

**UNIVERSITY FOR DEVELOPMENT STUDIES**

**THE EFFECTS OF INFORMATION AND COMMUNICATION TECHNOLOGY  
USAGE ON STUDENTS IN THE EAST MAMPRUSI DISTRICT OF NORTHERN  
REGION, GHANA**

**IDDRISU SHAIBU**

**Thesis Submitted to the Faculty of Integrated Development Studies, University for  
Development Studies in Partial Fulfilment of the Requirement for the Award of**

**Master of Philosophy Degree in**

**Development Studies**



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DEVELOPMENT STUDIES**



**Student**

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere:

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## ABSTRACT

The study examined the effects of ICT usage on the academic performance of students in the East Mamprusi District (EMD) of Northern Region, Ghana. It sought to establish the availability and access to ICT tools, pattern of use, students' level of competence as well as how ICT use affects their studies. The survey method was used to sample the views of 292 respondents selected from four schools including two Senior High Schools and two Colleges of Education and Health in the district. The respondents comprised Students, Teachers, Parents and internet café attendants. The study found that, students had restricted access to ICT tools due to the limited number of ICT tools in school. Students used ICT mainly for acquiring ICT skills, communication and entertainment purposes. Student had basic knowledge in ICT competence. However, there was no significant impact of ICT usage on students in the EMD. Boys were found to be more competent and used ICT for entertainment and communication purposes while girls were found to be less competent in ICT but used it more for academic purposes. Students faced numerous challenges including lack of internet connectivity, poor electricity supply among others. Based on the findings the researcher recommends that, government, educators and all stakeholders in the education sector should collaborate to improve on availability and access to ICT tools in SHS and Colleges in the EMD and Ghana in general.



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## DEDICATION

This work is dedicated to my late Sister DiboAyishatu (May her soul rest in peace), my dear wife AbdulaiFatimata and my lovely children Wuntima, Wunnam, Chentima and Mankubasi.

Not forgetting my Mom MemunatuWuni and my Dad ShaibuBaako.



## LIST OF ACRONYMS

BECTA	British Educational Communications and Technology Agency
DfES	Department of Education and Skills
DVD	Digital Video Disk
EMD	East Mamprusi District
GES	Ghana Education Service
GeSCI	Global e-Schools and Communities Initiative
GIFEC	Ghana Investment Fund for Electronic communications
GNAG	Ghana News Agency
GSS	Ghana Statistical Service
ICT4AD	Information and communication Technology for Accelerated Development
ICT	Information and Communication Technology
ITU	International Communication Union
JHS	Junior High School
ISPs	Internet Service Providers
LDCs	Least Developed Countries
MoE	Ministry of Education
MTN	Milicom Communication Network
NCA	National Communication Authority
NTP	National Telecommunication Policy
PISA	Programme for International Students
PWD	Public Works Department
RIA	Research ICT Africa
SHS	Senior High School



UN United Nations [www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh)

UNESCO United Nations Educational, Scientific, and Cultural Organisation

WASSCE West African Senior School Certificate Examination

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## **1.1.Introduction**

Information and Communications Technology (ICT) involves the use of computer hardware, software and telecommunication devices to store, manipulate, convert, protect, send and receive data (Ansah, *et al.*,2012). Technological tools such as computers, mobile phones and the internet have made it easier for professionals to collect, store, manipulate and share data and information both individually and within organizations. ICT has become an integral part of human daily activities to the effect that sometimes we barely notice it. This has in no doubt had a major impact on the way we live, learn, work and play (Ansah *et al.*,2012).

The diverse and evolving nature of available ICT equipment and applications is such that measurement of what they can do at any point in time is likely to quickly become irrelevant. According to ITU (2008) there is a natural separation of ICT into ‘old’ and ‘new’ technologies, with the latter including the mobile phone, the computer and the internet, while the former includes, fixed-line telephones, the radio and the television. Notwithstanding the importance of older technologies, especially in a developing country like Ghana, this study focused on the effects of ‘new’ ICT usage on students in the East Mamprusi District (EMD) of Northern region, Ghana.

## **1.2.Background**

As more and more people join the global information society and high-speed communication, measurement of ICT development remains as relevant as ever. The rapid diffusion of computers, internet and mobile phone use have been constant in the global landscape over the past two decades. Estimates from the ITU (2005) World Telecommunication indicators suggest that, the world personal computer penetration (the number of PCs per 100 people) rose from 4.2 in 1995 to more than 12 in 2004. The dispersion of information technology use to the developing countries has also been remarkable. For the least developed countries



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(LDCs), there were only six computers per 1000 people. The computer/population ratio however, climbed to 3.7 computers per 100 people in 2004. Despite this rapid rate of penetration in developing countries, a large digital divide remains between the developed and developing world. This gap is especially pronounced in African countries. In Nigeria forexample, there were 0.68 computers users per 100 people in 2004. On the other hand, some developing countries have much higher rates. Among the developing countries with the highest penetration rate were Brazil and Mexico (11 per 100 people respectively). Generally, there exists a substantial amount of variation in rates of technology use between developed and developing countries and even across the set of developing countries(Chinn & Fairlie, 2010).

The Research ICT Africa (RIA)2012 survey indicates that, as at the year 2012,only 10% of Ghanaians had ever used a computer, a level of individual computer use far behind that of the RIA respondents in South Africa which stood at 26.7% computer use and Cameroon (15.1%), but better than Tanzania's1.9% computer use (Frempong, 2012). The 2010 Population and Housing Census (GSS, 2013) on the other hand revealed that, 7.9% of the households in Ghana owned a desktop/laptop computer.

According to the ITU(2013),over 2.7 billion people were using the Internet in2013; thiscorresponds to 39% of the world's population. In the developing world, 31% of the population is online compared with 77% in the developed world. Europe is the region with the highest internet penetration rate in the world (75%), followed by the Americas (61%). Only 16% of the people in Africa were using the Internet which is only half the penetration rate of Asia and the Pacific. Latest data on global ICT trends by theITU(2015)shows that, 3.2 billion people will be using the Internet by the end of 2015 with 2 billion of the number coming from the developing countries. The data adds that, for every Internet user in the developed world there are 2 in the developing world. However, 4 billion people from





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developing countries remain offline, representing 2/3 of the population residing in developing countries. Of the 940 million people living in the least developed countries LDCs, only 89 million use the internet, corresponding to 9.5% penetration rate. The proportion of households with Internet access at home globally increased from 18% in 2005 to 46% in 2015 (ITU, 2015).

Boateng (2012) established that, the use of computers in Ghana have increased tremendously, while the numbers of Internet Service Providers (ISPs) have also increased. At the end of 2008, the National Communications Authority (NCA) had licensed a total of 114 companies to provide Internet services in the country. Out of these, only 36 had actually commenced business (NCA, 2008). This therefore portrays a relatively low internet penetration rate in Ghana. However, statistics available from the (ITU, 2011) indicate that, the number of internet users in Ghana increased from 30,000 in 2000 to 1, 297,000 in 2011. Even though the increment in terms of absolute figures was encouraging, the penetration rate was 5.2%. This was lower than the African average rate of 11.5% (Frenpong, 2012).

The 2010 Population and Housing Census on the other hand, recorded 1,312,971 users of internet facilities out of 16,886,306 population 12 years and above in Ghana. This indicates that, only 7.8% of the population 12 years and older had access to internet. The report further revealed that there were marked regional differentials in access to internet facilities. The highest percentage of internet users in the country was 42.3%, resided in the Greater Accra region followed by Ashanti region (22.5%), with the lowest in Northern region (2.4%), Upper East region (1.2%) and Upper West region (1.1%) (GSdS, 2013). The report further indicated that, less than one per cent (0.8%) of the population in the EMD had internet access.

According to ITU (2013), there were almost as many mobile-cellular subscriptions as people in the world in 2013 with more than half of the subscribers coming from the Asia-Pacific



region (3.5 billion) out of 6.8 billion total global subscriptions. The report added that, as global mobile-cellular penetration approaches 100% and market saturation reached, growth rates have fallen to their lowest levels in both developed and developing countries. The report also indicates that, mobile-cellular penetration rates globally stand at 96% with 128% in developed countries and 89% in developing countries (ITU 2013).

ITU's (2015) estimate on the other hand suggests that, by the end of 2015 there will be more than 7 billion mobile cellular subscriptions globally. This will correspond to a penetration rate of 97%, up from 738 million in 2000. Mobile broadband is said to be the most dynamic market segment and its penetration has reached 47% in 2015, an increase of 12 times since 2007 (ITU, 2015).

As at December 1990 there were only 8.6 million subscribers of mobile telephone in Africa. These subscribers were mostly located in the North African countries and South Africa. At that time, Norway had more telephone subscribers than all of the Sub-Saharan Africa. As at then, not one African country was connected to the internet but for about two decades now the situation is radically different with all African countries having mobile networks in operation and internet connectivity (ITU, 2008).

The first cellular phone service was introduced in Ghana in 1992, with an initial 19,000 Ghanaians owning mobile phones. The figure shot up to 43,000 in 1998 after the process of deregulation of the telecom sector began in 1997. By the end of 2000, the monopoly by Mobitel was broken by three other mobile phone operators: Spacefone, Onetouch and Westel, which competed for cellular customers and subscribers numbering 132,000. Spacefone is now MTN, while OneTouch and Westel are now Vodafone and Airtel respectively (Graphic Online, 2013)

The NCA (2013) indicate that, there were six mobile phone service providers as of February 2012, with about 20,773,563 subscribers. The total number of active mobile phone lines in



Ghana as of November 2012 according to [www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh) NCA(2013) stood at 25,344,745. This was marginally higher than the population of Ghana which stands at 25,241,998 NCA. Ghana's 2010 Population and Housing Census report on the other hand shows that, while 43.1% of the urban population 12 years and older owns mobile phones, only 12.1% of the rural population owns mobile phones. The report adds that, of all the administrative districts in the Northern region, Tamale Metropolis has the highest urban and rural ownership rates of 56.9% and 35.7% respectively. Karaga has the lowest proportion of urban ownership (17.1%) while the East Mamprusi district has the lowest (5.7%) level of rural ownership of mobile phones (GSS, 2013).

The rapid development of ICT, as discussed above, is one of the most fascinating phenomena characterising the Information Age. ICT powers our access to information, enables new forms of communication, and serves many online services in the spheres of commerce, culture, entertainment and education. Tapscott (1998) claimed that for the first time in history, children are more comfortable, knowledgeable, and literate than their parents about an innovation central to society's functioning. These children and youngsters according to the report are already members of the "Net-Generation", and they will use digital media to develop and impose the digital culture on the rest of society. Indeed, the penetration of digital media has been greatest among households with children. Currently, about two out of three households with children in the US are using computers and about 40% have internet connectivity. Computers and internet do not only give children powerful intellectual tools, they also shape their thinking about their own selves and their social environment such as personal identity, interpersonal relationships and sexuality (Turkle, 1995).

Despite these potentials, the educational systems in developing countries seem unprepared to cope with the pace of these transformations, as the majority of which are taking place outside the school (Rafiet *al.*, 2009). Educators are of the belief that, ICT can help children develop



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their competencies already in their early years if it is used appropriately. A number of researchers concerned with the proliferation of ICT have proved that new technologies considerably influence young children's lives (Ivan, 2010). Recognising this, educational institutions try to restructure their educational programs and classroom facilities in order to minimise the teaching and learning technology gap between developed and the developing countries. This restructuring process is providing learners with knowledge of specific subject areas to promote meaningful learning and to enhance professional productivity (Amenyadzi *et al.*, 2011).

Syed (2013) indicated that, integrating ICT into teaching and learning process can contribute to increased interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers. This gives way to new scenarios which favour both individual and collaborative learning. Syed (2013) further added that, the use of ICT in educational settings by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICT for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools, the influence of the technology on supporting how students learn will continue to increase.



According to Malcolm and Godwyll (2009), the introduction of ICT in educational institutions has had beneficial impact on both students and their teachers. ICT enhances the learning process as students gather information on subject based courses on the internet, radio and on television and use as extra reference materials that help to deepen their understanding of the subjects being taught in the classrooms. The study adds that, the introduction of ICT in school has brought about higher order thinking skills among students where their computer skills have been enhanced and have resulted in the use of those skills in other areas of

discipline such as online collaborative learning projects which have enhanced their global awareness and knowledge of other cultures.

### 1.3.Problem Statement

*“In modern day education, students are not supposed to be confined only within the learning in a classroom context. They are expected to explore the vast horizon of knowledge made available through ICT”*(Islam and Fouj, 2010:101). The advancement of ICT in education across the globe and the growing interest of educators and students to advance the use of technology to enhance teaching and learning has become a subject of grave interest to researchers. In line with this, some studies have been carried out to establish the link between students ICT usage and its influence on their academic performance. However, there have been limited empirical studies on this subject matter in the EMD. In view of this, the need then arises for a study of this nature to be carried out to ascertain the level of advancement of the emerging technologies and how it affects students in the EMD.

Previous studies on the effects of ICT usage on students have produced mixed results. While Angrist and Lavy (2002); Banerjee *et al.* (2004) on one hand found no significant impact of ICT usage on the academic performance of students, Kulik (1999); Fushs and Wossman (2004); Talley (2005) on the other hand, argued that, the use of ICT by students has a positive impact on their academic performance. Valasidou and Bousiou (2005) indicate that, some ICT tools help students in their learning by improving the communication between them and their instructors as well as their school mates to enhance their studies and improve their academic performance. Leuven *et al.* (2004) on the other hand noted that, some students may use ICT to increase their leisure time and have less time to study. It indicated further that, online gaming and increased communication channels such as twitter, facebook, whatsapp and other platforms do not necessarily lead to improved student performance. Gamboa and Garcia-Suaza (2011) in support of this observed that,



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extended use of computers can disrupt students attention, reduce their effort levels and restrict their creativity causing them to perform poorly in school..

#### **1.4. Research Objectives**

The main objective of this study is to examine the effects of ICT usage on students in the East Mamprusi District of Northern region.

##### **1.4.1. Specific Objectives**

1. To examine whether students have access to ICT facilities and tools in the study area.
2. To ascertain the purpose for which students use ICT.
3. To examine students' level of competence in ICT usage.
4. To determine the effects and challenges of ICT usage on students.
5. To examine whether there is gender difference in ICT usage and competence between boys and girls.

#### **1.5. Research Question**

The main research question of this study is to assess how the use of ICT affects students in the East Mamprusi District of Northern Region.?

##### **1.5.1. Specific Research Questions**

1. What is the level of access to ICT facilities and tools in the study area?
2. What is the purpose for which students used ICT?
3. What is the level of students competence in ICT usage?
4. What effects and challenges does the use of ICT have on students in the study area?
5. What gender difference exist in ICT usage and competence between boys and girls in the study area?



### 1.6. Significance of the study

The results of this study will provide insight about the true state of ICT facilities and services in the study area and how accessible they are to students. This will help government and all stake holders to make concrete decisions on how to improve or sustain the current situation.

The study will also help players in the education sector to design and develop effective and efficient ICT plans and programs that will help students to improve on their studies.

The findings of the study and recommendations may provide guidelines for teachers, parents and other interest groups to support students with the requisite skills and competence to use ICT effectively to support their studies.

The researcher hopes that the findings of the study may be useful to future researchers with interest in examining further the effects of ICT usage on students. This should lead to the generation of new ideas for better utilisation of ICT by students and teachers for learning purposes.

### 1.7. Definition of key concepts

**Information and Communications Technology (ICT):** is the use of computers and telecommunication devices for gathering, processing, storing and transmission of information. It includes the use of computer, Internet and mobile phone.

**Computer:** A computer is a device that accepts input (in the form of digits) and manipulates it for results based on a program or sequence of instructions on how the data is to be processed.

**Internet:** Internet is global computer network/connections that provide a variety of information and communication facilities, consisting of interconnected networks using standardised communication protocols.

**Mobile Phone:** A mobile phone (also known as a cellular phone, cell phone, hand phone, or simply a phone) is an electronic device that can be used to make and receive telephone calls over a radio link while moving around a wide geographic area. It can also be used to browse



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the web if its internet enabled. It also has other multimedia functions such as camera, radio among others

### **1.8. Arrangement of the Thesis**

The study is organised into five (5) different chapters. The first chapter presents the introduction, background to the study, statement of the problem, the research questions and objectives, the significance of the study as well as the definition of key concepts in the study.

The second chapter deals with the review of related literature while the third chapter talks about the profile of the study area and the research methodology that was used in the study.

The fourth chapter on the other hand, deals with the presentation, analysis and discussion of the data that was collected from the field. The last chapter deals with the summary of findings, the conclusions that were drawn and the recommendations thereof.





## **2.0.Literature Review**

### **2.1.Introduction**

This section begins with brief discussion of the historical overview of ICT development in Ghana followed closely with literature review on Ghana's education structure and ICT situation, Ghana's ICT policy framework, potentials of ICT in education/learning, availability and access to ICT tools in schools, Purposes for which students use ICT tools, students level of competence in ICT usage, effects and challenges of ICT usage on students as well as gender difference in ICT usage and competence between boys and girls.

### **2.2.Historical overview of ICT development in Ghana**

Ghana's ICT development started as far back as the late 19<sup>th</sup> century in the form of telecommunication by the British colonial administration to enhance communication within the territories of the colony. According to Allotey and Akorli (1999), the first telegraph line in Ghana (then Gold Coast) was a ten mile link installed in 1881 between the castle of the colony in Cape Coast and Elimina. By 1886, telegraph lines were extended to the middle and northern parts of Ghana into the territory of the Ashanti. By the end of 1912, 1,492 miles of telegraph lines had been constructed to link forty-eight (48) telegraph offices spread throughout the country. By 1920, the backbone of the main trunk telephone routes of Accra-Takoradi, Accra-Kumasi, Kumasi-Takoradi, and Kumasi-Tamale was built using unshielded copper wires.

By 1930, the number of telephone exchange lines in Ghana had grown to 1,560 linking the coastal region with the central and northern parts of the country. In 1953, the first automatic telephone exchange with 200 lines was installed in Accra to replace the manual one erected 63 years earlier. Three years later, in 1956, the trunk lines connecting Accra, Kumasi, Takoradi, and Tamale were upgraded through the installation of a 48 and 12-channel Very



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High Frequency (VHF) network and by the end of 1963 over 16,000 telephone subscribers and 32,000 rotary-type telephones were in use in Ghana.

The management of Ghana's telecommunication institutions was initially assigned to the Public Works Department (PWD) but was transferred to the post office following the enactment of the Post Office Ordinance in 1886. Telecommunication was later administered by the government's Post and Telecommunications Department until the early 1970s when it was declared a public corporation by National Redemption Council Decree No. 311 and placed under the authority of the Ministry of Transport and Communication, (Allotey and Akorli, 1999).

### **2.3. Ghana's ICT Policy framework**

Nations worldwide have recognised the developmental opportunities and the challenges of the emerging information age characterised by information and communication technologies (ICTs). These technologies are driving national development efforts worldwide and this has resulted in a number of countries in both the developed and developing countries exploring ways of facilitating their development process through the development, deployment and the exploitation of ICT within their economies and societies.

The government of Ghana in conformity with the advancement of ICT globally, introduced its Information and Communication Technology for Accelerated Development policy (ICT4AD) in the latter part of 2003. The Policy statement defines Ghana's ICT-driven development agenda in the information age. It sets out Ghana's road map in terms of the vision, missions, strategies and policy priorities for developing Ghana's information society and economy. The ultimate objective of the policy is to accelerate Ghana's socio-economic development process towards the realisation of the vision to transform Ghana into a high income economy and society that is predominantly information-rich and knowledge-based within the next two to three decades or less (Government of Ghana, 2003).



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It has been recognised that, for the ICT4AD policy to make an appreciable and desirable impact on the socio-economic development process of Ghana, it will need to be integrated into the overall development objectives, priorities and programmes of the country. Such an all-inclusive comprehensive 'ICT for development' policy and strategies must be aimed at the implementation of initiatives that could contribute to addressing the key developmental challenges facing the country (GoG, 2003).

The National Telecommunications Policy (NTP) which was introduced in 2004 on the other hand, was developed in consultation with industry and civil society stakeholders and included proposals for further policy and legislative reviews. The basic objective set out in the policy was that, every citizen and resident of the Republic of Ghana should have available, high quality, and affordable access to information and communication services in order to help transform Ghana into a knowledge-based society and technology-driven economy. Amongst the specific objectives of the NTP is the promotion of universal access for all communities and population groups in Ghana to telephone, internet and multimedia services by the year 2010. The NTP is to establish market structures that will be most beneficial to Ghanaian citizens and businesses, and to set in motion the procedures and incentives that will boost the market development and also to support the realisation of the vision of the national ICT4AD policy (Frempong, 2010).

### **2.3.1. ICT in education policy**

From the early 1990s, education stakeholders in Ghana have been concerned about how teachers and students use computers in schools and how their use supports learning (Boakye and Banini, 2008). At the beginning of the 21<sup>st</sup> century, government of Ghana and education authorities embarked on a number of projects to introduce ICT into Ghanaian education set up at the basic and secondary school levels.



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As part of the ICT in education policy which was introduced in 2007 to see to the successful implementation of the national ICT4AD policy in the education sector, the Ministry of Education (MoE) and Ghana Education Service (GES) proposed that the use of ICT in schools must:

1. Ensure that students have ICT literacy skills before coming out of each level of education.
2. Provide guidelines for integrating ICT tools at all levels of education.
3. Provide means of standardising ICT resources in all schools.
4. Facilitate training of teachers and students on ICT usage.
5. Determine the type and level of ICT needed by schools for teaching and administrative purposes.
6. Promote ICT as a learning tool in the school curriculum at all levels.

Source: MoE & GES, 2002.

In line with the Ministry of Education and GES's proposal, the 2007 educational reforms, highlights ICT as an important crosscutting issue in the education sector, and sought to address this through several strategies including : equipping all educational institutions with computer equipment and ICT tools in a prioritised manner; implementing ICT programmes at the pre-tertiary level in a phased approach, starting with schools already possessing adequate laboratories and teachers; gradually expanding to other schools as and when ICT equipment and teachers become available; and adequately resourcing computer science and IT departments in public tertiary institutions to enable them produce skilled humancapital to meet the requirements of industry. Within these reforms, it is also expected that the introduction of ICT into schools would cover teaching of ICT skills to all students, preparing students for the ICT professions and enhancing teaching and learning through ICT. Towards this end, the overall policy goal of the ICT in education policy was to enable graduates from



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Ghanaian educational institutions; formal and non-formal to confidently and creatively use ICT tools and resources to develop requisite skills and knowledge needed to be active participants in the global knowledge economy by 2015 (MoE, 2008).

#### **2.4. Ghana's current Education structure and ICT situation**

The current educational system consists of six years of primary school followed by three years of Junior High School (JHS) and three years of Senior High School (SHS). At the end of which, pupils in JHS sit for the Basic Education Certificate Examination (BECE), while students in SHS sit for the West African Secondary School Certificate examination (WASSCE). The six years of primary education and the three years of JHS forms nine years of basic education, which is compulsory and free. SHS education on the other hand, is neither compulsory nor free. However, there is a huge debate going on by Ghanaians as to whether it can be made completely free or progressively free.

