

UNIVERSITY OF EDUCATION, WINNEBA

**INFORMATION COMMUNICATION TECHNOLOGY USAGE PATTERNS
IN SECOND CYCLE SCHOOLS: A STUDY OF SELECTED SENIOR HIGH
SCHOOLS IN WESTERN NORTH REGION OF GHANA**



EMMANUEL ASSUMAN

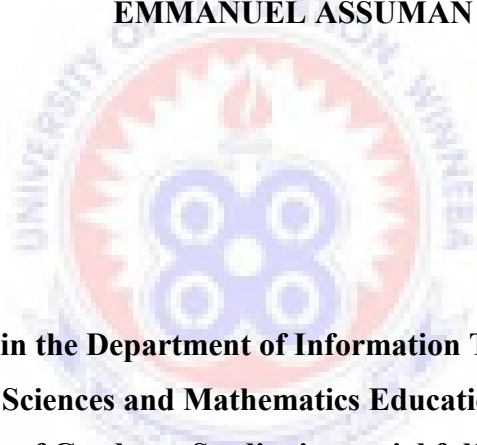
MASTER OF SCIENCE DISSERTATION



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**A dissertation in the Department of Information Technology Education,
Faculty of Applied Sciences and Mathematics Education, submitted to the School
of Graduate Studies in partial fulfilment
of the requirements for the award of the degree of
Master of Science
(Information Technology Education)
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MAY, 2021

DECLARATION

STUDENT DECLARATION

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

SIGNATURE:.....

DATE:.....

SUPERVISOR'S DECLARATION

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

DR. KWAME ANSONG-GYIMAH

SIGNATURE:.....

DATE:.....

DEDICATION

The study is dedicated to my family.



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I am very grateful to the almighty God who out of his will, has granted me his travelling mercies, knowledge and understanding throughout the course. A big thank you to my supervisor, Dr. Kwame Ansong-Gyimah for his gracious support to me throughout my Dissertation writing.



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ABSTRACT

Information and Communication Technologies (ICTs) are valuable tools that can help people gain access to higher-quality education. ICT resources have been used to develop teaching and learning pedagogical techniques where teachers can use ICT for online interactive learning. Teachers' attitudes toward ICT and their perceptions of ICT viability play a significant role in ICT use in their teaching and learning activities. Empirically, several studies have been done on ICT usage in schools in different countries but very limited in Ghanaian context. Thus, the study sought to find out the usage pattern of Information Communication Technology at senior high schools in Western North Region of Ghana. Descriptive research design with quantitative approach was used in this study. The population of the study comprise of all teaching and non-teaching staff of public senior high schools in Western North Region of Ghana. The sample size for the study was three hundred and ten (310) staff of public senior high schools in Western North Region of Ghana. Stratified sampling was used for selecting the sample size from the population. The study used questionnaire in gathering the data for studying the issue under investigation. Analysis of the data was done through the use of the SPSS. The study shows that the effects of ICT usage in teaching and learning explain almost all of the factors that explain students' academic work. The study concluded that there is a statistically significant effect of ICT usage in teaching and learning in students' academic work. It is recommended that stakeholders should supply teaching and non-teaching staff of public senior high schools in Western North Region of Ghana with a rack, laptop computers, tablets, projectors, routers, internet servers, printer, uninterrupted power supply, power invertor, desktop computers, and solar panels.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Information and Communication Technologies (ICTs) are valuable tools that can help people gain access to higher-quality education (Ifijeh, Michael Onuoha, Ilogho & Osinulu, 2015). Thus, development agencies, educational institutions and teachers use these ICT tools to find new ways to enhance student learning. The development and delivery of lessons, as well as comprehensive preparation, have all been used to make ICT use easier at school (Barth et al., 2016). The use of ICT in our teaching and learning environment is still a work in progress (Mor et al., 2015; Holmberg, 2014). Although it is widely acknowledged that technology cannot improve teaching and learning without the involvement of others where teachers play an important role in such activity (Kirkwood & Price, 2013; Goodyear & Retalis, 2010). Furthermore, today's students are technology consumers, and they regularly inquire about the technology tools available in educational institutions, as well as how their teachers use them during teaching and learning (Khokhar & Javaid, 2016).

But there is evidence in the literature for both negative and positive effects of ICT use on teaching and learning (Fried, 2008). However, the results of studies that link students' academic performance to their use of ICT have been mixed with other findings. The findings revealed that the experimental group of students who use ICT in their learning performed significantly better academically than the control group (Wurst, Smarkola, & Gaffney, 2008), while other research revealed that the association between students' academic performance and ICT use is negative (Fried, 2008; Grace-Martin & Gay, 2001). According to the 2013 Information Literacy of International

Computer and Research, 63 per cent of teachers emphasised the enhancement of their students' abilities in comparison to explicit ICT capacities (Fraillon et al., 2014). ICT resources have been used to develop teaching and learning pedagogical techniques where teachers can use ICT for online interactive learning (Samson, 2010; Caron and Gely, 2004; Anderson et al., 2003).

Furthermore, teachers' attitudes toward ICT and their perceptions of ICT viability play a significant role in ICT use in their teaching and learning activities (Becta, 2008). Teachers' perspectives on the effectiveness of ICT in making teaching easier and more interesting for students have been featured in studies conducted in Europe (Huang & Liaw, 2005; Korte & Hüsing, 2007; Becta, 2008). Some teachers claimed in their studies that the use of ICT had a positive impact on students' learning. Some of the benefits include reinforcing the connection between the classroom and outside-of-classroom learning and encouraging personal learning (Huang & Liaw, 2005; Korte & Hüsing, 2007; Becta, 2008). Despite this, only few teachers claimed that the benefits of ICT were not evident in students' performance. As a result, the study aims to examine the effects of ICT usage on students' academic work at senior high schools in the Western North Region of Ghana.

According to a study by Tondeur, Valcke & van Braak (2008), teachers' positive attitudes toward modern technical innovations will broaden their use of ICT in the classroom teaching and learning process. According to Woodrow (1992) using ICT is an inspirational attitude toward educational growth for a fruitful improvement in instructive activities and locations. According to empirical evidence, only few teachers have successfully integrated ICTs into their classrooms (Padayachee, 2016; Nkula &

Krauss, 2014). PowerPoint, spreadsheets, word processors, projectors, web indexes, intuitive whiteboards, mobile phones (messages, websites, videos, and so on), compact disc read-only memory (CD-ROMs), tablets, digital books, texting, Wikipedia, animations, podcasts, and simulations have all been listed as advanced devices that can be used in teaching and learning (Assan & Thomas, 2012; Molotsi, 2014; Batchelor & Olakanmi, 2015; Govender & Govender, 2014; Lorenz, Banister, & Kikkas, 2015; Mereku & Mereku, 2015; Tamim, Borokhovski, Pickup & Bernard, 2014).

These studies show that ICTs are used appropriately during teaching and learning. However, more in-depth knowledge is needed for technology classification understanding and how this influences teaching methods. As a result, the importance of using ICT in teaching and learning at senior high schools in the Western North Region of Ghana. South Africa's Department of Basic Education conceded in their 2015b Action Plan to 2019 study that while technology improves learning, it has not progressed as expected in South Africa. Mooketsi & Chigona (2014) discovered a distinction between instructors' behaviour and government wishes for the use of ICT in educational institutions. Also, Vandeyar (2015) maintains that several studies have been conducted on the challenges associated with ICT integration in schools. However, exploratory studies into the potential need for an e-Education policy seemed to have escaped the attention of academic experts. Research that uncovers requirement issues is extremely important because it can be used to enhance teacher preparation to incorporate ICT into teaching and learning (Padayachee, 2017). Thus, the study aims to look into the use of ICT in senior high schools in Ghana's Western North Region.

The Government of Ghana set out in 2003 intending to improve education quality, access, and equality for all Ghanaians. To achieve this, the government developed an ICT strategy in education, complete with quantifiable outcomes and timelines (Opoku-Agyemang, 2015). Moreover, the most recent Education Reform, which was sent out in 2007, highlights ICT integration as a major problem and attempts to fix it through several procedures. These involve providing computers and other ICT equipment to all schools in a systematic manner and implementing ICT programmes at the pre-tertiary level in a staged methodology, starting with schools that already have adequate laboratories and instructors (Opoku-Agyemang, 2015). Besides, as teachers and ICT resources become accessible, the programme can expand to different schools. Also, adequately resourcing Software Engineering and Information Technology faculty in universities can provide professional human resources to meet business needs. As part of these reforms, it is also planned that the use of ICT in schools would provide students with ICT skills (Opoku-Agyemang, 2015). To make progress, the introduction of ICT into education is a significant and critical challenge that necessitates a deliberate emphasis on interventions (Opoku-Agyemang, 2015). It is by these policies that the study seeks to find out the usage pattern of ICT in senior high schools.

1.2 Statement of Problem

Many senior high schools in Ghana are falling short of standards when it comes to implementation of ICT into teaching and learning (Olson et al., 2011). Many senior high schools do not have access to the internet despite having computers. Empirically, several studies have been done on ICT usage in schools in different countries (Padayachee, 2017; Barth et al., 2016; Rolf, Knutsson, & Ramberg, 2019; Ayllón et al., 2020; Scale et al., 2019; Lidström, Ahlsten, & Hemmingsson, 2010; Khokhar & Javaid,

2016), but very limited in Ghanaian context (Padayachee, 2017). To bridge the gap in literature, the study sought to find out the usage pattern of Information Communication Technology at senior high schools in Western North Region of Ghana.

1.3 General Objective

The aim of the study was to find out the usage pattern of Information Communication Technology in second cycle schools.

1.4 Specific Objective

These are the specific objectives that will be achieved in the study:

1. To investigate the importance of using ICT in teaching and learning at senior high schools in Western North Region of Ghana.
2. To examine the effects of ICT usage on students' academic work at senior high schools in Western North Region of Ghana.
3. To investigate the use of ICT at senior high schools in Western North Region of Ghana.

1.5 Research Questions

The following are the research questions that will be addressed in the study:

1. What is the importance of using ICT in teaching and learning at senior high schools in Western North Region of Ghana?
2. What is the effects of ICT usage on students' academic work at senior high schools in Western North Region of Ghana?
3. What is the use of ICT at senior high schools in Western North Region of Ghana?

