00
Using ICTs make assessment of students' easier	3.35 0.49	1.58 0.45	0.00 0.00	0.00 0.00	0.00 0.00
ICTs facilitates problem-based learning and teaching	2.72 0.49	1.78 0.47	0.00	0.50 0.06	0.00

Number of Respondents (N) = 08 (Field Work)

In order to find out the how the use of ICT resources affect the teaching of tutors in Colleges of Education, tutors were asked to indicate whether they agree or disagree to the following statements.

Using ICTs make my teaching easier

In order to find out how ICT resources usage enhances the teaching of tutors during clothing and textiles lessons from Table 4.4, a mean score of 4.57 with a standard deviation of 0.49 for strongly agree and 0.40 for strongly disagree was recorded. This means that almost all the teachers who responded to the questionnaire agreed to the fact that ICT resources usage makes their teaching of clothing and textiles very easy.

Using ICTs enhances my learner's critical thinking

To determine how ICT resources usage affect tutors teaching of clothing and textiles, they were asked to indicate whether ICT resources usage enhances their critical thinking or not. From Table 4.4 a mean score of 3.39 and a standard deviation of 0.49 for strongly agree and 1.56 a standard deviation of 0.45 for agree was obtained. This means that all the tutors agreed to the fact using ICT resources for teaching clothing and textiles help in enhancing their learners critical thinking.

Using ICTs promote problem-solving skills

In finding out how ICT resources usage affect tutors teaching clothing and textiles in the Colleges of Education, tutors were asked whether they agree or disagree to the fact that using ICT resources for teaching clothing and textiles promote their problem-solving skills. Responses from tutors indicated in Table 4.4, a mean score of 3.50 with a standard deviation of 0,49 for strongly agree and 1.50 for agree was recorded. This

means that all the tutors agreed to the fact that ICT resources usage help promote their problem-solving skills. This might be that using ICT resources frequently in their lessons equip them with the necessary skills they need to solve problems in their everyday life activities.

Using ICTs enhance collaborative teaching and learning

Tutors were asked whether they agree or disagree to the statement that using ICT resources for teaching enhance collaborative teaching and learning among them as tutors. From Table 4.4 a mean score of 3.85 and a standard deviation of 0.49 for strongly agree and 1.13 for agree was recorded. This means that majority of the tutors agreed strongly that their collaborative teaching and learning is enhanced when ICT resources are used in their lessons. This might be that several tutors come together to learn and prepare for lessons using ICT resources.

ICTs usage enhances my learner's understanding of concept

In finding out from tutors how ICT resources enhance their teaching of clothing and Textiles, tutors were asked to state their views on whether ICT resources enhance their learners understanding of clothing and textiles concepts**.** From Table 4.4 a mean score of 3.42 with a standard deviation of 0.49 for strongly agree and a mean score of 1.56 was obtained. This means that all the tutors strongly support the statement that using ICT resources in learning and teaching clothing and textiles help to enhance learner's understanding of concept. This means that most learner are able to observe different pictures and diagrams that help to enhance their understanding of the concept.

ICTs integration in lesson is more tedious and time consuming

As part of finding out how ICT resource s usage affect tutors teaching, tutors were asked to agree or disagree with the statement ICT resources integration in lesson is more tedious and time consuming. From tutors' responses, a mean score of 4.12 and a standard deviation of 0.49 for strongly agree and 0.86 for agree was recorded. This means that majority of tutors agree with the notion that integrating ICT resources in lesson is more tedious and time consuming. This might be that tutors find it difficult in getting ICTs for their lessons due to the inadequacy of ICT resources at the various Colleges of Education. This might also be the fact that tutors lack the basic knowledge on integrating ICT resources into the teaching and learning of clothing and textiles.

Using ICTs make my lessons more practical

On whether ICT resources usage makes lesson more practical, from Table 4.4 a mean score of 5.00 with a standard deviation of 0.49 for strongly agree for all tutors means that all tutors admitted to the fact that using ICT resources for teaching clothing and textiles makes lessons more practical.

Using ICTs make my lessons more interesting

As part of finding out from tutors how ICT resources affect their teaching, tutors were asked if ICTs usage makes their lessons more interesting or not. From the responses in Table 4.4, a mean score of 5.00 for all tutors was recorded. From the analysis, it is evident that all tutors admitted to the fact that when ICT resources are used in teaching, the lesson becomes more interesting.

Using ICTs make assessment of students' easier

In finding out from tutors the influence of ICT resources of their learning and teaching, tutors were asked whether ICT resources make assessment of their students' easier or not. From Table 4.4 showing the responses of tutors, a mean score of 3.35 and a standard deviation of 0.49 for strongly agree and 1.58 for agree was obtained. This means that all tutors agree to the fact that ICT resources usage makes assessment of students easier.

ICTs facilitates problem-based learning and teaching

In finding out how ICT resources usage enhance tutors teaching of clothing and textiles, tutors were asked whether the use of ICT resources facilitates problem-based learning and teaching. From their responses, a mean score of 2.72 a standard deviation of 0.47 for strongly agree, a mean score of 1.78 for agree and 0.50 for disagree respectively were obtained. This means that whiles some tutors accept that using ICT resources in teaching has the tendency to facilitate problem-based learning, others also disagree with this notion.

4.4.3 Research Question Three

What challenges do tutors and student teachers of Colleges of Education encounter in using ICTs in learning and teaching of clothing and textiles?

In order to find out the challenges faced by tutors and student-teachers in using ICT resources for learning and teaching of clothing and textiles, tutors and student teachers were given 10 items on a 5-point Likert scale to respond. The scale was interpreted as 5= strongly agree, 4= Agree, 3 = Uncertain, 2= Disagree and 1= strongly Disagree. The results of the respondents are shown in the Table 4.5.

Table 4.5: Response of student teachers on challenges they encounter on using ICTs for learning Clothing and Textiles

Statement	SA mean SD	AG Mean SD	UN Mean SD	DA mean SD	SD mean SD
Insufficient number of computers in the college laboratory	3.60 0.49	1.27 0.44	0.00 0.00	0.13 0.03	0.00 0.00
Insufficient internets access in the college	3.25 0.46	1.31 0.40	0.00 0.00	0.44 0.14	0.00 0.00
Personal ICT resources are not allowed by student-teachers	0.00 0.00	0.00 0.00	0.00 0.00	1.43 0.39	3.50 0.47
Lack of adequate skills of tutors	0.00 0.00	0.20 0.14	0.00 0.00	1.00 0.36	3.80 0.46
Most tutors are not in favor of using ICTs in the college	0.00 0.00	0.00 0.00	0.00 0.00	1.37 0.46	3.60 0.48
Insufficient power supply	0.00 0.00	0.33 0.10	0.00 0.00	1.17 0.43	3.50 0.47
There is not enough time for student teachers to use ICT resources for clothing and Textiles practical	3.00 0.38	1.20 0.34	0.00 0.00	0.80 0.24	0.00 0.00
The ICT technician is not always available at the college ICT laboratory	3.70 0.37	0.80 0.27	0.00 0.00	0.33 0.22	0.27 0.16
ICT technicians in the college is not having content knowledge in clothing and textiles stuff	3.83 0.45	1.00 0.42	0.00 0.00	0.17 0.13	0.00 0.00
There are always clothing and textiles software problems	3.60 0.47	1.40 0.47	0.00 0.00	0.00 0.00	0.00 0.00

Number of Respondent (N) = 120, (Field work, 2023)

Table 4.5 shows the means and standard deviations of student teachers on the questionnaire they responded to on the challenges they encounter in using ICT resources in their teaching of clothing and textiles. Their views include:

Insufficient number of computers in the college laboratory

In finding out the challenges encountered by student teachers in using ICT resources for learning clothing in their colleges, student teachers were asked to comment on whether insufficient number of computers in the college laboratory was a problem or not. From Table 4.5, it can be seen that a mean score of 3.60 with 0.4 standard deviation for strongly agree, 1.27 mean score and 0.44 standard deviation for Agree and 0.13 mean score with 0.03 standard deviation for disagree was recorded. This means that majority of the student teachers who responded to the questionnaire see insufficient number of computers in the college laboratory as a major challenge for them in using ICT resources for learning clothing and textiles.

Insufficient internets access in the college

Student-teachers were asked to comment on how internet accessibility is a challenge for them as student teachers in the college. From table 4.5, a mean score of 3.25 and 0.46 standard deviation was recorded for strongly agree, 1.31 with 0.40 standard deviation for agree and 0.44 mean score and 0.14 standard deviation for disagree. This means that majority of the student teachers see insufficient internet access in the colleges as a big challenge. This might be due to the geographical locations of the colleges which has poor internet connectivity.