The system of higher education on the other hand, includes universities and university colleges, polytechnics, professional institutes, and pre-service training institutes. All public higher education institutions are under the National Council for Tertiary Education which forms an advisory and coordinating body at the national level. The Council is under the Minister of Education. Each higher institution has its own council and academic board (or their equivalence) (Mangesi, 2007). The polytechnics, which are currently offering Higher National Diploma (HND) programmes, are now in the process of being upgraded to offer university-level courses. Teacher-training and Nurses Training colleges have been upgraded from Certificate to Diploma awarding institutions but are yet to be upgraded to tertiary institution status.

Amenyedzi *et al.* (2011) indicated that, Ghana over the years, have undertaken educational reforms aimed at raising the standard of education. The JHS system was introduced to equip their graduates with technical and vocational skills while preparing students for the Senior



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High Schools. In view of the infrastructural challenges facing Ghana's educational system, ICT use, especially computers and internet was introduced to increase access and to improve the relevance of education at all corners of the country. As part of the effort to extend access to education, the 2007 educational reform introduced a general educational programme of direct class teaching through the internet or television to thousands of homes in densely populated communities where fewer schools were available. Educational policymakers in Ghana have hailed the introduction of ICT in Ghanaian high schools as a remarkable step that will contribute to knowledge production, communication and information sharing among students and teachers in the school system. Government in collaboration with NGOs and donor organizations have extended ICT facilities to some schools, mostly in urban communities to increase access to ICT (Dankwa, 1997; Parthemore, 2003; Amenyedzi *et al.*, 2011). Amenyedzi *et al.* (2011) further pointed out that, many secondary schools in Ghana can now boast of computer laboratories through which students are gaining basic computer literacy. A number of these schools have internet capabilities, enabling students to deepen their connection to the outside world.

The Ghanaian tertiary education sector on the other hand, is the most advanced in the deployment and use of ICT in the country. All the country's major universities have their own separate ICT policy which includes an ICT levy for students. This enables students to have access to 24-hour computer laboratories with broadband connection. However not all tertiary institutions in the country are equally endowed and there are instances where the computer facilities are run purely by the private sector as cyber cafés on campuses.

In the basic and secondary education sector, a project to set up computer laboratories in all science schools in the country has led to a significant number of computers being installed across the country. A computer levy of GH¢3.00 is allowed in most secondary schools to keep the laboratories running. There is, however, a great disparity between public and private



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schools as well as between urban and rural areas in availability and access to ICT. In schools where ICT exist, some teachers use the internet for research, smart boards and projectors for teaching among others. Even though ICT integration into teaching and learning has been a policy for long, the Ghanaian school curriculum is not yet on CD to allow full integration of ICT into the teaching and learning process (Mangesi, 2007).

Investment Fund for Electronic Communications (GIFEC) was established in 2004 as an implementing agency for the Ministry of Communications to facilitate the spread of ICT use in rural Ghana to promote research and reading culture, train rural school children and teachers in the use of ICT and also empower rural communities by providing access to information to help increase direct participation in development and decision making processes. GIFEC on the 20<sup>th</sup> of November, 2010 launched the school connectivity project of the government of Ghana for Colleges of Education to ensure that teachers reappraised their methodologies to meet the learning needs of their students. The Government ICT connectivity project covered 38 Colleges of Education (formerly Teacher Training colleges), 37 Public Technical Institutes, 510 Public Senior High Schools, and 23,000 Public Basic Schools with computing infrastructure (GNA, 2010).

As of July 2013, the Government of Ghana in collaboration with other agencies through the school connectivity project had provided 459 schools and institutions with fully furnished and equipped ICT laboratories and internet access, 38 Colleges of Education, 37 National Vocational Training Institutes, 26 Technical Institutes, 10 Youth Leadership Training Centres and 249 SHS have benefited from the project. Other beneficiaries were 25 JHS, 49 Nursing Colleges and 25 Community Development Vocational Institutes (GIFEC, 2013).

### **2.5.Potentials of ICT in Education/Learning**

Learning according constructivist view is a process of making sense of the world around you and constructing knowledge through the experiences you have, by relating your experience to



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what you already know, and through the guidance that teachers are able to offer you,(von Glaserfeld, 1995). In the ICT-rich classroom, the provision of additional sources of knowledge and information reduces the dependency of students upon the teacher. The students are able to use the ICT at their disposal to control and pace their own learning, taking an active role, and constructing knowledge rather than taking the more passive role of receiving it. Their construction of knowledge can then be assessed against those of other members of the class, including those the teacher had planned for. Having choices and making independent and/or collaboratively negotiated decisions are features of independent learning (DfES, 2004).

ICT in education refers to the use of information technologies in different processes of education to support and enhance learning in educational institutions. This includes the use of ICT as a supplement to traditional classrooms, online learning or mixing both modes (Khaled, 2014). ICT in learning offers educational institutions and their students the flexibility of place and time of delivering or receiving learning information. Continuing professional development practices in today's fast moving work place environment increasingly involve the use of modern technologies as part of the quest to provide a flexible and responsive learning experience. The use of ICT in learning is beginning to spread widely all over the world, as access to different forms of technology improves.



Ellen Wartella,*et al.*(2010 cited in Khaled, 2014) indicates that, technology has become very important element in organization and society, as it has eased information flow due to various communication resources it provide. It further indicated that, ICT as a field contains technologies such as computers, software, peripherals, and internet connections which can add value to educational process and enhance educational environment by increasing the level of motivation and participation in classroom as well as developing comprehension among students.



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(DfES, 2003) sets out the objectives for effective use of ICT in teaching and learning as:

1. Broadening horizons with more opportunities for creative expression
2. Flexibility to study where, when and how best suits individual needs and preferences
3. Increased motivation through learning that stimulation
4. Stretches wider access to learning and participation
5. Sensible choices about when, when not and how to use new technology to enhance, enrich and extend learning.

### **2.6. Availability and Access to ICT Tools in Schools**

According to Merriam (2012) the first key factor in the use of ICT among students is the availability of ICT facilities and tools in school and at home. The United Nations (2003) also points out that, many young people, particularly in developing countries, are excluded from the growing information revolution due to inadequate ICT tools largely as a result of low per capita income. The GSS (2013) confirmed this in its 2010 population and housing census report which indicated that, only 7.9% and 7.8% of the population 12 years and older in Ghana used the computer and the internet respectively. GSS (2013) also found that, only 2.7% of the population in the EMD had laptop/desktop computers, less than 1% used internet facilities while about 14% had mobile phones.

Kennedy *et al.* (2008) conducted a survey of 2000 Australian high school students on their access, use and preferences to ICT tools. The study revealed that, 85.5% of the students had unrestricted access to computers, while only 0.6% indicated they had no access to computer; 99.4% of the students had unrestricted access to mobile phones and 72.9% of the students reported having unrestricted access to broadband connection. Corroborating this finding, (Ellis & Newton, 2009) carried out a pilot survey of a sample of first year students entering the university in Australia. The purpose of the study was to investigate ICT uses, experience, expectations, skill level and training needs of entry level students in Australia.



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The study found that, students had unrestricted access to ICT both at home and at school. It was further revealed by Newton and Ellis, (2009) that, students used ICT highly for writing documents, learning, using the internet to find reference materials, use mobile phone for text messaging, playing digital music files, playing networked games and sharing photos on the internet. The study also found that, younger students under 20 years used ICT more for instant messaging and playing digital music and also preferred social networking, particularly synchronous communication, using their mobile phones and retrieving online content than those who were 20 years and older. The 20 years and older students on the other hand, used ICT for activities that could be considered more 'mature' uses particular using internet services and the creation of online content. The study further found that students had basic knowledge in the use of ICT they however, had very low desire of using ICT for studies. It concluded that, students require training on how to use ICT to support their studies.

Zuochen (2014) compared Canadian and Chinese high school students access and use of ICT in an exploratory study and found that, almost 40% of the Canadian students reported having a cell phone, 57% had a smart-phone, and about 86% had a gaming device. The study further found that, almost 70% of the students had personal mobile phones and computer while over 40% reported having a tablet computer. The Canadian students according to Zuochen (2014) said they were allowed by school authority to bring their own ICT devices to school and accessed internet in and out of the classroom for learning resources and activities. The Chinese participants on the other hand, seemed to have a higher ratio of (cell phone 50%; smart-phone 95%; mobile computer 93%, and tablet computer 78%) except for gaming device (42%). The study also found that unlike the Canadian students who were allowed to bring their own ICT devices to school, the Chinese students were not allowed to bring their own ICT devices to school. The Chinese students according to the study had minimal utility of ICT both in school and at home.



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Kenya SchoolNet (2003) conducted a survey to investigate availability and access to ICT in some selected 40 schools in Kenya. According to the study more than 20% of the schools had less than 5 computers which were used for administrative purposes and not for teaching and learning purposes. The study further found that only one third of the schools studied had dedicated computer laboratories. Pádraiget *al.* (2007) affirmed the findings by Kenya SchoolNet (2003) in a study which sought to look at the implementation of ICT projects in three selected educational institutions in Kenya. The study found that access to ICT was limited in schools. It noted that, the ratio of students to computer in the institution surveyed was: 25:1, 32:1 and 4:1. respectively

Oguomaet *al.* (2013) conducted a descriptive survey of 400 head-teachers and teachers who were selected randomly from twenty one (21) primary schools in Nigeria on the availability and utilization of ICT tools in teaching and learning. The study found that, only 7.5% of all the twenty one (21) schools had computers. It noted that, availability, utilization and accessibility of ICT tools for instructional delivery was very poor in the schools surveyed. This confirms the earlier finding by Kenya SchoolNet (2003) and Pádraiget *al.* (2007) that access and utilisation of ICT in educational institutions in Kenya were limited. Oguomaet *al.* (2013) conclude that, the lack of availability and utilisation of ICT tools is partly due to Poor electricity supply, lack of knowledgeable ICT support staff, high cost of ICT equipment and accessories, lack of internet connectivity among others.

A closely related study was jointly conducted by Ghana Education Service (GES) and Global e-Schools and Communities Initiative (GeSCI). The survey covered five hundred and one (501) institutions, representing 97.6% of all Second Cycle Institutions in Ghana to assess the availability and access to computer and internet facilities in these schools. Out of the 98.5% of schools that had computers, almost half (43%) of the computers were not functioning. Only about 46% of the schools reported having computers that met the minimum technical



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specifications of the Ministry of Education. The student to computer ratio ranged from a low of 3:1 to a high of 650:1 at the school level. Computers were mainly used for administrative purposes rather than for teaching and learning. The regional computer to student ratio indicated that, the Northern Region had the highest student to computer ratio of 50:1 and Volta Region the lowest at 33:1. While almost all schools had computers, 87% of them had computer laboratories with only 17.7% of the schools surveyed having internet connectivity (GeSCI and MoE, 2009). This finding indicates that availability and access to ICT in second cycle institutions in Ghana were not encouraging.

Amanortsu (2013) carried out a quantitative survey of 125 students and teachers of the Accra Polytechnic on access to and use of ICT in Polytechnic Education in Ghana. The study revealed that, there were limited number of ICT facilities in the school, however, the majority of lecturers (90%) and students (74%) had access to and used ICT facilities in the school. The results also showed that, the majority (64%) of the students got access to the school computer laboratory occasionally while only 4% had regular access to the computer laboratory. This finding shows a slightly improved situation contrary to the finding by Kenya SchoolNet (2003), Pádraiget *al.* (2007), GeSCI and MoE (2009) as well as Oguomaet *al.* (2013) which suggested that, students in Kenya, Ghana and Nigeria respectively had little or no access to ICT tools in school.



Buami, (2013) conducted a quantitative survey of 255 JHS students in Nima a suburb of Accra on access to internet and the purpose for which they were used by the youth (mainly students). The study found that, 71.8% of students do not find it difficult accessing the Internet at their various designated places. Out of this number according to the study, 36.9% strongly agreed that they find it very easy to access the Internet anytime they wish to be online and the rest 34% just agreed on the assertion. Significantly according to the study, only 11.4% of the respondents complained of having problem in accessing internet.

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Buami(2013) also found that, close to half (49.8%) of the respondents used the internet to do their assignments, 35.7% used it to chat with family and friends while only 5.9% read news and stories on the internet. The findings in Buami, (2013) was expected as already indicated by GSS (2013) in the 2010 population and housing census report that, Greater Accra Region had the the highest propotion of internet users in Ghana. This can be attributed to the digital divide that exist between urban and rural areas where ICT facilities and services are concentrated in big towns and cities.It is observed that, while Amenortsu (2013), GeSCI (2009), Oguoma *et al.* (2013) and others focused on availability and access to ICT in educational institutions in Ghana and Nigeria, Buami (2013) focused on access to only internet with less emphasis on where it was accessed.

Sarfo and Ansong-Gyimah (2011) curried out a survey involving 300 SHS students selected randomly from 4 SHS in Ghana to explore their access to and the purpose for which they used the emerging ICT tools such as computer, internet and mobile phone in school and at home. The study found that, 40%, 30% and 3% of students had used mobile phone, computer and internet respectively before. The study further indicated that 65.3% of students, who have used computer before, got access to computer at school as against 60% who got access at home. More students (22% and 96.8%) however, had access to internet and mobile phone at home than (10% and no access) to internet and mobile phone respectively at school. It added that students were restricted from using mobile phone in school. These findings show that only a sizable number of the students in Ghana used ICT both in school and at home. This is contrary to Zuochen, (2014) and Buami (2013) findings on Canadian and Chinese students as well as JHS students in Nima-Accra access to ICT tools respectively. On the frequency of access to ICT tools by students per week, the study indicated that, 25% used computer every day; 24.1% used computer at least three times a week; 24.7% of the students use computer at least once a week while 25.4% of students only used the computer when they were at school.



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It added that almost all the students (96.8%) used mobile phones everyday outside school; only few (2.4%) of students used mobile phones at least three days in a week out of school, and a very small number (0.8%) either use mobile phones out of school once a week, or never at all. On what students used ICT for, Sarfo and Ansong-Gyimah (2011) found that most students used ICT for social communication purposes but not for learning or pedagogical purposes contrary to Buami (2013) assertion that, most students used ICT for learning purposes. Sarfo and Ansong-Gyimah (2011) further indicated that, most students use computer at home and at school for acquiring computer skills rather than for learning or pedagogical purposes.

Yukhymenko and Brown (2009) investigated ICT use among 122 Ukrainian high school students and found that, 53.3% of the students used computer at school at least once per week contrary to Sarfo and Ansong-Gyimah (2011) finding that, 25.7% get access to computer once a week. The study further found that, 33.5% of the Ukrainian students never used computer at school. Meanwhile, 84.4% of the students indicated they had computers at home while 60% also had internet access at home.

Asabereet *al.* (2012) conducted a survey of 140 students in Accra Polytechnic and Regional Maritime University on tertiary students expectation on mobile device usage and found that, 100% of students had personal mobile phones of varying types and used them for communication purposes. This corroborate the study by Akanferiet *al.* (2014) in a survey of some selected tertiary institutions in Accra found that, 99% of students had personal mobile phones and mainly used them for browsing the web and for making and receiving calls.

The above literature confirms the assertion by UN (2003) that, many young people particularly in developing countries are excluded from the growing information revolution due to limited availability and access to ICT tools. It has been establish from the literature that, African countries such as Ghana, Nigeria and Kenya faces similar challenges with



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regards to the insufficient availability and limited access to ICT tools in schools contrary to their counterparts in developed countries such as Canada, Australia and china who had unrestricted access to ICT tools. This goes to buttress the point made by Dr. Sam Jonah the Chancellor for the University of Cape Coast (UCC) that, while Singapore had 100% access to ICT in school, Malaysia and Ghana had only 14.7% and 1.4% respectively. This indicates that a lot more needs to be done in Africa to improve availability and access to ICT tools.

### **2.7.Purposes for which students use ICT**

According to Polly (2011), technology has shown to positively influence students learning when they explore technology-rich tasks that simultaneously require them to use higher-order thinking skills (HOTS) such as analyzing or evaluating information or creating new representations of knowledge. Research has shown that, appropriate use of ICT can catalyse the paradigmatic shift in both content and pedagogy which is at the heart of educational reform in the 21st century (Aduand Olatuudun, 2013).

Several studies have been carried out to find out what students use ICT for, however the findings have been mixed. Lau and Au (2002) conducted a survey on tertiary students in Hong Kong to ascertain what they used home computers for. The results of the study indicates that, 89% of the students used computer for doing homework/assignment, 83% used it for e-mail/newsgroup/sending e-cards, 79.4% for surfing the web/internet, 77% for typing/word processing while 66.5% used it for chatting on social media. It indicates further that, 50% of the students used the computer and internet for downloading software, music, photos and video while less than 10% of the students used the internet for shopping. Consistent with this finding is a survey conducted by Oguret *al.*(2004) in a Turkish military medical School on students attitude to computer and Internet usage. It was revealed that, the most gratifying reasons for which students used computer was connecting to the browsing the



web (91.9%), listening to music ([www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh) (70.5%) and watching videos (69.6%). The most common use of the Internet was e-mail (81.6%).

In line with Lau and Au (2002) and Oguret *al.*(2004), the use of the computer for word processing (82%) and surfing the web/internet (88%) was found to be prevalent among students in a study carried out by Rafiet *al.*(2009) to investigate the purpose for which Israeli High School students used ICT.Rafiet *al.*(2009) further found that, about 60-70% of the Israeli High School students used ICT for graphic processing while only about 30-40% of the students used ICT frequently for database, spreadsheet and audio/video processing.

Ismail and Ahmad ( 2013) found that, Malaysian High School students used the computer for general study purposes but a large proportion of the students (84%) used the computers for entertainment. The study adds that, 85% of students used the internet for study purposes while 80% used mobile phones for making calls and sending text messages. On the contrary, Amenyedziet *al.*(2011) in a study of 180 students and teachers selected randomly from three SHS in the Tema metropolis in the Greater Accra region to assess their computer and internet usage as supplementary educational material to enhance quality teaching and learning, found that, less than 50% of the student used the computer and the internet facility for entertainment, whereas 23.3% used the facility for research and learning and 35% used it for e-mail and browsing the web.



DeBell and Chapman, (2006) carried out a survey in the United State of America to examine the use of computers and the internet among children in nursery schools and in kindergarten through grade 12 on overall technology use. The study found that, 46% of students used the Internet for school work (doing assignment), 36% used it for e-mail or instant messaging while 38% used it to play games. This finding corroborate Buami (2013) finding that, 49.8% of Junior High School students in Nima a suburb of Accra used the Internet for academic purposes while 35.7% used it to chat with families and friends.



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Contrary to the assertion by DeBel and Chapman (2006) and Buami (2013) finding which indicated that most students used the computer and internet for learning, Ayebi-Arthur *et al.* (2009) in a study to find how Senior High School students in Cape coast Municipality used the computer and internet found that, the majority (61% and 51%) of students used the internet to practice computer skills and exchange information with other students about their personal life respectively. Only about 39% of the students according to the study used the internet for learning purposes. The finding indicated that, majority of the students used the internet to acquire computer skills and for communication needs rather than for learning.

North *et al.* (2014) in a review of literature on the reasons why students used mobile phones indicated that; owning a mobile phone by students in Australia and Malaysia was the convenience of being able to contact others and be contacted regardless of time and location through calls and messaging as well as for privacy purposes (allowing freedom of communication without filtering or interference by parents or siblings while being readily contactable was found to be an advantage, it was also noted that it can be a disadvantage, as contact could occur at inappropriate times. Apart from being a communication device, the mobile phone is used by university students in the United Kingdom (UK) and Australia for many other functions, such as alarm clock, camera, music player, diary and phonebook.

Studies in the USA, Netherlands and Malaysia also found that, mobile phones have surpassed their initial purpose as communication devices; they have become a status symbol of social progress to users and are somewhat of a fashion item than mere communication device.

Previous studies according to North *et al.* (2014) have shown that, students in countries such as Singapore, China, Germany and Japan use their mobile phones to learn. The study concluded that, there is a positive correlation between owning a mobile phone and academic performance of students and that students enthusiasm towards mobile phones can use it to enhance their learning.



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Omotayo and Manoj (2014) conducted a survey to examine first-year IT students' use of mobile phones in South Africa and found that, 64.4% of students used mobile phones for finding new information on the internet while 58.3% used mobile phones for research. The study further found that, 55.6% of students used mobile phones to obtain their exam results while 69.3% used their phones to keep in touch with family and friends. The study further indicated that, 66.7% of students used mobile phones for social networking while 42.2% used mobile phones for entertainment.

A study to examine patterns of mobile phone usage by students in the University of Nairobi focused on exploring the various mobile phone applications among students, the levels of mobile phone usage among university students for academic purposes and the gender difference between male and female students' mobile phone usage for academic purposes. In all, 300 students were sampled. A self-reported questionnaire was used to collect data for the study. The study found that, the majority of the students were using their mobile phones to communicate with their classmates, and lecturers about lesson timetables and exchanging other important academic information. Additionally, over 70% of the students said they use their mobile phones to search important information to help them complete their assignments. However, a good number of the students used their phones more often for activities unrelated to their studies. The study recommends the need for students and educators to be sensitized on the appropriate ways of using mobile phones in order to avoid the potential academic risks associated with high-frequency cell phone use (Mogambi, 2015).

### **2.8. Students level of competence in ICT usage**

Decades after the knowledge to use ICT became relevant to educators and designers, there is yet to be any general research based acceptance and justification of the concept internet/digital skills. This lack of theoretical justification has resulted to different definitions that ignore the full range of skills which only focus on some limited skills for practical



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purposes (Aviram and Eshet-Alkalai, 2006). According to Ilomaki et al. (2011), the term competence is more used than skills, reflecting the need for a wider and more profound content of the concepts. It explained that, competency is more than just knowledge and skills. It involves the ability to meet complex demands by drawing on skills and attitudes in a particular context. It also involves social and emotional aspects for using and understanding digital devices. Punie and Cabrera (2006) cited in Ilomaki et al. (2011) defined digital competence as involving the confidence and critical use of ICT for work, leisure and communication. It added that, digital competence is grounded on basic skills in ICT, which may include the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the internet. UNESCO (2003) indicated that, the best way to introduce computers to institutions is teaching students skills of how to use various ICT tools and applications. These tools according to the report are the productive tools required later on in life by students in their various places of endeavours.

To buttress this point, Wallet (2014) posits that, unlike the developed world, children and youth in developing countries frequently learn more about how to use ICT informally (outside of the school system) than in the classroom. Davis (2003) advocated for a policy that will outline minimum standards of ICT competencies for students and teachers but indicated that such a policy must be grounded in the use of ICT for teaching and learning to ensure that students and teachers acquired the right skills and attitudes towards ICT use for learning and research. Ainley, (2010) in support of this, reported that ICT is part of life in modern society and students who do not develop proficiency in ICT are likely to be limited in their participation in later economic and social life.

Olson (2002) pointed out that, the ability to use application software (word processing and others) eliminate some of the frustrations of writing and it enable students to better



express their ideas in writing. [www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh) When tools such as database, spreadsheets, and multimedia, e-mail and network search engines are utilised to complete projects requiring students to use information to solve problem, there is greater potential to promote cognitive development.