1.6 Significance of the Study

The finding of this study could be broadly applicable and beneficial to scholars and researchers. Since, they would use this study as a point of reference. The study will also give an insight to scholars and researchers in the usage pattern of ICT in second cycle schools. Also, the study will guide researchers with a broader understanding on how to conduct similar studies. Furthermore, the results of the study will be relevant to the ministry of education, policy makers and implementers, teachers, students and other stakeholders in their decision making towards an enhanced teaching and learning.

1.7 Delimitation of the Study

The study was delimited to senior high schools in Western North Region, Ghana. The outcome of the research could not cover all senior high schools in Western North Region, Ghana but rather public senior high schools.

1.8 Organization of the Study

This dissertation was divided into five parts. The current chapter which is the first part deals with background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation of the study, definition of terms and organization of the study. The second part highlights on Introduction, conceptual framework (review literature on the variables), theoretical review, hypotheses development, empirical review, and conclusion. The third chapter is concerned with the methodology employed for this study. This contains introduction, research design, population, sample and sampling technique, research instrument/measurement, pilot study, research approach and conclusion. The fourth chapter analyses the data gathered and addresses each of the research questions in turn.

It contains introduction, research approach, correlation analysis, hypotheses result and conclusion. The last chapter which is the fifth present's introduction, overall findings based on the research objectives, implications of the study, theoretical contribution, practical contributions, methodological contributions, limitation of the study, recommendation for future research and conclusion.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of the study was to find out the usage pattern of Information Communication Technology in second cycle schools. This chapter constitutes the conceptual framework of the study, theoretical review, hypothetical development and empirical review.

2.2 Conceptual Framework of the Study

2.2.1 *ICT in/and education*

ICT is playing an essential role in workplaces, business, entertainment and education. In the educational area, the use of ICT in the classroom is significant for providing chances to students to learn and utilize the necessary skills, so they learn the notion of using ICT as a tool for lifelong learning (Ayllón et al., 2020). Furthermore, ICT enhances education and its significance for educators in playing out their function as makers of pedagogical conditions. ICT encourages instructors to introduce their teaching appealingly and versatile for students at each degree of instructive programs (OECD, 2019). In recent years, various studies have been conducted to examine, among other aspects, how schools are equipped in the area of ICT, how ICT are used in everyday school life, and what the estimates of the use of ICT are. With regards to the present review, an overview of the various studies on ICT in/and education will be given. For this purpose, the availability of ICT in school, the utilization of ICT in teaching and learning, the computer and information literacy (CIL) of students and the teachers' experience with ICT will be our main focus.

2.2.2 Availability of ICT in education

In order to be able to participate successfully in the social and professional life of the 21st century, competent handling of digital media is elementary and has become an increasing focus of school efforts in recent years. In everyday school life, sufficient equipment with digital media is considered necessary in order to support students in their ICT skills. The assessment of ICT equipment situation in schools is usually based on a description of the amount of equipment accessible for instructing and learning purposes (Ayllón et al., 2020). The European Commission's "Survey of Schools" in 2012 found that, as to ICT facilities, the average European number of class eight students sharing a computer is five. While Norway, Denmark and Spain have a 3:1 ratio, the ratio for Estonia and Belgium is 4:1. Greece is ranked second to last, in the last group of nations, with 21 students per computer. Romania ranks at the low end of the scale on this indicator with 13 students per computer (European Commission, 2019).

With a view to grade 4 there are on average in the European Union seven students per computer. Especially Norway, Denmark and Spain have a good number of students to a computer (3:1). Estonia (5:1), Luxembourg (6:1) and Finland (6:1) having a better number of students to a computer than the EU average. For Austria, the ratio is 9:1, and for Romania, it shows a number of students to computers of 17:1 (European Commission, 2019). Similar findings were also found in the 2nd survey. The findings of the second Survey of educational institutions show that under 1 out of 5 of students in Europe go to schools which approach rapid Internet over 100 mbps. What's more, the findings show substantial contrasts between and inside European nations with the Nordic nations coming out as clear leaders with respect to the sending of rapid Internet

in schools, but also in terms of being digitally equipped and with different nations and schools situated in towns or little urban communities, which are those that are clearly lagging behind (European Commission, 2019).

As well as the European Commission, the international computer and information literacy study examined how many students on average share digital devices (desktop computers, laptops/notebooks and tablet devices alike) that are available at schools in different countries (Fraillon et al., 2019). The result of the ICILS 2018 study shows that the European average is 8.7:1. In Finland, an overall average of 3.4 students share a digital device. Luxembourg (4.5:1) and Denmark (4.6:1), as well as France (7.2:1), are above the European average together with Finland. Germany shows a ratio of 9.7:1. A noticeably lower result is found in Italy (14.3:1) and Portugal (16.9:1) (Eickelmann et al., 2019; Fraillon et al., 2019). In the context of Information Technology (IT) equipment for schools, it seems increasingly important to develop concepts that are continuously and sustainably developed along with criteria.

In this context, the European ESSIE study (European Commission, 2019) with its sub-study on HECC (Highly Equipped and Connected Classrooms) may offer an approach that addresses both schools that are just beginning to develop technology and schools that already have developed IT equipment and equipment concepts. Apart from the school approach chosen, it seems important, both in the light of the developments and experience in recent years, to point out that concepts relating to IT equipment should be developed across schools and should support schools where they are at the stage of their work and development (Ayllón et al., 2020).

2.2.3 ICT usage in teaching and learning

The use of ICT in teaching and learning contexts has been considered at national and international level for many years (Voogt & Knezek, 2008). When ICT is integrated into teaching and learning contexts, this has often been done with the purpose of assisting subject-specific learning and the development of cross-curricular competencies and enhancing the quality of education (Eickelmann & Schulz-Zander, 2010). Especially in the subject-specific contexts, for example, in the teaching subjects, there are many opportunities to learn how to use digital media competently (Tulodziecki et al., 2019). The critical point of departure here is the assumption that the use of new technologies offers high potential in itself for developing knowledge and skills in the area of CIL (Fletcher et al., 2012; Fraillon et al., 2013). According to this, specific and reflected handling of technologies and computer-based information can be supported in school. The use of ICT in education can provide a motivating and interesting teaching environment, contribute to equal opportunities, enable and guarantee social participation through specific competence development, and prepare students for the professional world (Plomp et al., 2009).

Due to rapid technological developments, the aspects of the use of ICT in education is becoming increasingly relevant, resulting in new developmental tasks and requirements for the educational systems (Cox, 2008; Greenhow et al., 2009). Looking at the integration of ICT in educational institutions and education, for example, the European Commission (2013) concluded that on average in the EU the greater part (53%) of grade eight students use desktop computers at least once a week. The comparison between the countries considered shows that Bulgaria has the highest proportion of eighth-grade students (71%) who indicate that they use a school computer/laptop for learning

purposes during lessons at least weekly. The percentages for Spain (52%), Estonia (51%), Romania (50%), Belgium (47%) and Austria (40%) are under the European average. Based on the ICILS 2018 study, the use of digital media at school was examined from the perspective of eighth-graders. The study revealed a usage rate of 45.1 percent for the EU comparison group in terms of weekly use of digital media for school-related purposes.

In a comparison of the countries, Denmark especially stands out with a rate of 90.9 percent. While Finland has a weekly frequency of use of 58.1 percent, Italy (23.1 %) and Germany (22.8 %) show a similar average value. Looking in more detail at the everyday utilization of ICT by students for educational purposes, Denmark is again the best performer with an average of 81.0 percent. The averages for France (8.1%), Italy (7.2%) and Germany (4.4%) are significantly below the EU average (Schaumburg et al., 2019; Fraillon et al., 2019). The overarching internationally oriented analyses of Sakamoto (2018) indicate that the utilization of ICT in schools has the potential to advance the CIL of students, especially the ability to collect and evaluate information. In this sense, according to Sakamoto (2018), the use of digital media at school can be more efficient than its use in the house. However, use in the house also has a significant effect on students' competences. Numerous research have explored the connection between the use of ICT in schools and the achievement of professional skills (Eickelmann & Schulz-Zander, 2010; Fuchs & Wößmann, 2004; Song & Kang, 2012).

For example, a supplementary study to PISA 2012, which examined the acquisition of digital literacy and the quality of students' Internet-related navigation and evaluation skills, showed that students who used the Internet at school a few times per month achieved better results over students who never used the Internet at school (OECD,

2015). This is supported by the work of Pagani, Argentin, Gui & Stanca (2016) who argue that digital skills may allow for simpler admittance to a wide assortment of learning instruments. Further Pagani, Argentin, Gui & Stanca (2016) who analysed PISA 2012 data suggest that digital skills:

can give more inspiration to figure out how to low achievers than for high-performing understudies. The capacity in utilizing the Internet may speak to an elective wellspring of chances that turns out to be especially significant when other, more customary, sources are not compelling in giving capital-improving encounters. Thus, we expect that the possible additions of advanced aptitudes are bigger for low achievers than for those whose performance is as of now high (150-151).

Research is increasingly suggesting that ability as opposed to access speaks to an urgent cause of digital imbalance (van-Deursen & Helsper, 2015; van-Deursen, van-Dijk & Klooster, 2015). Thus, “more grounded impacts of students digital proficiency with lower school accomplishment and financial foundation propose that projects pointed toward expanding Internet data aptitudes among the adolescent can assume a significant part in diminishing instructive imbalance and, thus, bringing down disparities in the work market” (Pagani et al., 2016, p. 157).

2.2.4 Computer and information literacy of students (CIL)

With the increase of ICT in everyday life, numerous nations have perceived the significance of the execution of computerized media in educational institutions and education and the role of computer and information literacy (CIL) (Kozma, 2003; Voogt, Erstad, Dede & Mishra 2013). In recent years, the usage of ICT by students to enhance learning and acquire skills for future gainful investment in society and work

has been reaffirmed and established in policy statements (E-learning Nordic, 2006). The interest of skills related to ICT is obvious in the attestation by the European Commission that CIL is “progressively turning into a fundamental life fitness and the powerlessness to access or use ICT has viably become a hindrance to social joining and self-improvement” (European Commission, 2008: 4). Ferrari (2012) describes digital literacy as a necessity and the privilege of residents to have the option to live and perform in today’s society. Ferrari points out seven key capability zones: management of information, coordinated effort, sharing and communication, making of content and information, morals and duty, assessment and critical thinking, and specialized activities.

