Assessing the Effects of ICT Resource Use on Enhancing Clothing and Textile Teaching and Learning in Ghanaian Colleges of Education: A Case Study in the CENTWEST zonal Colleges of Education

ABSTRACT

Aims: Toassess the Effects of ICT resource use on enhancing Clothing and Textile teaching and learning.
Study design: Cross-sectional descriptive survey research design.
Place and Duration of Study: Central and Western (CENTWEST) zonal Colleges of Education in Ghana
Methodology: The researcher adopted a quantitative research design. The target population of students' teachers in levels 100 to 400 is 415 people, with 8 teachers. Purposive sampling was used to select all of the students' teachers and teachers in levels 200 and 300 for the study. In all four colleges of education, there are 230 students' teachers and 8 teachers at levels 200 and 300, respectively. The research instrument used for the data collection was
a questionnaire. The usage of a data analysis application known as the International Business
Machine, Statistical Package for Social Sciences, and Microsoft Excel assisted the data analysis (IBM SPSS).
Results:66.7% of student teachers indicated that hardware resources like computers, laptops, projectors etc. were not available. 82.5% of student teachers reported that software for teaching clothing and textiles was not available. 50% of student teachers said storage resources like pen drives, CD/DVDs were available, while 33.7% said they were not. 58.3% of students indicated their colleges have internet/WiFi resources. 88% of teachers agreed that software for teaching clothing and textiles was not available, though they reported hardware, storage and internet resources were available but inadequate. Both students (mean 3.88) and teachers (mean 4.2) agreed that using ICTs makes teaching and learning of clothing and textiles easier (student mean 4.58, teacher mean 4.57). ICTs enhance learners' understanding of concepts (student mean 4.03, teacher mean 4.42) and make assessment easier (student mean 4.54, teacher mean 4.35). However, there was a high coefficient of variation of 55.33% among students on whether ICTs enhance collaborative learning.
Conclusion: The results indicated both students and teachers agreed ICT usage positively impacted the teaching and learning of clothing and textiles despite the inadequate resources available.

Keywords: ICT resources, Clothing and textiles, Colleges of Education, Teaching and learning.

1. INTRODUCTION

Integration of Information and Communication Technology Resources (ICTs) is a top priority on the global educational reform agenda, particularly in developed countries [1]. It is frequently regarded as an essential tool for fully participating in the knowledge society [2]. As a result, information and communication technology resources are seen as providing a window of opportunity for educational institutions and other organisations to

harness and use technology to supplement and enhance the process of instruction and learning [3]. Although developed countries have a large body of research on factors influencing the integration of ICTs in education, recent research indicates that developing countries are finding ways to participate effectively in the global information society and to address challenges related to ICTs in education [4].

Ghana's efforts to use ICTs in education are clear in their goal of achieving an ICT legal framework for all residents and key stakeholders [5]. The incorporation of ICTs into Ghana's educational system was formally introduced 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 that all students in Ghana's pre-tertiary institutions acquire basic ICT literacy skills (including internet use) and apply these not only in their studies but also in a variety of ways in their daily lives [6]. Despite these efforts, Ghana's recent participation in the most recent international ICT development index revealed that the country ranked between 100th and 140th out of 154 countries surveyed [7]. This demonstrates that Ghana, like many other African countries, lags in terms of ICT integration in educational institutions. To fully integrate ICTs into learning and teaching in Ghana, a situational analysis of the various contexts and challenges that exist within her educational institutions regarding ICT use is a necessary first step to investigate. Most importantly, stakeholders and decision-makers must be aware of the situation within educational institutions in terms of teacher readiness. Also included are the availability of ICT facilities and skilled human resources to support the achievement of learning and teaching with ICTs in colleges of education, particularly vocational courses such as clothing and textiles.

The use of instructional technology in clothing and textiles in colleges of education is critical to the learning and teaching of clothing and textile skills. Effective technology integration enriches and deepens the learning experience [8]. It encourages active participation, frequent interaction, and feedback [9], [10]. This strengthens the bond between the teacher and the students. The art of teaching is concerned not only with passing on ideas, skills, and attitudes to the learner, but also with equipping learners with technological skills to enable them to function effectively in society [11]. Learning and teaching with computer technology alters how different types of learners are reached and how students' understanding is assessed [12].