Personal ICT tools are not allowed by student teachers

As part of identifying the challenges student teachers encounter in using ICT resources for learning clothing and textiles, student teachers were asked to comment on whether personal ICT resources are not allowed by student teachers in the colleges. From Table 4.5, it can be seen that a mean score 3.50 with 0.47 standard deviation and 1.43 with 0.39 standard deviation were recorded for strongly disagree and disagree respectively**.** This means that student teachers are allowed to use their own personal ICT resources during lessons, group work and on their personal studies. Majority of student teachers have personal ICT resources such as laptops, tablets, smartphones, hard drives, pen drives and others which help them to do effective research work during clothing and textiles lesson and other lessons altogether. This shows that using personal ICT resources is not a challenge at colleges of educations since student teachers are permitted to use free any ICT resources, he or she has in order to enhance their academic performance.

Lack of adequate skills of tutors

Student teachers were asked if lack of adequate skills of tutors is a challenge for them in using ICT resources for their learning of clothing and textiles. From Table 4.5, the analysis showed that a mean score of 3.80 and 0.46 standard deviation was obtained for strongly disagree, 1.00 with 0.36 standard deviation for disagree and 0.20 with 0.14 standard deviation for agree respectively. This means that majority of the respondents disagree with the fact that lack of adequate skills of tutors is a challenge for using ICT resources in the college. This also means that tutors in the colleges have adequate skills for handling ICT resources during teaching of clothing and textiles. This might be that they have received training of how to use ICT resources and this

has helped to overcome the challenge of tutors finding it difficult to integrate ICT resources into their teaching.

Most tutors are not in favor of using ICTs in the college

When student teachers were asked if most tutors are not in favor of using ICT resources in their colleges, the response indicated in Table 4.5 a mean score of 3.60 and a standard deviation of 0.48 for strongly disagree and1.37 with a standard deviation of 0.46 for disagree. This means that all the student teachers who responded to the question disagree with the statement that most tutors are not in favor of using ICT resources in the college. This also means that tutors in the Colleges of Education in the western and central zone are in favor of their student teachers using ICT resources during lessons and their personal studies. This might be that most tutors know the benefit of using ICT resources for learning and hence have been encouraging student teachers to integrate them during lessons and their personal studies.

Insufficient power supply

Student teachers were asked if insufficient power supply is a challenge for them in using ICT resources for learning clothing and textiles. From Table 4.5, it was seen that a mean score of 3.50 with 0.47 standard deviation was recorded for strongly disagree, 1.17 mean score with 0.43 standard deviation for disagree and 0.33 with 0.10 standard deviation for agree. This means that student teachers have diverse views on as to insufficient power supply being a challenge for ICT resources usage in their colleges. Whiles some of them do not see it as a challenge, others see it as a challenge for ICT resources usage. This might be that some colleges have electric plant which

can supply them with adequate power supply in case of power outage whiles some colleges may lack such a device. Those with such electric plants may not see this as a challenge since they will have constant power supply. However, those without such plant will be forced to stop using projectors, computers and laptops. This will go a long way in affecting their Integration of ICT resources which will also affect student teachers' academic performance.

There is not enough time for student teachers to use ICT tools for clothing and Textiles practical

Student teachers commented on whether there is enough time for student teachers to use ICT tools for clothing and Textile's practical. Results from Table 4.5, showed a mix response from student teachers. It can be seen that a mean score of 3.00 and 0.38 standard deviation for strongly agree and 1.20 mean score with a standard deviation of 0.34 for agree, also 0.80 and 0.24 standard deviation for disagree. This means that most of the student teachers agree to the fact that there is not enough time for student teachers to use ICT resources for clothing and textiles practical and this makes it a challenge whiles other also disagree with the statement and do not see it as a challenge in using ICT resources for their studies. This means that time for using ICT resources for clothing and textiles practical vary from one person to another. Some colleges may have the time for using ICT resources for clothing and textiles practical based on their school environment. Some may have a specific time where they can use ICT resources to do practical on their owns whiles others may not have such time.

The ICT technician is not always available at the college ICT laboratory

Student-teachers were asked to comment on whether ICT technician is not always available at the college ICT laboratory. Responses from Table 4.5 shown a mean score of 3.70 and standard deviation of 0.37 for strongly agree, 0.80 and a standard deviation of 0.27 for agree, 0.33 with 0.22 standard deviation for disagree and 0.27 with 0.16 standard deviation for strongly disagree. This shows the different views that student-teachers have when it comes to availability of ICT technician at the college ICT laboratory. Some of the student-teachers strongly agree and other agree to the fact that ICT technicians are not always available at the college ICT laboratory. This might be that these people have never met the technicians at the laboratory before or they have not benefited from their services before.

ICT technicians in the college is not having content knowledge in clothing and textiles stuff

In finding out challenges encountered by student teachers in using ICT resources for learning clothing and textiles, student teachers were asked to comment on whether ICT technicians in the college is not having content knowledge in clothing and textiles stuff. Result from Table 4.5 indicated that a mean score of 3.83 with a standard deviation of 0.45 and 1.00 mean score with a standard deviation of 0.42 were obtained for strongly agree whilst 0.17 was obtained for disagree. This means that most of the student teachers agree to the fact that majority of the ICT technicians lack basic content knowledge in clothing and textiles.

There are always clothing and textiles software problems

Student teachers were asked to comment on whether there are always clothing and textiles software problems in their colleges. Results from Table 4.5 revealed a mean score of 3.60 and 0.47 standard deviation for strongly agree and 1.40 and a standard deviation of 0. 47 for agree. This means that majority of student teachers in colleges of education belief that there are clothing and textiles software problems in the various colleges within the western and central zone. This shows that this software is not available for use by student teachers in the colleges.

From the results it can be seen that the major challenges encountered by student teachers in using ICT resources for learning clothing and textiles include in the colleges of education within the western and central zone include; insufficient number of hardware resources such as computers, projectors, printers and smartphones. These ICT resources are not adequate in the colleges and this always hinder effective integration of ICT resources into their learning of clothing and textiles. Insufficient internet access is also one of the major challenges militating against effective integration of ICT resources in learning clothing and textiles in their respective colleges. Due to insufficient internet access, student-teachers are unable to visit education sites to download videos, files and other documents that can help them in their learning of clothing and textiles. Another challenge student-teachers encounter in learning clothing and textiles with ICT resources in the colleges is lack of clothing and textiles software. Since there is no clothing and textile software on any of the computers in the ICT laboratory, student-teachers are unable to use them for their practical work. Tutors teaching the course also lack this software hence their inability to use them with students during practical work. Lack of enough time for student-teachers to practice with ICT resources in clothing and textiles was also identified as

another challenge faced by student teachers in using ICT resources for learning clothing and textiles. Since the time table is choked and student-teachers have other lectures to attend throughout the week, they are unable to visit the college multimedia center to use these ICT resources to learn clothing and textiles. These challenges identified must be address as early as possible so as to help ensure effective ICT resources integration into the teaching and learning of clothing and textiles.

In order to find out from tutors the major challenges they encounter in their attempt to use ICT resources for learning and teaching of clothing and textiles in Colleges of Education, tutors responded to 10 items questionnaire on a 5 - point Likert Scale `with their views. The scale was interpreted as 5 - strongly agree, 4 - Agree, 3 - Uncertain, 2 - Disagree and 1- strongly Disagree The results from the responses of the questionnaire are presented in Table 4.6

Table 4.6: Response of Tutors on Challenges they Encounter in using ICTs for Teaching Clothing and Textiles

Statement	**SA**	**AG**	**UN**	**DA**	**SD**
	mean	**Mean**	**Mean**	**mean**	**mean**
	SD	**SD**	**SD**	**SD**	**SD**
Insufficient number of	3.75	1.20	0.00	0.00	0.00
computers in the college	0.48	0.47	0.00	0.00	0.00
laboratory					
Insufficient internets access	3.50	1.50	0.00	0.00	0.00
in the college	0.49	0.45	0.00	0.00	0.00
Insufficient power supply	0.00	0.00	0.00	0.96	3.54
	0.00	0.00	0.00	0.44	0.49
Fixed lesson time for using	0.00	0.00	0.00	0.00	4.89
ICTs to teach clothing and	0.00	0.00	0.00	0.00	0.57
textiles					

Present of ICT technicians	5.00	0.00	0.00	0.00	0.00
to assist in college ICT	0.49	0.00	0.00	0.00	0.00
laboratory					
ICT technicians in the	4.25	0.00	0.00	0.75	0.00
college to fix ICT problems	0.49	0.00	0.00	0.39	0.00
Absent of Software to help	4.37	0.50	0.00	0.00	0.00
Clothing and textile lessons	0.49	0.22	0.00	0.00	0.00
Present of system for	0.00	0.00	0.00	1.33	3.58
monitoring and evaluating	0.00	0.00	0.00	0.47	0.49
ICTs enhancement in the					
college					
presence of CAD to design	0.00	0.00	0.00	0.00	4.89
curves in 2D/3D	0.00	0.00	0.00	0.00	0.47
Insufficient knowledge of	0.00	0.00	0.00	3.87	1.13
ICTs in clothing and textiles	0.00	0.00	0.00	0.47	0.41

Number of respondents (N) = 08 (Field Work, 2023)

Table 4.6 shows the mean and standard deviation of tutors' responses on the various questions that they were asked on their challenges of using ICT resources for learning and teaching clothing and textiles.