In the ICILS Study, CIL is characterized as referring to “a person's capacity to utilize computers to research, make and impart so as to take an interest viably at home, at school, in the work environment and in the public eye” (Fraillon et al., 2013: 17). To outline students’ skills and learning progress, assessment programs have been developed at the international level to decide the degree to which students are creating satisfactory degrees of ICT skills. Various projects and studies, like the IEA ICILS (Fraillon, 2014; Fraillon et al., 2019) and the Assessment and Teaching of 21st Century Skills (Griffin, McGaw & Care 2012), point out a growing interest regarding the assessment and evaluation of adequate skills for today’s society. Selwyn (2009) describes students’ Internet use as “inactive utilization of information as opposed to dynamic formation of content” (Selwyn, 2009, p. 372). According to this, the implementation of digital media and the teaching of CIL to support students’ skills plays an important role in school and teaching (OECD, 2010).

The investigation ICILS 2018 estimates the CIL of students in the participating countries and education systems for the second time after ICILS 2013. The competence levels are divided as follows: The lowest competence level I comprises rudimentary receptive skills and very simple application skills such as clicking on a link or sending an e-mail. Competence level II describes the competent handling of basic knowledge as well as very simple information handling skills, for example, simple document processing. Students who reach Competence Level III can use guidance to find and process information and create simple information products (such as simple text documents). Competence level IV covers the independent determination and organisation of information and the independent creation of elaborate documents and information products. Finally, the highest competence, level V, describes very elaborate computer- and information-related competencies, which include the confident evaluation and organisation of independently determining information and the creation of information products with demanding content and form (Senkbeil et al., 2019; Fraillon et al., 2019).

In an international comparison, the eighth-graders in Denmark reach the highest average achievement level with 553 scale points, and the lowest average achievement level shows Kazakhstan with 395 points. Furthermore, eighth-graders in Finland achieve an average of 531 and in Germany 518 scale points in CIL. Italy achieves an average rate of 461 scale points, which is below the European average of 509 points. Concerning the five competence levels in ICILS 2018, the EU comparison group shows an average of 1.5 percent of the students reaching the highest competence level. These eighth-graders are able to determine information independently, evaluate it reliably and create information products that are sophisticated in terms of content and form. The

corresponding proportion in Germany is 1.9%, in Finland 2.7% and in Denmark 3.1%, which is above the EU average. For Portugal (1.1%), France (1.0%) and Italy (0.2%), the values are below the EU average (Fraillon et al., 2019; Eickelmann et al., 2019).

2.2.5 Student background

Different studies have shown that the background characteristics of students have some influence on the CIL of students. For example, students with better access to ICT and in general with a higher socioeconomic status achieved better CIL results (Fraillon et al., 2019; Australian Curriculum Assessment and Reporting Authority [ACARA], 2015; Claro et al., 2012; Hatlevik et al., 2015). Aesaert et al. (2015) argue in this context that, in addition to the socio-economic characteristics of students, the attitudes of their parents to and their use of information technology must also be taken into account. Regarding CIL results differentiated by boys and girls, various literature that young ladies have higher CIL than boys (Fraillon et al., 2019; Australian Curriculum Assessment and Reporting Authority [ACARA], 2015). However, there are also studies that report the opposite or report no difference at all (Rohatgi et al., 2016). The use of ICT can improve teaching by increasing student motivation and supporting academic achievement if it is all around coordinated into the educating and learning method (OECD, 2015, 2016).

In this context, the integration of ICT such as computers, tablets or other digital devices in schools can help students, including those who do not have access to ICT at home, to learn the ICT skills needed to participate in the knowledge societies of the 21st century. In addition, the use of ICT can help to overcome geographical isolation by connecting students, teachers and schools in terms of learning resources. The level of

students' CIL changes significantly as indicated by age, education and sexual orientation (van-Dijk, 2005; Warschauer, 2003). Subsequently, expanded admittance to ICT chances additionally to build the computerized isolate if not gave similarly, especially regarding admittance to information on difital abilities – and learning with them. With this the computerized separate between people yet in addition among nations and areas is expanding in Europe (European Commission, 2013, 2019).

The most explanatory criterion of social background, as well as more detailed analyses showed, was the number of books in the household as an indicator of cultural capital (Hatlevik, Throndsen, Loi & Gudmundsdottir 2018). In view of public and global results, the ICILS 2013 study confirmed the comparatively high social disparities in CIL among students of different age groups (Aesaert, van-Nijlen, Vanderlinde, Tondeur, Devlieger & van Braak 2015; Australian Curriculum Assessment and Reporting Authority [ACARA], 2018; Claro et al., 2012; Gui & Argentin, 2011; Hatlevik et al., 2015). Furthermore, the mentioned studies consistently show the importance of cultural capital in explaining differences in background. The focus is on social characteristics of background, cultural resources (the provision of cultural goods) and cultural practice in the family (e.g. support for the acquisition of 'digital' skills and parental control of digital media use), which play a particularly important role in the acquisition of CIL (Nikken & Jansz, 2013).

Socially incited various examples of utilization can be recognized over all age groups, for example for kids and youths as well as for youthful grown-ups and more seasoned grown-ups (Harris et al., 2017; Hargittai, 2010; Zillien & Hargittai, 2009; van-Deursen et al., 2015). In general, it is demonstrated that socially favored kids and youngsters

will in general incline toward instrumental-oriented utilizations (for example for looking for data or learning) and socially distraught kids and youngsters will in general incline toward libertine and socially intelligent utilizations (for example for amusement or self-articulation) (Hollingworth et al., 2011; Senkbeil, 2018; Zillien & Hargittai, 2009). In addition, a series of studies show that socially privileged young people not only have a longer period of experience in using digital media and more considerable expertise in dealing with them but also realise a broader spectrum of usage options. For example, they are more capable of using Internet services for their private and professional advancement (e.g. exploring career options, obtaining information about financial services) as well as for active participation and articulation of interests in digitally mediated discourses than socially disadvantaged young people (Kahne et al., 2012; Zillien & Hargittai, 2009).

With the EU Kids Online Survey, it could be recognized that children of guardians who were less taught or didn't utilize the Internet were a critical group that accomplished higher danger and were more furious about upsetting on the web material (Livingstone et al., 2011). There is likewise proof that computer aptitudes are on the rise among students in further developed a very long time than in prior years. For instance, the Australian National Assessment of ICT Literacy utilized a connected scale covering grades 6 and 10, making it possible to compare students' performance at 4-year intervals (Australian Curriculum Assessment and Reporting Authority [ACARA], 2015). Kim & Lee (2013) likewise report that the computer skills of understudies in the third year of senior high school are higher than those of first year of senior high school students. These discoveries may maybe not be so amazing given that age, insight and instructive level are significant factors for the utilization of ICTs, for example, the

Internet and computers (van-Deursen, van-Dijk & Peters, 2011). Moreover, van-Deursen & colleagues (2011) argue that “the higher instructed portion of the populace is described by elevated levels of computer possession, the accessibility of Internet access at home, significant levels of broadband network, and by investing a more than normal time on the web” (p. 129).

2.2.6 Teachers’ experience with ICT

The utilization of ICT in school and teaching changes the education process where learners manage information in a functioning, self-coordinated and valuable way (Voogt et al., 2013). ICT isn't just observed as a device that can be added to or utilized as a substitution for existing educating strategies. Or maybe, ICT is viewed as a significant device to help new educating and learning techniques. In particular, it is essential to use ICT in a way that will build up students’ abilities for coordinated effort, communication, critical thinking and long lasting learning (Voogt et al., 2013). In this context, teachers have a unique role as mediators, as they have to understand the potential of the role of ICT and also have the ability to use ICT in teaching. Teachers should, therefore, have aptitudes, knowledge and an inspirational mentality towards the usage of ICT in schools (Ratheeswari, 2018; Davis et al., 2013; OECD, 2019). Most educators have been acquainted with the utilization of ICT for instructing and learning for certain years yet at the same time use it above all else for setting up their teaching (European Commission, 2013).

It shows, that at EU level 75 percent of instructors have been utilizing the Internet and computers at school for more than three years. This has risen in the 2nd Schools Survey to 90 percent (European Commission, 2019). In both surveys, it was found that teachers use ICT much more frequently to prepare their lessons and that the use of ICT doesn't,

however, require an elevated level of ability (European Commission, 2013, 2019). Particularly in the field of online media, educators reliably have lower levels of ability than in the operation of ICT hardware in general. The COVID-19 outbreak in 2020 can have had an effect on this situation, given that much of the teaching was moved online as schools closed. A recent international online survey by Gudmundsdottir & Hathaway (2020) focusing on Teachers' Readiness Online (TRIO) in which the researchers gathered points of view from 1186 educators about their encounters identified with web based instructing in the early weeks of COVID-19 school terminations showed that instructors' office was enacted in the hours of the COVID-19 pandemic.

The discoveries feature that regardless of educators' naiveté and ineptness for internet instructing, they were modestly set up to utilize different computerized tools and ready to make web based learning work for students and teachers (Gudmundsdottir & Hathaway, 2020). According to the findings of recent decades, the implementation of digital media continues to be shaped by the attitudes and behaviour of teachers towards digital media (Eickelmann & Vennemann, 2017; Ertmer, 2005; Tondeur et al., 2019). When looking at the perception of the potentials in an international comparison within the framework of ICILS 2013, it became clear that the attitudes of teachers varied between the educational systems. Mueller et al. (2008) concluded that teachers with positive teaching involvement in the use of computers are bound to utilize computers in class. In addition, self-assessment of computer-related teacher competencies has emerged as a key determinant of computer use in teaching (European Commission, 2013; Fraillon et al., 2014; McKenney & Roblin, 2018; Siyam, 2019).

A positive attitude of teachers towards the use of digital media in teaching was also identified as a significant predictor of the use of computerized media in teaching (Celik & Yesilyurt, 2013; Holmberg, 2019; Lopes, 2018). The findings of international studies make it increasingly clear that teachers can usually only use digital media in such a way that they make a quality contribution to the design of schools and lessons if they have been appropriately prepared for the use of digital media during their own teacher education (Albion & Tondeur, 2018; Eickelmann et al., 2019; Tondeur et al., 2019). Particularly in view of the fact that the aspect of teacher education is an essential factor within the implementation of digital media in schools and education in general, the relevance and effectiveness of teacher education related to digitalisation is being continuously expanded internationally (OECD, 2019).