It is well known that no meaningful learning or teaching can take place in an unsuitable environment [13]. Many Ghanaian colleges of education, according to observations, lack adequate instructional facilities [14]. To achieve good results or output, the learning and teaching environment must be conducive to learning. Using good educational facilities and services is a sure way to accomplish this. Colleges must improve their learning and teaching environments, workshops, and laboratories. Educational environments have a strong influence on the learning and teaching processes because effective learning occurs in a well-organized environment [15]. This is especially true when it comes to learning clothing and textiles.

The need to learn clothing and textiles has shifted dramatically over the last century [16]. Before the development of ready-to-wear apparel industries, clothing and textiles were learned informally through the apprenticeship system [17]. It was an important part of preparing young women for domestic responsibilities. Individuals learned clothing and textiles from their masters and mistresses informally. The introduction of instructional technology ushered in the use of ICTs in the learning and teaching of clothing and textiles [18]. Clothing and textile skills were regarded as important job preparation in the textiles and apparel industry [19], [20]. Nowadays, the desire to learn clothing and textiles is driven by creative rather than economic factors [21]. Ghana has been struggling under the effective integration of information and communication tools in the educational curriculum for the past decade. As a result, the country has fallen behind in the massive digital revolution [22]. However, all colleges of education have made significant progress in utilising computer technology for learning and teaching. Some departments within colleges of education have been reported to have failed to harness appropriate ICT resources for learning and teaching, including clothing and textiles [23].

Clothing and Textiles programmes in colleges of education are vocational degree programmes that study all aspects of the textiles and apparel industry [24]. Bachelor's, master's, and doctorate degrees in Clothing, Fashion Design, Textile Design, and Technology are available at Ghanaian universities. These programmes are desperately needed in Ghana because they help to generate the new technological knowledge required in the textile and apparel industries. Globalisation has placed demands on the teaching of such programmes in colleges of education that they not only provide students with the necessary cognitive skills and competencies, but also equip them with technological, critical thinking, and collaborative skills for working in a knowledge society by integrating various forms of information and communication technology in learning and teaching.

According to [25], ICT can be used to teach clothing and textiles. To identify, collect, organise, create, and disseminate data and information, information and communication technology employs a diverse set of

technologies. Telecommunication technologies such as telephone, cable, satellite, television, and radio, computer-mediated conferencing and video conferencing, as well as digital technologies such as computer information networks (internet, world wide web, and intranet) and software applications, are examples of information and communication technology [26].

A substantial body of research has demonstrated that rapid integration of ICT into the learning environment necessitates the development of effective ICT policy [27]-[29]. As a result, an ICT policy implementation strategy or framework for a country's education sector is critical for revolutionising learning and teaching processes and opening up new learning opportunities. An ICT policy that ensures people can use it to source and assimilate information and transform it into useful knowledge is needed to improve ICTs [30]. It is difficult to effectively integrate ICT and bring about desired improvements in the reach and quality of education unless a specific policy exists and decision-makers have a clear strategy in place [31].

The most recent Ghanaian Education Reform, which was launched in 2007, highlights ICTs as an important cross-cutting issue in the sector and seeks to address it through several strategies, including prioritising the provision of computer equipment and ICT tools to all educational institutions; and implementing ICT programmes at the pre-tertiary level in a phased manner. [32] discovered that teachers frequently use ICT for informative, organisational, recreational, and lesson planning purposes.

Many governments and educational institutions around the world consider ICT integration to be a top priority. Many governments have created master plans for ICTs in education [32], as well as spent millions of dollars on educational infrastructure and professional development for teachers and other staff members. Nonetheless, evidence suggests that, despite these investments, ICT has not been effectively integrated into learning and teaching activities [33]-[36].

Despite the efforts of governments and other stakeholders to make effective use of ICT in education to train tutors and student teachers in Colleges of Education, there is still a limited use of ICT in teaching and instructional activities in Ghana [37]. Most colleges have ICT facilities, but their use is limited to administrative tasks, teaching computer literacy, and internet skills [38], [39]. ICT is rarely used as a medium of instruction to improve curriculum delivery [37]. [40] discovered that even though tutors have attended several sessions of ICT training, they are not effectively integrating ICTs in learning and teaching in public colleges in Tanzania. [41] discovered that ineffective ICT training for tutors hinders the effective use of ICTs in learning and teaching when researching the role of ICT in learning and training student teachers in colleges.

Colleges of Education, as institutions of higher learning, have made strides in acquiring computers for research purposes and for tutoring and student teaching practises. However, these computers are not being used effectively [42].