Insufficient number of computers in the college laboratory

All the tutors who responded to the questionnaire strongly agreed and agreed that there are insufficient computers in the ICT laboratories of the colleges of Education. From Table 4.6, a mean score of 3.75 with 0.48 standard deviation and 1.20 with 0.42 standard deviation for strongly agree and agree respectively shows that all the tutors accepted the fact that the number of computers in the ICT laboratories are not sufficient.

Insufficient internets access in the college

In finding out from tutors how internet accessibility is a challenge for them in integrating ICT resources into their learning and teaching, Table 4.6 a mean score of 3.50 with a standard deviation of 0.49 and 1.50 with a standard deviation of 0.45 were recorded for strongly agree and agree respectively. This means that all the tutors who responded to the questionnaire agreed that there is insufficient internet access in the colleges of education in the Central and Western zone.

Insufficient power supply

Tutors commented on how insufficient power supply has been a challenge in using ICT tools for teaching and learning. From Table 4.6, it can be deduced that a mean score of 3.54 and a standard deviation of 0.44 and a mean score of 0.96 with 0.44 standard deviation for disagree and strongly disagree indicate that insufficient power supply is not a challenge for using ICT resources in the colleges of education in the central western zone. This might be that the area has a stable power supply which sustains academic work. This might also be that most of the colleges have plant that supply the colleges with power supply when there is power outage in the vicinity.

Fixed lesson time for using ICTs to teach clothing and textiles

Tutors were asked if they have fixed time on the timetable for using ICT resources for teaching and learning clothing and Textiles. From Table 4.6, a mean score of 4.89 and a standard deviation of 0.49 for strongly disagree shows that there is no fixed time on the time table for using ICT resources for teaching clothing and Textiles. This means that the tutors use ICT resources during their lesson time but not separate from their

lessons. This might be that the ICT lab is always occupied and not available for clothing and textiles practical.

Present of ICT technicians to assist in college ICT laboratory

In finding out the challenges that militate tutors ICT resources usage, tutors were asked if the college has ICT technicians to assist in the college ICT laboratory. From Table 4.6 a mean score of 5.00 and a standard deviation of 0.49 for strongly agree indicates that all the tutors accepted the fact that there are enough ICT technicians to assist in setting up gadgets in the college ICT laboratory.

ICT technicians in the college to fix ICT problems

Tutors were asked to comment on whether there are ICT technicians in the college to fix ICT problems. From Table 4.6, a mean score of 4.25 and a standard deviation of 0.49 for strongly agree and 0.75 and a standard deviation of 0.39 for disagree was recorded. This means that majority of the tutors who responded to the questionnaire indicated that the colleges are having enough ICT technicians in the colleges for to fix ICT problems. However, some few tutors disagree to the fact that ICT technicians are not present in their colleges to fix ICT problems. This might be that the technicians in some colleges are not enough and the few ones do not come to work regularly.

Absent of Software to help Clothing and textile lessons

When tutors were asked if absent of software to help Clothing and Textiles lessons was a challenge for them integrating ICT resources into their teaching of the subject, a mean score of 4.38 for strongly disagree and 0.50 for disagree was recorded. This means that majority of tutors see the absent of software to help Clothing and Textile

lessons was a big challenge to tutor using ICT resources for teaching Clothing and Textiles in the Colleges of Education.

Present of system for monitoring and evaluating ICTs enhancement in the college

Tutors were to comment on whether a system exist in their respective colleges for monitoring and evaluating ICTs enhancement in the college. From Table 4.6 a mean score of 3.58 with a standard deviation of 0.49 for strongly disagree and 1.33 with a standard deviation of 0. 47 for disagree shows that all the tutors who responded to the questionnaire attested to the fact that majority of the colleges do not have systems for monitoring and evaluating ICTs enhancement in the colleges. This might be that the colleges do not give much attention to ICT resources usage, hence the lack of monitoring and evaluating its enhancement and how it affects learning and teaching in the colleges.

Presence of CAD to design curves in 2D/3D

Tutors were also asked to comment on whether the colleges have CAD to design curves in 2D and 3D during cutting and pattern design lessons. From Table 4.6, a mean score of 4.97 and a standard deviation of 0.49 for strongly disagree indicate that majority of the colleges lack CAD design curves in 2D and 3D to assist student teachers during clothing and textiles lessons. This problem is a big challenge since tutors have to resort to the old and traditional ways of teaching designs and cuttings. This become a challenge when the colleges are not having the apparatus that can be used for cutting and designing manually.

Insufficient knowledge of ICTs usage in clothing and textiles

In finding out the challenges associated with ICT resources usage in clothing and textiles, tutors were asked if insufficient knowledge of ICT resources in teaching clothing and textiles was a challenge or not. Table 4.6 showed a mean score of 3.87 for disagree and 1.13 for strongly disagree respectively. This means that majority of tutors in colleges of education within the western and central zone have sufficient knowledge in ICT tools usage and are able to use them effectively for the teaching and learning of clothing and textiles when the tools are available.

4.5 Testing of Research Hypothesis

Null Hypothesis (Ho)

There is no statistically significant difference in the effect of ICT resources usage on teaching of clothing and textiles in males and females tutors in Colleges of Education.

Alternative Hypothesis (H_1)

There is a statistically significant difference in the effect of ICT resources usage on teaching of clothing and textiles in males and female tutors in Colleges of Education.

The independent sample t- test was used to compare the mean of males and females tutors on the use of ICTs in the learning and teaching of clothing and textiles in the Colleges of Education to find out if there is a statistically significant difference in their views on ICT resources usage. The set alpha value for the test was set at $p \leq 0.05$. Summary of the result is shown in Table 4.7.

Table 4.7: t-test analysis of male and female tutors on ICT tool usage for teaching clothing and textiles in the Colleges of Education

Gender	Mean	t-value	Df	Sig (2-tail)	Mean diff
Male	20. 321	0.146	7	0.884	0.213
Female	20.667				

Males = 03 Females = 05

The mean score of females (20.667) was slightly higher than that of males (20.321). A t-value of 0.146 at 7 degrees of freedom gave a *p-value* of 0.0884. Since the p-value of 0.884 is higher than the set alpha of 0.05, it was concluded that there was no significant difference between males and females', tutors on ICT resources usage for teaching clothing and textiles in the Colleges of Education. This means that males and females tutors share similar ideas when it comes to using ICT tools in learning and teaching of Clothing and Textiles.

CHAPTER FIVE

DISCUSSION

5.1 Overview

This chapter discusses into details significant results and novel findings of the study. These findings have been identified, interpreted, discussed and presented research questions by research question.

5.2 Discussions on Tutors and Student Teachers Demography

The result of the study on demography on number of tutors who participated in the study revealed that there are more female tutors handling clothing and textiles than male tutors in Colleges of Education. This pattern of having more female tutors than male tutors could be attributed to matriarchy in the traditional African society where subjects like Clothing and Textiles and Food and Nutrition are mostly taken by women. Thus, some African societies still believed that sewing remained the female's duty. The lack of many male tutors teaching Clothing and Textiles in the Colleges of Education may have a negative impact on the young men desire to offer the subject. The mere presence of male tutors in the clothing and textiles department may also motivate young men to have keen interest in the subject and hence choose Clothing and Textiles as a career. This claim supports the findings of UNESCO (2005) that, in countries where families are not favorably disposed to the education of girls, the presence of female tutors can encourage families to send their girls to school. Consequently, female tutors' presence in large numbers in colleges would give an impetus to the current global call for the women education. The demography also revealed that majority of teachers teaching clothing and textiles in the Colleges of Education qualified academically for the job. This implies that most tutors have the

right experienced with respect to the course of study. Therefore, it is obvious that tutors if exposed to ICT tools and practices that support their beliefs about good learning would easily adopt the use of ICTs in learning and teaching Clothing and Textiles (Regina, Grozman, & Ticzon, 2004). The results on tutors teaching experience showed that majority of tutors had taught Clothing and Textiles at the colleges for quite a good number of years and have gained enough experience from their teaching. These tutors have experience both teaching with and without ICT tools and would be able to give a better understanding of how ICT tools can effectively enhance learning and teaching of the subject. Teaching experience was useful to this study because the researcher had assumed that the tutors with longer service tended to influence the less experienced ones on the use of ICTs in teaching. This might be attributed to the ability to bring with them their past experiences with respect to change and technology. The tutors' past experiences would in turn influence their willingness and capacity to adopt new forms of computer technology. The study also found out that all the two male tutors who took part in the study were tutors of a mixed college whiles the single sex colleges have all their tutors being female. This might be that since the single sex colleges in the CENTWEST zone are all females, the management wanted all female tutors so that they can serve as role models for the ladies in terms of academics, dressing and behavior.