2.2.7 Government Policies on ICT in Ghana

Ghana as a country upon realizing the transformation caused in the development of any nation through the use of ICT has formulated a policy on ICT. The policy, named the Ghana ICT for Accelerated Development (ICT4AD) speaks to the vision for Ghana in the data age. It depends on the approach system report which expresses that: “A Combined ICT-drove Socio-economic Advancement Policy and Plan Expansion Framework for Ghana”. This policy was delivered in March 2003 (The Ghana ICT for Accelerated Development Policy, 2003). The Ghana ICT strategy completely considers the desires and the arrangements of key financial advancement structure records including: the Vision 2020. The approach sets out the guide for the advancement of Ghana's data society and economy and gives a premise to encouraging the financial improvement of the nation in the developing data, information and digital age to be overwhelmed by data and information based economies. The policy anyway has been

intended to help Ghana's advancement cycle by adding to tending to the country's key development challenges.

These challenges cut across issues of human development, transforming the agricultural sector the adoption of science and research among others. To solve these challenges, the ICT policy proposes a number of objectives to guide the implementation of the policy. Some of the objectives that apply to this study include:

1. To guide the cycle of the improvement of public human resource limit and the country's R&D abilities to meet the varying needs and requests of the economy.
2. To advance an improved instructive framework inside which ICTs are broadly sent to encourage the conveyance of instructive services at all degrees of the instructive system.
3. To quicken the improvement of ladies and take out sexual orientation imbalances in instruction business, decision-making through the deployment and misuse of ICTs by building limits and giving chances to women and young ladies.

The formulation of the ICT policy in Ghana has brought some changes in the school curriculum. Some of these changes include the inclusion of ICT as a subject of study in the basic and second cycle school levels. ICT is today taught at the basic school level and is also an examinable subject in the BECE. The subject is also taught in the second cycle level (for first and second year students) but not examinable at this level. The ICT policy has also put pressure on the government to provide the infrastructure that is conducive for ICT use in educational institutions. Many public schools in Ghana have benefited from the provision of either an ICT facility or from the provision of either

laptop or desktop computers. The government of Ghana in 2014 under its program called “the Better Ghana Agenda” developed a program for training students and teachers in the use of ICT with RLG Communications⁷ as the sole distributor of its ICT products.

The government under this program distributed 2,331 laptop computers to teachers in the Central region. This is one example of many beneficiary projects done by the government in Ghana to implement the ICT policy in the country. Although a number of ICT infrastructure have been developed for schools in the country, there are many schools in the country that lack ICT facilities. This lack of ICT facilities has therefore created a huge gap in the distribution of ICT access and uses among students in either the basic or second cycle level. These differences in the availability of ICT facilities has created what social scientists refer to as a digital divide phenomenon. The next topic of discussion in this chapter deals with the digital divide phenomenon.

2.3 Theoretical Review

2.3.1 The Technology Acceptance Model

Developed from the theory of reasoned action (Ajzen & Fishbein, 1980), the technology acceptance model clarifies user acceptance of a technology dependent on client perspectives (Davis, 1989). This model perspectives the causal connections as basically unidirectional, with the environment impacting psychological convictions, which impact mentalities and conduct. It recommends that two explicit conduct convictions, perceived ease of use and perceived usefulness, decide a person's expectation to use technologies. In view of the technology acceptance model, individuals' perceptions with respect to the usability of the Internet will decidedly impact their expectations to keep

on using the Internet. In a meta-analysis of user technology acceptance revealed that perceived ease of use has demonstrated a noteworthy impact on perceived usefulness in most of studies. This proposes users who see the Internet as a simple technology to use will accept that the Internet is helpful. Perceived enjoyment alludes to the degree to which the activity of using technology is seen to be enjoyable in its own right, aside from any performance results that might be envisioned (Lee et al. 2005). Rather than analyzing the effect of web network, this study centers on individuals' aim to keep on using the Internet. Most studies using the technology acceptance model, as called attention to by Venkatesh et al. (2003). Whether Internet knowledge, as well as typical technology acceptance model factors, influence individuals' repeated use of the Internet after their acceptance of it receives little scholarly attention and as a result considered as part of this study.

2.4 Empirical Review

Studies conducted in a private college uncovered that students needed their educators to utilize ICT in their teaching on the grounds that students thought that it was valuable and accepted that it helped them to realize whatever the instructor was instructing (Littlejohn, Margaryan, & Vojt, 2009). Students additionally requested that the school give them better ICT hardware and quicker web availability in their learning class or labs. Students who partook in this exploration concurred with the possibility that ICT improved upgraded academic performance. This study likewise proposed that accessibility, openness and the ability of the clients influence the learning cycle. A study by Littlejohn, Margaryan, & Vojt (2009) conducted at a study with college students and they recognized the hole that existed between students' utilization of technology and how and what they are required to gain from it. This research uncovered

that literature on college students all through their four term degree programme stayed unaltered. This research demonstrated that review practices of students are impacted by their earlier investigation encounters as the outcome didn't show any relationship between students' utilization of ICT and their desires for how they may learn. Omwenga (2005) contends that it is the utilization of ICT as well as the unique situation and the need to apply the instructional method. The restrictions of the utilization of technology additionally relies upon the students and instructor capacity to deal with it and apply in the learning cycle (Khokhar & Javaid, 2016).

McKenzie (2003) considered students and educators impression of ICT use in the learning room and found that the two students and instructors utilized ICT in their regular day to day existences, for both, administration and academic purposes. Dominant part of the instructors and students approach an individual ICT gadget outfitted with web availability and they use it for various purposes from speaking with other too to finishing allocated task by their educators. The study likewise discovered both the instructors and students accepted that ICT is a significant device to amplified learning in classrooms however students accepted that their educators' utilization of ICT was least inventive and students needed their instructors to go past PowerPoint introduction and indicating recordings in the classroom, that is, utilizing ICT to make legitimate instructing and learning classroom encounters. The research likewise featured the requirement for having ICT program in schools as instructors felt that to make the majority of the accessible ICT gadgets; they need preparing and rules from schools as an ICT strategy. This schools took an interest in this examination didn't have clear bearings for educators about what technology to utilize and this brought about the acquisition cycle of ICT tools in educational institution. The educational institution will

purchase ICT tools without talking with educators and not knowing if they can utilize it. The case of this was buying electronic board in educational institutions without obviously setting rules about who should utilize and how this can be utilized. The absence of ICT programme likewise brought about the enlistment strategy of schools as they had not employed an ICT trained individual to help students and instructors. This finding is likewise consistent with all educational institution in Pakistan, regardless of whether state or non-public schools.

Padayachee (2017) contemplated a preview study of ICT usage in South African schools and found that the most every now and again utilized logical sort tools included information projectors and BYODs. Just 16% of educators have never utilized an information projector and 20% have demonstrated that they have never utilized BYODs. These devices are viewed as generally significant and educators have an elevated level of attention to these kinds of apparatuses. Regarding experiential tools: web indexes highlight as prevalent devices. Educators have a serious extent of consciousness of web crawlers and a significant level of significance is appended to them. Just 4% of educators have never utilized a web index. Regarding devices used to share data and thoughts, word processors and introduction type apparatuses are utilized regularly. Just 7% of educators have never utilized a word processing package, while just 9% have never utilized introduction type programming. Apparently online video sharing destinations, for example, YouTube are additionally famous. Regarding intelligent discourse apparatuses; versatile learning instruments and web-based media devices demonstrated exceptionally mainstream.

A minority of instructors (just 20%) showed that they never utilize a versatile learning device while 35% demonstrated that they never utilize an online media device. These apparatuses are adequate to use for technology empowered dynamic learning in the learning room. Thus it might be a helpful venture to profit by the educators' current information bases instead of to present new technologies. Additionally, the research found that an assortment of inventive methodologies were advertised. YouTube can be utilized for an assortment of subjects going from arithmetic and music to writing. Google is valuable for supporting exercises with realities, enigmas, sound, and pictures. BYOD gadgets can be valuable for sharing assets and correspondence. WhatsApp seems, by all accounts, to be a significant device for correspondence while Facebook is suspected to be an indispensable instrument for sharing data, for example, worksheets and memos. Instructors seemed to utilize ICTs all the more oftentimes in their readiness and organization. The conceivable clarification for this is instructors have the foundation at home for those reasons, yet not at school. As to the third inquiry regarding the ICT-related vision of instructors, the most coded terms which were extricated included web indexes, video, intelligent whiteboards, e-learning stages, information projectors, PowerPoint, BYODs and online appraisals.

These devices lean towards utilizing sharing data and thoughts and logical apparatuses which are outfitted more towards inactive learning. While web engines were seen as an experiential instrument for students, instructors saw them more as a methods for getting pictures and information to impart to the students, though the greater part of the devices at the lower part of the rundown (for example least separated code terms) were either experiential devices or intelligent discourse apparatuses. For example, PC games, mailing records, 3D virtual universes, web-based media, designs programming and web

journals had less quantities of references. Plainly educators need to see technologies as an instructive device and not simply an apparatus to convey content inactively. It is apparent that instructors don't have a reasonable vision regarding changing ICTs into instructional method. Thusly, there were a few references to drawing in with communities of practice, for example, instructors, colleges or organizations and including worldwide communities of practice.

On normal the recurrence of use per device type was as per the following: logical devices (41%), sharing data and thoughts devices (29%), experiential instruments (26%) and intelligent discourse apparatuses (18%). The overall significance of hardware types was as per the following: contextual tools (53%), sharing Information and thoughts instruments (41%), experiential devices (36%) and intelligent exchange apparatuses (27%). Apparently the use recurrence of the apparatuses and the general significance joined per device were associated. Apparently technology instruments that were identified with content were favored over academic devices. It is conceivable that instructors are keener on driving the substance of the schedule instead of the experiential and intelligent side of educating. Extant research (Nkula & Krauss, 2014; Msila, 2015) ascribe the absence of self-viability of instructors for the moderate movement to ICT usage in the learning room.

