UNIVERSITY OF EDUCATION, WINNEBA

STUDENTS' AND TEACHERS' PERCEPTIONS OF THE USE OF CELL PHONES AS INSTRUCTIONAL TOOLS FOR TEACHING AND LEARNING IN SENIOR HIGH SCHOOLS AT THE EJISU MUNICIPALITY OF ASHANTI REGION

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

MAY, 2021

DECLARATION

STUDENT'S DECLARATION

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

SIGNATURE:…….

DATE :…….

SUPERVISOR'S DECLARATION

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

(SUPERVISOR) **:** Dr. Kwame Ansong-Gyimah

SIGNATURE **:**…….

DATE **:**……

DEDICATION

This project work is dedicated to Mrs, Alatia Felicia, my lovely wife and my children

ACKNOWLEDEMENT

I would first express my profound gratitude and appreciation to my supervisor Dr. Kwame Ansong-Gyimah for his assistance given me, for his time and patience in providing for the work with all the necessary guidance and support throughout the period of study.

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ABSTRACT

The poor performance of students in WASSCE is cause for concern. Various factors such as teachers' mastery of the subject and the pedagogical strategies used have been widely reported as the main causes of the low performance of students in the exams. Mobile device is a common sight today in our schools as you see students going to school/class with some of the most expensive and sophisticated mobile phones, tablets and ipads that has all the applications, facilities and software that can connect them to the internet and all forms of social media platforms, other web sites and so on, where they chat, access, stream, download, upload, exchange and play different kinds of media contents. Objectives of the study are to establish if students own and use mobile device on their campuses, determine the pattern of mobile device use among students of senior high school, determine if the use of mobile device in senior high schools have significant impact on students' learning, determine if the use of mobile device in senior high school effect student's achievement.

A well-resourced mobile learning facility must be constructed by government, Parents and Teachers Association in each school and schools with it already must be improved, and it should be manager by well-trained facilitators to assist student in other to have the maximum benefit of the use of mobile devices. There should be a dedicated period for the facilitators to train and also sensitize students on the effect/ appropriate use of the device aside they assisting them to use for academic performance.

Students are to be made to take more active role in the use of mobile device for learning specially department like science should be encourage to use in class with their teachers and teachers must be train to use more videos and audio lessons. Curriculum planners should consider student learning style base on this content developers and programmers should design and develop educational mobile phones.

CHAPTER ONE

INTRODUCTION

1.1 Background

Technologies have extremely influenced all aspects of human life in recent decades. The powers and the features of these technologies have increased rapidly with the developments. Consequently, the variety and usage of technological devices have been increasing in education as well (Baradaran & Kharazyan, 2016). Mobile devices have become an almost essential part of daily life since their rapid growth in popularity in the late 1990s, Ling (2004). A nationwide survey conducted in 2010 shows that mobile phones are the most necessary medium of communication for adolescents. It has virtually affected the society's accessibility, security, safety and coordination of business and social activities and has hence become a part of culture of the whole world. Over the past decades, many new technologies such as computers, laptops, high speed Wi-Fi, tablets, cell phones, and others have made their way into classroom by becoming an integral part of the learning process (Nishizaki, 2015). Besides, they challenge them through tasks that they enjoy and provide effective way of stimulating learning (Morris, 2011). Interest in mobile learning, as one of the new trends in learning, has grown enormously within the last few years due to the rapid advancement in mobile technologies, wireless networks, and specification of today's mobile devices. Cui and Wang (2008) state that mobile devices such as cell phones, personal digital assistants (PDAs), smart phone etc, are carrying powerful functions as do personal computers (p.69). Accordingly, Mobile phones with internet connectivity can search thousands of web pages and provide details of high degree of accuracy to the reader. At the higher education level where the patronization of mobile technology in the teaching and

learning process is ubiquitous, most students and academics seem to embrace it as a routine in the advancement of making information known, including other various purposes. Nowadays, a lot of iPhones, iPads, and other identical smart devices are equipped with many functionalities and special features that can be used for delivering learning content. Most devices are now capable of processing information in the same way as desktop computers (Khaddage & Latteman, 2013). research have shown how mobile technology can offer new opportunities that can transform teaching and learning processes from being highly teacher-dominated, to student/learner-centred. Many experts are also of the view that this transformation will result in increased learning gains for students, thereby creating and allowing opportunities for learners to develop their creativity, problem-solving skills, and other higher-order thinking skills (Bullen & Morgan, 2009).