Several studies have been conducted in recent years to investigate how ICTs are being integrated into learning and teaching activities at both secondary and tertiary levels in subjects such as science, mathematics, physical education, and social studies [43]-[45]. However, improving ICT usage in clothing and textiles instruction at the college level has received little attention, particularly in the Ghanaian context. It is therefore critical for the researcher to determine how the use of ICT resources improves learning and teaching of clothing and textiles in Ghanaian colleges of education. This will serve as a foundation for other researchers at a lower level, such as JHS. According to [46-64], the clothing and textiles departments in colleges of education face challenges such as a lack of computers and insufficient funds to purchase the necessary software packages. This prompted the researcher to investigate the ICT resources available for the teaching and learning of clothing and textiles in Ghana's colleges of education within the CENTWEST zonal Colleges of Education.

Research Questions

1. What 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?

2. METHODOLOGY

The current study used a cross-sectional descriptive survey research design as part of a quantitative approach [47]. This is because the current study aims to describe the effects of ICT use in clothing and textile teaching and learning in Ghana's CENTWEST zonal Colleges of Education. In Ghana's Western North Region, there are three educational colleges. The population included all of the students' teachers and clothing and textiles teachers from Ghana's Colleges of Education within the CENTWEST zonal Colleges of Education.

2.1 Sampling Technique
The total population of students' teachers in levels 100 to 400 is 415 people, with 8 teachers. Purposive sampling was used to select all of the students' teachers and teachers in levels 200 and 300 for the study. In all four colleges of education, there are 230 students teachers and 8 teachers at levels 200 and 300, respectively. Level 200 and 300 clothing and textiles students were considered for the study because they had completed the clothing and textiles course for at least one year. Level 100 students were not considered because they had just started college and had not completed most of the clothing and textile courses. Furthermore, the level 400 students were at the internship doing their teaching practices, making access to them difficult because they were dispersed throughout their internship programme.

2.2Research Instrument
The research instrument used for the datacollection was questionnaires for the students' teachers and teachers. There were ten (10) different items in thequestionnaire for students and teachers. Questionnaire was made to examine theavailability of ICT resources for usage in learning and teaching of clothing and textiles in the College of Education.The questionnaire was pilot-tested at Wesley College of Education in Kumasi, Ghana's Ashanti Region, to ensure its reliability. Cronbach Alpha reliability of the effect of ICT usage was 0.84, making it reliable for the current study. The information was gathered in ten working days.
There were ten (10) items in thequestionnaire for tutors. Questionnaire for tutors was madeto examine the effect of ICTs usage on learning and teaching of clothing and textiles in Colleges of Education. The questionnaire was arranged in 5-
point Likert scale with Strongly Agree = 1, Agree= 2, Neutral = 3, Disagree = 4 and StronglyDisagree = 5.

2.3 Data Collection Procedure
The researcher first went to the colleges to get to know the students and teachers. The researcher administered the questionnaire herself so that she could provide clarification to the participants as needed. The researcher's presence also ensures that all questionnaires are retrieved for data analysis.

2.4 Data Analysis

Excel and SPSS (International Business Machine, Statistical
Package for Social Sciences) 27.0 were used to analyse the data. Bar charts, descriptive statistics such as means and standard deviations, and coefficients of variation were used to analyse the data.

3. RESULTS AND DISCUSSION

ICT Resources Available for Usage in Learning and Teaching of Clothing and Textiles in the College of Education
Research Question One: What are the ICT resources available for usage in learning and teaching of clothing and textiles in the College of Education?

The first objective of the study examine 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.