The current research likewise featured this issue, nonetheless, it was minor in contrast with different obstructions raised. Similar to literature (Mooketsi & Chigona, 2014; Mereku & Mereku, 2015; Assan & Thomas, 2012) instructors are okay with utilizing the web and word processors to set up their exercises. Govender & Govender (2014) found that perspectives, for example, website design, electronic assets and conversation

groups, email and electronic references are not generally utilized, which is predictable with the discoveries of the current research. Mereku & Mereku (2015) found that instructors don't utilize ICTs to speak with their students aside from those students who are explicitly considering Information Technology as a subject. In any case, in this investigation it was discovered that an enormous extent of instructors from different branches of knowledge utilized versatile learning applications and web-based media for communication. The pervasive idea of cell phones and online media might be impelling this type of communication among instructors over all fields.

While instructors do show interest, they additionally tell vulnerability in regards to the best way to continue with ICT usage in the learning room. Subsequently instructors are calling for information sharing. Like past investigations (Adu, 2016), the top issues are the absence of framework and the restrictive expenses. The absence of time along with expertise deficiencies additionally seem, by all accounts, to be huge boundaries to utilizing ICT in the learning room. The infrastructure issues and the outstanding tasks at hand of instructors request a similar degree of need. The other significant issue is that students should be focused concerning utilizing ICTs, as they may turn out to be quickly flustered by technology. Thus there is a requirement for rules for ICT utilization for the two educators and students.

Rolf, Knutsson & Ramberg (2019) contemplated an examination of advanced skill as communicated in configuration designs for innovation use in instructing and found that scaled down learning exercises recognized in the plan designs are generally obviously connected with the improvement of students' computerized competency. The composition of designs patterns gives the instructors the likelihood to think about not

just how to utilize technology in the learning environment yet in addition on potential impediments identified with its utilization, for example, the aptitudes required for various digital tools and assets. The overall issue/arrangement situated character of design patterns guides instructors in articulating the issues they see (Winters & Mor, 2008). The outcome demonstrates that instructors expect that their associates and future clients of the plan designs share similar worry for the students' computerized fitness. The outcome affirms the ICILS wherein educators were asked whether they considered the ICT abilities of their students when arranging and completing their instructing (Fraillon et al., 2014).

In their findings, educators unequivocally expressed their interests identifying with students' competency, which is suggested (Beetham, 2013; Fraillon et al., 2014; Littlejohn, Beetham & McGill 2012). The correspondence and coordinated effort region of advanced competency was recognized in practically 50% of the little learning exercises, and data and information education in 33%. Seven scaled down learning exercises were solely intended to improve looking, assessment and imparting data skills, including referring to. Other small scale learning exercises include speaking with the instructor or teaming up with peers. These smaller than expected learning exercises are in this way thought to be advantageous to place into phrasing and offer. Conversely, the region of advanced content creation is considerably less unmistakable in the activities, and the part of wellbeing isn't engaged with any mini-learning action. A clarification can be drawn from the way that instructors partaking in high education are worried about setting up their students for future research. The zone of data and information proficiency accordingly is a fitting need, and different capabilities that might be viewed as vital for EU residents (Vuorikari et al., 2016) are essentially less

applicable, despite the fact that not totally disregarded by the upper optional educators in this research.

Further concerns can likewise be induced from the scaled down learning exercises. Conceptualizing, the assessments of lesson and flipped classroom are instances of exercises that show the point of rousing future clients to exploit innovation that is accessible for learning purposes, and simultaneously to build up the overall commonality of students with different computerized apparatuses and assets. Despite the fact that the three mini-learning exercises proposed for plan pattern three, "The computer is utilized distinctly as a typewriter," are extremely fragmented to have the option to unmistakably anticipate an inventive utilization of computers by future plan design clients, they may welcome educators to investigate methods of using innovation for school work (Prieto et al., 2011). The client of the plan pattern will have the chance to shape the learning action as per their inclination. Given the arranged character of getting the hang of, planning educators can besides not anticipate precisely how a plan example will be utilized, nor how an arranged action will be done. The movement and what occurs during the action will be dynamic and intelligent (Goodyear & Retalis, 2010) and the client of a plan example will decipher it to make it appropriate for the specific situation (Holmberg, 2014).

Scale *et al.* (2019) considered the propensity of ICT use among young adult in Oredo in Nigeria and completely demonstrated that the accessibility and utilization of computers and web supposedly is extremely poor. While numerous schools may flaunt computer lab however just a couple can be seen with web offices/access. This is undoubtedly not a long way from the perspective on Goldman, Cole and Syer (1999),

who asserted that most educational institutions have computer labs, yet there are factors actually blocks web access inside the school climate. Nonetheless, from perception a large portion of the schools computers systems are obsolete. It is basic that elementary schools over the city utilizing Oredo Local Government Area as contextual analysis should attempt to obtain computers for functional and furthermore web access and this will help engage the students instructively. From observational overview, a few schools with computers systems associated with the web keep undergrads from access it. This is against the affirmation that students progressively use the web to do investigate on their own drive, and fulfill their different types of data needs (Smith & Philips, 1999).

The research uncovers that huge numbers of the students have the ability to utilize the web, and these web aptitudes are significantly gained from companions against the instructors who just empower them on its utilization through tasks and other school works that requires the utilization of Internet. Formal abilities are gained through classrooms while casual aptitudes outside classrooms. Nonetheless, the exploration has uncovered that students gain these aptitudes more from companions which to this study is considered as casual. The perspective on this research is in accordance with (Ojoko & Asaolu, 2005) evaluation that 67.9% of the students gained aptitudes through educating by companions, 39.3% through self-instructing while 20.7% procured their abilities by perusing of books.

A few scientists in the course of recent many years have focused on the requirement for educators and guidance to receive the utilization of ICT on kids instruction since it makes exceptional advantages for their future and prosperity (Rodriguez, 2007; Livingstone, 2012). It is a no uncertainty that data drives the world and to be essential

for this worldwide standard it is basic for schools and guidance to withstand the way of life ICT in all part of kids instruction. Further, these mission to push schools, instructors and guidance to grasp ICT in their kids education doesn't preclude the negativities related with it use rather, to make the worldwide affirmation on student prosperity (O'Hara, 2008). The current administration of young adult instruction in this last decade has seen a turnaround in the conventional methodology of educating in a few decades back. The expansion of handheld gadgets has additionally contributed hugely to this turn of events. About 80% schools presently have computer labs where ICT classes and instructing are taken (Bauer & Kenton, 2005).

Students are presently shown the nuts and bolts (prologue) to computers and these cut across booting ON/OFF, creation/sparing of records and essential speed on console keys (Dowlin, 2015). Some have gone a touch more than others in learning some product bundles like word record, dominate, power point, and so on this is an incredible improvement in this last decade among schools youngsters when contrasted with a few decades prior. What ICT has brought to the doorstep of instruction is perpetual. Students presently submit task by means of ICT and the looked into task is sent back to the student through a similar medium (Safford & Stinton, 2016). The positive idea of this innovation is that it offers unlimited assets for students to explore through. This equivalent medium that award admittance to task submission likewise gives intends to getting to the required materials that can help build up the student mental condition of education. A few educators additionally give the connection (site) where these resources can be found.

The energy it offers by means of visual instructing is another part of the various points of interest of ICT (Dowlin, 2015). There are innumerable instructive sites offering internet educating and exercises explicitly intended for essential and auxiliary students (Chu, Tse & Chow, 2011). There is this solid discussion on the impediment of children time with PCs and this could be seen from the developing issue among 21st century kids. Some have ascribed this issue to computer compulsion. The services offer by the ICT for kids are tremendous and kids need to abuse all that they see alluring on the web. Internet gaming destinations and program are likewise central point affecting kids disposition. Kids currently invest a ton of energy playing these games at the weakness to their education (Borgman, 2010). However, PC makes fun yet on wellbeing matter it represents a danger to human life. Long utilization of use of PC can prompt folly. Eyes can get stressed subsequent to gazing for a really long time at the visual display unit (VDU) of the PC.

Martin (2011) appeared in his work that over the top utilization of the PC can prompt stoutness and this is on the grounds that it doesn't make space for customary development. Children that sit for a really long time utilizing PC are probably going to be in danger of stoutness contrast with kids that goes or stroll around. The quantity of jihadist and their rough demonstrations against individual human has increment lately. Reports have indicated that they use ICT as methods for enrolling individuals. Children, who frequently use PC or web, are probably going to be inclined to some brutal webpage that proliferates such inclination. The rough being seen today by the jihadist is presently more advanced in light of the fact that ICT has given them the empowering climate to connect with juvenile. On the off chance that these children are not appropriately screen, they are likely going to accept what they see and watch (Ybarra

& Mitchell, 2018). Another part of worry with student utilizing the ICT offices is the debasing component of erotic entertainment which throughout the years has lead to a negative outcome among juvenile. From crafted by Fisher and Barak (Fisher & Barak, 2001), it could find that kids who invested energy in web watching erotic entertainment are likely going be explicitly fierce to their other gender. Limiting how young adult use ICT ought to be the point of convergence of Schools, instructors and direction in order to acquire the enduring good propensity them (Borgman, 2010).



CHAPTER THREE

METHODOLOGY

3.1 Introduction

The purpose of the study was to find out the usage pattern of Information Communication Technology in second cycle schools. This chapter covers the introduction, research design, population, sample and sampling technique, data collection instrument, data collection procedure, validity and reliability, pilot study, the procedure for the analysis of the data and ethical consideration.

3.2 Research Design

Descriptive research design with quantitative approach was used in this study (Noor & Simiyu, 2020). This study is a quantitative research which aims to find out the usage pattern of Information Communication Technology in second cycle schools. The researcher used quantitative research because quantitative data is best used to understand and explain a research problem. The design enable the researcher to select a probability sample which provided a group of respondents whose characteristics were taken to reflect those of the larger population. The quantitative research enabled the researcher to carefully construct standardized questionnaires which provided data in the same form from all respondents. The study was conducted at senior high schools in Western North Region.

3.3 Population

Population of a study refers to a group of individuals to whom the survey applies. It is the population to which a researcher wants to generalize the results of a study (Muianga, Barbutiu, & Hansson, 2019). The population of the study comprise of all teaching and

non-teaching staff of public senior high schools in Western North Region of Ghana. The total number of senior high schools in Western North Region of Ghana is seventeen (17) with a total of seven hundred and forty (740) teaching and non-teaching staff (Nkrumah, 2020). Out of this population, four hundred and ten (410) were males and three hundred and thirty (330) were females.