Students have different attitude toward computer use and as such have different level of competencies in computer skills. In view of this, (Hall, 2005) classified computer literacy into four types of computer users, which include the emergent user, the progressive user, the high user and the dependent user. According to Hall (2005) the emergent user is characterised by having access to computer(s) at home or at work. It indicates that, such a user has access to, and knows how to use word processing, e-mail and web browsing software and download information to external drive for printing elsewhere. The study describes progressive users as those who are ready for whatever it takes them to have more knowledge of computer. They spend their time and money to learn more about the technology. The high users on the other hand, are those who are well verse in computer technology. They know how it works and how it can be manipulated. Finally the dependent users are those who do not know anything about computer and are not making any attempt to learn it. The dependent users according to Hall (2005) depend on those who know ICT to help them whenever they have something to do on computer.

Adding to this (Rowe 1993) defined two groups of students, (the top and the bottom) when it was found that, children differ greatly in the use of the computer in both its efficiency and effectiveness. Rowe (1993) in a similar study, referred to students who intertwine learning and computer use and were confident computer users as orchestrates, those who see the computer as a separate area of learning as amplifiers, those who view computers as non-essential and that they are mainly used for calculation and word processing as machinists and finally those who made limited use of computers, mainly copying others and using drill and practice package was named as the preservers.



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McDowell and Ma(2007) explored computer competency among baccalaureate nursing students at a university in the U.S. from 1997 to 2005 by surveying 411 students on admission and 429 students on graduation. The study also explored global categories of microcomputer use which include, keyboard skills, word processing, spreadsheet experience, database use, email, World Wide Web, bibliographic database search, computerized statistical programs, and presentation packages. The results of the study indicated that baccalaureate nursing students lacked the necessary competence to effectively use technology to enhance their studies.

Jiang et al.(2004) examined seven overall domains as well as 100 specific computer competencies for nursing students by surveying 29 experts from nursing-related institutions in Taiwan to ascertain which specific competencies should be developed. In the seven domains, they found that attitudes toward the computer and principles of computer applications were most important, whereas program design and the concepts of hardware, software, and network were least important. In the competency domain of skills in computer usage (which ranked fifth in importance out of the seven domains), the most important skill identified was the ability to use the word processor. Other skills of statistical significance related to education included spreadsheet programs, presentation editing software, management of files, use of peripherals, and use of clinical information systems.



National assessments of ICT literacy among Australian students in years 6 and 10 conducted a survey to ascertain students ability to use ICT appropriately to access,manage, integrate and evaluate information, develop new understandings and communicate with others in order to participate effectively in society. The study found that, students had much capability of using ICT for communication with peers as well as searching for information on the internet; they however, had little capability in other ICT competencies such as word processing contrary to Jiang et al. (2004) as well as Meiers and Pat, (2009).

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Danner and Pessu (2013) carried out a study to examine the ICT usage habits and the self-assessed ICT competencies possessed by undergraduate students in teacher preparation programmes in the University of Benin. The study found that, students perceived themselves to be competent (either excellent or good) in the use of word processing (64%) and in file navigation (51%) contrary to Meiers and Pat (2009) on Australian students inability to use word processing application. A lower proportion of students according to Danner and Pessu (2013) perceived themselves to be broadly good in Internet browsing (40%) and emailing (42%). The study further showed that, about 70% of the students had no capability at all in the use of presentation tools (PowerPoint).

In line with Danner and Pessu (2013), Blankson (2015) in a descriptive survey of students and teachers in second cycle institutions in the Cape Coast Metropolitan area on students proficiency in computer use observed that, word, excel, power point, and internet were the application software taught in second cycle institutions and as a result, both teachers and students had knowledge and could use the application software mentioned above as well as use computer and its accessories.

A dissertation by Geoffrey (2006) to find the effects of ICT on students learning indicated that, only 16% of the students envisaged their skills to use spreadsheets as very good together with 33.7% who rated their skills as fair. Majority of the respondents 34.9% rated their skills of using spreadsheets as good. While 8% rated their skills as poor and 7.4% rated as very poor.

Mudasiru and Modupe (2011) conducted a case study on Nigerian university student-teacher competence and attitude towards ICT. The study found that, majority of both male and female student-teachers lacked skills in various ICT applications and operations of equipment that were important to support and enhance their learning experiences. It also found that, student-teachers gained their competency in the use of ICT through personal



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study, family or friends and through training outside school corroborating Wallet, (2014) finding that, children and youth in developing countries frequently learnt more about how to use ICT informally (outside of the school system) than in the classroom. It was also revealed that, over 50% of the student-teachers were not competent in the use of spreadsheet, presentation, database, web authoring tools and also the use of peripheral ICT equipment contrary to the finding by Blankson (2015) on students ability to use application software such as word processor. It indicated further that eventhough there was no significant difference between male and female students competence in ICT usage, male students demonstrated more competence in the use of ICT than their female counterparts.

Asfar and Zainuddin (2015) carried out a study to identify secondary school students perceptions on the use of ICT in promoting students self-directed learning in Malaysia. Survey design was used to gather quantitative data through questionnaires from 100 students. The study found that the level of ICT competence such as accessing and sharing information amongst colleague students were at intermediate level. Moreover, the majority of the students had little knowledge in terms of using advanced ICT application. The study finally revealed that students had low level of self-directed learning readiness.

Tella and Mutula (2008) noted that, most of the problems affecting education in sub Saharan Africa were students lack of competencies, knowledge and skills which are key in a rapidly changing technological environment to effectively utilise ICT. Daly (2003) cited in Tella and Mutula (2008) shed more light on the debate by pointing out that, education in most developing countries especially those in Africa are bedevilled by technophobia, lack of prerequisite skills to manipulate new technology, and reluctance to switch from traditional methods of teaching to technology oriented approaches.

As important as it may be to ensure students acquire the necessary competencies and skills to use ICT to support learning, the concern has been that most educational institutions especially



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in developing countries are yet to fully implement the ICT in education policy to enable students acquire the needed skills and competence for life-long learning. The above literature on students competence in ICT usage shows that, most students to a large extent had competencies in the use of application software such as word processor, spreadsheet, and presentation software. There are however, very minimal levels of internet usage competence among students in the literature. The reason for this could be that, most schools focus more on teaching students how to use office suit (Word processor, presentation, Spreadsheet among others) than the internet. It could also be attributed to lack of internet connectivity in most schools especially in developing countries.

### **2.9. Effects and challenges of ICT usage on students**

PISA (2006) indicates that, students with different characteristics would get different benefits from the same frequency of ICT use. Skills, interests and attitudes determine what students do on a computer and its related technologies and how well. Some students would benefit more from ICT because they know how to use it as a tool for learning. Some others according to the report will benefit less because they lack the skills necessary to use ICT for educational purposes. In the same way, students interested in school are likely to use ICT on activities related to school. Students with little interest in school would spend more time on ICT activities that are not related to school.



Mbaezeet *al.* (2010) conducted a study in Evan Enwerem University in Nigeria to find whether there was a positive relationship between ICT use and students achievement. A total of 120 participants were selected for the study. Chi-square statistical tool was used to analyse the data. The results of the study indicated that there was no statistically significant relationship between ICT use and students academic performance with  $\chi^2=2.06$ ; critical F value of 3.84 with 0.05 level of significance.



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Islam and Fouj, (2010) carried out a survey of 110 undergraduate students of ASA University in Bangladesh on the impact of ICT usage on students academic performance. According to the study, students viewed ICT as a source of recreation rather than a learning aid. The study found that, the value of correlation coefficient was 0.012 and the significance level of .904 which indicated that, there is a very weak positive relationship between ICT use and student academic performance meaning that, the use of ICT by students has no impact on their academic performance. This finding corroborates Mbaezeet *al.* (2010) which found no significant relationship between ICT usage and students academic performance. This reaffirms the fact that, availability and access to ICT does not automatically translate to increase in academic performance of students.

Contrary to Islam and Fouji (2010), Nisaret *al.* (2011) surveyed 429 students selected from five colleges and universities in Pakistan on the usage and impact of ICT on students academic performance. The study found that, availability and usage of ICT had a positive impact on academic efficiency of students. According to the study, availability of ICT in educational institutions improves students learning skills by helping them to better prepare their assignments and projects. This finding is inconsistent with Islam and Fouji (2010) where students viewed ICT as a recreational tool rather than a learning aid. Nisaret *al.* however, failed to indicate the specific areas of ICT usage/tools which impacted positively on the academic performance of students.

In relation to Nisaret *al.* (2011), Mba (2010) found that, students in the University of Buea, Cameroon had positive attitudes towards ICT usage and as such used it to facilitate learning. This confirms the earlier assertion by (Bataineh and Baniabdelrahman, 2005) that ICT can be used as a supplement of the teacher's job. Thus students use computers/mobile phone with internet to download and save relevant information from the internet so as to facilitate learning. Mba (2010) further indicated that, students find it easier to search for information



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on the internet than in the library. It found that, 80% of students go on the internet mostly to send e-mails and to research for information from the internet to enhance their studies.

A similar study was carried out by Valentine and Pattie (2005) to understand the links between children's educational uses of ICT at home and their performance and attainment at school. The study found that, there was statistically significant positive relationship between students use of ICT out of school for leisure purposes and decreases in academic performance. The study indicated further that, the effect was more than twice as large an effect as the positive association of using ICT for educational purposes. It explained that, it is not access or general use of ICT that could raise students academic performance, but rather how the technology is used is what matters. They further indicated that, the more time students spend playing computer games, the less time they may have available for other tasks, including homework and study. The study finally advocated for the need to make students aware of the negative effect of predominantly leisure uses of ICT and encourage them to adopt a more responsible attitude to the use of ICT for school work.

Quarshie (2012) in a study on the impact of computer technology on the development of children in Ghana stated that, the use of the computer and Internet in school allows students to work together, encouraging the sharing of ideas and cooperative learning. According to the study, students who use the computer and the Internet for academic purposes show gains in cognitive abilities such as memory, spatial and logical problem solving, critical thinking, concentration, abstraction and comprehension. Quashie (2012) agreed with Valentine and Pattie (2005) that, even though the computer and the internet have some positive effects, there are also negative effects which can mislead students. It explains further that, children can visit sites which are meant for only adults, they are also unable to differentiate what is real from fiction.



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In line with Quashie (2012) and Valentine and Pattie (2005), North et al. (2014) carried out a survey on how students in South African Universities used mobile phone and found that, although there are many benefits of using a mobile phone, there can also be negative effects on the users and environment. According to the finding, lessons are disrupted when mobile phones are used at inappropriate times. The study also found that, mobile phone addiction which is manifested as over dependency can cause problems such as emotional stress, damaged relationships, loss of sleep and falling literacy. It indicated further that, students who are mobile phone addicts show signs of cognitive salience where they think about their phones when they are not using them, as well as behavioural salience, where students constantly check their mobile phones for missed calls or messages while studying.

Kahari (2013) examined the effects of cell phone use on the study habits of University of Zimbabwe first year Faculty of Arts students. The research was carried out using questionnaires distributed to 200 students who own cell phones. The questionnaires collected information about the respondents, cell phone type preferences, uses of cell phones during study, predominant usage during study and information about challenges facing students in using mobile phones for study purposes. The results revealed that, cell phone use has negative and positive effects on the study habits of university students depending on usage patterns of use. The results further indicated that, over 50% of students at some point during studies made or received calls, checked their cell phones several times when studying anticipating a call, text message or email. More than 90% of the calls made or received during study were non-educational purposes. Kahari further explained that, most messages sent or received by students are written in shorthand or abbreviated forms. The use of shorthand the study indicates has been related to negatively affecting spelling and grammar proficiency of students as evidenced from the use of abbreviated words, incorrect subject-verb agreement and misspellings in assignments and examinations scripts of students. These



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finding points out how cell phones can be distracting to students academic performance. Kahari (2013) conclude that, despite the challenges faced by students, cell phones unlike other educational innovations are firmly rooted in the society in which education and institutions are part of and ignoring the use or applications of this technology would be ill-advised.

In a related study by Massimini and Peterson (2009) who conducted a survey on the effects of ICT on United State of Americas' College Students cell phone usage. The study revealed that, using e-mail, instant messaging (IM) services, SNs, browsing the web, and misplacing cell phones accounts for a considerable amount of class tardiness and sleep loss. According to the study, students reported that, the use of cell phones, e-mail, and SNs were all major contributors to their class lateness. Almost half of the students reported losing sleep at least once in a week due to cell phone and IM use. Over half of the students surveyed (62%) reported losing sleep at least once in a week due to using Facebook or MySpace and 21.3% reported losing sleep at least 3 times. The study concluded that, sleep deprived students incorrectly rate their performance as better than that of individuals who were not sleep deprived. These individuals may not see the connection between their reduced performance and their sleep.

In line with this, Louis-Philippe and Murphy (2013) carried out a study on the impact of the ban on students from use of mobile phones by some public schools in the UK. The study reported that, mobile phone use by students can be disturbing especially during instructional hours. Teachers according to the study, usually spend time to keep students attention in class as they chat, text, browse the web, play games, and visit Facebook and Twitter through their mobile phones while the teacher tries to teach. According to the study, the ban on students from using mobile phones had the effect of giving students an extra week education over the course of an academic year and test scores increased by more than 6%. It added that, the



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benefit of banning mobile phones was equivalent to an additional hour a week in school, or to increasing the school year by five days.

According to (ITU, 2012), access to ICT remains a challenge for young people in the developing world. The cost of ICT access is much higher as a proportion of per capita income in these particularly disadvantaged countries. The challenge is bringing together all relevant stakeholders, including governments, civil society and the private sector to encourage them to work together to provide an environment that fosters the development of young people and enable them to realize their potential in the Information Society (ITU, 2012)

Osakwe (2012) conducted a survey study on challenges of ICT application in teaching and learning in Nigerian public secondary schools. The results revealed three main challenges which included: firstly inadequate funding (training and retraining of teachers, provision of technological infrastructure, development and maintenance of software packages and electricity supply), lack of qualified personnel in secondary schools and colleges and lack of basic infrastructures/resources such as inadequate or non-existence of physical facilities and material resources such as computer rooms, furniture and electricity or electric generators.

Similarly, Oguoma *et al.* (2013) carried out a survey on utilization of ICT tools in teaching and learning in primary schools in Oweri State, Nigeria and identified numerous constraints to ICT based instruction in schools. The constraints include poor electricity supply, lack of knowledgeable ICT support staff, inadequate trained ICT teachers, high cost of ICT tools, lack of interest on the part of teachers and students in ICT use, government and school proprietors non-committal attitude to ICT, inability to replace broken down equipment and facilities, lack of funds and lack of internet connectivity.

In line with Oguoma *et al.* (2013) Boateng (2012) in a study to find the role of ICT in Ghana's rural development identified a number of factors that inhibit the development of ICT in rural areas to include, disparities in income levels, telephone density, legal quality and



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human capital. According to the study, critical to the use of ICT for rural development in Ghana is availability of electricity which has resulted in lack of computers and other equipment in rural areas. Boateng (2012) conceded that, even when there is electricity supply, affordability and maintenance of ICT equipment become an issue for the rural poor. It added that, the major means of access to ICT in the rural areas is through tele-centres that have been established in the regional and district capitals. The study further indicated that, areas where ICT facilities are available, maintenance become a problem when they break down because of lack of spare parts or lack of skills to repair the equipment. The study further revealed that, there are fewer computer-literate personnel in the rural areas compared to the urban centres.

GIFEC (2012) also carried out a similar study to find barriers to internet usage in Ghana and found that, majority of ICT users do not know how to use it or lack the requisite skills and competence to use it. The study found 17.5% of respondents said they do not see the value of internet while 9% were unable to use the internet because they do not have access. The study further revealed that, the cost of connectivity was a barrier to internet usage. About 66.8% of students were of the view that internet access is expensive while 71.2% of respondents said lack of quality infrastructure and the total absence of any infrastructure in many localities in the country had created barriers to information access, making it difficult to effectively use ICT especially by students in rural communities.



The above literature shows relatively mixed result on the effects of ICT on the academic performance of students. The literature shows that, appropriate use of ICT especially for study purposes has can have a positive impact on students. The literature also shows that, students require training on how to effectively use ICT to enhance their studies. Despite the potentials of ICT to enhance study and the need to provide training for teachers and students to use ICT, there exist numerous challenges in accessing ICT in educational institutions. The literature on challenges facing successful implementation of ICT in educational institutions

seems to run through the West African sub-region. Osakwe (2012) and Oguomaet *al.* (2013) both conducted their studies in Nigeria using the survey method of data collection and found lack of basic infrastructures such as computer rooms and furniture, lack of qualified personnel, high cost of ICT tools, lack of electricity supply or electric generators as major challenges. Boateng (2012) and GIFEC (2012) in their studies also identified almost the same challenges as major hindrance to successful implementation of ICT in Ghanaian schools. This shows that a lot needs to be done to improve availability and access to ICT in educational institutions within the West African sub-region.

### 2.10. Differential Impact of ICT on Gender

Despite the importance of ICT in students learning and the perceived gender difference in ICT usage and competence, not much research has been done in Ghana to ascertain the level of these differences among students in second cycle institutions and colleges. According to Kay (2007:1), *“many children mostly in the developed world, start interacting with computers at three or four years of age; gender-based socialisation begins even earlier, at the moment when someone asks, “Is it a boy or a girl?” A critical question arises as to whether computer behaviour is influenced by gender. If computers play an increasingly prominent role in our society, one could argue that significant power and success rest with those who know how to use this technology effectively. It is vital that boys and girls have equal opportunity to work with and benefit from computers”*.

Becta (2008) carried out a study to explore the differences between boys and girls use of ICT both within and outside school, and for both educational and leisure purposes. According to the report, the use of ICT in education improves the motivation and attainment of both girls and boys, although the increases were more marked for boys than girls. The study explained that, most girls use ICT more for school work, whereas boys use it more for leisure purposes. Girls also prefer social (popular on online social networking) and creative uses of



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ICT than their boys counterparts. They also like to work collaboratively and enjoy using technology to learn in both formal and informal contexts compared with boys. The report revealed further that, girls are more dependent than boys on school for their access to ICT and for guidance on how to use it while boys had a greater experience of using ICT at home. According to the report, there was evidence to suggest that, ICT does have positive effects on the attainment of both genders, it however, seems to have a greater positive effect on boys than it does on girls.

Jones *et al.* (2009) conducted a survey study of 40 U.S. education institutions to learn about whether race and gender made a difference in internet usage among college students. The findings of the study suggested that, male college student Internet users spend more time online than female college student Internet users. The male college students spend greater amounts of their time pursuing a wide variety of leisure activities online including listening to and downloading music, watching and downloading videos as well as playing games than females. The study further revealed that female college students tend to use the internet for communicative and academic purposes more frequently than do their male counterparts. The study also found that, among the most frequent uses of internet online, communicating socially ranked first for females and second for males. This corroborates Becta (2008) ascertainment that girls generally prefer social and creative uses of ICT than their boys' counterpart.

Valentine and Pattie (2005) carried out a survey to find whether there were gender patterns in relation to the purpose of ICT use by students. The study found that, the majority (61%) of boys were more likely to report use of the computer for games than (39%) girls. This finding according to Valentine and Pattie (2005), corroborate numerous other studies that have all suggested that computers are boys' toys and therefore seems to favour boys than girls.





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A study by Reidulf *et al.*(2008) on gender profiles of internet and mobile phone use among Norwegian adolescents showed that,chatting and e–mailing were used more by girls than boys. It further revealed that, more girls (59.9 %)thanboys (50.7%) used the internet for chatting while boys (36.3%) played games compared with 17.6%girls. On mobile phone usage, Reidulf*et al.*(2008) found that, 99.4% of girls reported using their mobile phone for text messaging (SMS), while 97.5% of the boys did so.

Dzapkasu (2005) indicated that, but for the demand for job on the job market and their desire to be employable, most women will not learn ICT. According to the study, most women view computer task as being too complex. The study adds that, boys easily talk about themselves as computer proficient and tended to express themselves in terms of self-confidence, even when they were not than girls.

Hew and Leong (2011) conducted a study to find gender difference among pre-university students in Malaysia. The study found no significant gender differences in eight out of nine ICT competencies; however, the male students were slightly higher in mean score in all the ICT competencies except word processing competency where female students had a higher mean score. According to the study females were perceived as better typists and tended to use more word processing applications compared to their male counterparts.

The literature review has revealed serious concerns regarding availability and access to ICT tools in schools in Ghana and the sub-region in general. The literature shows that students used ICT for varied purposes including learning, communication and entertainment. Acquisition of ICT skills by students according to the literature mostly took place outside the school through the effort of learners themselves. The effects of ICT on students as far as the literature is concerned produced mixed results with;while some studies found no significant impact of ICT on students others found significantly positive impact of ICT on students. It is also evident in the literature that, students faced numerous challenges such as poor electricity



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supply, in adequate ICT equipment among others in accessing ICT in school. According to the literature, boys are more confident in talking about their competence in ICT usage than girls. These issues as revealed in the literature have the potential of impacting positively or negatively on students. This study therefore sought to examine how the findings in the literature corroborates or contradicts the present study.

### **2.11. Theoretical Framework**

The UNESCO Planning Guide (2002) outlined theories and concepts which support the new view of learning through ICT. These theories include Vygotsky's sociocultural theory, constructivist theories, self-regulated learning, situated cognition, cognitive apprenticeship, cognitive flexibility theory and distributed cognition. All the theoretical approaches referred to by the UNESCO Planning Guide share a constructivist perspective of learning which assumes that, individuals are active agents who are purposefully seeking and constructing knowledge within a meaningful context (UNESCO 2002).

The Constructivist Theories of Learning assumes that the knowledge we acquire about the world is not just a photocopy of the outside world that was put into our heads by some instructional process. Rather, knowledge is actively constructed by the individual, as part of a process of "meaning-making", with the right kind of tool/technology. In a Constructivist learning environment, students construct their own knowledge and apply it to new tasks, contexts and situation, integrating the new knowledge into their already existing knowledge structures (Magambo, 2007).

Constructivism according to Oluwafisayo (2010) is a learner-centred model of learning where students are assumed to learn better when they are motivated to learn things themselves rather than when they are told the information. It argues further that, ICT learning experiences are linked with the Constructivist Theory because it is through ICT tools such as computer and internet that students have access to massive amounts of information in which they can use to



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determine their own path of learning. This learning through ICT prepares students for their global existence as they are able to use technology outside the classroom in their daily life to connect with others in the wider community and around the world.

The integration of ICT in education can create knowledge using interactive activities at a pace that is determined by the learner, creating an opportunity for instructors to break away from conventionally scheduled class time and instructional designers to create more opportunities to vary the learning tools for diverse learning styles (Garcia, 2011).

Wilson (2014) discovered that students' experience of technology use are many and varied and can be categorised into learning and non-learning purposes. According to the study, it is anticipated that the experiences of students' ICT use will trigger enthusiasm among students to use ICT to support personal learning thereby gaining ICT literacy proficiency. However, there is no guarantee that students will solely use ICT for only study purposes.

Technology integration in teaching and learning, if done properly, can help in diverse ways the process of creating more authentic learning environment. Studies along the lines of Constructivist theories have shown that, if the learning environment is technologically rich, it can increase self-esteem and enthusiasm for learning (Fouts, 2000). This can lead to more positive attitudes for learning, as well as lower student absenteeism and dropout rate.