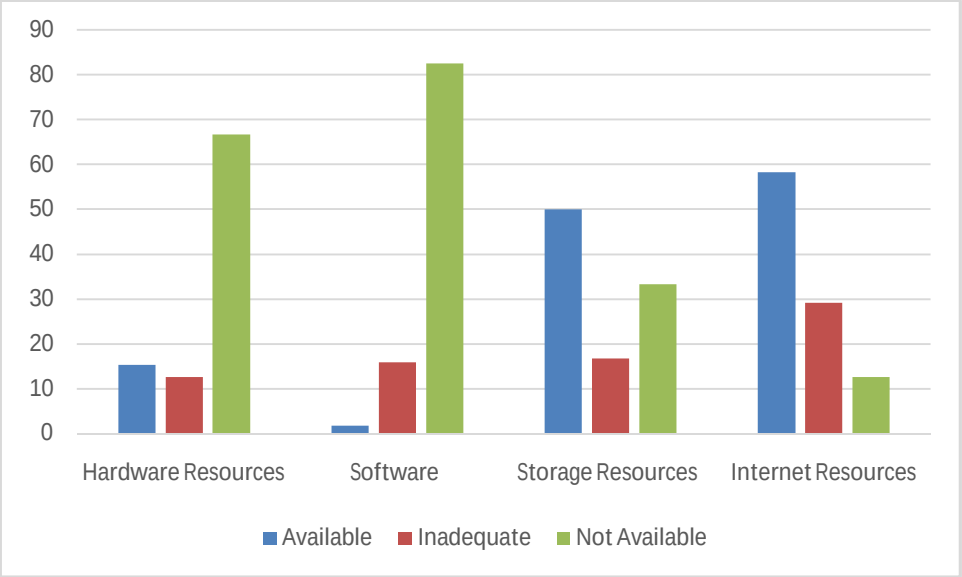

Figure 1: *Students Responses on the Availability of ICT Resources*

Figure 1 depicts the responses of students studying clothing and textiles based on the availability of ICT resources. In terms of hardware, the majority of learners (66.7% of total student teachers) indicated that hardware resources are not available in colleges of education, while less than 20% indicated that resources are available but inadequate. Furthermore, as 82.5% of the total students, the majority of the student teachers indicated that software for teaching clothing and textiles was not available in their respective colleges. This is consistent with the findings of [46], who discovered that insufficient computers and insufficient funds to purchase the necessary software packages were issues confronting clothing and textile departments in educational institutions. This could be because the teachers did not expose the students' teachers to the software used in colleges to teach clothing and textiles. It is also possible that the department did not request the purchase of those software for the department of home economics, or that the colleges were unable to obtain those software due to a lack of financial resources or knowledge of the existence of those materials. It is quite surprising that the majority of students indicated that the college has storage resources for clothing and textiles, as this represented 50% of the total student teachers. Despite the large percentage of respondents indicating the availability of storage facilities, 33.7% indicated that these facilities are not available in schools. The reason for this could be that some colleges have an abundance of these ICT storage facilities, whereas others do not [48]. For example, one of the colleges was absorbed by the government in 2016 and thus cannot be compared to other colleges that have been in the system for more than 30 years. Finally, the majority of students (58.3% of student teachers) indicated that their schools have internet resources, while only 12.5% of student teachers indicated that internet resources are not available in their colleges. This could be a result of the government of Ghana's initiative to provide internet resources to colleges of education during the outbreak of the colleges for teachers and students to have smooth instruction via online or remotely as the country was locked down [49]. This could also be due to the colleges' efforts to meet tertiary statutes to become fully autonomous colleges after years of affiliation with traditional universities. It is also possible that some students consider using their own phone internet for a variety of activities and thus consider the availability of networks in their colleges.