3.4 Sample and Sampling Technique

The sample size for the study was three hundred and ten (310) staff of public senior high schools in Western North Region of Ghana. Stratified sampling was used for selecting the sample size from the population. Since there are plenty of males in the population, the majority of males were selected over females for the study. The researcher selected the sample size by calculating a fraction of males over the population ($410/740$) of the sample for men which was one hundred and seventy-two (172) and another fraction of females over the population ($330/740$) of the sample for females which was one hundred and thirty-eight (138).

3.5 Data Collection Instrument

Primary and secondary data were the two source of data used in the research (Saani, 2012). The study used primary data for the study because data from articles and journals were the main source of data used for this study. The study used questionnaire in gathering the data for studying the issue under investigation. The researcher used questionnaire as an instrument because it enabled the researcher to unearth relevant information from the target population in order to better understand the context of the study. Also, data collected through this instrument was easily analyzed. The questionnaire for the respondents was close-ended items. The items were structured

systematically and coherently. Simple sentences were used for the wording such that respondents could understand the instructions. Five point Likert-type scales were given ranking from '1' to '5'- from 'strongly disagree' to 'strongly agree' questions.

3.6 Data Collection Procedure

Data was gathered by the utilization of a structured questionnaire which was designed using Microsoft word and administered to teaching and non-teaching staff of public senior high schools in Western North Region of Ghana (Saani, 2012). Data was collected within a period of three weeks. The researcher introduced himself to the teaching and non-teaching staff of public senior high schools in Western North Region of Ghana per a letter. The researcher introduced the study to the teaching and non-teaching staff of public senior high schools in Western North Region of Ghana before they were used for the study. The researcher distributed four hundred questionnaire to the participants who were teaching and non-teaching staff of public senior high schools in Western North Region of Ghana, although the participants for the study were three hundred and ten. This was to ensure that data collected to be encoded in SPSS for analysis is accurate.

3.7 Validity

Validity refers to the extent to which a test measure what we actually want to measure (Ngitoria, 2014). To ensure the questions validity, the preliminary questionnaire was given to course mates and other colleagues to read through and offer suggestions for revision. Appropriate suggestions given were taken and the questionnaire restructured accordingly. It was finally viewed by researchers' supervisor who read through and ensured that the necessary suggestions and corrections are done.

3.8 Reliability

Reliability is a measure of the degree to which research instruments yield consistent results after repeated trial (Ngitoria, 2014). The researcher sent twenty questionnaire to the teaching and non-teaching staff of Kukuom Anglican senior high school in Bono Region of Ghana as a pilot study and statistically coded it into SPSS and reliability test was done to check how reliable the items in the questionnaire are. The researcher chose teaching and non-teaching staff of Kukuom Anglican senior high school in Bono Region of Ghana because they are not in the region where the study was conducted. Thus, participants in a pilot study are not recommended to take part in the main survey. Hence, the reliability test was .809.

3.9 Pilot Study

Pilot study is a crucial part before asking the respondents to fill out the questionnaires, and there are numerous benefits for carrying out pilot tests (Riemenschneider, Leonard, & Manly, 2019). Apart from assuring the validity and the reliability of the questionnaire, it can also ensure that the questions are clearly worded, and that the respondents understand the questionnaire in the right way. The researcher sent twenty questionnaire based on the purpose of the study to the teaching and non-teaching staff of public senior high schools in Western North Region of Ghana to administer. The researcher gathered the answered questionnaires and coded it in SPSS to check the reliability of each of the item in the questionnaire. The Cronbach's Alpha was .809.

3.10 Data Analysis Procedure

Data collected were edited by carefully inspecting it in order to identify the mistakes and questions wrongly answered and responded to items. Analysis of the data was done through the use of the Statistical Package for Social Sciences (SPSS) version 22 (Baran, Bilici, Sari, & Tondeur, 2019). Descriptive analysis was used to discuss the importance of using ICT in teaching and learning at senior high schools in Western North Region of Ghana and the use of ICT at senior high schools in Western North Region of Ghana. Inferential statistics was used to examine the effects of ICT usage on students' academic work at senior high schools in Western North Region of Ghana.



CHAPTER FOUR

RESULTS AND INTERPRETATION

4.1 Introduction

This study was purposely to find out the usage pattern of Information Communication Technology in second cycle schools. This section included demographic characteristics of respondents, answers to the research questions, and discussion of findings.

4.2 Respondents' Demographic Characteristics

For this study, the demographics of the respondents are age, gender, qualification, type of employment, and work experience in this organization.

4.2.1 Age

Figure 1 shows that twenty-four of the respondents representing 7.7% are below 22 years, one hundred and eighty of the respondents representing 58.1% are 22 years or 42 years or between, one hundred and two of respondents representing 32.9% are 43 years or 60 years or between, and four of the respondents representing 1.3% are 60 years and above.

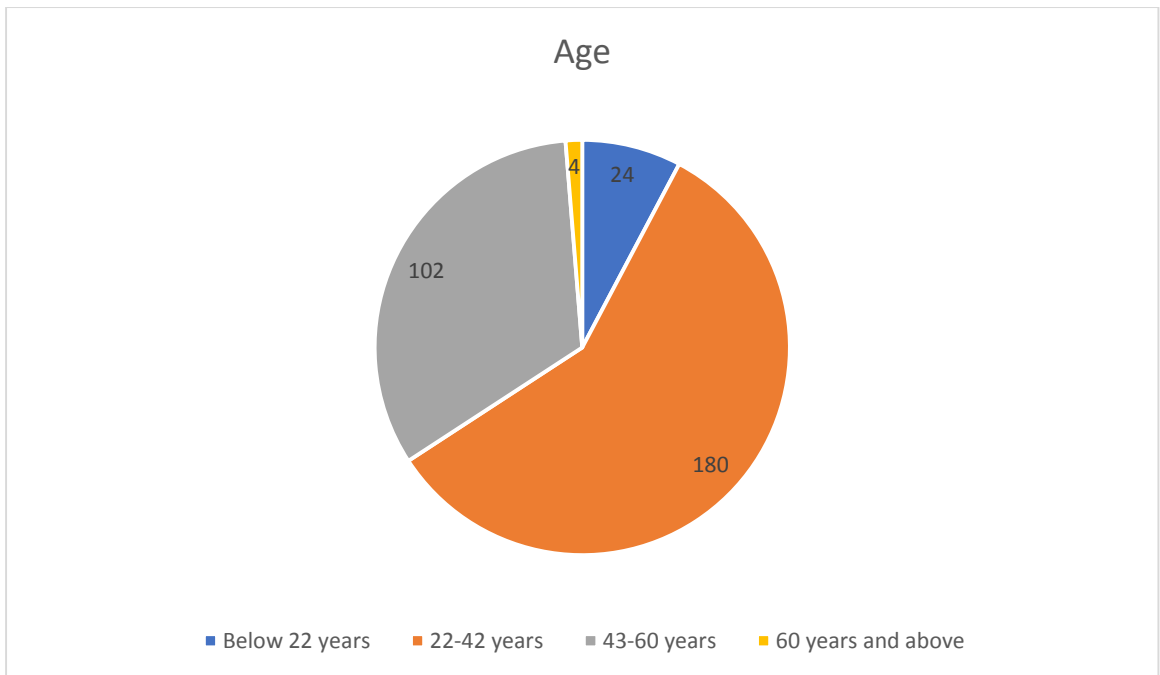


Figure 1: Age of respondents

Source: Researchers' field survey, 2021

4.2.2 Gender

Figure 2 shows that two hundred and fourteen of the respondents representing 69% are males and ninety-six of the respondents representing 31% are females.

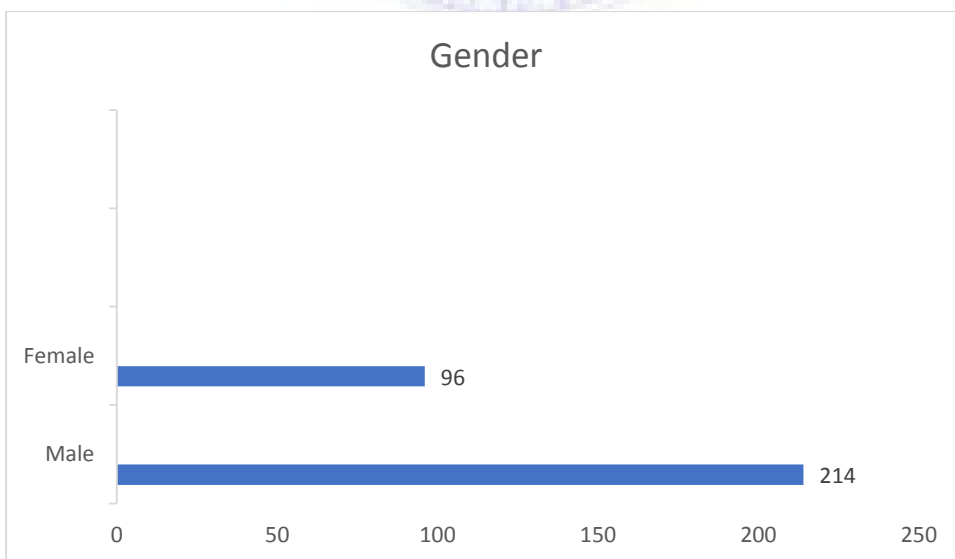


Figure 2: Gender of respondents

Source: Researchers' field survey, 2021

4.2.3 Qualification

Figure 3 shows that twenty-three of the respondents representing 7.4% are holding a Diploma certificate, two hundred and eight of the respondents representing 67.1% are holding a Bachelor's Degree certificate, forty-nine of the respondents representing 15.8% are holding a Master's Degree certificate, and thirty of the respondents representing 9.7% are holding other certificates.