Stratham and Torell, (1996) argued that, technologically rich learning environments provide for better development of life skills. These skills include organizational, problem solving, inquiry, and collaboration skills. The learning environment is improved by providing more cooperative learning and reduced competition. Research also has shown that technology integration increase the chances of interaction within the learning environment where students learn by doing and receive feedback to refine their understanding and build new knowledge (Keengwe, et al, 2008).



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Carlson & Gadio (2002) argued that, ICT cannot be transformative on its own and requires teachers to integrate it into the curriculum and use it to improve student learning. ICT has been introduced into education largely as a supplement to existing teaching and learning practices. However, there is still much to be done in terms of exploiting ICT to enhance pedagogical purposes (enhanced teaching and learning) (Collis & Van Der Wende 2002). While there are calls for educational institutions to use ICT to enhance teaching and learning, it is argued that teaching and learning is unlikely to be improved simply by the application of a new technology. Learning can be enhanced when innovations take into account not only the characteristics of the technology, but also the pedagogic design, the context within which learning takes place, student characteristics, their prior experiences and their familiarity with the technologies involved. It is therefore important that, designers and implementers of ICT consider access and use of ICT based on diverse backgrounds and circumstances of students and their potentials as well as pay attention to the 'digital divide' and use ICT where it is most appropriate (Kirkwood & Price 2005).



## CHAPTER THREE

### 3.0. Methodology

#### 3.1. Introduction

This chapter highlights the details of the relevant and appropriate research method that was used for this study. Explanations are provided as to how and where the research was carried out. The Chapter includes the general profile of the study area, methods and research design, sampling frame, sampling selection, methods of data collection, data handling and ethical consideration among others.

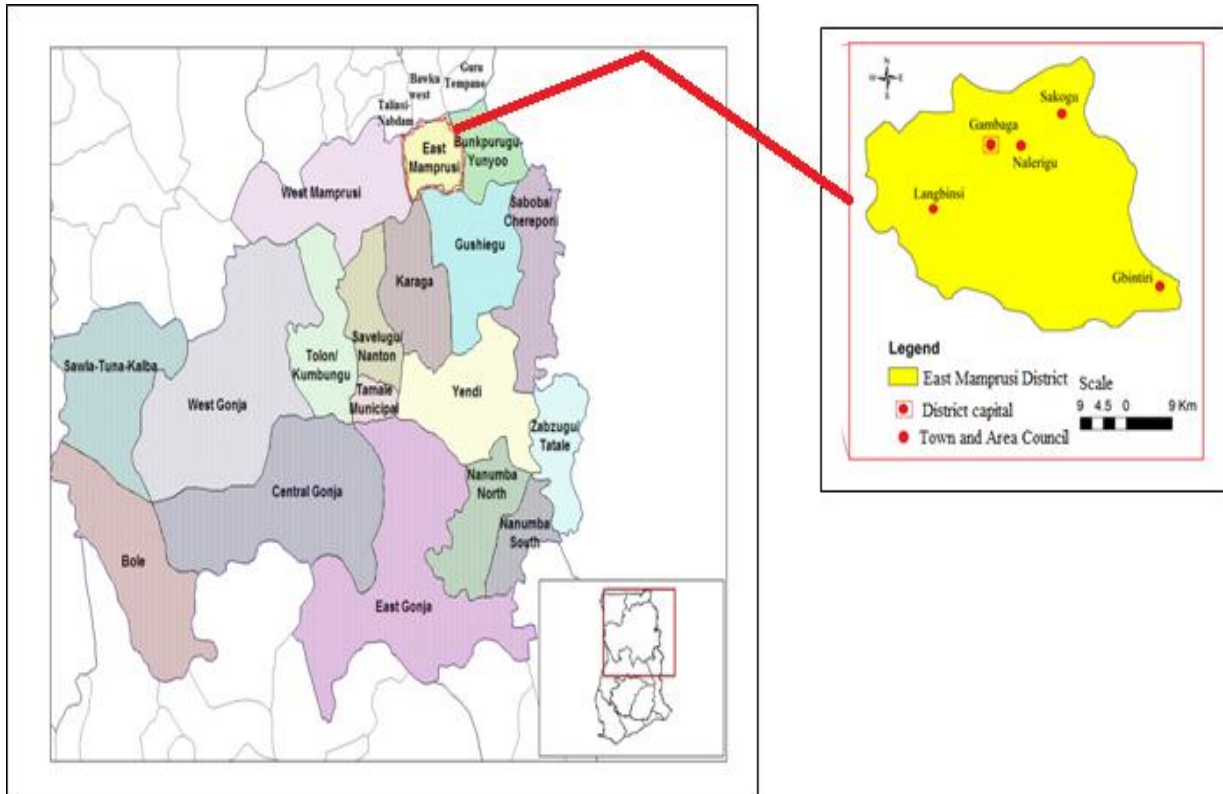
#### 3.2. Location and size of the EMD

The study was conducted in the East Mamprusi District of Northern Region. The East Mamprusi District (EMD) was established by Legislative Instrument (LI) 1776 (2004) with the capital located at Gambaga. Gambaga is a historic town lying next to the seat of the Nayiri, king of Mamprugu, and also the first headquarters of the Northern Territories. It is one of the oldest districts in the Northern Region. Out of it, the West Mamprusi district was carved in 1988. In 2004, the Bunkpurugu-Yunyoo district was also created to promote developments. It therefore served as the parent district for West Mamprusi and Bunkpurugu.

The district is located at the north-eastern part of the Northern Region. To the north, it shares boundaries with TalensiNabdam district, Bawku West and Garu-Tempene district, all in the Upper East Region and to the east is Bunkpurugu/Yunyoo district. It is bordered to the West by the West Mamprusi District and to the south by Gushiegu and Karaga districts. Figure 1 below shows the political map of the EMD on the map of Ghana



**Figure 1: Map of the East Mamprusi District**



Source: <http://mapsof.net/ghana/northern-ghana-districts>

### 3.2.1. Topography, drainage, Vegetation and Climate of the EMD

The district is characterized by a gently rolling topography with the Gambaga escarpment which marking the northern limits of the Voltain sandstone basin. The scarp stretches from east to west and at Nakpanduri the peak of the escarpment and its waterfalls.

Important drainage features in the district include the White Volta which enters the district from the northeast and is joined by the Red Volta near Gambaga escarpment with the Nawonga and Moba rivers also draining the south-western part ( Louknan, 2010; GSS, 2013). The district experiences a single rainfall regime with a mean rainfall of about 100cm to 115cm and an annual average temperature of 27<sup>0</sup>C. In years in which the rains are heavy, access to outlying settlements is difficult. The highest peak is the Gambaga scarp which is



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136.9m (449 feet) above sea level. Temperatures are generally high throughout the year. Low temperatures are however, experienced between November and February during the Harmattan period (Jamong, 2011).

### 3.2.2. Demographic Characteristics of the EMD

The population of EMD according to the 2010 Population and Housing Census report is 121,009 representing 4.9% of the region's total population. Males constitute 49% and females represent 51%. The district has a rural population of 81,850, representing 67.6%. The population of the district is youthful (0-14 years) representing 47.6%. About 33% of the of the population who are eleven years and older are literate while 67% are non-literate. The proportion of literate males is higher (39%) than that of females (27.5%). The average population density is 57 persons per square kilometre, which is lower than the national density of 79.7 persons per square kilometre but about twice the regional density of 26 persons per square kilometre. The low population density of the district may be as a result of the interaction between a harsh climate and ecology as well as migration and poverty. There are 142 communities in the district with total household population of 119,596. The majority 80,989 (67.7%) live in rural areas and the rest live in urban areas 38,607 (32.3%). The number of households in the District is 13,895. Out of this number, 5,069 (36.5%) is rural and 8,826 (63.5%) is urban. Compared to the regional figure (7.7), the average household size for the District is 8.6. Similarly, 7.6 and 9.2 are the average household size for both urban and rural localities respectively (GSS, 2013).



### 3.2.3. Socio-economic Activities of the EMD

About 76.8% of the population aged 15 years and older is economically active while 23.2% are economically not active. The major economic activities in the district are agriculture and trade. The majority, (90.6%) are engaged in agriculture. About 99% of the farmers are engaged in crop farming (maize, millet, sorghum, beans, groundnut among others) while

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77.3%, 0.4% and 0.3% engage in livestock, tree planting and fishing respectively. Agricultural production activities in the district are carried out by both males and females. Most crop farmers (82%) are small-scale holder farmers (cultivating up to 4 acres), while only 3% of the farmers have large scale holdings. The farming activities are depended on rainfall. Few farmers are also engaged in vegetable production in the dry season along river bodies within the district but on a very small scale due to lack of irrigation facilities in the district. Furthermore, almost every house in the district rear goats, sheep and chicken for domestic use and as a source of income for the family. Cattle on the other hand are reared for commercial purposes. Most of the inhabitants who rear cattle engage the services of Fulani herdsmen who are known to have expertise in cattle rearing (GSS, 2013; Jamong, 2011; Louknan, 2010).

The dominant trading activity in the district is the processing of agricultural produce such as groundnuts and shea butter. Shea butter and groundnut oil extraction is dominated by adult women. Processing of dawadawa, blacksmithing, bakery, pito brewing, food processing, carving and weaving of traditional textile and baskets are carried out on a small scale. There are three major functional markets centres at Nalerigu, Gbintiri and Langbinsi (GSS, 2013)

#### **3.2.4. Education and Literacy in the EMD**

The district has seventy one (71) public primary schools, nineteen (19) Junior High Schools, one (1) Youth Leadership Training Institute, two Senior High Schools, one (1) Nursing and Midwifery Training College, and one (1) Teacher Training college as well as University of Cape Coast Teacher Training Distance learning Centre. Aside these, there are also thirteen (13) private primary schools as well as three (3) private Junior High Schools. Moreover, the district can boast of two (2) public ICT Training Centres, one (1) public Library and one (1) Private ICT Training Institute.





The greatest problem facing education in the district is inadequate teachers. There are few trained teachers with a large proportion of untrained teachers. This situation adversely affects the performance of JHS and SHS pupils and students in the district. However, it is hoped that, the establishment of Teacher Training schools in the district will go a long way to improve the situation.

Literacy and education of people who are 11 years and older in the district is low. Only 24,440 (33%) of the population of 73,993 (11 years and above) can read and write with understanding. This indicates that 67% can neither read nor write. However, among those aged 11-19 years for both male and female, there are higher proportions of literate than non-literate. More females (72.5%) than males (61%) can neither read nor write in any language (GSS, 2013).

### **3.3. Scope of the study**

The study focused on the effects of ICT usage on students in the East Mamprusi District of the Northern Region. The investigation was carried out to ascertain the availability and access to ICT tools, purposes for which students used these tools, perceived competence of students in ICT usage, effects and challenges of ICT usage on students and finally gender difference in students ICT usage and competence. The 2007 Educational Reforms sought to equip all educational institutions with computer equipment and ICT tools in a prioritised manner beginning with pre-tertiary institutions which already had ICT laboratories and equipment to undertake the teaching and learning of ICT in school. It is on the basis of this, that the only pre-tertiary institutions in the district, thus; Nalerigu Senior High School, Gambaga Girls Senior High School, Nalerigu Nurses and Midwifery Training College and Gambaga College of Education were selected for this study to assess how ICT usage by students has affected their study habits. These schools that were selected are all located in two communities in the district (Nalerigu and Gambaga). Even though the study targeted students as the main



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respondents of this study, the views of some teachers, parents, school authority and internet cafe attendants were sought as part of the results of the study.

### **3.4. Research Design**

This study used both qualitative and quantitative approach in a survey method. Survey methods lend themselves to probability sampling from large populations. Thus, survey research is very appealing when sample generalisability is a central research goal. Survey research is often the means for developing a representative picture of the attitudes and characteristics of a large population. Survey research method is chosen for this study because it samples a number of respondents who all have to answer the same questions. Surveys are also efficient because many variables can be measured without substantially increasing the time or cost and relatively quickly.

#### **3.4.1. Population**

The need for selecting some respondents as sample cannot be over emphasised. Sampling is necessary because in dealing with large number, there is the need to get a fair representation of the people since everybody in the population cannot be studied. The study population comprised students, teachers, parents and internet cafe attendants. There are two Senior High Schools and two Colleges of Education and Health with a total population of at least 4,700 students. The school with the highest number of students among the four schools was Nalerigu SHS (2,265), followed by Gambaga Girls SHS (900), Nalerigu Nursing College had 840 students while Gambaga College of Education had only 695.

#### **3.4.2. Sample Selection**

A simple random sampling technique was used for selecting students and teachers from all the four schools. The sample consisted of 282 students and 40 teachers selected from the schools. In addition to this, fifteen (15) parents and four (4) internet cafe attendants within the study area were selected to participate in the study. In all, a sample size of 341 respondents was



selected. This sample size was chosen based on Sarantakos (1988) guide for sample selection which states that, for a population of 2800, a sample size of 338 can be used. Also, for a Population of 15 000, a sample size of 375 can be used while for a population of 20 000, a sample size of 377 can be used. Since the population of this study falls within, the stated populations and the sample size to be used, the sample size of 341 was considered appropriate for the study.

### 3.4.3. Sampling Procedure

List of students in each class from the four schools was obtained from the school authorities. Computer software (Excel) was use to randomly select 282 students and 40 teachers from the four schools. Each student was assigned a random number using the Excel formula “=RAND()”. After obtaining the random numbers, the “Rank formula” (=RANK(<n) in Excel was then used to rank the random numbers. Any name with a value of TRUE corresponding to it was considered randomly selected for the study. The same procedure was used in selecting 10 teachers each from the four schools. Table 1 provides details of samples selected from each group of respondents based on gender.

**Table 1: Distribution of respondents based on gender**

Categories	Number	Female	Male	Total
Students	4700	150	132	282
Teachers	194	10	30	40
Internet cafe attendants	4	-	4	4
Parents	-	5	10	15
Total	4798	165	176	341

**Source: Field survey, August 2015**

Table 2 below present detailed information on the number of boys and girls sampled from each of the four schools.

**Table 2: Distribution of Sampled students based on school and gender**

Name of School	Total Population	Girls		Boys		Total
		Frequency	Percentage	Frequency	Percentage	
Nalerigu S.H.S	2265	65	47.2	71	52.8	136
Gambaga Girls S.H.S	900	54	100	-	-	54
Gambaga College of Education	695	18	42.9	24	57.1	42
Nalerigu Nursing T. College	840	24	47.5	26	52.5	50
Total	4700	161	57.0	121	43.0	282

**Source: Field survey, August 2015**

Simple random sampling was employed to sample ten (10) Teachers each from the four (4) schools. Details of the number of teachers sampled from each school based on gender are presented in Table 3.

**Table 3: Distribution of Sampled Teachers according to School and Gender**

Name of School	Total Population	Female		Male		Total
		Frequency	Percentage	Frequency	Percentage	
Nalerigu S.H.S	78	5	50.0	5	50.0	10
Gambaga Girls S.H.S	58	4	40.0	6	60.0	10
Gambaga College of Edu	38	-	-	10	100	10
Nalerigu Nursing T. College	42	2	20	8	80	10
Total	194	11	27.5	29	72.5	40

**Source: Field survey, August 2015**

### 3.4.4. Purposive Sampling Technique

Purposive sampling is a sampling technique in which a researcher relies on his or her own judgment when choosing 64 members of a population to participate in the study. Since parents



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of Senior High School students and Colleges of Education and Health are scattered all over the country, purposive sampling was used to select 15 parents and 4 internet café attendance in the study area for interview.

#### **3.4.5. Sampling Procedure**

Home addresses of parents within the District were obtained from students for sampling. Parents who could easily be accessed were then contacted at their residence and work places for interview. All the four internet café Attendants in the study area were included in the study.

#### **3.4.6. Sources of Data**

Data for this study was obtained from primary and secondary sources. The primary data for this study was solicited from students in the four schools located in two communities in the EMD (Gambaga and Nalerigu). Primary data was also collected from, teachers, parents and internet cafe attendants through self-administered questionnaires, interviews, focus group discussion and observation. Data gathered from respondents formed the basis for the analysis and subsequent discussions and drawing conclusion on the findings. Secondary data on the other hand was used to complement the information solicited from the respondents by the researcher to discuss the problem under investigation and to draw valid conclusions. Sources for the secondary data was obtained from existing journals, articles, information from the web, newspapers as well as published and unpublished works of scholars in the study area.

### **3.5. Data Collection Instruments**

#### **3.5.1. Structured Questionnaire**

The main instrument used in this study was the questionnaire. Both closed and open ended questions were used. The open ended questions were used to allow the respondents to express themselves without any given limit. The questionnaire was chosen for this study because it was suitable for addressing almost all the research questions under investigation in this study.



They were also easy to analyse and data entry and tabulation for nearly all surveys can easily be done with several computer software packages(SPSS). Most people are also familiar with questionnaires and so researcher may not be required to take respondents through rigorous training.

### **3.5.2. Observation**

Observation was made in the four schools on the levels of availability of physical ICT facilities and services such as computer laboratories, computers and internet connectivity and how accessible they were to students. Observation provided first-hand information and supplementation of the other methods used. A check list was used to tick as well as write down key features of the observation.

### **3.5.3. Interview**

Semi-structured interviews were used to gather information from internet café attendants, and parents to find out how students used ICT to find out whether students used ICT outside the school and how they used it. Some ICT teachers were also interviewed during the observation tour of the schools to find out how they manage the laboratories and the computers as well as the students to enhance effective teaching and learning. Interview guide was developed to guide the interview and ensure that all areas of interest were examined.

### **3.5.4. Focus Group Discussion**

This method was employed to collect information from students on how ICT usage impacted positively or negatively on their studies. This method gave the respondents the chance to collectively air their views on the subject matter. It provided in-depth information on why students used certain media content and the satisfaction or otherwise derived. The use of this method also allowed the researcher to do multiple checks on the information gathered earlier through the use of questionnaires.



### **3.6. Quality assurance**

Follow up was made to retrieve unreturned questionnaires from respondents to achieve a higher response rate. In addition to this, the researcher before data analysis ensured that thorough checks were done on data to avoid too many errors during the analysis. This was done through data cleaning to deal with repetitions and other common errors which might compromise the quality of the analysis.

### **3.7. Data Analysis**

Data that was obtained from the field was organised through data cleaning and processing by coding and editing before data entry process. A descriptive statistical method was employed to analyse the data using Statistical Package for the Social Scientist (SPSS v16). Appropriate statistical tools as shown in the table below were used to process the raw data for interpretation and relevant inferences made from the output of the SPSS analysis. The data was analysed using frequency and percentage distribution as well as cross tabulation and chi-square test. Tables, bar charts and pie charts were employed for interpretation. Qualitative data on the other hand, was analysed by first understanding the data obtained from respondents by listening to recorded tapes of the interview, transcribing interviews from tape to paper, and reading over the written transcripts.

### **3.8. Ethical Considerations**

A written notice asking for permission to carry out the study was sent to the schools at least two weeks before data collection started. The researcher sought respondents' consent before involving them in the research. This included briefing the respondents about the research objectives and their role, and how they were going to benefit from the study. The researcher assured the respondents about the degree of confidentiality in the information that will be gathered from them.



## CHAPTER FOUR

### 4.0. Analysis and Discussion of Findings

#### 4.1. Introduction

This chapter presents the analysis and discussion of the results obtained from the data that was collected during the study. In all, two hundred and ninety two (292) respondents comprising, 240 students, 38 teachers, 12 parents and 2 internet cafe attendants took part in the study. This constituted a total response rate of 85.6% of all respondents.

The chapter is made up of six (6) sections. The first section presents the socio-demographic characteristics of the respondents. The second section is the analysis and discussion of the first objective of this study thus, availability and access to ICT tools in the four schools studied. The third section examines the purposes for which students used ICT tools. This is followed closely by the fourth section which examined students level of competence in ICT usage. The last section examines the effects of ICT usage on students as well as the challenges faced by students in using ICT tools in school while the final section looks at the differential impact of ICT on gender.

#### 4.2. Socio-Demographic characteristics of respondents

The socio-demographic characteristics of the respondents in respect of gender was carried out to: identify the number of respondents in each group who participated in the study, find out the number of students (boys and girls) who participated in the study from each of the four (4) schools, identify the ages of students and teachers as well as the number of years students have spent in school.

Table 4 presents information on the number of male and female respondents in each group that took part in the study.





**Table 4: Gender of all respondents who responded to the study**

Respondents	Gender				Total	
	Female		Male		Freq.	Perc
	Freq.	Perc	Freq.	Perc		
Students	133	55.4%	107	44.6	240	82.
Teachers	6	15.8%	32	84.2	38	13
Internet cafe Attendants	-	-	2	100	2	0.7
Parents	3	25%	9	75	12	4.1
Total	142	49.6%	150	50.4	292	100

**Source: Field survey, August 2015**

Table 4 shows that, the majority (55.4%) of the students who participated in the study were females while male students accounted for 44.6%. Initially, the design was to have an equal number of girls and boys, but because Gambaga Girls Senior High School is a single sex school, it became difficult to get equal number of students with respect to gender. Table 3 further shows that, fewer number of female teachers (15.8%) compared with their male counterparts (84.2%) participated in the study. It was noted during the study that fewer females compared with males could be found in all the schools visited. This can be attributed to the lower educational attainment rate of females compared with males as indicated by the 2010 Population and Housing Census (GSS, 2013)

Table 4 reveals further that, all the internet cafe attendants who took part in the study were all males. The internet cafe job may not be attractive to females because of the time required to manage a cafe, especially if it has to be combined with home management. Again it is clear from Table 4 that, only 25% of the parents who participated in the study were females while their male counterparts constituted 75%. This is not surprising because in the African setting and for that matter among the Mamprusi tribe which is the dominant tribe in the EMD,



husbands are perceived as owners of children and are therefore responsible for all their educational and financial needs. In view of this, despite the key role that women play in children's upbringing, they preferred their husbands to talk about issues relating to their children's welfare and educational needs. The discussion above is an indication of a male dominated society in the district.

The researcher also examined the number of students, both boys and girls who took part in the study from each of the four (4) schools. The details are presented in Table 5.

**Table 5: Name of school and gender of students respondents**

School	Gender				Total students respondents	
	Girls		Boys			
	Freq	Perc	Freq.	Perc	Freq.	Perc
Gambaga girls S.H.S	57	100	-	-	57	23.75
Nalerigu College of Health	15	33.3	30	66.7	45	18.75
Gambaga College of Education	18	54.5	15	45.5	33	13.75
Total	133	55.4	107	44.6	240	100

**Source: field survey, August, 2015**

Table 5 shows that, 240 students participated in the study. Out of this number, 55.4% were females while males constituted 44.6%. Most of the respondents (43.8%) came from Nalerigu SHS, followed by Gambaga Girls SHS (23.8%) and Nalerigu Nursing and Midwifery College (18.8%). The school with the least number of respondents was Gambaga College of Education (13.75).

Table 6 presents information on the ages of students who took part in the study.



**Table 6: Ages of students**

Age	Frequency	Percentage
Below 15	24	10
15 to 20	155	64.6
21 to 25	57	23.8
Above 25 years	4	1.7
Total	240	100

**Source: field survey, August, 2015**

Table 6 shows that, the majority (64.6%) of the ages of students fell within 15 to 20 years while 23.8% were between 21 to 25 years old. About 10% of the students were below the age of 15 years while only 1.7% of the students were above 25 years old. This suggests that, students in SHS and colleges of Education and Health in the EMD are aged between 15-20 years old.