The results on demography of student teachers revealed that clothing and textiles is females dominated. Like tutor respondents, female student teachers are more inclined to clothing and textiles education as opposed to their male counterparts. This agrees with the observation of other researchers (Arubayi, 2004; Dzikite, Chimbindi, & Dandira, 2013) that Home Economics is generally viewed as the domain of females. Anderson (2013) also explained that though there is male dominance in the fashion

industry the males prefer to learn garment production through apprenticeship training to avoid being mocked by their peers for offering a female subject in school. This is similar to the finding by Opoku-Asare *et al,* (2014) that more girls prefer to offer Fashion which they perceive as a girl-friendly subject. The results on levels of student-teachers revealed that, with the exception of level 100 student-teachers who do not offer any elective course, equal number of student -teachers offering clothing and textiles at all levels were allowed to share their views on the study topics. Equal number was selected from both level 200 and 300 because the researcher wanted to give equal chance to all respondents in sharing their views on how the usage of ICTs enhance their learning of clothing and textiles courses. This was to help avoid biases that may have arisen due to levels discrepancies.

5.3 Discussion on Research Question One: Are ICT tools available for usage in teaching and learning of clothing and textiles in the Colleges of Education?

Results on availability of hardware resources in Colleges of Education for teaching clothing and textiles from both teachers and student teachers revealed that hardware resources are available in the colleges but they are inadequate for both the use of both tutors and student teachers. This means that the number of computers, laptops, printers which are supposed to be in the schools for effective learning and teaching of clothing and textiles are in limited supply in the colleges. One -on -one interview with student-teachers and tutors revealed that the only hardware resource that all students have access to is their smart phones. Almost all the student teachers have smart phones which they use to do their personal research during lectures and study time. Again, almost all tutors use their personal laptops during learning and teaching of clothing and textiles. This means there is still the need for management of the

colleges of CENTWEST to increase the number of hardware resources such as computers, projectors, in their respective colleges in order to ensure effective learning and teaching of all courses in the colleges. This also implies that there is still a responsibility on government to help ensure that ICT tools are in adequate supply in all the 46 colleges of education in Ghana to help improve learning and teaching of all courses. However, two (2) tutors representing 25% of the total tutors is of the view that hardware resources are available and adequate for student teachers. This means that availability of hardware resources varies from one college to another due to college factors such as enrollment and financial resources. This might be that some colleges have very high enrollment making their resources inadequate for their students while others may have less enrollment hence, the few resources available are adequate for the student-teachers. This suggest that enough ICT hardware resources need to be provided in the colleges. This is in line with Asare and Nti (2014) who suggested that, for clothing and textiles education to be effective, the right infrastructure and the learning and teaching resources should be available and adequate.

This was confirmed by student- teachers and tutors during an interview when they were asked if the computers, projectors, printers and other hardware resources are adequate for them. Extract of the interview is shown below:

Student 1(from college A) "hmm, the computers in the ICT lab are not enough, sometimes we have to share one computer to 2 or 3 students."

Students 5 (from college B) "sometimes, tutors must postpone lectures just to wait for other tutors to finish teaching so that they can also use the projector."

Tutor 5 (from college C) "there is pressure on the projector so sometimes, I ignore it and do my normal teaching without projector"

Tutor 1 (from college A) "we use our own laptops for lectures, pen drives and modems. if you are a tutor and you don't have them then you can't use any of them because the college is not having any provision for tutors.

Although, majority of student teachers and tutors believe that hardware resources are inadequate in their various colleges. However, none of them is of the view that hardware resources are not available in the college. Though most of the tutors use their initiative in bringing ICT tools such as their laptops, computer, phones, and iPad to classrooms to show and display images and play videos in their lessons, they complained of a shortage of electrical adaptors in the classrooms to support their devices while teaching. Also, student-teachers are unable to see clearly since these ICT tools are smaller in size and student-teachers at the back cannot have a good look of whatever picture of video the tutor is showing. This means that no college in the CENTWEST zone of colleges of education lack hardware resources for learning and teaching. This implies that none of the colleges in the CENTWEST zone is handicap when it comes to ICT hardware resources availability but the available ones are not enough for them. The availability of hardware in the colleges of education is an indication that tutors would be able to utilize ICT resources in their teaching process although it might not be effective due to its inadequacy. This finding is in line with

Adwoa-Oppong, et al, (2013) which found that most teachers teaching clothing and textiles are unable to integrate ICT resources into their teachings due to inadequate computers at clothing and textiles studio for practical work.

Results on software availability in Colleges of Education for learning and teaching clothing and textiles showed that both tutors and student-teachers pointed out that software resources are not available in the colleges for effective learning and teaching. This might be that this software are scarce and expensive hence their inability to buy and install them for use by both tutors and student teachers. This was confirmed by student teachers and tutors during an interview when they were asked if clothing and textiles software such as AutoCAD, OptiTex, Lectra, and Gerber are available learning and teaching clothing and textiles in their respective colleges. Extract of the interview is shown below:

Student 12 (from college C) "we have never used such thing in our clothing and textiles lessons since we came to this college

Student 16 (from college D) "haha, I have not seen such software in the college. Sometimes, tutor mention the names during lessons but I have not seen or use some before.

Tutor 6(from college C) "yes, such software is available but because, they are expensive, the college is unable to buy for the student teachers"

Tutor 8 (from college D) "we don't have such software in the college for student-teachers. They are there but the college is unwilling to buy them due to their cost.

The finding revealed that the inadequacy of software resources in the Colleges of Education hampers its use in the learning and teaching of clothing and textiles as revealed by Khirwadkar (2007) that, a relatively low percentage (12%) of institutions had access to software resources. This explains the reason why many educational institutions have not fully embraced the use of ICTs in education. This finding also supports a finding by Adwoa-Oppong, et al, (2013) which stated that in many Ghanaian schools and institutions, these ICT software packages are not widely available for learning and teaching clothing and textiles.

The results on internet availability for learning and teaching of clothing and textiles revealed that both tutors and student-teachers attested to the fact that internet resources are inadequate in the colleges for teaching and learning. From the various responses from both student-teachers and tutors teaching and learning clothing and textiles, tutors explained the inadequacy of internet in the Colleges of Education for effective learning and teaching of clothing and textiles. This has made it difficult for tutors integrating ICT resources in their teaching. One of the tutors clearly explained from his experience the problem he usually faced in using the internet for his lesson.

> *"The internet connectivity in the college is very bad. Sometimes you want student-teacher to watch a video from U tube during lesson but they find it difficult to connect due to bad network in the school. The college WIFI is not strong for downloading videos and even picture. Using the internet becomes difficult if you don't have money to buy your own data but want to rely on the school internet."* (Tutor #3 from college B)
>
> *"Poor connections in the college affect us so much. You can't download videos in the college, you can't even visit educational sites and read*

information from their due to poor internet connection. If you want to use internet, you need to wake up at 2am when most of the student-teachers are asleep, if not you can't use the internet. (Student teacher #9 from college B).

some students also share their problems with internet in their colleges as follows:

student 3 (from college A): "the WIFI on campus is not strong. It always jams when a lot of students are using it at the same time. It becomes slow and unable to use.

Student 6 (from college): "the system becomes slow during the day. If you want to use the college WIFI for learning, you need to wake up at night where a lot of people are sleeping.

It can therefore be concluded that all the Colleges of Education in the central and western zone lack adequate internet connectivity that will enable tutors and student teachers to integrate ICTs into their learning and teaching of clothing and textiles to be specific and all the other courses they are studying as a whole. This means that for effective integration of ICT resources in the Colleges of Education for learning and teaching of clothing and textiles will demand adequate provision of strong internet Wifi on the various campuses so that both tutors and student teachers can download videos, pictures and other documents that are likely to enhance the learning and teaching of subject in their colleges. The findings of this study support that of Wambau-Kamau (2012) which found out that the limited use of these clothing and textile software packages in many schools in Ghana is due to the high cost of purchasing this software by students, teachers, lecturers and the entire institutions. This finding also supports the finding of another study by Adwoa-Oppong et al. (2013) which discovered that the apparel and textiles departments in Ghanaian universities and colleges face obstacles such as lack of computers and funds to

purchase the necessary software packages. This means that, despite the fact that the majority of this software is available on the market, most institutions are unable to purchase it. Finding out what ICT resources are available in Ghanaian institutions of education is crucial because it will reveal whether these colleges have enough of these ICT resources for learning and teaching about clothes and textiles.