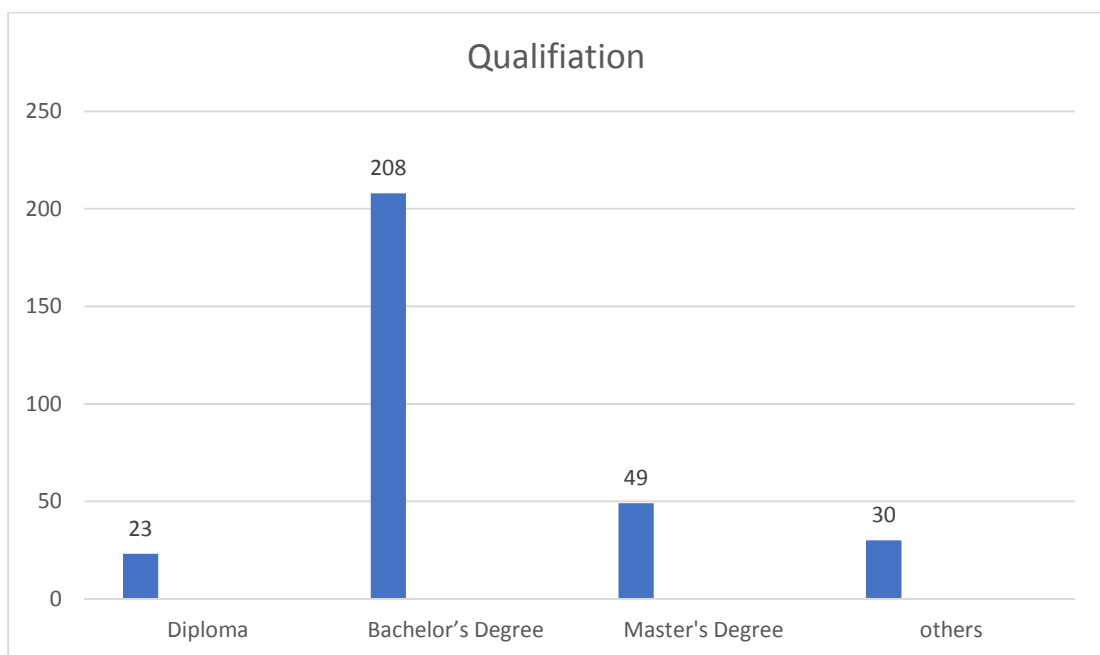


Figure 3: Qualification of respondents

Source: Researchers' field survey, 2021

4.2.4 Type of employment

Figure 4 shows that ten of the respondents representing 3.2% are part-time workers, none of the respondents representing 0% is contract workers, and three hundred of the respondents representing 96.8% are permanent workers.

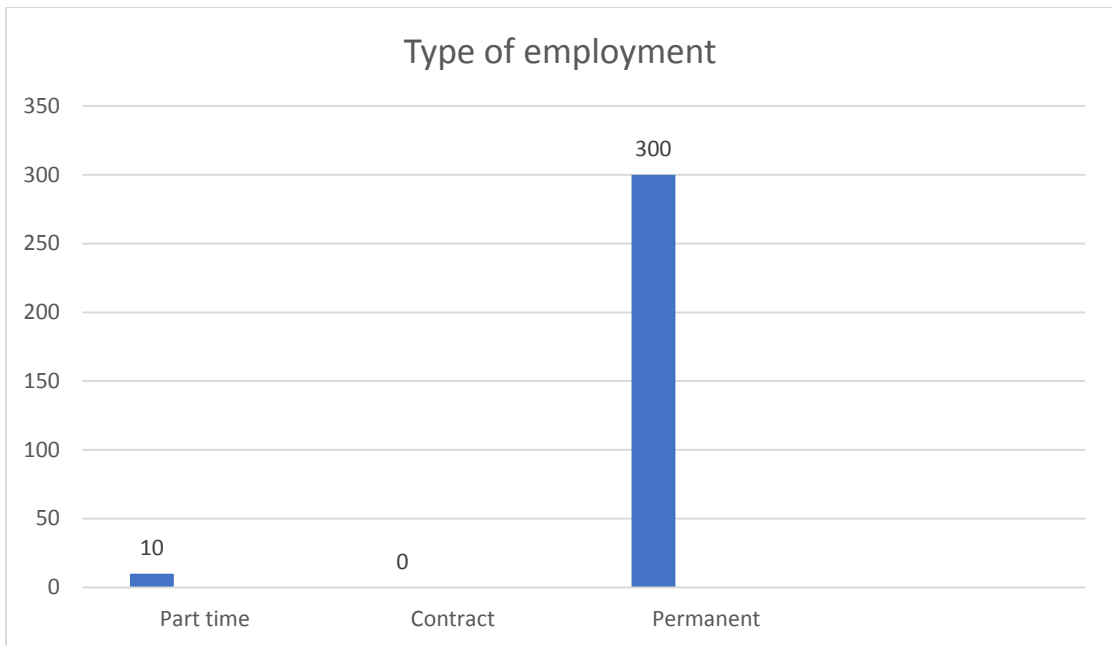


Figure 4:: Type of employment of respondents

Source: Researchers' field survey, 2021

4.2.5 Work experience in this organization

Figure 5 shows that nine of the respondents representing 2.9% have less than 3 years' work experience, sixty of the respondents representing 19.4% have 3-7 years' work experience, one hundred and twenty of the respondents representing 38.7% a have 8-15years' work experience, and one hundred and twenty-one of the respondents representing 39% have 15 years and above work experience.



Figure 5: Work experience of respondents

Source: Researchers' field survey, 2021

4.3 Importance of using ICT in Teaching and Learning

Table 1 below shows that the use of ICT motivates learning had the highest mean of 2.5707. This shows that other ICT motivates learning. The next highest factors are an integration of ICT plays a major role in curriculum development and the use of ICT promotes inclusion among students with the second-highest mean of 2.5598. The next importance is the use of ICT enhance higher-order thinking skills with a fourth-highest mean of 2.5380. The next importance is the use of ICT promotes collaboration with a fifth-highest mean of 2.4973. The next importance is the use of ICT allows for effective differentiation instruction with technology with a sixth-highest mean of 2.4755. The next importance is the use of ICT improves ICT Capability and ICT literacy with a seventh-highest mean of 2.3207. The next importance is that ICT in education enhances knowledge retention and engagement with an eighth-highest mean of 2.2255. The next importance is the use of ICT promotes subject learning with a ninth-highest mean of 1.9946. The next importance is for online learning with the last mean of 1.8668.

Table 1: Importance of using ICT in teaching and learning

S/N	N	Minimum	Maximum	Mean	Std. Deviation
For online learning	310	1.00	4.00	1.8668	.86481
The use of ICT promotes inclusion among students	310	1.00	5.00	2.5598	1.09580
The use of ICT enhance higher-order thinking skills	310	1.00	5.00	2.5380	1.02219
The use of ICT promotes subject learning	310	1.00	5.00	1.9946	1.00948
The use of ICT improves ICT Capability and ICT literacy	310	1.00	5.00	2.3207	1.11243
ICT in education enhances knowledge retention and engagement	310	1.00	5.00	2.2255	.91055
The use of ICT promotes collaboration	310	1.00	5.00	2.4973	1.03086
The use of ICT allows foreffective differentiation Instruction with technology	310	1.00	5.00	2.4755	1.02261
The use of ICT motivates learning	310	1.00	5.00	2.5707	1.07506
Integration of ICT plays a major role in curriculum development	310	1.00	5.00	2.5598	1.06298

Source: Researchers' field survey, 2021

4.4 The use of ICT in Senior High Schools

Table 2 below shows that ICT used for file sharing (e.g. Dropbox) had the highest mean of 3.0571. This shows that ICT usage in the senior high school is used for file sharing (e.g. Dropbox). The next highest factor is that ICT usage in the senior high school is used for teaching and learning with a second highest mean of 2.8451. The next highest factor is that ICT usage in the senior high school is used for learning using internet-based learning platform (e.g. ANGEL, Moodle, Blackboard etc.) with the third-highest mean of 2.8342. The next factor is that ICT usage in the senior high school is used for online examinations/tests with a fourth-highest mean of 2.8207. The next factor is that

ICT usage in the senior high school is used for chatting with a fifth-highest mean of 2.7283. The next factor is that ICT usage in the senior high school is used for project work with a sixth-highest mean of 2.6957.

The next factor is that ICT usage in the senior high school is used for printing questions with a seventh-highest mean of 2.4973. The next factor is that ICT usage in the senior high school is used for browsing. The next factor is that ICT usage in the senior high school is used for designing software with a tenth-highest mean of 2.3804. The next factor is that ICT usage in the senior high school is used for educational computer games with eleventh-highest mean of 2.0924. The next factor is that ICT usage in the senior high school is used for entertainment with a twelfth-highest mean of 2.0163. The next factor is that ICT usage in the senior high school is used for research with the last mean of 2.0082.

Table 2: Descriptive Statistics for ICT tools

	N	Minimum	Maximum	Mean	Std. Deviation
Research	310	1.00	4.00	2.0082	.82034
Entertainment	310	1.00	5.00	2.4212	1.08207
Project work	310	1.00	5.00	2.6957	1.07221
Use of ICT for teaching and learning	310	1.00	5.00	2.8451	1.10507
Chatting	310	1.00	5.00	2.7283	1.19356
Browsing	310	1.00	5.00	2.0163	.75986
Printing questions	310	1.00	5.00	2.4973	.92202
Designing software	310	1.00	5.00	2.3804	.81662
For learning using internet-based learning platform (e.g. ANGEL, Moodle, Blackboard etc.)	310	1.00	5.00	2.8342	1.13753
File sharing (e.g. Dropbox)	310	1.00	5.00	3.0571	1.02795
Educational computer games	310	1.00	5.00	2.0924	.76514
Online examinations/tests	310	1.00	5.00	2.8207	1.17902

Source: Researchers' field survey, 2021

4.5 Effects of ICT usage on Students' Academic Work

The effects of ICT usage on students' academic work was analyzed using regression analysis as shown in table 4 and 3. From the R Square in table 4 the value is .359 which is greater than .3 and is considered as a good fit. The R square from table 4 is .129 which means that the effects of ICT usage in teaching and learning account for only 35.9% of the variation in students' academic work. Therefore 64.1% of the variation in students' academic work is explained by other factors. So the effects of ICT usage in teaching and learning explain almost all of the factors that explain students' academic work. Also, a positive correlation of .359 means that the more ICT is used in teaching and learning the more students' academic work is improved. The significant value from table 3 of ANOVA is .000 which is below .001 and .005. This indicates that there is a statistically significant effect of ICT usage in teaching and learning in students' academic work.