The ages of the teachers who took part in the study were determined and presented in Table 7.

**Table 7: Ages of teachers**

Ages	Frequency	Percentage
Below 25	1	2.6
25 – 30	6	15.8
31 – 35	23	60.5
36 – 40	6	15.8
Above 40	2	5.3
Total	38	100

**Source: field survey, August, 2015**

Table 7 shows that, the majority (60.5%) of the teachers were between the ages of 31 to 35 years. About 15.8% of the teachers fell within the ages of 25 to 31 and 36 to 40 years age



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brackets respectively. Only 5.3% of the teachers were above 40 years while only 2.6% of the teachers were below 25 years. This indicates that majority of the teachers in SHS and colleges of education and health in the EMD were aged between 31-35 years old.

To determine the level of students in terms of the number of years they have spent in school, respondents were asked to indicate whether they were in first year, second year or third year.

Table 8 shows the number of years students have spent in school.

**Table 8: Number of years spent in school**

Years in school	Frequency	Percent
First year	55	23
Second year	174	72.8
Third year	10	4.2
Total	239	100

**Source: Field survey, August, 2015**

The data in Table 8 indicates that, the majority (72.8%) of the students were in second year, while 23% were in first year. Only 4.2% were third year students. At the time this data was being collected, third year students in second cycle institutions in Ghana had completed their final year WASSCE exams and had left school and therefore were not available to take part in the study. Third year students in colleges of education on the other hand were out of campus for their off campus teaching practice. Only third year students in Nalerigu Nursing and Midwifery Training College and a few of the Teacher Trainees who were doing their teaching practice within Nalerigu and Gambagatowship were available for questioning.

#### **4.3. Availability and access to ICT tools in school**

To determine the availability of ICT tools (the computer, the internet and the mobile phone) in school, students and teachers were tasked to state whether the above mentioned ICT tools were available in their respective schools. Details of this are presented in Table 9.



**Table 9: Availability of ICT tools in school**

ICT Tools	Students			Teachers	
	Response	Frequency	Percentage	Frequency	Percentage
Computer	Yes	230	95.8	38	100
	No	9	4.2	-	-
	<b>Total</b>	<b>240</b>	<b>100</b>	<b>38</b>	<b>100</b>
Internet	Yes	77	32.1	8	21.1
	No	163	67.9	30	78.9
	<b>Total</b>	<b>240</b>	<b>100</b>	<b>38</b>	<b>100</b>
Personal Mobile Phone	Yes	136	56.7	-	-
	No	104	43.3	-	-
	<b>Total</b>	<b>240</b>	<b>100</b>	<b>-</b>	<b>-</b>

**Source: Field survey, August, 2015**

Table 9 shows that, 95.8% of the students said computers were available in their school while only 4.2% indicated they had no computers in school. All the teachers (100%) said computers were available in their respective schools. This is a confirmation of what the researcher discovered during observation in the schools. It was observed that all the four schools had computer laboratories stocked with computers ranging from 25 to 75 computers. This finding is contrary to GeSCI and MoE (2009) as well as Asante's (2014) finding that, only 46% and 28% respectively of schools in Ghana had computers. This finding shows a remarkable improvement in the availability of computers in Ghanaian educational institutions. This could be as a result of Ghana government/GIFEC's effort to supply computers to all educational institutions in Ghana through the school connectivity project.



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As to whether there was internet connectivity in the respective schools of students, only 32.1% of the students said they had internet connectivity in their schools while the majority (67.9%) said they had no internet connectivity in their schools.

On the part of the teachers, only 21.1% indicated they had internet connectivity in their respective schools while the majority (78.9%) said there was no internet connectivity in their schools.

The researcher in the course of the study observed that, all the schools with the exception of Nalerigu College of Nursing and Midwifery had no internet connectivity. This shows that, there is serious deficiency in the availability of internet connectivity in schools within the EMD. This corroborates GeSCI and MoE's (2009) as well as GIFEC's (2012) finding that, only 17% and 17.5% of schools in Ghana had internet connectivity. It was noted that, almost all the schools surveyed had the necessary internet equipment such as wireless routers, switches, among others.

According to the ICT teachers and the heads of schools who were interviewed, most of the internet equipment which was found in the schools were donations from benevolent individuals and organisations. The heads of schools indicated further that, even though they had internet equipment in school, they were unable to afford monthly internet subscription of at least GHC300.00. This reinforces the point made by ITU (2012), Boateng (2012), Oguoma et al. (2013) that, income disparities and high cost of internet connectivity are partly the reasons for lack of ICT in educational institutions.

On the issue of students owning personal mobile phones, Table 9 reveals that, the majority (56.7%) claimed they had personal mobile phones in school while (43.3%) said they had no personal mobile phones in school. This shows that, notwithstanding the ban on students in SHS from using mobile phones in school, significant number of the students had personal mobile phones. This corroborates the finding by Asabere et al. (2012), Akanferiet al. (2014) and



Zuo Chen (2014) that, majority (100%, 99% and 70-95% respectively) of students in tertiary institutions in Ghana as well as high school students in Canada and China respectively had personal mobile phones. Comparatively, Asabere *et al.* (2012), Akanferi *et al.* (2014) and Zuo Chen (2014) recorded relatively high percentages of students who had personal mobile phones compared with those recorded in this study. This could be due to unwillingness on the part of the students in this study to disclose their ownership of personal mobile phones for fear of victimisation by the school authority as a result of the ban on students from the use of mobile phones in school. Lack of funds on the part of SHS students compared with their counterparts in the universities and the developed countries coupled with high cost of mobile phones could also be a reason why relatively fewer students had personal mobile phones in the EMD.

#### 4.4. Access to ICT tools by students in school

##### 4.4.1. Students access to computer in school

The study sought to find whether students had access to ICT tools in school. Table 10 presents the views of students and teachers on students' access to computers in school.

**Table 10: Access to computer in school as reported by students and teachers**

ICT Tool	Students			Teachers	
		Frequency	Percentage	Frequency	Percentage
<b>Computer</b>	Yes	205	86.5	38	100
	No	32	13.5	-	-
	Total	237	100	38	100

**Source: Field survey, August, 2015**

Table 10 reveals that, 86.5% of students said they had access to computers in school while 13.5% indicated they had no access to computers in school. All the teachers (100%) who took part in the study indicated that, students had access to computers in school. This finding shows that, Sarfo and Ansong-Gyimah's (2011) finding that, only 30% of students in Ghana

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had ever used a computer, is no longer the case. The results show that, there has been remarkable improvement in the number of students who gets access to computer in school.

The researcher in an interaction with some ICT teachers during observation in the schools, sought to find how students accessed ICT tools in school considering the huge number of students with the number of computer laboratories and computers available. It was noted that, schools had timetables which indicated the time within the week a particular class was supposed to visit the computer laboratory. It was further noted that, each class in the school was entitled to 1 hour 20 minutes practical time in the ICT laboratory per week due to limited number of ICT laboratories and computers.

The tutors conceded that, sometimes students are made to pair computers especially when some of the computers develop problems. This shows that students in the EMD had restricted access to computers in school unlike their counterparts in Australia as reported by Kennedy *et al.* (2008) that, 85.5% of students in Australia had unrestricted access to computers in school. This affirms the assertion by the UN (2003) that, many young people particularly in developing countries are excluded from the growing information revolution due to minimal availability of ICT tools. This shows that despite the global effort to eliminate the digital divide between the developed and the developing countries, the problem still persist.

Table 11 show details of other places where students get access to computer.

**Table 11: Other sources of students access to computer**

Source	Frequency	Percentage
Internet café	1	4.3
Anywhere on my own device	14	60.9
At home	2	8.7
From friends	9	39.1
Total	26	113.0

**Source: field survey, August, 2015**



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Table 11 shows that, only 10.8% of the students in this study got access to computer outside those provided by the school for students. The majority, (60.9%) of those who got access to computers outside the school used their own computers. In the same vein, 39.1% got access to computers from friends while 8.7% indicated they got access to computer at home. Only 4.3% of the students got access to computer at internet cafe. The results show that, most students got access to computer only when they were in school. Out of the 12 parents who were interviewed, only 3 representing 20% indicated they had computers at home which their wards used anytime they were at home. This is contrary to the finding by Sarfo and Ansong-Gyimah (2011) that, most SHS students in Ghana got access to computer at home. The results further show that, only a sizable number of the students in the EMD had access to computers outside the school.

The ICT teachers were asked whether there were any added value to students who had access to computer and internet outside the school in terms of their attitude towards ICT. The teachers answered that, students who had access to computers at home had positive attitude towards ICT and it was easier to teach such students ICT skills than those who did not have computers at home. They indicated further that, students with access to computers at home had good control of computer and could use them for variety of activities including learning.

#### 4.4.2. Students Access to Internet

On whether students in the schools surveyed had access to internet, 44.6% of the students indicated they had access to internet in school while 55.4% said they had no access to internet in school. This shows there has been significant improvement on access to internet in Ghanaian schools contrary to Sarfo and Ansong-Gyimah's (2011) finding that, only 3% of SHS students in Ghana used internet. This shows also that from 2011 to date access to internet in SHS and colleges in Ghana have seen remarkable increase. This increase could be attributed to the proliferation of wireless broadband technologies which allow students to



access internet anywhere with the right tools/device. The effort of government and civil society organisations in line with the NTP basic objectives of ensuring that, every citizen and resident of the Republic of Ghana has available, high quality, and affordable access to information and communication services in order to help transform Ghana into a knowledge-based society and technology-driven economy is on course.

The researcher further tasked students to indicate the medium through which they accessed internet in school. The result as reported by students is presented in Table 12. Students were asked to tick as many as was applicable to them.

**Table 12: Medium through which students access Internet in school**

ICT tool	Frequency	Percentage
Laptop computer	15	14
Desktop computer	55	51.4
Tablet	11	10.3
Mobile phone	42	39.3
Total	123	115

**Source: field survey, August, 2015**

Table 11 shows that, out of the number of students who got access to internet in school, the majority (51.4%) said they got access through desktop computers, 39.3% accessed internet in school through mobile phones while 14% got access to the internet through laptop computers. In the same vein, 10.3% of the students indicated they got access to internet through tablets. It is interesting to note from Table 9 and 12 respectively that, students who claimed they had internet connectivity in school were less than those who said they had access to internet in school. This is not surprising because several students had indicated they access internet through mobile phones and tablets which does not necessarily require connectivity provided by the school.



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The study revealed further that, students (especially in Nalerigu Nursing and Midwifery Training College which had a functional internet connectivity), were allowed to use their own mobile devices such as tablets and laptops to access internet provided by the school. This corroborate the finding by Zuo Chen (2014) which indicated that, high school students in Canada were allowed to bring their own ICT devices to school to access internet in and out of the classroom.

When teachers were asked whether students had access to internet in school, only 21.1% indicated students had access to internet in school while the majority (78.9%) indicated students had no access to internet in school. Most of the teachers however, indicated that some student had their own devices such as mobile phones, tablets, labtops and wireless modems which allowed them to access their own internet service in school. This finding shows that, the proliferation of wireless technologies in Ghana is making positive impact in terms of access to ICT in schools

Students were asked to indicate where else they got access to internet other than the school. Students responses regarding this question is presented in Table 13. Students were to tick as many as was applicable to them.

**Table 13: Other sources where students access internet other than the school**

Place of access	Frequency	Percentage
Internet café	14	14.3
At home	34	34.7
From friends	35	35.7
Anywhere on my own device	33	33.7
Total	110	118.4

**Source: field survey, August, 2015**

The analysis of data in Table 13 revealed that, 40.8% of students got access to internet from other sources other than the school. Out of this number 35.7% got access to internet from

friends while 34.7% got access to [www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh) internet at home. About 33.7% got access to internet through their own devices (mobile phones, tablets and laptops) while only 14.3% accessed internet through internet cafe.

It is evident from Table 13 that, the internet cafe is now the least place students accessed internet compared to about a decade ago when the internet cafe was almost the only place one could get access to internet service as indicated by Frempong (2005). The internet cafe attendants when contacted confirmed that, students patronage to internet services in their premises had been very low. This is at variance with Sarfo and Ansong-Gyimah's (2011) assertion that, most student got access to internet at internet cafe. It was further revealed by the internet cafe attendants that, students mostly visit the internet to access printing services, online WASSCE and BECE registration or check exams results. The low patronage to internet services from internet cafes could be attributed to the proliferation of mobile/wireless broadband services and also the high fees charged by internet cafes.

None of the parents who took part in the study with the exception of one (1) indicated they had internet access at home. This is in line with the GSS (2013) report on the 2010 population and housing census that, less than 1% of the households in the EMD used internet facilities. The results showed that, even though majority of the schools did not have internet connectivity, a good number of the students had alternative ways of accessing internet in the area. This finding however, contradicts Buami's (2013) finding that, about 70% of students in Nima, a suburb of Accra had no difficulty accessing internet services. This is not surprising as was reported in the literature by GSS (2013) that, the highest proportion of internet users in Ghana is found in the Greater Accra region. This lays emphasis on the persistence of urban-based pattern of telecommunication development in Ghana and other developing countries as opined by Frempong (2005).



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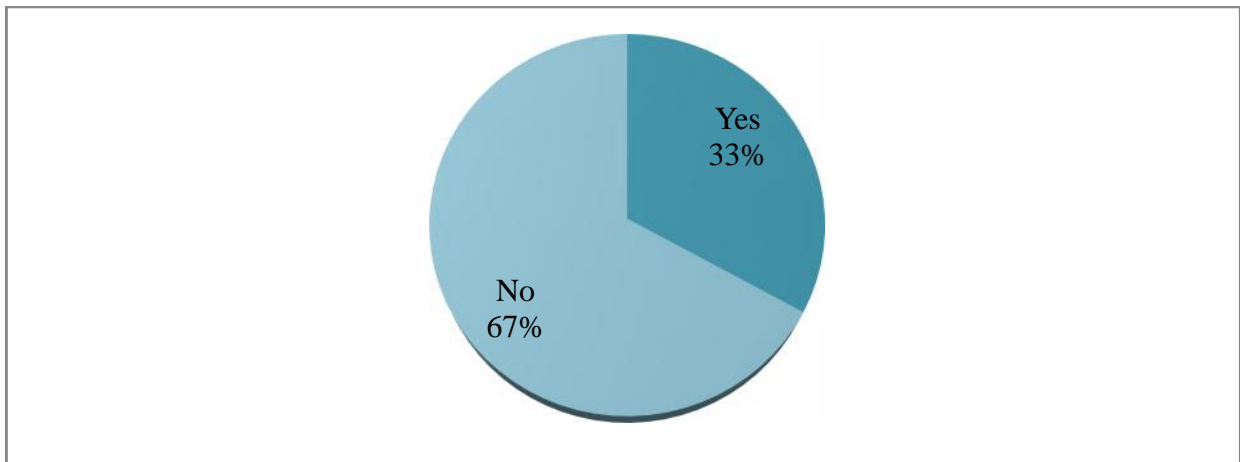
The results on access to computer and internet showed that while government and other relevant bodies are making efforts to increase access to ICT in school, little effort is being made by school management to ensure that there is a continuous access to ICT facilities by both teachers and students in schools. It was observed that most, ICT equipment such as computers, routers, printers and projectors which had developed problems (broken down) were left without any attempt to repair or replace them. Even though students were charged ICT levy of at least Ghc5.00 per term to maintain and keep the computer laboratories running, unfortunately some of the ICT laboratories in the schools surveyed had not seen any renovation or replacement of equipment whatsoever for years. The heads of schools especially those in SHS indicated that, even though students were being charged ICT levy every academic year, they (Heads of schools) were unable to use the money for the intended purpose. They indicated that, money collected as ICT levies were often diverted to feed students because government had failed to release feeding grants meant to feed students for more than two terms. The ICT teachers and some Heads of schools were of the view that, the only way that schools can run and sustain their computer laboratories is when the school's receives external support for maintenance and replacement of broken down ICT equipment.

#### **4.4.3. Students access to mobile phone**

Figure 2 presents information on whether or not students had access to personal mobile phones in school.



**Figure 2: Students Access to Mobile Phone**



**Source: Field survey, August, 2015**

Figure 2 shows that only 33% of students are allowed to use mobile phones in school while the majority (67%) said they were not allowed to use mobile phones in school. This finding as can be seen in Table 8 and figure 2 respectively suggests that, the majority (56.7%) of the students had mobile phones but did not use them in school. The reason for this is that, unlike the students in the Gambaga Colleges of Education and Nalerigu Nursing and Midwifery Training College who were allowed to use mobile phones in school, their counterparts in SHS (Nalerigu SHS and Gambaga SHS) were not allowed to use mobile phones in school. This finding corroborates Zuo Chen's (2014) study which indicated that, Chinese students unlike their counterparts in Canada, were not allowed to bring their ICT devices to school.

The survey also sought the views of teachers on whether they allowed students to use mobile phones in school. In response to this question, the majority (60.5%) of the teachers indicated they allowed students to use mobile phones in school while 39.5% said they do not allow students to use mobile phones in school. This finding suggests that, despite the ban on SHS students from the use of mobile phones in school by the GES, some teachers were reluctant in enforcing the rules thereby allowing students to use mobile phones in school. Some of the teachers interviewed by the researcher were of the view that, students should be allowed to use mobile phones in school because the mobile phones could be used by students to



support their learning and not allowing them to use will mean depriving them of an essential tool which could enhance their studies. They further stressed that, some students used mobile phones to access information on the internet to support their studies, socialise with friends and relatives, and get in touch with their teachers in time of need as well as calling for help when they were in trouble/danger. The teachers also noted that, rather than ban students from using mobile phones in school, students could be trained on how to use mobile phones appropriately to enhance their studies. This suggestion is in line with Mogambi (2015) that, students and educators need to be sensitized on the appropriate ways of using mobile phones in order to avoid the potential academic risks associated with high frequency cell phone use by students.

In spite of these, some teachers insisted that, there were very good reasons why students were not allowed to use mobile phones in school. The views of teachers on why students were not allowed to use mobile phones in school are presented in Table 14. Teachers were expected to tick as many as was applicable to them.

Table 14: Reasons why teachers do not allow students to use Mobile phone in school

Reasons	N	Percent
Students spend too much time on Mobile Phone at the expense of studies	16	94
Mobile Phone use by students detracts learning	14	82.4
They use their phones for dubious activities eg, pornography	9	52.9
The spend too much money on call credit	9	52.9
Other (enforcing G.E.S. rule)	5	29.4
Total	53	311.4

**Source: Field survey, August, 2015**

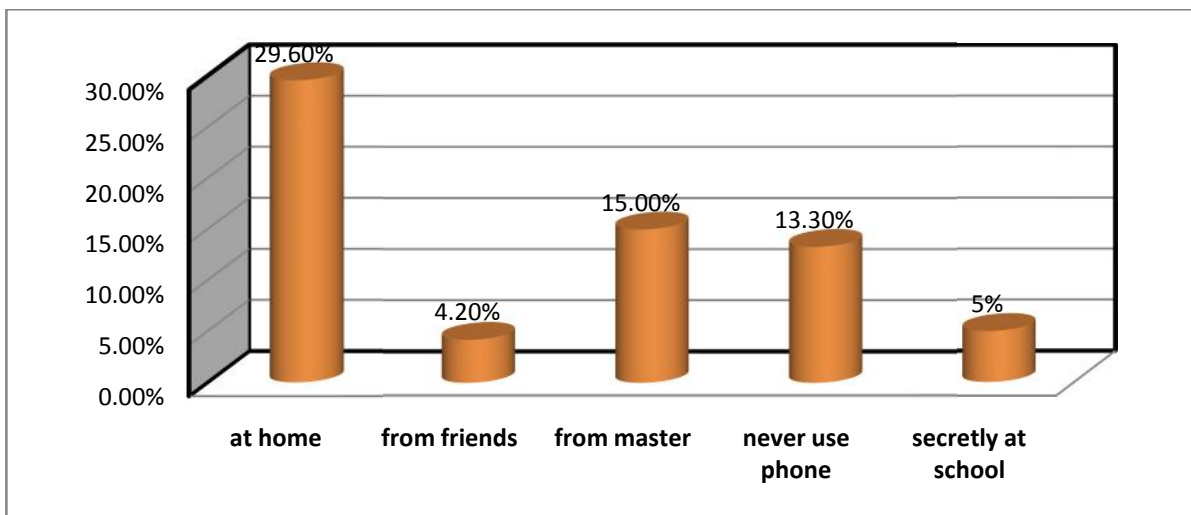
Table 14 reveals that, 44.7% of the teachers who participated in the study responded to this question. Out of this number, the majority (94%) said they do not allow students to use mobile phone in school because students spend too much of their time on mobile phone



usage at the expense of their studies while 82.4% teachers indicated that, the use of mobile phone by students in school distracted their attention from learning/lessons. These findings are supported by Kahari (2013) which found that first year university students in Zimbabwe at some point during studies make or receive calls and also checked their mobile phones several times anticipating a call or a message causing distraction to studies. Table 14 further indicate that about 52.9% of the teacher said, students use mobile phones for dubious activities such as watching pornography while the same number of teachers (52.9%) indicated students spend too much of their upkeep money on call credit and internet bundles. About 29.4% said their reason for not allowing students to use mobile phones in school is to enforce the directive by the GES.

Students who could not use personal mobile phones in school were asked if they used mobile phones elsewhere. Students response to this question is presented in figure 3.

**Figure 3: Alternative places where students get access to mobile.**



**Source: Field survey, August, 2015**

Figure 3 shows that about 29.6% students used mobile phones when they are at home while 15% indicated they get access to mobile phones from their masters/school workers in school. The results revealed further that, 13.3% of the students said they do not get access to mobile phones at all while 5% said they secretly use mobile phones in school. Only 4.2% of





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the students indicated they get access to mobile phones from friends. All the parents who were interviewed for the purpose of this study had personal mobile phones. About 58.3% of the parents indicated they call their wards in school through teachers and other school workers since their wards were not allowed to use mobile phones in school. Only 25% of the parents indicated they call their wards directly on their own personal mobile phones while 16.7% said they do not call their wards at all while they were at school.