Concerning availability of storage resources in the college, the results revealed that student teachers lack ICT storage devices in their respective colleges of education. The responses from student-teachers and tutors learning and teaching clothing and textiles during an interview confirmed that ICT storage devices are inadequate in the colleges. This has made it difficult for student-teachers to store most of their valuable information they need for their lessons. Some of the extract from the response is shown below:

Student 15(from college D): "I don't have pen drive. I store most of my things on my phone. When the memory gets full, I sometimes delete some from my phone and they get lost forever.

Student 7 (from college B)" I don't have money to buy hard disk or memory chip. I only store some documents on my phone.

This means that majority of college students lack tools for storing learning information but prefer to store them on their phones. The disadvantage with this is that some information is deleted to make way for new ones which cause them to lose vital information. However, such information is lost completely in case of losing the phone or the phone getting spoilt.

5.4 Discussion on Research Question Two: What is the effect of ICTs usage on learning and teaching of clothing and textiles in Colleges of Education?

How ICT usage enhances the teaching and learning of clothing and textiles in colleges of education was investigated. The result of the study revealed that both tutors and student teachers agree strongly that ICT resources usage makes teaching and learning of clothing and textiles easier. This means that effective use of ICTs in clothing and textile lesson help learners to learn easier since learning becomes more practical. This study is in line with Osborne & Hennessy (2003) who found out that ICTs usage in learning has the potential to make the content to bel learn more easier among students.

The study also revealed that both tutors and student-teachers support the view that using ICT tools for teaching and learning clothing and textiles enhance their critical thinking. This means that when tutors use ICT resources for teaching, it enlightens their learners more and cause them to do deeper and critical thinking. This might be that through the use of audiovisuals such as projectors, learners are able to visualize objects, pictures and diagrams and relate them in a broader perspective of all forms of life. This study confirms Nwosu (2003) who found out that using ICT resources during lessons has the tendency to promote critical thinking among students.

Another effect of ICT's usage found on both tutors and student-teachers teaching and learning clothing and textiles is that it promotes and enhances problem-solving skills among tutors and their student-teachers. This means that ICT usage for teaching clothing and textiles equip them with the necessary skills for solving problem in their everyday life activities.

The study also found out that when tutors effectively integrate ICT resources into their teaching, it helps to enhance and promote collaborative way of thinking among their learners. This means that as learners interact with ICT resources during

groupwork, practical work and class presentation, they share ideas among themselves and helps them to increase their team building capacity. However, students-teachers share contrary view with their tutors. Majority of student-teachers think that ICT resources usage rather promote individualistic learning and rather discourages collaborative learning among them. This is because since most student-teachers have these basic ICT resources at their disposal, they prefer to engage in their own personal research and learning at their preferred time rather than being part of groups to share and acquire alternative knowledge that can be retrieve from internet by themselves.

Another effect of ICT resources usage found on learning and teaching of clothing and textiles is that, it helps in understanding concepts easier and faster. The result of the study showed that both tutors and student teachers agreed strongly that ICT resources usage helps in enhancing student teachers understanding of concepts faster and easier. This means that effective integration of ICT resources in teaching and learning clothing and textiles enables them to explore broader areas of knowledge and this help to enhance their understanding of these concepts faster.

The study revealed that ICT resources usage is found to be time consuming by tutors but student-teachers have opposite view. Student teachers agree that using ICT resources to learn clothing and textiles is neither tedious nor time consuming. This might be that most of the student-teachers have personal ICTs such as smart phone, laptops and modems which allow them to search for information from the internet, do their assignments and observe pattens and cuttings without any difficulties. However, using ICTs for teaching clothing and textiles is more tedious and time consuming for tutors because of the time they spend in preparing towards a lesson with ICT. This might be that tutors take long time in preparing power points and other materials that will make the lesson more attractive, interesting and practical.

The study also found out that integrating ICT resources into the teaching and learning of clothing and textile helps to promote research-based learning among the students. This might be that student-teachers are able to do effective research using the various ICTs they have. They are able to connect to all forms of educative sites to download all forms of pictures, videos and information to enhance their learning.

Another effect of ICT's usage on the teaching and learning of clothing and textiles was found to be making lesson more interesting.

5.5 Discussion on Research Question Three: What challenges do tutors and student teachers of Colleges of Education encounter in using ICTs in learning and teaching of clothing and textiles?

Challenges that tutor and student-teachers encounter in using ICT resources were investigated. The result reveal that both student- teachers and tutors agreed to the fact that colleges of education in the CENTWEST zone have insufficient number of computers in their respective colleges for Learning and Teaching clothing and textiles. This also means that most student teachers are not able to get access to computers and other hardware resources due to their shortage in the colleges. This has affected student teachers in doing effective research to broaden their horizon in the field of clothing and textiles. This might be that the colleges are not having enough funds to purchase more computers to help effective teaching and learning. Tutor during the interview section review that not only computers are insufficient in the college but other hardware resources such as projectors, printers, and laptops are all not sufficient in the colleges. Some of the views of the tutors are as follows:

"In larger classes where I'm supposed to use a projector at all times to ensure effective teaching, it's quite frustrating for me because there's only one projector that

is sometimes being used by another tutor in another hall. So, in such cases, I'm forced to use the regular traditional method of teaching" (Tutor #2 from college A).

Another tutor said:

> *"Because our college has computer labs, the labs are just names because the equipment is not worthy; and we have second-hand equipment that is usually difficult to use. Colleges like our own supposed to have an internet connection throughout, but we have a problem, we can go for a semester without an internet network, so it makes it uncomfortable to use ICTs to teach* (Tutor #4 from college B).

Some students also shared their views on the challenges they encounter in using ICT tools for learning clothing and textiles. Some of the extracts include:

> *Student 13 (from college D): "because we are many, you sometimes don't get access to computers in the ICT lab. we have to use our phones and if you don't have one, then thus all"*
>
> *Student 11(from college C): "sometimes there is no projector for us. You will go to the ICT lab for projector and nothing is there. We are unable to watch important videos and pictures.*

All these responses from tutors indicate that computers and its associate hardware are insufficient in the colleges of education in the western and central zone. This however, affects how tutors integrate ICT resources into their learning and teaching especially for clothing and textiles. This finding supports Pelgrum (2001) who explored tutor's practice of ICTs in 26 countries on the main difficulties faced in integrating ICTs in colleges, Pelgrum concluded that two of the ten main barriers were the insufficient number of computers compared to the number of students and inadequate ICT resources to match the students' number. The finding also supports

Korte and Hüsing (2007) who pointed out that tutors have so many student -teachers to teach and so many topics to cover along with increasing accountability demanded from them, therefore, it is simply too difficult for them to incorporate ICTs as a regular instructional practice in the clothing and textiles classrooms.

Another challenge the study revealed as affecting effective teaching and learning clothing and textiles in the colleges was insufficient internet accessibility. This might be due to the geographical location of this part of the country which does not support strong internet accessibility. The colleges are also not having enough money to purchase high routers that will support high internet connectivity. When tutors were interviewed on these issues, their responses also affirmed that fact that internet accessibility is a big problem in their colleges and this highly affect their integration of ICT resources into their teaching and learning. Some extracts of their responses are shown below:

Poor connections, and internet fluctuations are big problems here. You need to go to town where you can get internet before you can download some videos and others you need for your lessons. The internet connection in our college is not strong. (Tutor #7from college B).

Another Tutor said

"*Where our college is located is not helping us at all. It is very difficult to get internet accessibility. You need to wake up at night before you can download their files and documents" (Tutor #5 from college C)*

Response of some student teachers during the interview were as follows

Student 8 (from college B: "internet is not strong on campus at all. Sometimes, the WIFI doesn't even work. They have to check it.

Student 2 (from college A): "they have to do something on our WIFI for us. Is too slow. Downloading things take several times.

All these responses attest to the fact that internet connectivity is a bigger challenge in colleges in the central and western zone. This has affected how tutors and student-teachers integrate ICT resources into their teaching and learning of clothing and textiles. The government and school management must ensure that all colleges have good and fast internet in their colleges to help student-teachers and tutors with their ICT integration during their lessons and personal studies. This finding is found to support Gyamfi and Gyaase (2015) which found out providing internet connection to students in institutions or school is another barrier that affect ICT usage in schools and colleges in Ghana.