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.006	1	8.006	54.204	.000 ^b
	Residual	54.057	366	.148		
	Total	62.062	367			

Source: Researchers' field survey, 2021

Table 4: Effects of ICT usage on students' academic work

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.359 ^a	.129	.127	.38431

Source: Researchers' field survey, 2021

4.6 Discussion of Findings

This section discusses findings based on the three objectives of this study.

4.6.1 Importance of using ICT in teaching and learning

The study revealed that the use of ICT motivates learning had the highest mean of 2.5707. This shows that other ICT motivates learning. The study is similar to that of Lee et al. (2005). The next highest factors are an integration of ICT plays a major role in curriculum development and the use of ICT promotes inclusion among students with the second-highest mean of 2.5598. The study is similar to that of Littlejohn, Margaryan, & Vojt (2009). The next importance is the use of ICT enhance higher-order thinking skills with a fourth-highest mean of 2.5380. The study is similar to that of Omwenga (2005) and Khokhar & Javaid (2016). The next importance is the use of ICT promotes collaboration with a fifth-highest mean of 2.4973. The study is similar to that of Padayachee (2017). The next importance is the use of ICT allows for effective differentiation instruction with technology with a sixth-highest mean of 2.4755. The study is similar to that of Nkula & Krauss (2014). The next importance is the use of ICT improves ICT Capability and ICT literacy with a seventh-highest mean of 2.3207. The study is similar to that of Msila (2015) and Mooketsi & Chigona (2014). The next importance is that ICT in education enhances knowledge retention and engagement with an eighth-highest mean of 2.2255. The study is similar to that of Mereku & Mereku (2015) and Assan & Thomas (2012). The next importance is the use of ICT promotes subject learning with a ninth-highest mean of 1.9946. The study is similar to that of Govender & Govender (2014). The next importance is for online learning with the last mean of 1.8668. The study is similar to that of Mereku & Mereku (2015).

4.6.2 The use of ICT in senior high schools

The study shows that ICT used for file sharing (e.g. Dropbox) had the highest mean of 3.0571. This shows that ICT usage in the senior high school is used for file sharing (e.g. Dropbox). The study is similar to that of Adu (2016). The next highest factor is that ICT usage in the senior high school is used for teaching and learning with a second highest mean of 2.8451. The study is similar to that of Rolf, Knutsson & Ramberg (2019). The next highest factor is that ICT usage in the senior high school is used for learning using internet-based learning platform (e.g. ANGEL, Moodle, Blackboard etc.) with the third-highest mean of 2.8342. The study is similar to that of Dowlin (2015) and Borgman (2010). The next factor is that ICT usage in the senior high school is used for online examinations/tests with a fourth-highest mean of 2.8207. The study is similar to that of Martin (2011) and Fraillon et al. (2014). The next factor is that ICT usage in the senior high school is used for chatting with a fifth-highest mean of 2.7283. The study is similar to that of Beetham (2013). The next factor is that ICT usage in the senior high school is used for project work with a sixth-highest mean of 2.6957. The study is similar to that of Fraillon et al. (2014).

The next factor is that ICT usage in the senior high school is used for printing questions with a seventh-highest mean of 2.4973. The study is similar to that of Littlejohn, Beetham & McGill (2012). The next factor is that ICT usage in the senior high school is used for browsing. The study is similar to that of Scale *et al.* (2019). The next factor is that ICT usage in the senior high school is used for designing software with a tenth-highest mean of 2.3804. The study is similar to that of Rodriguez (2007). The next factor is that ICT usage in the senior high school is used for educational computer games with eleventh-highest mean of 2.0924. The study is similar to that of Livingstone

(2012). The next factor is that ICT usage in the senior high school is used for entertainment with a twelfth-highest mean of 2.0163. The study is similar to that of Littlejohn, Margaryan, & Vojt (2009). The next factor is that ICT usage in the senior high school is used for research with the last mean of 2.0082. The study is similar to that of Padayachee (2017) and Nkula & Krauss (2014).

4.6.3 Effects of ICT usage on students' academic work

The study found that the R Square in table 4.4 the value is .359 which is greater than .3 and is considered as a good fit. The R square from table 4.4 is .129 which means that the effects of ICT usage in teaching and learning account for only 35.9% of the variation in students' academic work. The study is similar to that of Mereku & Mereku (2015) and Assan & Thomas (2012). Therefore 64.1% of the variation in students' academic work is explained by other factors. So the effects of ICT usage in teaching and learning explain almost all of the factors that explain students' academic work. Also, a positive correlation of .359 means that the more ICT is used in teaching and learning the more students' academic work is improved. The study is similar to that of Rolf, Knutsson & Ramberg (2019). The significant value from table 4.3 of ANOVA is .000 which is below .001 and .005. This indicates that there is a statistically significant effect of ICT usage in teaching and learning in students' academic work. The study is similar to that of Scale *et al.* (2019).

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

The purpose of the study was to find out the usage pattern of Information Communication Technology in second cycle schools. The chapter constitutes the summary, conclusion, and recommendations.

5.2 Summary

The study revealed that the use of ICT motivates learning had the highest mean of 2.5707. This shows that other ICT motivates learning. The next highest factors are an integration of ICT plays a major role in curriculum development and the use of ICT promotes inclusion among students with the second-highest mean of 2.5598. The last importance is for online learning with the last mean of 1.8668. The study found that ICT used for file sharing (e.g. Dropbox) had the highest mean of 3.0571. This shows that ICT usage in the senior high school is used for file sharing (e.g. Dropbox). The next highest factor is that ICT usage in the senior high school is used for teaching and learning with a second highest mean of 2.8451. The last factor is that ICT usage in the senior high school is used for research with the last mean of 2.0082. The study shows that the R Square in table 4.4 the value is .359 which is greater than .3 and is considered as a good fit. The R square from table 4.4 is .129 which means that the effects of ICT usage in teaching and learning account for only 35.9% of the variation in students' academic work. Therefore 64.1% of the variation in students' academic work is explained by other factors. So the effects of ICT usage in teaching and learning explain almost all of the factors that explain students' academic work. Also, a positive correlation of .359 means that the more ICT is used in teaching and learning the more

students' academic work is improved. The significant value from table 4.3 of ANOVA is .000 which is below .001 and .005. This indicates that there is a statistically significant effect of ICT usage in teaching and learning in students' academic work.

5.2 Conclusion

The study revealed that the use of ICT motivates learning had the highest mean of 2.5707. This shows that other ICT motivates learning. The study found that ICT used for file sharing (e.g. Dropbox) had the highest mean of 3.0571. The study shows that the effects of ICT usage in teaching and learning explain almost all of the factors that explain students' academic work. The study concluded that there is a statistically significant effect of ICT usage in teaching and learning in students' academic work.

5.3 Recommendation

It is recommended that stakeholders should supply teaching and non-teaching staff of public senior high schools in Western North Region of Ghana with a rack, laptop computers, tablets, projectors, routers, internet servers, printer, uninterrupted power supply, power inverter, desktop computers, and solar panels. These will aid in teaching and learning. Also, since 64.1% of the variation in students' academic work is explained by other factors, the study recommends that future studies should look into those factors.

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APPENDIX A
QUESTIONNAIRE

Dear respondent, this questionnaire is designed to gather data about the usage pattern of Information Communication Technology in second cycle schools. This research project is conducted by a UEW-K Masters’ student and your kind cooperation in this research is very much appreciated. Your anonymity and confidentiality are assured.

SECTION A: YOUR PERSONAL DATA

Please indicate your response to statements by ticking [] the appropriate box.

1. Age: Below 22 years [] 22-42 years [] 43-60 years [] 60 years and above []
2. Gender: Male [] Female []
3. Qualification: (Highest): Diploma [] Bachelor’s Degree [] Master's Degree []
others specify.....
4. Type of employment: Part time [] Contract [] Permanent []
5. Work experience in this organization: Less than 3 years [] 3–7 years [] 8–15 years [] 15 years and above []

SECTION B: IMPORTANCE OF USING ICT IN TEACHING AND LEARNING

How often do you use the following digital technologies (i.e. digital media, e-learning tools, online services and digital devices) in your teaching process? Please use this five likert scale; 1 = strongly agree a day, 2 = agree, 3 = slightly agree, 4 = disagree 5 = strongly disagree.

S/N	Statement	1	2	3	4	5	6
1.	For online learning						
2.	The use of ICT promotes inclusion among students						
3.	The use of ICT enhance higher-order thinking skills						

4.	The use of ICT promotes subject learning							
5.	The use of ICT improves ICT Capability and ICT literacy							
6.	The use of ICT promotes collaboration							
7.	The use of ICT motivates learning							
8.	ICT in education enhances knowledge retention and engagement							
9.	The use of ICT allows for effective <u>d</u> ifferentiation Instruction with technology							
10.	Integration of ICT plays a major role in curriculum development							

Source: Twenty items adopted from(Padayachee, 2017).

SECTION D: ICT USAGE BY STUDENTS

Students use ICT for the following. Please use this five likert scale; 1 = strongly agree a day, 2 = agree, 3 = slightly agree, 4 = disagree 5 = strongly disagree.

S/N	Statement	1	2	3	4	5	6
1	Research						
2	Entertainment						
3	Project work						
4	Chatting						
5	Browsing						
6	Printing questions						
7	Designing software						
8	For learning using internet-based learning platform (e.g. ANGEL, Moodle, Blackboard etc.)						
9	File sharing (e.g. Dropbox)						
10	Online examinations/tests						
11	Educational computer games						
	Use of ICT by teacher during lecture						

Source: Nine items adopted from (Fleischer, 2015).

SECTION E: EFFECTS OF ICT USAGE ON STUDENTS' ACADEMIC WORK

Please use this five likert scale; 5 = strongly agree, 4 = agree, 3 = slightly agree, 2 = disagree, 1 = strongly disagree. Tick as appropriate.

S/N		1	2	3	4	5
1	Students' perform well in their academic performance when ICTs are used appropriately to complement a teacher's existing pedagogical philosophies					
2	ICT transforms teaching and learning processes from being highly teacher-dominated to student-centered, and that this transformation will result in increased learning gains for students, creating and allowing for opportunities for communication skills, development of learners' creativity, informational reasoning skills, and problem-solving abilities.					

THANK YOU.