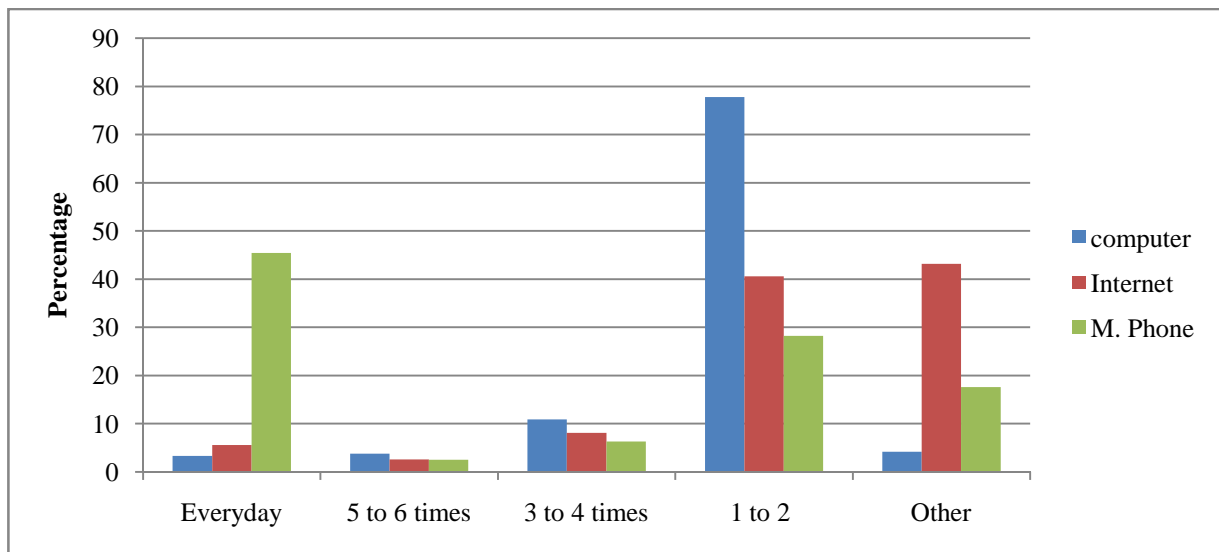
On whether their wards should be allowed to use mobile phones in school, about 41.6% of the parents said they will be happy if the school authority allowed their wards to use mobile phones in school. They complained they had to sometimes travel to see how their wards were doing in school when they could have easily called them to find out. The majority (58.4%) of the parents however, said students should not be allowed to use mobile phones in school because it may increase their (parents) financial burden. This view of the parents seems to agree with the teachers who said students spend too much of their upkeep money on call credit and internet bundles.

#### **4.4.4. Frequency of students access to ICT tools**

The study further sought to find out how frequently students got access to ICT facilities and tools in the EMD. Students were asked to indicate the number of times within the week they got access to computer, internet and mobile phone. Figure 4 gives details of students response to the question.



**Figure 4: Number of times students access ICT per week**



**Source: Field survey, August, 2015**

It can be seen from figure 4 that, the majority (77.8%) of the students said they used the computer at least once in a week while 10.9% of the students indicated they used computer 3 to 4 times a week. This corroborates Yurkymenko and Brown's (2009) research finding that, 53.3% of students in Ukrainian high schools used the computer at least once a week.

Furthermore, about 4.2% of the students said they either do not use computer or cannot tell the frequency to which they got access to computer while 3.8% said they used computer 5 to 6 times a week. Only 3.3% of the students said they used computer everyday contrary to Sarfo and Ansong-Gyimah (2011) finding that, 25% of students got access to computer every day.

Sarfo and Ansong-Gyimah (2011) found that 60% of students who have ever used the computer had computers at home, it is therefore not surprising that, greater number of the students used computers every day. Even though Sarfo and Ansong-Gyimah's (2011) study did not indicate the specific school within Ghana where the four schools were selected from, it could be that most of the schools surveyed were urban based schools. Studies have shown that people in urban areas get more access to ICT than those in rural areas (GSS, 2013; Frempong, 2005; Buami, 2013). Figure 4 further showed that, 43.2% of students either do not



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get access to the internet or cannot tell the frequency to which they got access. About 40.6% of the students got access to the internet at least once in a week while 8.1% indicated they used internet 3 to 4 times a week. Figure four further revealed that, 5.6% of the students used the internet every day while only 2.6% got access 5 to 6 times a week.

On the frequency for which students got access to mobile phone, about 45.6% of the students used mobile phones everyday while 28.2% used a mobile phone at least once in a week. About 17.6% of the students either do not use mobile phone or do not know the frequency to which they got access to it while 6.3% reported they used mobile phone 3 to 4 times a week. Only 2.5% said they used a mobile phone 5 to 6 times a week.

Analysis of the results in figure 4 indicates that, most of the students on one hand got access to computer and internet at least once every week. This confirms the report by the ICT teachers that, each class in the schools had access to computer facilities once every week. On the other hand, most students got access to mobile phone everyday. This is so because majority of the students had personal mobile phones which they used any time they wanted. It is also clear from the results that most students got access to computer more than they got access to internet and mobile phone. The reason for this could be as a result of the ban on SHS students from use of mobile phones and lack of internet connectivity in most of the schools surveyed.

Moreover more students indicated they did not use internet than those who said they did not use mobile phones. This shows that, it is easier for students to get access to mobile phone than the internet.

It was noted that most students had personal mobile phones which were not internet enabled and therefore could not be used to access the internet. It is important to note that, students who had no mobile phones could borrow from their friends to make calls and send messages to their friends and relatives.



Finally, the results in figure 4 show that, more students got frequent access to mobile phone than computer and internet while more students got frequent access to internet than computer. This implies that the computer is the least most frequently accessed ICT tool by students in the EMD.

#### 4.5.Purposes for which students used ICT

To determine what students used ICT for, students were to indicate by ticking as many as were applicable to them the items in Table 15 to 17. Table 15 show details of students response to what they used computer for.

**Table 15: Purposes for which students used the computer**

ICT usage	frequency	Percentage
Entertainment (playing games, music and watching movies)	134	59.3
Complete school assignment	91	40.3
Prepare documents with e.g. Word, Excel and PowerPoint	104	46
Learn typing skills	162	71.7
Learn subject taught in school	72	31.9
Learn basic computer application software skills e.g. Excel among others	126	55.8
Total	689	304.9

**Source: Field survey, August, 2015**

The results obtained from SPSS for the analysis presented in Table 15 shows that, 226 students representing 94.2% responded to this question in a multiple response dataset. It can be seen from Table 15 that, the majority (71.9%) of the students said they used the computer to learn typing skills while 55.8% used the computer to learn basic computer application software skills. Meanwhile about 46% of the students said they used the computer to prepare documents using MS Office suite application. The researcher also observed that, most



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students used the computer during ICT lessons to acquire computer literacy skills rather than for learning subjects taught in school. It is therefore not surprising that, the majority of the students indicated they used the computer to acquire typing skills and application software such as MS Excel, MS Word among other skills. These findings agree with Sarfo and Ansong-Gyimah's (2011) finding which indicated that, most students in SHS in Ghana used the computer to acquire computer skills rather than for pedagogical purposes. Similarly, 59.3% of the students said they used the computer for entertainment purposes (playing games, watching movies and listening to music). This corroborates the finding by Ismail and Ahmad (2013) and Ogur et al. (2004) that, the majority of students (84% and 70% respectively) used the computer for entertainment purposes.

Table 15 further shows that, 40.3% of the students used the computer to complete school assignment while 31.9% of the students said they used the computer to learn the subject taught in school through electronic learning resources such as Encarta dictionary, Encyclopaedia and multimedia CDs/DVDs. These electronic learning tools/resources were installed on the computers in almost all the schools' ICT laboratories by the ICT teachers to assist students find information relating to their study areas in the absence of internet connectivity. However, most of the ICT teachers complained that only a handful of the students were making good use of the material. The teachers added that, most of the students preferred playing games and watching movies on the computer rather than using it to find information on their subjects of study. The researcher noted further that, the school assignment that students claimed they used the computer to complete were ICT skills related work given to students by their ICT tutors to use the computer to complete and not general school assignments (from various subject areas). The attitude of students observed in this study regarding the use of the computer for learning purposes is contrary to the assertion by Lau and Au's (2002) that 89% of students used the computer for study purposes.



The analysis of results on the reasons for which students used the internet is presented in Table 16.

**Table 16: Purposes for which students used internet**

Internet usage	Frequency	Percentage
Send and receive emails	83	37.4
Registration of exam and result checking	72	32.4
Chat with friends and relatives on e.g. facebook, twiter among others	139	62.6
Watching movies and playing music	108	48.6
Playing games	105	47.3
Downloading songs/movies and games	80	36
Searching for money making opportunities online	14	6.3
Learn subjects taught in school	92	41.4
Other (monitor live football scores online)	12	5
Total	705	317.2

**Source: Field survey, August, 2015**

SPSS Output for the analysis of data presented in Table 16 shows that, 222 students representing 92.5% of the students responded to this question in a multiple response dataset. Table 16 shows that, the majority (62.6%) of the students used the internet to chat with friends and relatives on social media. This is in line with Lau and Au's (2002) finding which indicated that, 66.5% of students used the internet to chat on social media. About 48.6% of the students used the internet for watching movies and listening to music while 47.3% used internet for playing games. Table 15 further shows that, 41.4% of the students indicated they used the internet to learn subjects taught in school contrary to the finding by Ismail and Ahmad (2013) that 85% of students in Malaysian High School used the internet for study purposes. The finding however is consistent with the finding by Acheampong (2012) that, only 25% of students in Ghana used the internet for learning purposes.



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The inability or lack of interest on the part of SHS and College students in the EMD to use internet for academic purposes could be attributed to lack of internet access in most of the schools. Table 16 further indicates that, 37.4%, 36% and 32.4% of the students used the internet for sending and receiving emails, download/playing songs, games and watching movies as well as for online exam registration and checking exam results respectively. This finding is contrary to Ogur et al.'s (2004) finding that, 81.6%, 70.5% to 91.9% used the internet for sending and receiving emails and downloading/playing music, games and movies respectively. Meanwhile only 6.3% and 5% of the students indicated they used the internet to search for money making opportunities online as well as using the internet for other purposes such as monitoring "live football matches online and reading news. The study found that, teachers did not engage students in internet usage activities which related to their studies as a result of lack of internet connectivity in their respective schools. The teachers however indicated generally that, students who manage to get access to internet mostly used it for social networking (facebook, twitter, whatsapp among others) rather than for academic purposes. Almost all the parents who were interviewed indicated they had no idea how their wards used the internet but were concerned about the proliferation of internet fraud popularly known as "Sakawa" which they claimed had become very prominent among young people within the study area and beyond. However, the results in Table 16 indicate that only 6.3% of the students in the schools surveyed are likely to be involved in internet fraud or search for money making opportunities on the internet.

The analyses of the results in Table 16 suggest that, students in the EMD used the internet for communication (chatting on social media) purposes.

Table 17 present information on what students used mobile phone for.



**Table 17: Purposes for which students use mobile phone**

Mobile phone usage	Frequency	Percentage
Making and receiving calls	183	90.1
Browse the web/internet	99	48.8
Sending and receiving text messages	114	56.2
Chatting (whatsApp, facebook, viber among others)	86	42.4
Listening to music	96	47.3
Listening to radio	94	46.3
Playing games	107	52.7
Other (mobile money transfer, learning and taking pictures)	28	12.1
Total	807	395.8

**Source: Field survey, August, 2015**

It can be seen from Table 17 that, the majority (90.1%) of the students used mobile phone for making and receiving calls while 56.2% used mobile phone for sending and receiving text messages. This finding is supported by North, et al.'s (2014) finding that, the reasons why students used mobile phones in Australia and Malaysia was the convenience of being able to contact others and be contacted regardless of time and location through calls and messaging.

It is further shown on Table 16 that, 52.7% of the students used mobile phone for playing games. Moreover, 47.3% and 46.3% use mobile phone for listening to music and radio respectively. About 42.4% use the mobile phone for chatting on social media contrary to Omotayo & Manoj's (2014) finding that, 66.7% of students in South Africa used the mobile phone for chatting on social media. Majority of students in the EMD did not use mobile phone to chat on social media probably because most students could not afford internet enabled mobile phones. About 48.8% said they used mobile phone to browse the





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web/internet while 12.1% indicated they used mobile phone for other purposes including mobile money transfer, learning and taking photographs.

The results on the purpose for which students in the EMD used mobile phone was for communication (making and receiving calls as well as sending and receiving text messages) and also for entertainment (playing games).

This study sought the views of teachers on students attitude towards mobile phone use in school. The majority (55.3%) of the teachers said students spend most of their study and leisure time making and receiving calls, playing games and chatting on social media through their mobile phones. The teachers were of the view that, students needed to be trained on appropriate ways of using mobile phones especially for studies instead of banning them from using mobile phones. The teachers indicated further that, just as students are trained to use computers, it was equally important they were provided with the appropriate competency skill training that will help them to use mobile phones appropriately to enhance their studies. Most of the parents who were interviewed also indicated that, their wards while at home used mobile phones, mostly to call their friends and relatives.

In terms of how much time and frequency of mobile phone use by their wards, the majority (75%) of the parents indicated they had no problem with the pattern of their wards mobile phone usage. About 16.7% of the parents said they had no idea how their wards used mobile phones while 8.8% of the parents indicated they were worried about their wards mobile phone usage pattern because of the attention they gave to it and feared such attitude might affect their academic performance.

The analysis of results in Table 15 to 17 shows generally that, students in the EMD use computer for acquiring computer skills and entertainment but internet and mobile phones were largely used for communication and recreational/entertainment purposes rather than for academic purposes.



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Unlike computer skills which are taught in school, internet and mobile phone usage skills are not taught due to inadequate internet facilities in almost all the schools surveyed. Also, the restrictions put on SHS students mobile phone usage have contributed to the inability of students to explore the possibilities of using mobile phone to support learning.

The study further sought to find whether teachers engaged students in the use of ICT for learning. It was noted that, only ICT teachers engaged students in computer use mostly for learning basic computer skills such as typing and application software use (MS Office Suite). This was to be expected because ICT is only taught in school as a subject, it has not been integrated into the teaching and learning of subjects taught in school. This is against the backdrop of the constructivism proposition of creating learning environment where students can use technology to construct their own knowledge. The parents who indicated they had computers at home also indicated that, their wards mostly used the computer for typing, learning, playing games, listening to music and watching movies.

From the above finding it can be concluded that, students in the EMD used ICT purposely for the acquisition of computer skills, entertainment needs (playing games, music and watching movies) and communication needs (making and receiving phone calls, Text messaging and chatting on social media). This finding defeats the constructivist view that, ICT use helps students to construct their own knowledge and apply it to their already existing knowledge structures to enhance their studies.

The finding on the purposes for which students used ICT is not encouraging for students in the 21<sup>st</sup> century where ICT has become the preferred tool for effective teaching and learning. Students would most likely use ICT for academic purposes if they had unrestricted access and appropriate training on how to use it especially the internet and mobile phone for learning. This is consistent with Davis' (2003) assertion that, the use of ICT for teaching and learning can only be achieved when ICT tools are adequately available and accessible to all students in



school at all time. This finding [www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh) also shows that, the GES and MOE's (2002) proposed integration of ICT tools and the promotion of ICT as a learning tool in the school curriculum at all levels of Ghana's educational systems as well as the proposals and strategies in the national ICT4AD policy and its related policies in education is yet to yield the desired outcome as far as education is concerned.

#### **4.6. Students level of competence in ICT usage**

To ascertain whether students had ever learnt ICT, the researcher tasked students to indicate whether or not they learnt ICT in school. Students response to this question indicates that, almost all students (99.2%) learnt ICT in school while only 0.8% said they did not learn ICT in school. No student indicated they had learnt ICT outside the school. This response was expected because ICT is taught as a compulsory core subject in all Second Cycle Institutions and Colleges of Education and Health in Ghana. This finding is in line with UNESCO's (2003) assertion that, the safe way to bring computers to schools is teaching students the skills of how to use various ICT tools and applications. It is however, contrary to Mudasiru and Modupe's (2011) and Wallet's (2014) finding that, most student gained their competency in the use of ICT through personal study, family or friends and through training outside the school.

To determine the level of students competence in ICT usage, the researcher tasked students to indicate their level of competence (Much Knowledge, Little Knowledge and No knowledge) in each of the 18 items listed in Table 18 and 19. Table 18 provides information on respondents' level of competence in computer usage.



**Table 18: Studentslevel of competence in computer usage**

Activity	Much Knowledge	Little Knowledge	No Knowledge
Use all the keys on the Key board	35%	45.8%	19.2%
Name and save work on a drive	35%	39.2%	25.8%
Save and load work onto and from a disk	27.1%	32.2%	38.8%
Copy files onto an external disk/drive	19.2%	41.2%	39.6%
Print a document from a computer	21.2%	39.2%	39.6%
Use media files to play music and video	58.8%	34.6%	6.7%
Connect a computer to the internet	32.5%	30.4%	37.1%
Use of word processor	51.2%	35.4%	13.3%
Use Presentation software (PowerPoint)	37.5%	42.1%	20.4%
Use of Spreadsheet (Excel)	47.5%	30.4% %	22.1%

**Source: field survey, August, 2015**

Results from Table 18 show that, the majority (58.8% and 51.2%) of the students indicated they had much knowledge in the use of media player and word processor respectively. In the same vein, 34.6% and 35.4% said they had little knowledge in using media player and word processor respectively while 6.7% and 13.3% of the students said they had no knowledge in the use of media player and word processor respectively. Table 18 further shows that most of the students (47.5%) had much knowledge in the use of spreadsheet with only 30.4% and 22.1% indicating they had little and no knowledge respectively. In addition to this, most students (45.8%, 42.1%, 41.2% and 39.2 %) said they had little knowledge in the use of the keyboard, presentation software, copying files onto an external disk/drive as well as naming and saving work on a drive respectively while (37.5%, 35%, 35%, and 19.2%) of the students said they had much knowledge in using presentation software, keyboard, naming and saving



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work on a drive as well as copying files onto an external disk/drive respectively. Meanwhile 39.6%, 25.8%, 20.4% and 19.2% said they had no knowledge in copying files onto an external disk/drive, naming and saving work on a drive, using Presentation software (PowerPoint) as well as using all the keys on the Keyboard respectively. It was further revealed from Table 18 that, most of the students (38.8%, 39.6% and 37.1%) had no knowledge in using the computer to save and load work onto and from a disk, print a document from a computer and connect a computer to the internet respectively.

It is clear from the analysis of the results in Table 18 that, students in the EMD had much knowledge in the use of media player, word processor and to some extent spreadsheet applications while most of the students also had little knowledge in the use of the keyboard, presentation software, copying files onto an external disk/drive and naming and saving work on a drive.

The ability of the students to use word processor, spreadsheet and to some extent PowerPoint corroborates Danner and Pessu's (2013) and Blankson's (2015) finding that, students in teacher preparation programmes in the University of Benin and students and teachers in Second Cycle Institutions in the Cape Coast Metropolitan area respectively perceived themselves to be competent in basic computer application competence such as word processing, spreadsheet and powerpoint which they learnt in school. It however, contradicts Meiers and Pat's (2009) report that, Australian students had little capability in ICT competencies such as word processing, spreadsheet, among others. The reason for this could be that, while teachers and students in developing countries spend time teaching and learning computer application software skills such as word processing, most of their counterparts in the developed countries focus on computer skills that can support their studies.

Table 18 further shows that, most students had no knowledge in saving and loading work onto and from a disk, printing a document from the computer and connecting a computer to the



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internet. This is understandable because almost all the schools surveyed lacked printing equipment, internet connectivity and personal (students) storage device which they could use to learn how to print, connect a computer to the internet and copy files to and from personal drives respectively.

In view of this finding, it can generally be concluded that, students in the EMD had basic computer usage competence necessary to interact with the computers in their respective schools. It was noted from the study that, most of the students had positive attitudes towards ICT and had overwhelming interest in acquiring more skills to be able to use ICT effectively. The students attitudes and their level of competence revealed by this study, can be described as progressive as per Hall's (2005) classification of computer users. Hall (2005) described progressive computer users as those who are ready for whatever it takes to have more knowledge of the computer and they spend their time and money to learn more about the technology.

However the mind set of most of the students and teachers can be likened to a group of computer users who Rowe (1993) referred to as "Machinists". Rowe (1993) described Machinist computer users as those who view computers as non-essential and tools which are mainly used for calculation, gaming and word processing. Most of the students had no idea how ICT could be used to enhance their studies rather than for learning computer skills and entertainment. This goes to emphasise the need to enforce the views expressed by Means and Olson (1994) that, since the computer is seen as a real-life tool applicable to future employment, its use should be geared towards authenticating students work in order to promote attitudes important for life-long learning. This according to Means and Olson (1994) requires teachers and students to focus on the technology process rather than the systemic development of prescribed list of skills.



Further analysis was carried out to determine the level of students competence in internet usage. The result on this is presented in Table 19.

**Table 19: Students competence in internet usage**

Activity	Much knowledge	Little knowledge	No knowledge
Use mobile phone to browse the web	27.1%	34.2%	38.8%
Use the Internet to search for information	19.2%	41.2%	39.6%
Send an email and receive a reply	24.2%	45.0%	30.8%
Find information on the subject taught in school	29.2%	43.8%	27.1%
Use the Internet to complete assignment	22.3%	42.9%	34.6%
Chat on social media e.g., facebook and twitter	41.2%	32.9%	25.8%
Use the Internet to read news	33.2%	40.8%	25.8%
Use the Internet to make money online	11.7%	20.4%	67.8%

**Source: field survey, August, 2015**

The results in Table 19 reveal that, 38.8% of the students had no knowledge in using the mobile phone to browse the web while 34.2% of the students said they had little knowledge in using the mobile phone to browse the web. Only 27.1% indicated they had much knowledge in using the mobile phone to browse the web. Most students had no knowledge in using the mobile phone to browse the web because they lacked internet enabled phones. The researcher observed that, only few students mostly those in the College of Education and Health in the district had internet enabled mobile phones including smart phones. Most students probably did not have internet enabled mobile phones and or smart phones because they were expensive. It could also be as a result of the ban on SHS students from using mobile phone in school.

Table 19 further revealed that, most of the students (45%, 42.9%, 41.2% and 40.8%) indicated that, they had little knowledge in the use of internet for sending and receiving emails,



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completing assignment online, searching for information as well as reading news online respectively. This is inconsistent with Meiers and Pat's (2009) claim that, students had much knowledge in the use of internet for communicating with peers through emails as well as searching for information on the internet. In the same vein, 39.6%, 34.6%, 30.8% and 25.8% indicated they had no knowledge in the use of the internet for searching for information, completing assignment online, sending and receiving email as well as reading news online respectively while 33.2%, 24.2%, 22.3% and 19.2% said they had much knowledge in the use of the internet for reading news online, sending and receiving email, completing assignment online as well as searching for information respectively.

It is also clear from the results in Table 19 that, most students indicated they had no knowledge in the use of the internet to search for money making opportunities online (67.8%) and using the mobile phone to browse the web (38.8%). In addition to this, 20.4% indicated they had little knowledge in the use of the internet to search for money making opportunities online while 11.7% said they had much knowledge.

The analysis of students' competence in internet usage shows that, greater proportion of the students had little knowledge in internet usage except the use of the internet to chat on social media (facebook and twitter) which most students indicated they had much knowledge. It is also clear from Table 19 that, greater proportion of the students (67.8%) had no knowledge in the use of the internet to search for money making opportunities online. This comes as a relief to parents as it will allay their fears on the possibilities of their wards being lured into internet fraud (sakawa).

#### **4.7. Effects and Challenges of ICT usage on students**

##### **4.7.1. Positive effects of ICT usage on students**

This survey sought the views of students on how ICT use affected their studies either negatively or positively. Students were tasked to indicate by ticking as many as was





applicable to them, the items in Table 20 and 21. Students responded to the items in Table 20 and 21 were analysed and discussed with results obtained from students in a focus group discussion. Table 20 presents information on students' response to the positive effects of ICT on their studies.