The study also found out that personal ICT resources usage and power supply are not challenges that militate ICT resources usage in the colleges of education in the CENTWEST zone. Both tutors and student-teachers are at liberty to use their personal ICT resources such as laptops, modems, smartphones, pen drives, and CD ROMs in preparing lessons, personal research, group research and doing assignments. The colleges are having stable power supply due to the stable power supply in the western and central region of the country. Apart from this, most of the colleges also have electric plants that supply them with power supply when the national power supply is off. These electric plants are able to sustain academic work at both day and night. This was confirmed by tutors and student teachers when they were asked in an interview to comment on whether personal ICT resources usage and power supply were challenges to their usage of ICTs in learning clothing and textiles. Extracts of the interview are shown below:

Tutor (7 from college A): power supply is not an issue in this college. As you can see, we have plant which gives us power in case of light outs

Tutor (2 from college A): I don't even go to the ICT lab, I have my personal laptop for preparing my lesson, working on my assessments and doing my personal research work so am able to do things even in my house without going to the ICT lab.

Student 10 (from college C): this place they don't give light out frequently so we are able to charge our phones and laptops without difficulties

Student 14 (from college D): most of us have phones which we use for our personal research and studies. we even use the phone to type our assignments.

This shows majority of student teachers in the colleges of education have personal ICT resources to supplement what the school is having. This finding is in line with Prensky (2005) which stated that cell phones that students carry with them today can be utilized effectively in their learning whether in school or home. This study also conforms to Lei and Zhao (2006) which also emphasized that personal phones and laptops of students also help them in using ICTs in their personal studies both in school and outside school.

Another factor that hinders the tutors' decision to integrate ICTs was the availability of time. The study also revealed that both tutors and student teachers do not have fixed time on their time table for using ICT resources for teaching and learning clothing and textiles. This has become a big challenge especially when they want to do practical work with ICT resources. Student-teachers complained bitterly that the ICT lab is always occupied so they are unable to use the computers for their practical work. In the night where at least, they can go and do their practice, the technicians lock up the place and leave for their homes. Because of this limited time, student-

teachers only do the manual practical only without the technological one. All the Tutors (100%) complained of limited access to ICT resources in the colleges due to the college timetable. All the tutors addressed the insufficient time to effectively use ICTs in the classroom. They felt that there was no time given for them to plan and integrate ICTs into the lessons since they were busy achieving the goals of the curriculum. This was confirmed in an interview section with both students- teachers and tutors when they were asked to comment on the time available for using ICT resources for teaching and learning clothing and textiles. Extract of the interview is shown below:

> *"I don't have enough time to go through the lessons via the ICT resources…….. "limited time is not enough to set up all those ICT resources and start the class, especially with the practical aspect. The curriculum is now based on standards both pedagogy and content are being taught together at the same time" (Tutor #3 from college B).*
>
> *Student 4 (from college A): there is no time for us to use ICT resources to do our practical. We are always moving from one lecture to another lecture. By the time we are done for lectures and want to use the lab for our practical, the lab would be locked.*

This finding supports that of Becta´s (2004) study found that, insufficient time for tutors to effectively use ICTs in the learning and teaching process exists in many aspects of their work. This includes the time needed to prepare their lessons, exploring and pedagogical class usage of ICTs, inadequate time to deal with technical problems. Ahmed (2013) concluded that one of the main reasons why tutors do not use ICTs pedagogically in the classroom is the insufficient time necessary to

accomplish the pedagogical plan. Boakye and Banini's (2008) findings from the World Link programs conducted in several countries all over the world are quite similar to this study as they found out that the biggest problem tutors faced in pedagogically using ICTs are the insufficient time for ICT activities. They suggested that it is important for colleges to help tutors by providing sufficient time to incorporate ICTs in the learning and teaching process.

According to Albirini (2006), the lesson preparation using ICTs is time-consuming because as the rule of thumb, one hour of ICTs- enhanced lesson would require about 3 to 4 hours of preparation. Thus, the tutors faced problems either in preparing the lessons or in conducting the lessons within a limited time. Moreover, the tutors need additional time to set up all the ICT resources in the lecture halls. So, the tutors felt that they could accomplish the required tasks during their lesson hours instead of setting up the ICT resources of which they have limited knowledge to apply. Balanskat *et al.*, (2006) also claimed that the biggest barriers to the use of computers by teachers were the lack of time available in classes and in their own schedules for planning.

The study also brought to light the unavailability of laboratory technicians in the college laboratory as another challenge that hinder student- teachers from using ICT resources for teaching and learning clothing and textiles. According to student-teachers, the ICT lab is mostly locked so they are not able to use the place at their leisure times for their practical work. The day that the place will be open too, you may not meet any technician to assist you in your practical work at that time since the tutor may not be available at that time. This was revealed during the interview section when students' teachers were asked whether ICT technicians are not always available at the college ICT laboratory. Some responses of student-teachers are shown below:

The place is always locked, when it gets open, you don't see anyone one there to report your issues to. I think the technicians don't come to the laboratory regularly. (Student #4 from college B).

However, most of the tutors disagree with student teachers on the fact that ICT technicians are not available at the college laboratory. The tutors are of the view that the technicians are always available at the laboratory when there is lesson and whenever their help is being needed. They only stay away when there is nothing going on at the laboratory. Some tutors share their views in an interview on whether ICT technicians in the college are always present in the laboratory to assist student teachers in their lessons.

Tutor1(from college A): the ICT technicians are always available to help us anytime we need assistance in the laboratory and even when we call them on any difficulties, they always respond and help us.

This might be that the college has employed enough ICT technicians who assist tutors and student-teachers in fixing projectors, storing information of drives and helping student-teachers to assess portals and sites for their research work. These ICT technicians are always present in the college to provide the needed ICT assistance to tutors and student-teachers. This has help to reduce the burden on tutors looking for and fixing projectors which is tedious for them sometimes. Due to this, most tutors are ever ready to integrate ICTs into their teaching.

Another challenge identified to be militating against effective ICT resources usage in teaching and learning of clothing and textiles by both tutors and student-teachers in the colleges of education is the absent of Clothing and Textile software in the colleges. The student teachers revealed that They have heard only the names of clothing and textile software but they have not seen or use any of the software in

clothing and textiles before as part of their training. This might be that the colleges are not having enough funds to purchase this software for both tutors and students to use in the course. Tutors are therefore unable to use this software to teach student-teachers pattern designs and cutting. This has resulted in tutors using the traditional way of teaching instead of using ICT resources in their lessons. Most of the colleges also lack funds which can enable them to buy some of these expensive software for teaching clothing and textiles. During the interview section, student-teachers revealed that their tutors told them that the software is very expensive and the colleges cannot afford to buy them and even if they buy them, they can't use them since they require large amount of data to operate them. Some extract from student-teachers is shown below:

> *I have not seen or use any clothing and textile software before, they only tell us they are there but we have not seen some before. (Student #4 from college A)*

Another student teacher

> *We don't have any software in this college, we do manual practical during practical section. We are not using ICT resources to cut or design anything. We always do our normal free hand cutting and design. (Student #16 from college D).*

This finding conforms to that of by Adwoa-Oppong, Biney-Aidoo, and Antiaye (2013) which stated that in many Ghanaian universities and institutions, these ICT software packages are not widely available for teaching and learning clothing and textiles due to the high cost of purchasing them.

Another challenge student-teachers identified with laboratory technicians was lack of knowledge content in clothing and textiles stuffs. This means that the technicians have not studied clothing and textiles before so they are not able to help student-

teachers in clothing and textiles specific contents. They don't know how to use any software in the clothing and textiles and how to use them in cutting and designing. This means that their presence in the laboratory is sometimes not felt since they are not able to provide content guidance to them during lessons.

The study also found out that insufficient knowledge in ICTs by clothing and textile tutors is not a challenge for tutors using ICT resources in their teaching and learning. This might be that majority of the tutors teaching clothing and textiles have received enough training on how to integrate ICTs into teaching and learning hence it is not a challenge for them to use it during their lessons. In this study, tutors' and student teacher's knowledge of the use of ICTs, as well as their skills and competencies, were investigated. Understanding why some of the tutors were active in using ICT resources in their lecture halls and others using it indirectly, tutors were asked to explain the kind ICT related training in their course area, they undertook. From their responses, it was clear that most of the tutors have taken just basic ICT training on how to operate ICT resources during pre-service and in-service training. Also, most of the tutors who are making active use of the tools responded that their skills and competency in the utilization of these tools came as a result of personal efforts they took out of their working hours for their personal development. Others admitted not having enough knowledge to integrate ICTs in their course area. This is evident from some of their comments:

> "*After my training as a tutor seminar are being organized every year by resource persons to train tutors on the use of ICTs in their teaching. These training are specifically for tutors of ICT as a course. On a general note, other seminars are being organized to train tutors on basic computer skills. But*

most of the time these trainings do not help tutors in integrating ICTs in their various courses" (Tutor #4 from college B).