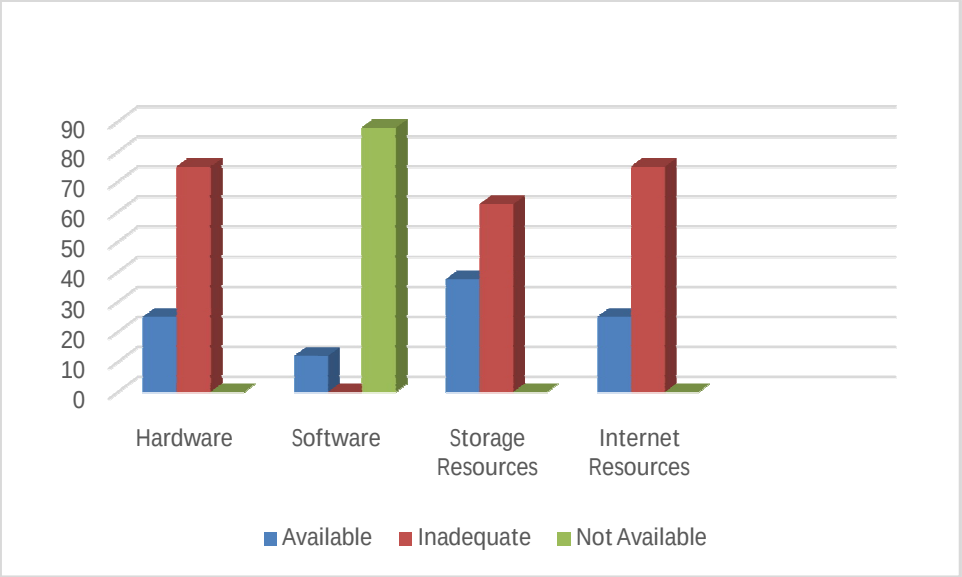

Figure 2: *Teachers Response to Availability of ICT Resources*

Figure 2 depicts teachers' responses to the availability of ICT resources in a college of education in Ghana's central west. The findings indicated that hardware, storage facilities, and internet resources are available; however, these ICT resources are in short supply. This contradicts the claim that secondary schools do not have adequate ICT resources for teaching [50]. Nonetheless, the majority of teachers agreed that software was not available for use in teaching clothing and textiles, accounting for 88% of the total number of teachers who participated in the study [51]. The presence of ICT tools such as hardware, storage facilities, and internet resources is not surprising given that the transformation of training colleges to colleges of education necessitates the establishment of a library as well as a functional ICT laboratory [52]. Furthermore, the new curriculum requires teachers to use ICT tools to teach at colleges of education, which has compelled the colleges to provide these tools. The inadequacy of ICT resources could be due to a lack of government funding to provide materials in large quantities. The fact that the majority of teachers agreed that there is no software in the school to teach clothing and textiles could mean that the school has other software, but it is not specifically designed to teach clothing and textiles. This could be due to teachers' concerns about not requesting the software through their department head. It is also possible that schools have been unable to obtain appropriate software for the department due to financial constraints or a lack of knowledge about the availability of such software for teaching clothing and textiles.

Effect of ICTs Usage on Learning and Teaching of Clothing in the Colleges of Education

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

Research question two examined the effect or the impact of the use of ICT resources on the teaching and learning of clothing and textiles in the colleges of education in Ghana. The research question was analysed using descriptive statistics such as means and standard deviations as well as the use of coefficient of variations. The results is shown in Table 1.

Table 1: *Descriptive of the effect of ICTs usage on teaching and Learning of clothing and Textiles*

	Students			Teachers		
Statement	Mean	SD	CV (%)	Mean	SD	CV (%)
Using ICTs make teaching and learning of clothing and Textiles easier	4.58	0.49	10.70	4.57	0.40	8.75
Using ICTs enhances learner's critical thinking	3.65	0.48	13.15	3.39	0.45	13.27

Using ICTs promote problem-solving skills	3.65	0.31	8.49	3.50	0.47	13.43
Using ICTs enhance collaborative teaching and learning	3.00	1.66	55.33	3.85	0.46	11.95
ICTs usage enhances learner's understanding of of clothing and textiles concept	4.03	0.43	10.67	4.42	0.49	11.09
ICTs usage in teaching and learning is more easier and saves time	4.02	0.35	8.72	4.12	0.36	8.74
Using ICTs make instruction more practical	4.32	0.48	11.11	5.00	0.00	0.00
Using ICTs make instruction more interesting	3.11	0.34	10.93	5.00	0.00	0.00
Using ICTs make assessment of students' easier	4.54	0.44	9.69	4.35	0.45	10.34
ICTs facilitates problem-based learning and teaching	3.78	0.26	6.87	2.72	0.47	17.28
Average	3.88	0.55	14.17	4.2	0.34	8.10

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

Table 1 shows the descriptive statistics of the impact of ICTs on the teaching and learning of clothing and textiles in Ghanaian colleges of education. Overall, the high mean scores for students (mean = 3.88, SD = 0.55) and teachers (mean = 4.2, SD = 0.34) indicated that the majority of respondents agreed with the items on the effects of ICT on clothing and textiles instruction. Furthermore, all of the responses from both student teachers and teachers indicated that ICT has a positive impact on the teaching and learning of clothing and textiles. All of the coefficients of variation are less than 30%, with the exception of the statement "Using ICTs enhance collaborative teaching and learning" from the perspective of the student teachers. This indicated that there are few differences between the responses of the student teachers and the teachers. The students' teachers' high coefficient of variation on "Using ICTs to enhance collaborative teaching and learning" indicated that there were disparities or variations in their responses. That is, while the majority agreed on the items, the majority of students and teachers disagreed, resulting in a high CV value. Table 1 shows that ICT has the following impact on the teaching and learning of clothing and textiles in Ghana's colleges of education in the Western North.