**Table 20: Positive effects of ICT on students**

Effects	Frequency	Percentage
Students are able to communicate easily with teachers and friends for study support and guidance	102	66.2
ICT helps students to learn fast and on their own	76	49.4
ICT serves as source of entertainment	113	73.4
Receive money from parents through ICT	72	46.8
able to learn for longer period using ICT	74	48.1
search and get information from the internet to enhance studies	71	46.1
Total	508	329.9

**Source: Field survey, August 2015**

Table 20 shows that, the Majority (73.4%) of the students said ICT serves as source of entertainment to them. According to the students they used ICT especially the mobile phone and the computer at their leisure time to listen to music, watch videos and played games. The students claimed using ICT for entertainment helped relieve them from stress and boredom. This is supported by Islam and Fouji's (2010) finding that, some students of ASA University in Bangladesh viewed ICT as a source of recreation rather than a learning tool.

The results further revealed that, about 66.2% of the students said ICT helped them to get in touch with their teachers and friends for study support and guidance whenever it was necessary to do so. According to the students, they contact their teachers and friends through phone calls, text messaging and chats to seek their support whenever they faced challenges in their private studies. It was observed that, the most common channel of communication



between students and teachers was through phone calls, text messaging and WhatsApp messaging; emails were used at a very minimal level. This corroborates the assertion by Quarshie's (2012) finding that, the use of ICT in school allowed students to work together, encouraging the sharing of ideas and cooperative learning which may lead to gains in cognitive abilities such as memory, spatial and logical problem solving, critical thinking, concentration, abstraction and comprehension.

About 49.4 % of the students indicated that ICT helped them to learn on their own without any support or guidance especially during school vacation holidays while 48.1% said with the use of ICT they are able to study for longer periods of time. Most of the students said playing mathematical games and other useful interactive programmes like Mavis Beacon and multimedia DVD using computer, helped them to study for longer periods of time and improved their understanding.

It can also be seen in Table 20 that, 46.8% of the students usually receive their upkeep money from their parents through mobile money transfer. It was noted that, students no longer find it difficult receiving their upkeep money from their parents as they easily walked into a mobile money transfer vendor to withdraw money sent to them by their parents/guardians. All the parents who were contacted on this issue said they send money to their wards through mobile money transfer for their upkeep and purchasing of learning materials. They indicated it was more convenient, safer and faster than any other way of sending money to their wards while they were in school. Finally, about 46.1% of the students said they were able to get information on the internet to support their studies. The students were of the view that their ability to find information relating to their courses of study has reduced the amount of money they would have required to purchase textbooks. They also indicated it is easier to find answers on the internet to complete assignments than in textbooks. This finding is supported by Bataineh and Baniabdelrahman (2005) and Mba (2010) who argued that, most students



used computers and mobile phones with the internet to download and save relevant information from the internet to enhance their studies.

The analysis of the results in Table 20 shows that, the majority of the students enjoyed the use of ICT as a recreational/entertainment to relieve them from stress and boredom. They were also satisfied with the ease of communication with teachers, relatives and school mates through ICT for study support and guidance. The above results indicate that students in the EMD failed to fully take advantage of the availability and access to ICT facilities and tools to enhance their studies.

#### 4.7.2. Negative effects of ICT usage on students

The researcher further tried to find which areas of ICT usage had negative effects on students.

Table 21 presents results regarding the negative effect of ICT on students.

**Table 21: Negative effects of ICT usage on students**

Effects	Frequency	Percentage
The use of ICT for entertainment, calls and chats consumes chunk of students study time.	111	52.4
Students get distracted by calls, messages/chats from friends and relatives while studying.	108	50.9
Students spend their upkeep money on call credit and data bundles	99	46.7
Chat on social media using abbreviated words affects students spelling and grammar proficiency.	107	50.5
Too many phone calls and whatsapping the previous night makes students sleep in class the next day while lessons are in progress	94	44.3
Total	505	238.2

**Source: Field survey, August 2015**

Table 21 shows that, 52.4% of the students indicated that, the use of ICT for activities such as playing games, listening to music and watching movies consumed chunk of their study time and affected their studies negatively. Valentine & Pattie (2005) argued that, the more time students spend playing computer games and other recreational activities, the less time



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they may have available for other tasks, including homework and study. Valentine & Pattie, (2005) therefore advocated for the need to make students aware of the negative effects of predominantly leisure uses of ICT and rather encourage them to adopt a more responsible attitude to the use of ICT for school work/studies.

It can be seen from Table 21 that, 50.9% of the students said they sometimes get distracted by phone calls, text messages and chats from friends and relatives while studying. They claimed making or receiving mobile phone calls, sending and receiving text messages and chats distracted their attention and caused them to lose focus on their studies. This finding corroborates Kahari's (2013) study which found that students at some point during studies made or received calls, checked their cell phones several times in anticipation of a call or a message. The finding is also in line with North et al.'s (2014) report that, even though there were several benefits of using a mobile phone, there were also negative effects on the users and the environment, as it can disrupt lessons and distract attention when they are used at inappropriate times and places.

Furthermore, the amount of time students spend on ICT especially mobile phone has been a cause for concern among school authority as has been indicated in this study. Some teachers expressed worry about the way some students have become addicted to their mobile phones at the expense of their studies. Most students in a focus group discussion confirmed this by saying, they do sometimes spend too much time on their mobile phones either making calls or chatting with friends and relatives on social media about issues that were unrelated to their studies. Loss of productive time to ICT especially mobile phone was reported in the literature by Louis-Philippe and Murphy (2013) that, the ban on students from use of mobile phone in some schools in the UK was equivalent to increasing the academic year by an additional week. This clearly shows the amount of time lost by students to mobile phone usage in school and its impact on their studies.



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Table 21 also show that, 50.5% of the students indicated they were affected negatively by the use of shortcuts or abbreviations such as, d (the), urs (yours), 2moro (tomorrow) among others while chatting on social media. According to the students, they used these shortcuts when chatting on social media with their friends however, they do sometimes forget and apply them on their assignment and exams scripts as well as other important documents. The teachers who were interviewed on this issue admitted that, students sometimes on their exam scripts used some uses expressions and abbreviated words which were very difficult to understand. This finding is supported by Kahari's (2013) study which argued that, the use of shortcuts or abbreviations by students on social media chats negatively affected their spelling and grammar proficiency resulting in the use of abbreviated words, incorrect subject-verb agreement and misspellings in assignments and examination scripts.

Table 21 further revealed that, 46.7% of the students said they used part of their upkeep money to buy call credit and internet bundles. On this issue most teachers said students spend most of their upkeep money on call credit and internet/data bundles. This according to the teacher has resulted in some students indulging in stealing and prostitution to survive on campus. This they indicated was worrying because some of the student girls end up becoming pregnant and drop out of school while others contract sexually transmitted diseases. Some of the boys on the other hand, engaged in internet fraud, drug use, stealing and other social vices.

It is also revealing to note from Table 20 that, 44.3% of the students claimed they sleep in class the next day while lessons were in progress because of the time they spent chatting on social media and phone calls the previous night. This finding is in line with Massimini and Peterson's (2009) report that, the use of cell phones, e-mail, and social networking sites (SNs) were all major contributors to students' class lateness and sleep loss.



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To delve further into the effects of ICT usage on students, the researcher tasked students to indicate whether the use of ICT helped to improve their performance in school. Students response to this question indicates that, the majority(51.2%) said the use of ICT doesnot improve their performance in school while 48.8% saidthe use of ICT has helped improve their performance in school. This results shows that, the use of ICT generally does not improve the performance of students in the EMD. This is to be expected because this study has consistently shown that majority of students in the EMD largely used ICT for non-academic purposes corroborating Wilson's (2014)assertion that students use ICT either for academic or non-academic purposes.It is in the light of this that Kirkwood & Price (2005)argued that, teaching and learning is unlikely to be improved simply by the application of a new technology and that learning can be enhanced when innovations take into account not only the characteristics of the technology, but also the pedagogic design, the context within which learning takes place, student characteristics, their prior experiences and their familiarity with the technologies involved.

#### **4.7.3. Correlation analysis of the impact of ICT on students performance**

Correlation analysis was performed to find whether there was a significant relationship between students access to ICT andtheir performance in school. Table 22 presents information on the correlation between access to ICT tools and students performance in school.



**Table 22: Correlation between access to ICT tools and students performance**

		ICT improves students performance	Access to computer	Access to internet	Ownership of personal mobile phone
ICT use improves students performance	Pearson Correlation	1	.040	.021	-.004
	Sig. (2-tailed)		.543	.750	.945
	N	240	237	240	240
Access to computer	Pearson Correlation	.040	1	.057	.059
	Sig. (2-tailed)	.543		.379	.366
	N	237	237	237	237
Access to internet	Pearson Correlation	.021	.057	1	.253**
	Sig. (2-tailed)	.750	.379		.000
	N	240	237	240	240
Ownership of personal mobile phone	Pearson Correlation	-.004	.059	.253**	1
	Sig. (2-tailed)	.945	.366	.000	
	N	240	237	240	240

**Source: Field survey, August 2015**

The results of the correlation analysis in Table 22 show a marginally positive relationship between students access to computer and their performance in school as given by the positive value of the computed correlation index (.040). The P-value of .543 which is greater than the level of significance (.05) implies that, the relationship is not statistically significant. The correlation analysis of the relationship between students access to internet and their performance in school on the other hand, also shows a marginally positive relationship with computed correlation index of .057 and P-value of .379 which is greater than the level of significance (.05). This implies that, the relationship between students access to internet and their academic performance is not statistically significant.

The correlation between ownership of personal mobile phone and students performance in school as can be seen in Table 22 indicates a negative relationship. This is shown by the



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negative value of the computed correlation index (-.004) with the p-value of .945 indicate that the relationship between ownership of personal mobile phone and students performance in school is not statistically significant.

The result of the correlation analysis indicates that, increased access to computer and internet by students in the EMD has a positive influence on their performance in school while increase in ownership of personal mobile phone has a negative influence on students performance in school. It is however, evident from Table 22 that, the influence of these ICT tools on the students performance is not statistically significant. This finding is consistent with Mbaezeet *al.*'s (2010) as well as Islam and Fouj's (2010) study which found no significant relationship between availability of ICT tools and students performance in school.

The negative influence of ownership of personal mobile phones on students performance to some extent, justifies the reasons why students in Ghanaian SHS have been banned from using personal mobile phones in school. It confirms the assertion by a section of the teachers in this study that, students spend most of their time using mobile phones at the expense of their studies. This finding supports Luis-Philippe and Murphy's (2013) finding that, the ban on students from using mobile phone in school has the effect of giving students an extra week of education in the course of academic year and increasing test scores by 6%.

#### **4.7.4. Challenges faced by students in using ICT in school**

The study carried out further investigation on whether students faced any challenges in using ICT in their respective schools. It was noted that 82.5% of students faced various challenges in using ICT in their respective schools. Details of the challenges faced by students in using ICT in school are presented in Table 23.





**Table 23: Challenges faced by students in using ICT in school**

Challenges	Frequency	Percentage
Inadequate computers	117	59.1
Lack of internet connectivity	149	75.3
Ban on use of mobile phone	104	52.5
Inadequate qualified ICT teachers	93	47
Inadequate computer labs	88	44.4
Poor and erratic electricity supply	109	55.1
High cost of call credit and internet bundle	97	49
Total	757	382.3

**Source: field survey, August, 2015**

Table 23 shows that, the majority (75.3%, 59.1%, 55.1 and 52.5%) of the students indicated, lack of internet connectivity, inadequate computers, poor and erratic electricity supply and ban on students from using mobile phones in school are the main challenges students faced in using ICT in school. These challenges were reported in the literature by Osakwe (2012), Oguoma *et al.* (2013) and Boateng (2012) who argued that the major constraints faced by educational institutions in accessing ICT in Nigeria and Ghana respectively includes poor electricity supply and lack of internet connectivity. Most students indicated that, lack of internet connectivity, inadequate computers and poor electricity supply in their schools was affecting their ability to use ICT to enhance their studies. It was observed by the researcher that, a good number of the students accessed the internet from their own devices such as mobile phones, laptops with wireless modems and tablets. Both students and teachers reported that electricity supply was very poor. According to them they sometimes find it practically impossible to use ICT because of the erratic nature of the electricity supply. It is important to note that, as at the time this data was being collected, there was an on-going load management programme due to difficulty in electricity generation in Ghana by the Volta



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River Authority (VRA). It is therefore not surprising that poor electricity supply was seen as a hindrance to ICT use in school.

On the issue of the ban on students from using mobile phones in school, most of the students were worried that they were not allowed to use mobile phones. According to the students, mobile phones were the most easiest and affordable ICT tool they could use to get in touch with their parents, teachers and friends as well as browsing the web to find information on the internet to enhance their studies.

Table 23 further shows that 44.4% of the students had challenges with inadequate computer laboratories in school. To buttress this point, the ICT teachers complained that, the insufficient number of computers and computer laboratories in the school was putting pressure on the few computers in the ICT laboratories resulting in many of them breaking down. According to the teachers, almost all the broken down ICT equipment in the schools had not been repaired or replaced due to lack of technical expertise and funds to purchase spare parts. Lack of funds and technical expertise to replace or repair ICT equipment was reported in the literature by Boateng (2012) as the main challenge of ICT utilisation in rural communities. The heads of schools on their part indicated that, maintenance and sustainability of ICT laboratories were capital intensive and required external support to be able to keep the laboratories running.

This corroborate the assertion by ITU's (2013) report which suggested that, access to ICT especially in developing countries remained a challenge due to the cost of ICT access compared with per capita income of the majority of the population.

Table 23 revealed further that, 49% and 47% of the students said they had challenges with high cost of internet bundle and call credit as well as lack of qualified ICT teachers to teach the subject. Some of the students who were allowed to use mobile phone in school said they were sometimes unable to buy call credit or internet bundle because they were expensive. It was also noted that some of the ICT teachers in the schools had not been trained on the



subject and therefore could not teach the subject effectively especially the practical aspect.

The heads of schools expressed concern about the situation but indicated they were compelled to use teachers who have no professional ICT background to teach the subject because it was difficult getting qualified ICT teachers to handle the subject.

#### 4.7.5. Measures to mitigate the challenges as proposed by students and teachers

To resolve these challenges, students were asked to choose as many options as was applicable to them from a list of suggested solutions to the above challenges. The views of students on how these challenges could be mitigated are presented in Table 24.

**Table 24: Students suggestions on possible ways of resolving the challenges**

Solution	Frequency	Percentage
Stock the computer lab with enough computer	84	47.5
Provide the school with stable and reliable internet service	146	82.5
Employ qualified ICT teachers to teach the subject	132	74.6
Improve on the electricity supply situation of the school	105	59.3
Lift the ban on the use of mobile phones by students	124	70.1
Build additional computer lab to ensure that all students have access	88	49.7
Network companies should subsidise call credit and internet bundle for students	120	67.8
Total	799	451.4

**Source: Field survey, August, 2015**

To resolve the challenges in Table 23, the majority (82.5%) of the students suggested that, there should be provision of stable and reliable internet service in school while 74.6% suggested qualified ICT teachers should be employed to teach the subject in school. About 70.1% and 67.8% suggested, the GES and for that matter school authorities should lift the ban on students from using mobile phones in school as well as government subsidising call credit and internet bundle for students respectively. A good number of the students (59.3%) suggested that, there should be improvement in electricity supply in school. In addition to this, 49.7% and 47.5% suggested that additional computer laboratories should be built to



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ensure that all students had access to ICT tools in school and also stocked the computer laboratories with computers respectively.

On their part, teacher suggested that, GIFEC should be more proactive in providing quality and sustainable ICT access to schools especially in rural communities. Teachers were more concerned about lack of internet connectivity as well as the inability of the schools to maintain and sustain the computer laboratories due to lack of funds. The heads of schools on the other hand said the GES should setup an ICT unit within the education service to be responsible for construction, supply and maintenance of ICT facilities in schools as well as providing training and retraining of all teachers to be able to integrate ICT into teaching and learning processes.

On what the schools on their own were doing to improve ICT situation in the absence of external support, almost all the heads of schools complained that, all attempts to make students pay extra fee to take care of some of the challenges mentioned above had met stiff resistance from government and relevant agencies. This according to the school authorities makes it very difficult for them to embark on their own initiative to improve on the situation. Most teachers were of the view that, students should be trained on appropriate ways of using mobile phones since mobile phones have as much benefits as their short comings. The teachers views on students mobile phone usage agrees with Kahari's (2013) and Mogambi's (2015) suggestion that, students should be trained to use mobile phone to support their studies and that, any attempt to restrain students from the use of mobile phone will be ill-advised.

#### **4.8. Gender difference in ICT usage and Competence on boys and girls**

The researcher tried to assess whether there were gender differences in ICT competence and what students used ICT for. The data as observed from respondents' responses is presented in Table 25.



**Table 25: Gender difference in students computer usage**

Computer Activities	Gender	
	Girls	Boys
Entertainment (playing games, music and watching movies)	49.6%	63.6%
Complete school assignment	42.9%	31.8%
Learn typing skills	62.4%	73.8%
Learn subjects taught in school	34.6%	24.3%
Prepare documents with Word, Excel and PowerPoint	45.1%	41.2%

**Source: field survey, August, 2015**

Table 25 shows that, more boys (63.6%) than girls (49.6%) engage in the use of the computer for entertainment. This finding corroborates Valentine and Pattie (2005) and Becta's (2008) finding that, the majority of boys (61%) were more likely to use the computer for entertainment purposes than 39% of their girls counterparts. Table 25 also revealed that, girls (42.9%) are likely to engage in the use of ICT to complete school assignment than 31.8% boys. It is also clear from Table 25 that, boys (73.8%) will use the computer to learn typing skills compared with 62.4% of their girls counterparts. On using the computer to learn subjects taught in school, more girls (34.6%) confirmed using the computer for that purpose as against 24.3% boys. Again 45.1% girls indicated they used the computer to prepare documents with Word, Excel and PowerPoint compared with 41.2% boys. The above analysis shows that girls are likely to use the computer to perform school related activities while boys were likely to engage in the use of computer for recreational and other adventurous activities. These findings are in line with Becta's (2008) finding that, most girls used ICT more for school work, whereas boys used it more for leisure purposes. The reason for this as indicated by Becta (2008) is that, girls enjoyed using technology to learn in both formal and informal



contexts compared with boys and also focused more on using technology to accomplish a task compared with boys who focus more on how technology works.

**Table 26: Gender difference in what students used internet for**

Internet Activity	Girls	Boys
Sending emails and receiving reply	39.1%	29%
Chat with friends and relatives on social media	55.6%	60.7%
Watching movies, listening to music and playing games	43.5%	47.7%
Searching for money making opportunities online	7.5%	3.7%
Search for information on subjects taught in school	30.4%	28.3%

**Source: field survey, August, 2015**

Gender difference was evident in students communication through email where more girls (39.1%) indicated they communicate through emails than only 29% of their boys' counterparts. This finding agrees with Reidulfet *al's*. (2008) finding that, emails were used more by girls than boys. Table 26 also shows that, more boys (60.7%) are likely to use the internet to chat on social media platforms than girls (55.6%). This contradicts Reidulf *et al.*'s (2008) finding which sought to indicate that chatting on social media was used more by girls than boys. Moreover, 47.7% of boys used the internet to watch movies,listen to music and played games, as against only 43.5% of girls who indicated they used the internet for the same purposes. This corroborate Joneset *al.*(2009) finding that, male college students spend most of their time pursuing recreationalactivities online including listening to and downloading music, watching and downloading videos as well as playing games than girls.

The results in Table 26furthershows that, 30.4% girls are likely to use the internet to search for information on subjects taught in school than 28.3% boys who indicated they used the internet for the same purpose. This re-emphasis the point that, girls use ICT to accomplish school work compared with boys (Becta, 2008).Moreover, girls (7.5%) are more likely to use



the internet to search for money making opportunities online than 3.7% of their boys' counterparts.

**Table 27: Gender difference in Mobile phone usage**

<b>Mobile phone activity</b>	<b>Girls</b>	<b>Boys</b>
Making and receiving calls	75.9%	76.6%
Sending and receiving text messages	45.9%	49.5%
Browse the web/Internet	41.4%	41.1%
Chatting (whatsApp, facebook, viber among)	32.3%	40.2%
Playing games	43.6%	45.8%

**Source: field survey, August, 2015**

Table 27 reveals that, more boys (76.6%) than girls used their mobile phones for making and receiving calls as against 75.9% girls. About 49.5% boys were likely to use the mobile phone for sending and receiving text messages than 45.9% girls contrary to the finding by Reidulfet al.'s(2008) finding that, 99.4% of girls used the mobile phone for text messaging as against 97.5% boys. Similarly almost the same number of girls as boys (41.4%) compared with 41.1% boys used mobile phone for browsing the web/internet. Boys (40.2%) however, used mobile phones for chatting on social media platforms than 32.3% girls. The same was found in Table 27 about the use of internet by boys to chat on social media. This indicates that, boys used internet and mobile phone for chatting on social media more than girls. This finding contradicts Wattenet al.'s(2008) finding that, Norwegian girls used mobile phone and internet for social activities such as chatting and emailing more than boys. Boys (45.8%) were likely to use the mobile phone to play games than 43.6% of their girls counterparts. The same was found by Wattenet al.(2008) that boys were more likely to use mobile phone for technical activities such as gaming than girls.



#### 4.8.1. Gender difference in ICT competence

The researcher examined whether there was gender difference in ICT competence between boys and girls. The information on the difference between boys and girls in their level of ICT competence is presented in Table 28.

**Table 28: Gender difference in ICT competence**

Internet competence	Girls			Boys		
	Much Knowledge	Little Knowledge	No Knowledge	Much Knowledge	Little Knowledge	No Knowledge
Use all the keys on the keyboard	33.1%	(45.1%)	21.8%	37.4%	46.7%	15.9%
Use of word processor	45.1%	36.8%	18.0%	58.9%	33.6%	7.5%
Use of presentation software	30.1%	50.4%	19.5%	46.7%	31.8%	21.5%
Use of Spreadsheet	38.8%	35.3%	26.3%	58.9%	24.3%	16.8%
Send email and receive replay	30.8%	36.1%	33.1%	26.2%	52.3%	21.5%
Search for information online	30.1%	37.6%	32.3%	28.0%	51.4%	20.6%
use internet to complete assignment	24.8%	33.1%	42.1%	19.0%	55.2%	25.7%
Chat on social media	36.8%	33.8%	29.3%	46.7%	31.8%	21.5%

**Source: Field survey August, 2015**

Gender difference in ICT competence as presented in Table 28 shows that, boys had much knowledge in: keyboarding skills (37.4%), word processing (58.9%), presentation (46.7%), spreadsheet (58.9) and chatting on social media (46.7%), compared with 33.1%, 45.1%, 30.1%, 38.8% and 33.8% of girls respectively. On the other hand, girls had much knowledge in emailing (30.8%), searching for information online (30.1%) and using ICT to complete assignment (24.8%), compared with 26.2%, 28% and 19% of boys respectively.