Another tutor said:

> *"First of all, our program and curriculum are practical oriented and we do not normally use ICT resources. You know we go for seminars, but I have not yet attended a seminar where we are taught how to integrate ICTs in clothing and textile lessons. Most of the symposium I have attended, tutors were just trained on some basic computer skills".* (Tutor #6 from college C)

Contrarily, other tutors express their satisfaction on the seminars but emphasize that it helps them in improving their technological knowledge and not knowledge in using the tools to teach their courses, one of the tutors noted:

> *"I have received in-service training and also equally not long ago under one nongovernmental organization. After all these pieces of training, I became flexible in browsing and researching the net. So, I think that training was a key to my current skills on the internet".* (Tutor #7 from college D)

The tutors admitted that the seminars did not help them in their course areas, so they could not make practical use of the tools in the lecture halls even when they got the opportunity to use them. Consequently, they admitted not having sufficient knowledge to use ICT resources effectively in their lecture hall. Some of the tutors who were competent enough to use the tools in the learning and teaching process admitted that most of what they know came as a result of their interest in the ICT resources and the ability to work collaboratively with other ICT competent tutors. One of the teachers noted:

"Most of what I know has been through my personal effort and sometimes I asked help from colleagues who are more incline in ICT for instance from the ICT tutors". (Tutor #2 from college A)

From the various responses, it was evident that many of the tutors gave reference to previous training and ongoing ICT training offered by resource persons. Overwhelmingly, this training did not equip them with the knowledge needed to use these tools in the learning and teaching process, as a result, many of the tutors were not practically using these tools in their lecture halls. This serves as one of the variables why the integration of ICT resources remains a difficult concept amongst teaching staff.

Tutors' skills and knowledge would not be of much value to the process of integrating ICTs in the learning and teaching process without considering student teachers' skills and knowledge in the pedagogic use of ICTs. Following the interview, tutors were asked if their student teachers have the skills to make effective pedagogical use of ICTs. Some of the tutors who were more competent in using these tools in the learning and teaching process express the fact that it was impossible at times to use some of the tools as some of the student teachers did not have enough knowledge about the utilization of the tools. The tutor admitted that some of the student = teachers are coming from diverse backgrounds and consequently limit the utilization of the tools in their lecture halls. The tutors unanimously agreed that:

"The student teachers are coming from different background, some from poor homes where it's hard for them to have personal computers or even smartphone, I have so much learning software on my laptop, but it is impossible to share with them because most of them will not understand how it works". (Tutor #8 from college D)

The majority of the tutors acknowledged that they did not have enough knowledge to use ICTs in their lecture halls pedagogically.

Mishra and Koelher (2006) pointed out that merely knowing how to use technology is not the same as knowing how to teach with it. They stated that learning new skills with ICTs is not enough to develop an adequate understanding of them using in lecture halls. Despite efforts made towards the use of ICTs in teaching, it was evident from the findings that the majority of the tutors were unaware of how to use ICTs pedagogically. In the course of this study during observation, it was apparent that ICT-based activities were not carefully thought for specific topics and objectives. Instead, ICTs were used without real purpose and not in the context described by Rosnaini, Mohd, & Arif (2010) as a wrong and shallow use of ICTs in education. As a result, it becomes a challenging task to prepare tutors to use ICTs pedagogically more often in a more efficient way. In many educational systems around the world, both pre-service and in-service tutors are offered just basic ICT courses to prepare them to use ICTs in assessing their student teachers and some form of administration purposes. As a result, the pedagogic use of ICTs still posits as a major problem in education (Asabere, 2013; Mends-Brew, 2012; Hutchison & Reinking, 2011 & Baron & Goldman, 2004). Also, it was interesting to note that tutors admitted having a private computer but still comfortable with the typical instructional method of teaching. As a result, it did not change the way they deliver their lessons. Similarly, Becta's (2004) study concluded that teachers who are not well skilled in using ICT pedagogically feel anxious about using it in front of their students.

Analysis from interviews revealed that in-service training was not sufficient to fully equipped tutors with the required methodological framework to integrate ICTs in the

learning and teaching process effectively. The training offered to tutors mostly concentrated on basic skills where tutors were taught how to manipulate ICT resources. Insufficient in-service training for tutors to integrate ICTs in their course work and the lack of interest on the part of the majority of the tutors to attend these seminars resulted in the ineffective integration of ICTs in these colleges. This study is coherent with Hammond & Munfra (2009) review of in-service ICTs programs for Cameroonian teachers, where he concluded that only 1.2 percent of teachers had undergone in-service ICT training on the practical use of ICT and more than 60 percent of the training skills acquired are mostly endowed with technological knowledge. Becta's (2004) report argued that if teachers are to be persuaded of the importance of ICTs in their teaching, their training should focus on pedagogical issues. Unfortunately, ICTs in-service training was organized few times per semester. As a result, tutors complained of limited time to incorporate ICTs skills in clothing and textiles. Yuksel, Soner, and Zahide's (2009) review confirmed that traditional one-time in-service teacher training workshops which include knowledge in primary operating systems, word processing, spreadsheets have served as an obstacle towards the effective pedagogical use of ICTs. More recent research carried out in Norway found that the main problem with the pedagogical use of ICTs was the insufficient amount of in-service ICT training programs (Ong, 2009). Colleges need to provide training courses for tutors to gain experience in dealing with new and modern ICT resources in different pedagogical approaches. As it can be seen from the tutors' responses, they all presume that more time should be allocated for professional development programmes.

5.6 Discussion on Hypothesis testing: There is no statistically significant difference in the effect of ICTs usage on teaching of clothing and textiles in males and females tutors in colleges of education

A t-test analysis pointed out that there is no statistically significant difference between male and female tutors on ICT resources usage for learning and teaching clothing and textiles. Both of them belief that ICT resources usage has the tendency to enhance learners understanding of concepts being learned. The study also revealed that ICT resources usage enhances the learning and teaching of clothing and textiles by making the lesson more practical. Both tutors and student teachers agreed that the use of ICTs in learning and teaching of clothing and textiles makes the lesson more practical. This means that as student teachers interact with these ICT resources, they learn how to handle them, use them for drawing, cutting and designing patterns. This makes the lesson more practical and hands on rather than theoretical which encourages rote learning.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Overview

This chapter presents a summary of the findings of the study as well as conclusions drawn from the findings. Based on the findings and conclusions drawn from the study, recommendations are also made to guide educational practitioners and stakeholders.

6.2 Summary

The study was to find out how ICT resources can be used to enhance learning and teaching of Clothing and Textiles in Colleges of Education in Central and Western zone in order to be abreast with modern trend of learning. The objectives of the study were to establish the availability of ICT resources usage in learning and teaching of clothing and textiles in Colleges of Education, to determine the challenges encountered by tutors and student teachers in using ICT resources in learning and teaching of clothing and textiles, and to determine the extent to which ICT resources usage affect learning and teaching of clothing and textiles in the selected colleges.

To achieve the purpose, explanatory sequential design of the mixed methods was implemented for the study. Questionnaires and interview were used to collect data for the study. The population of the study comprised all the tutors and two hundred and thirty-eight (238) of level 200 and level 300 student teachers who offer clothing and textiles in the selected Colleges of Education in the CENTWEST zone. A sample size of one hundred ana twenty (120) student teachers and 8 tutors were selected to participate in the study. Data for this study were gathered through questionnaires and

interviews for both student teachers and tutors. The results obtained were presented using frequency distribution tables and figures.

Data obtained from the questionnaires were coded and analyzed using the SPSS version 21. The results obtained were presented using frequency distribution tables, pie chart, and bar chart in response to the research questions. The qualitative data obtained from the interviews were presented in narrative form and direct quotation to address the research questions.

6.3 Summary of Key Findings

A number of findings emerged from the study. The main ones were as follows:

1. There are inadequate ICT resources for learning and teaching clothing and textiles in Colleges of Education in the CENTWEST zone.
2. Male and female tutors teaching clothing and textiles in Colleges of Education share similar views and ideas on ICTs usage on learning and teaching clothing and textiles
3. The major challenges faced by tutors in using ICTs for teaching clothing and textiles were inadequate computers, inadequate laboratory technicians and inadequate content knowledge in clothing and textiles by lab technicians
4. Using ICT resources for learning and teaching clothing and textiles help in making the lesson practical, easier and interesting.
5. Integrating ICT resources into learning and teaching clothing and textiles is tedious and time consuming for college tutors.