First, ICT has the potential to simplify and speed up the learning of clothing and textiles. The use of ICT makes instruction more practical because some things can be easily illustrated using videos and simulations [8]. For example, ICT could be easily used to simplify the process of sewing a specific dress or illustrating a type of beam. A YouTube video, for example, can be downloaded to demonstrate the process of preparing a specific dish that cannot be easily prepared in schools due to time and other resources [53]. Furthermore, student teachers can easily follow some videos of the process learned in class to easily understand a concept that was previously difficult to understand [53]. Teachers can also use pictures, simulations, models, and videos to easily explain concepts to students' teachers. This means that effective integration of ICT resources in teaching and learning clothing and textiles allows them to explore broader areas of knowledge, which helps them understand these concepts more quickly [54]. This could be because the majority of student-teachers have personal ICTs such as smart phones, laptops, and modems that allow them to easily search for information on the internet, complete assignments, and observe patterns and cuttings.

Second, ICT resources encourage critical thinking, problem-solving abilities, and problem-based learning [55]. ICT can be used to investigate difficult problems and create problems for student teachers to discuss [56]. It can also provide challenging tasks by connecting classroom activities to real-life situations and posing problems that require critical thinking on the part of student teachers. The process of dealing with these challenges assists students in developing problem-solving abilities. For example, in creating a particle style of dress, ICT could be used to provide the various parts and student teachers could be used to bring the parts together to form a specific style that requires the learners to think critically. This could be because student-teachers are able to conduct effective research using the various ICTs available to them. They can connect to various educational websites and download various images, videos, and information to help them learn better. This could be because learners are able to visualise objects, pictures, and diagrams and relate them in a broader context of all forms of life by using audiovisuals such as projectors.

Furthermore, ICT makes clothing and textiles teaching and learning more interesting and practical [57]. ICT in clothing and textile instruction has the potential to make lessons more engaging by eliciting and maintaining students' interest throughout the learning situation [57].This is due to the ability of ICT tools to provide multimedia that meets the diverse needs of the learners. As ICT aids in the presentation of visual and audio representations of concepts being learned. In some cases, ICT tools can be used to create objects that learners can easily feel during lessons.

The study also discovered that when tutors effectively incorporate ICT resources into their teaching, it helps to improve and promote collaborative thinking among their students [58]. This means that when students interact with ICT resources during group work, practical work, and class presentations, they share ideas among themselves, which helps them to improve their team building skills. However, students-teachers disagree with their tutors. Some student-teachers believe that using ICT resources promotes individualistic learning and discourages collaborative learning, resulting in a high coefficient of variation [58]. This is because, now that most student-teachers have access to these basic ICT resources, they prefer to conduct their own personal research and learning at their leisure rather than participating in groups to share and acquire alternative knowledge that they can obtain from the internet on their own.

Finally, the use of ICT resources improves learner assessment [60]. Assessment is an important part of teaching. Effective assessment is the only way to conclude teaching. Even when on vacation, ICT resources such as software can be used to design a problem for students' teachers to work on. Furthermore, the ability of ICT tools to provide immediate feedback helps to encourage learners to solve more problems online [61]). For example, a teacher can create a multiple-choice quiz on clothing and textiles for students to complete on their mobile phones. In this case, immediate feedback is simple to obtain because ICT has the capability of providing immediate resources and corrections as soon as the works are submitted. Teachers can also create a project or problem in clothing and textiles and send it to students via online or social media platforms for them to complete.

4. CONCLUSION

The study investigated the impact of ICT resource use on clothing and textile teaching and learning in Ghana's Centwest Zonal Colleges of Education. The findings revealed that there is insufficient hardware, storage space, and internet access in educational institutions. Furthermore, students' teachers and teachers reported a lack of software for teaching and learning clothing and textiles in Ghana's Centwest Zonal Colleges of Education. In terms of the impact of ICT resources, the findings revealed that ICT use has a positive impact on the teaching and learning of clothing and textiles in Ghana's Centwest Zonal Colleges of Education. It is suggested that colleges of education provide ICT resources, particularly software, to the department of home economics in Ghana's Centwest Zonal Colleges of Education.

Consent:

Prior to gathering data, the researcher obtained permission from the principals, heads of departments, teachers, and academic deans. In addition, prior to the study's conduct, the student teachers and teachers were asked to sign a consent letter. The researcher first went to the colleges to get to know the students and teachers.

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DEFINITIONS, ACRONYMS, ABBREVIATIONS

Here is the Definitions section. This is an optional section.

Term: Definition for the term