Table 28 further show that, boys have much knowledge in five out of the eight competencies listed in Table 28 while girls had much knowledge in only three of the competencies. This





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finding corroborates Hew and Leong's (2011) finding that, boys were more competent in eight out of nine ICT competencies tested (Email, Spreadsheet, PowerPoint and word processing). It is however, contrary to Hew and Leong's (2011) finding that, girls were more competent in word processing than boys. Furthermore, Table 28 shows that, more girls had little knowledge in word processing (36.8%), presentation (50.4%), spreadsheet (35.3%) and chatting on social media (33.8%) than 33.6%, 31.8%, 24.3% and 31.8% respectively of their boys' counterparts. More boys on the other hand, had little knowledge in keyboarding skills (46.7%), emailing (52.3%), searching for information online (51.4%) and completing assignment online (55.2%) as against 45.1%, 36.1%, 37.6% and 33.1% of girls. Moreover, more girls had no knowledge in almost all the competencies listed in Table 28 except competencies in the use of presentation software which more boys than girls said they had no knowledge in. These findings support PISA's (2003) study which indicated that, girls more often than boys had problems using computer software and also exhibits fewer skills in "complex communications". It is clear that, while boys declared their competence in ICT usage as much and to some extent little knowledge, most girls declared their ICT competence as little and no knowledge in most cases. This shows that, girls lack confidence to express their competence in ICT skills as opined by Dzapkasu (2005) that, unlike girls, boys easily talk about themselves as computer proficient and tended to express themselves in terms of self-confidence, even when they were not.



## **5.0. Summary of Findings, Conclusion and Recommendation**

### **5.1. Introduction**

This chapter presents a summary of the findings as analysed and discussed in chapter four. It also draws conclusions and suggests recommendations based on the findings revealed by this study. The main objective of this study was to examine the effects of ICT usage on SHS and Colleges students in the EMD of Northern Region. Data were collected from 292 respondents comprising 240 students and 38 teachers who were randomly selected from four schools in the area. The researcher also interviewed 12 parents and 2 internet cafe attendants in the district. Tools which were used for the data collection were questionnaires, interviews, and focus group discussion as well as observation checklist. The questionnaire was structured for both students and teachers and consisted of both closed and open-ended items designed to elicit responses on availability and access to ICT tools, purpose for which students used ICT, students competence in ICT usage, effects and challenges of ICT usage on students and gender difference in ICT usage and competence. In all, a total of four schools comprising two Senior High Schools and two colleges of Health and Education were involved in the study. The response rate was 92.3% for students, 76% for teachers, 80% for parents and 50% for internet cafe attendance. The data was analysed using SPSS 16V. Details of the analysis are provided in chapter four.

### **5.2. Availability and Access to ICT tools**

This study found that, all the four schools surveyed had computer laboratories stocked with computer systems ranging from 25 to 75 computers. About 60% of the computers in the schools were desktop computers with about 40% being laptop computers. Both students (95.8%) and teachers (100%) confirmed that computers were available in their schools. Only 32.1% and 21.1% of students and teachers respectively said there was internet connectivity in



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their schools. It was observed that, none of the schools surveyed with the exception of Nalerigu Nursing and Midwifery College had active internet connectivity in school. The majority (56.7%) of the students owned personal mobile phones in school.

On access to ICT tools by students in the EMD, the majority (86.5%) of the students had access to computers in school, only a sizable number (10.8%) of the students got access to computers outside the school. It was also found that, only 44.6% of the students had access to the internet in school while 39.6% of the students got access to the internet from other sources including their own mobile devices, home, friends and the internet café

. On access to personal mobile phones in school, only 33% out of the 56.7% of students who had personal mobile phones were allowed to use mobile phones in school. Students who for some reasons could not use their mobile phones in school had other ways of accessing mobile phones including borrowing from their teachers/school workers and friends. Most students (77% and 40.6%) got access to computers and the internet at least once a week respectively while (45.6%) got access to mobile phones every day. The study further revealed that, despite the ban on SHS students from use of mobile phones in school, some teachers and school workers assisted students to access mobile phones in school. The majority of the teachers (55.3%) were against the ban on students from using mobile phone in school while 44.7% supported the ban.

### 5.3.Purposes for which students used ICT

On the purposes for which students used ICT, it was found that, students in the EMD used the computer purposely for acquiring computer skills and for entertainment. It was further revealed that, teachers did not engage students in the use of ICT for learning activities apart from the teachers who were assigned to teach ICT as a subject in school. The study also showed that, the majority (62.6%) of the students used internet purposely for chatting with friends and relatives on social media, while less than 50% of the students used the internet for



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other purposes such as watching movies, playing music as well as learn subjects taught in school.

The majority (90.1%) of the students used mobile phones for making and receiving calls while over 50% of the students also used mobile phones for sending and receiving text messages and playing games. Less than 50% of the students used mobile phone for other purposes such as browsing the web, listening to music and chatting.

#### **5.4. Level of students competence in ICT usage.**

The study found that, almost all students (99.2%) in the EMD learnt ICT in school. Most students had much knowledge in the use of media player programmes to play music and watched video files, and the use of word processor as well as spreadsheet applications. Most students also had little knowledge in the use of the keyboard, presentation software, copying files onto an external disk/drive as well as naming and saving work on a drive. Most students had no knowledge in printing a document from a computer, connecting a computer to the internet as well as saving and loading work onto and from a disc. These findings generally suggest that, most SHS and Colleges of Education and Health students in the EMD had minimal knowledge in computer usage competence.

On the level of students' competence in the use of the internet on the other hand, it was found that, most students had much knowledge in only the use of internet to chat on social media.

Greater proportion of the students had little knowledge in almost all the competencies listed in Table 19 except using the mobile phone to browse the web as well as search for money making opportunities online which most students indicated they had no knowledge. These findings generally indicate that, most SHS and Colleges of Education and Health students in the EMD had little knowledge in internet usage competence.



## **5.5. Effects and Challenges of ICT usage on students**

### **5.5.1. Positive effects of ICT usage on students**

This study found that, the majority (73.4%) of the students said ICT served as source of entertainment, thus; playing games, watching movies and listening to music helped them to get relieve from stress and boredom. It was also found that, 66.2% of the students were able to get in touch with their teachers and school mates as well as their parents for study support and guidance.

### **5.5.2. Negative effects of ICT usage on the academic performance of students**

This study revealed that, 52.4% of the students were affected negatively by the amount of time they spent on activities unrelated to their studies through ICT (playing games, watching movies and chatting on social media) while 50.9% of the students were negatively affected by distraction as a results of making and receiving phone calls, text messaging and chatting while studying. About 50.5% of the students were affected negatively by spelling and grammar proficiency problems resulting from the use of shortcuts and abbreviations while chatting with friends and relatives on social media and text messaging.

### **5.5.3. Overall Impact of ICT on students**

It has been found that, the majority, (51.2%) of the students said ICT use does not improve their performance in school while 48.8% said ICT use improves their performance in school.

The study also found from a correlation analysis that, access to computer and internet has a positive effect on students performance in school while students ownership of personal mobile phones had a negative effect on their performance in school.

### **5.5.4. Challenges faced by students in using ICT in school**

With regard to the challenges faced by students in accessing ICT tools in school, 82.5% of the students indicated they faced challenges in accessing ICT in their respective schools. The students indicated they had challenges with lack of internet connectivity, inadequate



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computers, poor electricity supply and the ban on students from use of mobile phone in school. Less than 50% of the students had challenges with high cost of call credit and internet bundle, inadequate qualified ICT teachers and inadequate computer laboratories.

#### **5.5.5. Measures to mitigate the challenges as proposed by students and teachers**

To resolve the challenges faced by student in using ICT in school, the students suggested there should be: provision of stable and reliable internet service, qualified ICT teachers should be employed to teach the subject, lift the ban on students from using mobile phone in school, network companies should subsidise call credit and internet bundles for students and relevant authorities should improve on the quality of electricity supply to schools. Teachers and heads of schools suggested that, GES and relevant agencies should establish a unit within the education service to support the provision of infrastructure, training and maintenance of ICT tools in all SHS and Colleges in Ghana. Teachers suggested they, as well as students should be trained on appropriate ways of using ICT especially mobile phone to support teaching and learning instead of banning students from using it in school.

#### **5.6. Gender difference in ICT usage and competence**

##### **5.6.1. Gender difference in ICT usage**

The analysis of gender difference in ICT usage indicates that, boys used the computer to learn typing skills and for entertainment purposes while girls used computer for completing school assignments, learning subjects taught in school and preparing documents with MS office suite application. The study also found that, more boys than girls used the internet to chat on social media, for entertainment as well as finding information on subjects taught in school. On mobile phone usage it was revealed that, more boys used mobile phones for making and receiving calls, sending and receiving text messages, playing games and chatting on social media than their girls' counterparts. More girls compared with boys on the other hand, used mobile phones for browsing the web/internet.



### 5.6.2. Gender difference in ICT competence

The researcher found that boys had much knowledge in five out of the eight competencies listed in Table 28 including keyboarding skills, word processing, spreadsheet and chatting on social media while girls were found to be competent in three out of the eight competencies (emailing, searching for information online and using ICT to complete school assignment).

The finding also revealed that, more boys had much and to some extent little knowledge in most of the competencies while most girls had little or no knowledge in most of the competencies. This shows that boys in SHS and Colleges of Education and Health in the EMD were more competent in basic ICT skills than their girls' counterparts.

### 5.7. Conclusion

From the analysis, discussions and summary of the findings, the following conclusions are drawn:

All SHS and Colleges of Education and Health students in the EMD had restricted access to ICT due to limited number of ICT facilities and tools in their schools. The purpose for which students in the EMD used ICT was for acquiring computer skills (typing and using MS office suite application), entertainment (playing games, music and movies) and for communication (making and receiving calls, chat on social media and text messaging) rather than for academic purposes.

Almost all students in the EMD learnt ICT in school as a subject however, most students had minimal knowledge in ICT due to lack of frequent access to ICT tools and facilities in school and at home.

The use of ICT as an entertainment tool helped relieve students from stress and boredom. It also helped students to get in touch easily with their teachers, friends and parents/guardians for study support and guidance. On the other hand, students were affected negatively by the



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length of time they spent on ICT activities that were unrelated to their studies. They also got distracted while studying as a result of phone calls, text messaging and chats on social media. Students were affected negatively by spelling and grammar proficiency problems as a result of the use of shortcut/abbreviated words while chatting on social media or text messaging.

Access to computer and internet had a marginally positive correlation on students performance in school while students ownership of personal mobile phone had a marginally negative correlation on students performance in school.

Students in the EMD faced numerous challenges in accessing ICT tools in school. These challenges faced by students included

- Lack of internet connectivity
- Inadequate computers
- Poor electricity supply
- Ban on students from use of mobile phones

On gender difference in ICT usage, more boys than girls used ICT for acquiring computer skills, communication and entertainment purposes while girls used ICT for study related activities.

This study has generally shown that the advancement of the new emerging technologies (computer, internet and mobile phone) is on course in the EMD. However, a lot more needs to be done by educators, interest groups and all relevant agencies to put the necessary policies and structures in place to boost access and utilisation of ICT in school.

### **5.8. Recommendations**

Based on the findings and conclusions drawn from this study, it can be seen that, all is not well with students regarding ICT usage due to limited access, inappropriate usage,





deficient ICT competencies and [www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh) gender bias. As a result of these findings, the following recommendations are made:

1. Authorities of SHS and Colleges of Education and Health should collaborate with the GES, education stakeholders and development agencies to expand ICT infrastructure (Build more computer laboratories, increase the number of computers as well as internet connectivity) in schools. This would help increase the number of times students get access to ICT tool in school.
2. Professionally qualified teachers should be employed by the GES to effectively teach ICT in schools.
3. ICT training through workshops and seminars should be organised for teachers to train them on the appropriate skills required to use ICT effectively to enhance teaching and learning.
4. Efforts should be aimed at integrating ICT into teaching and learning so that, ICT could be used to teach all subjects in school instead of merely teaching students computer skills.
5. With the proliferation of internet enabled mobile phones, the ban on students from using mobile phones in school should be lifted and students trained on how to use mobile phones to enhance their studies.
6. Special attention and encouragement should be given to girls during ICT instructional hours to help bridge the digital divide between boys and girls in ICT usage and competence.
7. The GES in collaboration with the ministry of Education should setup an independent ICT task force to take charge of schools' ICT infrastructure and equipment to ensure their sustainability and continuous utilization of ICT in Ghanaian schools.



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UNIVERSITY FOR DEVELOPMENT STUDIES

**RESEARCH TOPIC: EFFECTS OF ICT USAGE ON THE ACADEMIC PERFORMANCE  
OF STUDENTS IN THE EAST MAMPRUSI DISTRICT OF NORTHERN REGION**

**QUESTIONNAIRE FOR STUDENTS**

Thank you for accepting to complete this questionnaire; the purpose of this questionnaire is to assess the effects of Information and Communication Technology (ICT) usage on students in the East Mamprusi District of Northern Region. This is not a test and there is no wrong answer to any of the questions. You are assured that any information given is solely for academic purpose and your anonymity is guaranteed. Please, try as much as possible to answer all the questions.

**SECTION A: Socio-Demographic Characteristics of respondents .**

1. Name of School: .....
2. Gender a. Female [ ] b. Male [ ]
3. How old are you?
  - a. Below 15 years [ ]
  - b. 15 -20 years [ ]
  - c. 21-25 years [ ]
  - d. Above 25 years [ ]
4. Years spend in school a. First year[ ] b. Second year [ ]c. Third [ ]

**SECTION B: Access to ICT facilities and services**



[www.udsspace.uds.edu.gh](http://www.udsspace.uds.edu.gh)

5. Do you have computers in your school? Yes [ ] No [ ]
6. If yes, do you have access to these computers? Yes [ ] No [ ]
7. If no, where do you get access to computer? Tick as many as applicable to you.
  - a. Internet cafe[ ]
  - b. Anywhere on my own device [ ]
  - c. At home [ ]
  - d. From friends[ ]
  - e. Other.....
8. Do you have internet connectivity in your school? Yes [ ] No [ ]
9. If yes, do you have access to internet in your school? Yes [ ] No [ ]
10. If yes, through which of the following medium do you access Internet in your school?  
Tick those that are applicable to you.
  - a. Laptop computer [ ]
  - b. Desktop computer[ ]
  - c. Ipad [ ]
  - d. Mobile phone [ ]
  - e. Other (specify).....



11. If no, where do you get access to internet? Tick those that are applicable to you.
  - a. Internet cafe[ ]
  - b. At home[ ]
  - c. From friends [ ]
  - d. Anywhere on my own device[ ]
  - e. Other (specify).....

12. Do you have a mobile phone? Yes [ ] b. No [ ]

13. If yes, are you allowed to use Mobile phone in your school? Yes [ ] b. No [ ]

14. If no, where do you get access to mobile phone .....

15. How often do you get access to the following ICT tools in a week? Tick one box for each row.

ICT TOOLS	Everyday	5 to 6 times	3 to 4 times	1 to 2 times	Other (specify)
Computer					
Internet					
Mobile phone					

### **SECTION C: Purpose for Students use ICT?**

16. Which of the following activities do you use computer to perform? Tick only those that are applicable to you.

a. Entertainment (playing games, watching movies, etc)	
b. Complete school assignment	
c. Prepare documents with e.g. Word, Excel and PowerPoint	
d. Learn typing skills	
e. Learn subjects taught in school	
f. Learn basic computer application software skills	
g. Other (specify)	

17. Which of the following activities do you use the Internet to perform? Tick those that are applicable to you.



<b>Internet usage</b>	
Send and receive emails	
Registration of exam and result checking	
Chat with friends and relatives on social media	
Watching movies and playing music	
Playing games	
Downloading songs/movies and games	
Searching for money making opportunities online	
Learn subjects taught in school	
Other	

18. Which of the following activities do you use Mobile phone to perform? Tick only those boxes that are applicable to you.

- a. Making and receiving calls
- b. Browsing the web/Internet
- c. Sending and receiving text messages
- d. Chatting (whatsApp, facebook, viber, etc)
- e. Listening to music
- f. Listening to radio
- g. Playing games
- h. Other (specify).....



**SECTION D: Perceived ICT competence of students?**

- 19. Is ICT being taught in your school as a subject? Yes  No
- 20. If no, where did you learn it?.....
- 21. Indicate your level of knowledge in using the computer to perform the following activities by ticking the appropriate boxes in the table below.

Activity	Much Knowledge	Little Knowledge	No Knowledge
Use all the keys on the Key board			
Name and save work on a drive			
Save and load work onto and from a disk			
Copy files onto an external disk/drive			
Print a document from a computer			
Use media files to play music and video			
Connect a computer to the internet			
Use of word processor			
Use Presentation software (PowerPoint)			
Use of Spreadsheet (Excel)			

22. Indicate your level of knowledge in using the internet to perform the following activities by ticking the appropriate boxes in the table below.

Activity	Much knowledge	Little knowledge	No knowledge
Use mobile phone to browse the web			
Use the Internet to search for information			
Send an email and receive a reply			
Find information on the subjects taught in school			
Use the Internet to complete assignment			
Chat on the internet on e.g., facebook, twitter, etc			
Use the Internet to read news			
Use the Internet to make money online			



**SECTION E: Effects of ICT usage on the academic performance of students**

23. Which of the following activities of ICT use affect your academic performance negatively? Tick only those that are applicable to you.

Effects	
Students are able to communicate easily with teachers and friends for study support and guidance	
ICT helps students to learn fast and on their own	
ICT serves as source of entertainment	
Receive money from parents through ICT	
able to learn for longer period using ICT	
search and get information from the internet to enhance my studies	
Other	

24. Which of the following activities of ICT use affect your academic performance negatively? Tick only those that are applicable to you.

Effects	
ICT use for games, calls, chats, etc, consumes chunk of students study time	
Gets detracted by calls, messages/chats from friends and relatives while studying	
Students spend their upkeep money on call credit and data bundles	
Students do mistakenly use shortcuts often used while chatting on social media on their exam scripts.	
Too many phone calls and whatsapping the previous night makes students sleep in class the next day while lessons are in progress	
ICT use for games, calls, chats, etc, consumes chunk of students study time	
Other	

25. Do you face any challenges in using ICT in your school? Yes [ ] No [ ]



26. If yes, which of the following challenges do you face. Tick those that apply to you.

- a. Inadequate computers [ ]
- b. Lack of Internet connectivity [ ]
- c. Ban on use of mobile phones [ ]
- d. Slow and unstable internet service [ ]
- e. Inadequate qualified ICT teacher [ ]
- f. Inadequate computer lab [ ]

Any other challenge?

(Specify).....

27. Which of the following do you think would help address the challenges in question 24 above?

- a. Stock the computer lab with enough computers [ ]
- b. Provide the school with stable and reliable internet service [ ]
- c. Employ qualified ICT teachers to teach the subject [ ]
- d. Improve on the electricity supply situation in the school [ ]
- e. Lift the ban on the use of mobile phones by students [ ]
- f. Build additional computer lab to ensure that students have full access at all times [ ]
- g. Government Subsidising call credit and internet bundles for students [ ]
- h. Other (specify) .....





UNIVERSITY FOR DEVELOPMENT STUDIES

**RESEARCH TOPIC: EFFECTS OF ICT USAGE ON THE ACADEMIC PERFORMANCE OF STUDENTS IN THE EAST MAMPRUSI DISTRICT OF NORTHERN REGION**

**QUESTIONNAIRE FOR PRINCIPALS /HEADS OF SCHOOL AND TEACHERS**

Thank you for accepting to complete this questionnaire; the purpose of this questionnaire is to assess the effects of Information and Communication Technology (ICT) usage among students in the East Mamprusi District in the Northern Region of Ghana. This is not a test and there is no wrong answer to any of the questions. You are assured that any information given is solely for academic purpose and your anonymity is guaranteed. Please, try as much as possible to answer all the questions.

**SECTION A. Socio-Demographic Characteristics of respondents .**

1. Name of School: .....
2. Gender
  - a. Female [ ]
  - b. Male [ ]
3. How old are you?
  - a. Below 25 [ ]
  - b. 26 -30 [ ]
  - c. 31-35 [ ]
  - d. 36-40 [ ]
  - e. Above 40 years [ ]

**SECTION B: Students access to ICT tools**

4. Are the following ICT tools available in your school?



ICT TOOLS	YES	NO
Computers		
Internet connectivity		

5. If yes, do student have access to these tools in the school?

ICT TOOLS	YES	NO
Computers		
Internet connectivity		

6. Do you allow students to use mobile phones in school? Yes [ ] b. No [ ]

a. If yes, why?

b. If no, indicate by ticking in the Table below your reasons for not allowing students to use mobile phone in school. Tick as many as applicable.

Reasons	
Students spend too much time on Mobile Phone at the expense of studies	
Mobile Phone use by students detracts learning	
They use their phones for dubious activities eg, pornography	
The spend too much money on call credit	
Enforcing G.E.S. rules	

Other reasons (specify)



**SECTION C: students ICT use**

- 7. Do you use ICT in your lesson delivery?
- 8. If yes, how often do you engage your students in the use of ICT in your lesson delivery?

Indicate with reasons .....

.....

.....

.....

- 9. State the challenges faced by students and teachers in using ICT in school

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- 10. Suggestion measures to mitigate these challenges in the spaces provided below.

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**RESEARCH TOPIC: EFFECTS OF ICT USAGE ON THE ACADEMIC  
PERFORMANCE OF STUDENTS IN THE EAST MAMPRUSI DISTRICT OF  
NORTHERN REGION**

**INTERVIEW GUIDE FOR INTERNET CAFÉ ATTENDANTS**

1. What services do you provide in your café?
2. How many hours of service do you provide in a day?
3. Do students patronise your service?
4. How often do students access your service?
5. Do students visit your premise at school hours?
6. Which of the services you provide do students patronise?
7. Is there gender difference in how students patronise your service?
8. If yes, what are these differences?



**UNIVERSITY FOR DEVELOPMENT STUDIES**

**RESEARCH TOPIC: EFFECTS OF ICT USAGE ON STUDENTS IN THE EAST  
MAMPRUSI DISTRICT OF NORTHERN REGION**

**INTERVIEW GUIDE FOR PARENTS**

1. Do you have a child in any of the following educational institutions?
  - a. Senior high school
  - b. College of health
  - c. College of education
  
2. What is the name(s) of the school your child/children attend?
  
3. Is your child living in the school (border or day student)?
  
4. Which of the following ICT tools do you have in your house,
  - a. Computer
  - b. Internet connectivity and
  - c. Mobile Phone
  
5. Do your child/children use these ICT tools while they are at home?
  
6. Do you have any suggestions with regards to how your child/children use ICT?
  
7. If yes, what are your suggestions



**UNIVERSITY FOR DEVELOPMENT STUDIES**

**RESEARCH TOPIC: EFFECTS OF ICT USAGE ON THE ACADEMIC PERFORMANCE OF STUDENTS IN THE EAST MAMPRUSI DISTRICT OF NORTHERN REGION**

**FOCUS GROUP DISCUSSION GUIDE FOR STUDENTS**

1. What do you use the following ICT tools for?
  - a. Computer
  - b. Internet
  - c. Mobile phone
2. What benefits do you derive from the use of these ICT tools mentioned above as a student
3. In what ways does the use of ICT affect your studies negatively?
4. What challenges do you face in using ICT in school?
5. What do you want to be done to mitigate the challenges?



**SCHOOL OBSERVATION CHECK LIST**

SITUATION/ ACTIVITY	YES	NO	REMARKS
1. Availability of ICT tools			
a. Computer			
b. Internet			
c. Mobile phone			
2. Access to ICT tools			
a. Computer			
b. Internet			
c. Mobile phone			
3. How do students access ICT in school?			
4. What do students use ICT for?			
5. Do students face challenges in using ICT in school?			