6.4 Conclusion

From the evidence gathered by this study, participants view ICT as a crucial tool in terms of learning and teaching of clothing and textiles. However, on the basis of the key findings, it could be concluded that over half of participants indicated that ICTs integration into learning and teaching are challenge due to unavailability of software and inadequate access to internet in most of the Colleges of Education.

6.5 Recommendations

Based on the findings and conclusions of the study, it is recommended that:

1. The government, Principals, NGOs and other stakeholders of the education should consider providing variety of Information and Communication Technologies or resources proportionally to all Colleges of Education to encourage more effective learning and teaching.
2. Tutors who do not have practical skills in ICTs usage should seek some training from expects in the Universities teaching clothing and textiles with ICTs to enable them competently and confidently use them in teaching their respective subjects.
3. Universities and Colleges of Education programmes should consider including software in courses that involve practical methods of integrating ICTs in the learning and teaching of various subjects especially in TVET, since it will equip student teachers with necessary skills to enable them effectively integrate ICTs in their lessons after their training.

6.6 Suggestions for Further Studies/Research

1. The impact on the use of ICT resource in learning clothing and textiles on learners with visually impaired in the Colleges of Education.

2. Tutors competence on the use of ICTs in the learning and teaching of clothing and textiles in the Colleges of Education in Ghana.

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APPENDIX A

PART 1

QUESTIONNAIRE FOR STUDENT - TEACHERS

Welcome and thank you for sparing time to fill this questionnaire. I am undertaking an M.Phil. (Fashion Design and Textiles Education) program at the University of Education Winneba – Kumasi Campus (UEW – K). The purpose of this questionnaire is to assess the integration of information and communication technology tools into learning and teaching clothing and textiles at the colleges of education. Please complete each section as instructed. All information provided will be highly confidential. The study is for academic purpose ONLY and therefore your responses will be kept confidential. Under no circumstance will a response be traceable to you. Thank you.

SECTION A: DEMOGRAPHICS OF RESPONDENTS

Sex: Male [ ] Female [ ]

College Attend: Mixed [ ] Single sex [ ]

Level 200 [ ] 300 [ ]

SECTION B: AVALIABILTY OF ICT TOOLS FOR LEARNING CLOTHING AND TEXTILES

Please indicate {by ticking (√)} the availability, adequacy or otherwise of the following ICT tools in your institution.

(a) CD/Disk Players Adequate [ ] Inadequate [ ] Unavailable [ ]

(b) Projectors Adequate [ ] Inadequate [ ] Unavailable [ ]

(c) Computers/laptops Adequate [ ] Inadequate [ ] Unavailable [ ]

(d) AutoCAD Adequate [ ] Inadequate [ ] Unavailable [ ]

(e) OptiTex Adequate [ ] Inadequate [ ] Unavailable [ ]

(f) Lectra Adequate [ ] Inadequate [ ] Unavailable [ ]

(g) Smart phone Adequate [ ] Inadequate [ ] Unavailable [ ]

(h) Wi-Fi /internet Adequate [ ] Inadequate [ ] Unavailable [ ]

(i) iPads Adequate [ ] Inadequate [ ] Unavailable [ ]

(j) Drives Adequate [ ] Inadequate [ ] Unavailable [ ]

SECTION C: CHALLENGES FACED BY STUDENT TEACHERS IN USING ICT TOOLS IN LEARNING CLOTHING AND TEXTILES

Please indicate the extent of your agreement to the statements below

Statement	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
1. Insufficient number of computers in the college Lab					
2. Insufficient internets access in the college					
3. Personal ICT tools are not allowed by student teachers					
4. Lack of adequate skills of tutors					
5. Most tutors are not in favour of using ICTs in colle ge					
6. Insufficient power supply					
7. There is no enough time for student-teachers to use ICT tools clothing and textiles practical					
8. The ICTs technician is not always available at the college ICT lab.					
9. ICT technician in the college is not having content knowledge in					

clothing and textile					
10. There are always software problems					

SECTION D: EFFECTS OF ICTs USAGE ON LEARNING OF CLOTHING AND TEXTILES IN COLLEGES OF EDUCATION.

Please indicate the extent of your agreement to the statements below.

Statement	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
1. Using ICTs make my learning easier					
2. Using ICTs enhances my critical thinking					
3. Using ICTs promote my problem-solving skills					
4. Using ICTs enhance collaborative learning					
5. ICTs promote research-based learning					
6. Using ICTs for learning is more tedious and time consuming					
7. Using ICTs makes my learning more practical					
8. Using ICTs in my learning help me to understand concept faster					
9. I find the use of ICTs in learning and teaching a time consuming					
10. ICT facilitates problem-based learning					

PART 2

INTERVIEW GUIDE FOR STUDENT TEACHERS

1. Could you tell me a little bit about yourself, your level and the course that you're learning?
2. Do your tutors integrate ICTs in learning and teaching of clothing and textiles?
3. What are the available ICT tools your tutors mostly use in learning and teaching of clothing and textiles?
4. Which ICT tools have you found most challenging in learning clothing and textiles and why?
5. How do you plan to continue to use ICTs in your professional practice in the future?

Thank You!

APPENDIX B

PART 1

QUESTIONNAIRE FOR TUTORS (TQ)

Thank you for taking time to complete this questionnaire. Please answer each question to the best of your knowledge. Your thoughtfulness and responses will be greatly appreciated. Your responses will be kept completely confidential. Please indicate {by ticking (√)}

SECTION A: DEMOGRAPHICS OF RESPONDENTS

Gender: Male [ ] Female [ ]

Level You Teach: 200 [ ] 300 [ ] or both [ ]

College Type: Mixed [ ] Single Sex [ ]

Educational level: Bachelor's Degree [ ] Master's Degree (with research) [ ]

Master's Degree (without research) [ ] PhD [ ]

SECTION B: AVALIABILTY OF ICT TOOLS FOR TEACHING CLOTHING AND TEXTILES

Please indicate {by ticking (√)} the availability, adequacy or otherwise of the following ICT tools in your institution.

(a). Printers Adequate [ ] Inadequate [ ] Unavailable [ ]

(b). Projectors Adequate [ ] Inadequate [ ] Unavailable [ ]

(c). Computers /laptops Adequate [ ] Inadequate [ ] Unavailable [ ]

(d). AutoCAD Adequate [ ] Inadequate [ ] Unavailable [ ]

(e). OptiTex Adequate [ ] Inadequate [ ] Unavailable [ ]

(f). Lectra	Adequate [ ]	Inadequate [ ]	Unavailable [ ]
(g). Software programs	Adequate [ ]	Inadequate [ ]	Unavailable [ ]
(h). Wi-Fi /internet	Adequate [ ]	Inadequate [ ]	Unavailable [ ]
(i). Scanners	Adequate [ ]	Inadequate [ ]	Unavailable [ ]
(j). Drives	Adequate [ ]	Inadequate [ ]	Unavailable [ ]

SECTION C: CHALLENGES FACED BY TUTOR IN USING ICT TOOLS IN TEACHING CLOTHING AND TEXTILES

Please indicate the extent of your agreement to the statements below

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. Insufficient number of computer s in the college Lab					
2. Insufficient internets access in the college					
3. Insufficient power supply					
4. College time organization (fixed lesson time, etc.)					
5. ICTs technician to assist in college ICT lab.					
6. ICT technician in the college to fix ICTs problems					
7. Software to help Clothing and Textiles lessons					
8. System for monitoring and evaluating ICTs enhancement in the college					
9. CAD to design curves in 2D/3D					
10. Insufficient knowledge on ICTs in teaching clothing and textiles					

SECTION D: EFFECTS OF ICTs USAGE ON LEARNING AND TEACHING OF CLOTHING AND TEXTILES IN COLLEGES OF EDUCATION

Please indicate the extent of your agreement to the statements below.

Statement	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
1. Using ICTs make my teaching easier					
2. Using ICTs enhances my learners' critical thinking					
3. Using ICTs promote problem-solving skills					
4. Using ICTs enhance collaborative learning and teaching					
5. ICTs integration in my lesson enhance students understanding of concept					
6. I find the use of ICTs in lessons more tedious and time consuming					
7. Using ICTs make my lessons more practical					
8. Using ICTs make my teaching interesting					
9. Using ICTs makes assessment of students easier					
10. ICT facilitates problem-based learning					

PART 2

INTERVIEW GUIDE FOR TUTORS

1. Could you tell me a little bit about yourself, the level and the course that you're teaching?
2. What else can you tell us about yourself and the integration of ICTs in teaching clothing and textiles?
3. Which digital resources have you found most useful in teaching clothing and textiles and why?
4. Is there any challenge in selecting ICT tools in teaching clothing and textiles?
5. Does ICTs knowledge and skills enhance collaborative learning among your student teachers'?

Thank You!