There is the conflicting priority of young people, parents and teachers in relation to the mobile phone device, with teachers more concerned about issues such as discipline in the classroom and parents worried about means of contacting their children at every point in time. As Ling and Helmerson (2000) states, the mobile phone is "at cross purpose with the mission of the school". While in school students are supposed to take on their prescribed roles as students with full concentration on their studies and free from contact with the outside world. However, the mobile phone gives room to blending students' roles with other roles thus distracting and disrupting the students' academic work (Gergen, 2002; Halpen,2003; &Franzini, 2002). Internet access has exposed many adolescents to different kinds of contents. Just of recent, the availability of different kinds of affordable and inexpensive android mobile phones made it very easy for the adolescents to have access to different types of social media and pornographic sites where they access, download,

exchange and watch pornographic films of different sexual orientations from all over the world.

It is known that in this generation, students own very powerful multimedia technologies which make it easier for file sharing and messaging to take place; these activities do not normally fit into the conventional classroom setting (Open Universities Nederland, 2009). Today's young adults are more at ease with the use of collaborative technologies and they have fully grown in an era of mobile phone technologies. There was a time in previous generations where a notebook and pen were the basic learning tools, but nowadays students attend their classes equipped with mobile phones (Economist Intelligence Unit, 2008). Students are more likely to engage in rich technology interactions when they are outside the classroom (Haythornthwaite & Andrews, 2007) in order to supplement what has already been taught in class. According to Prensky (2005), mobile phone technologies are not only used in communicating with others, but are actually computers that are small as well as portable and students carry this technology wherever they go, therefore these technologies can be used for learning purposes.

It was found in the study conducted by Joan Ganz Cooney Center that most of the teachers perceive mobile phones to be distractions and are of the view that these devices should not be used in school (Shuler, 2009). According to Shuler (2009), presently there is no widely accepted learning theory for the use of mobile technologies, hence, hindering the effective evaluation, pedagogy, and development of new applications for learning. Physical features of mobile phone technologies that may inhibit a most advantageous learning experience consists of limited text entry, undersized screen size, and reduced battery life (Shuler, 2009).

It is against this background that this study seeks to find out the usefulness of mobile phones and their effectiveness in the teaching–learning process.

1.2 Problem Statement

The poor performance of students in WASSCE is cause for concern. Various factors such as teachers' mastery of the subject and the pedagogical strategies used have been widely reported as the main causes of the low performance of students in the exams. Mobile device has gained immeasurable ground in the lives of students all over the world. Mobile device is a common sight today in our schools as you see students going to school/class with some of the most expensive and sophisticated mobile phones, tablets and ipads that has all the applications, facilities and software that can connect them to the internet and all forms of social media platforms, other web sites and so on, where they chat, access, stream, download, upload, exchange and play different kinds of media contents, which most often, are pornographic in nature(Olofuniyi, Fashiku,& Owombo2012). Little has however been done to explore the possibilities of using cell phones with internet services as a resource which can help in the teaching of by the students. The mobile device is an effective technology that Ghanaian students already own, and their potential is continuously growing. When this tool is exploited, it can even be used even during lectures (Bright Hub Education, 2012). Mobile learning therefore needs to become a significant part of s education. Studies by Williams (2009), Johnson and Kritsonis (2007) have paid attention to the acceptance, adoption and rejection of cell phones as instructional tools. Hence, the impact of mobile device on academic life at the secondary school is significant. Thus, the present research examines the impact of mobile technology use for education in enhancing students learning

at senior high schools. This study also seeks to find out the usefulness of mobile phones and their effectiveness in the teaching–learning process.

1.3 Purpose of the Study

The study aims at investigating the impact and the usefulness of mobile devices use on students‟ learning at senior high schools.

1.4 Research Questions

This study aims to answer the following research questions:

1. Do students in students in senior high school own and use mobile device on campuses?
2. What is the pattern of mobile device use among students in senior high schools?
3. Does the use of mobile device in senior high schools have significant impact on students learning?
4. Does the use of mobile device in senior high schools effect student's achievement?

1.5 Objection of the Study

This study set to address the following objectives:

1. To establish if students own and use mobile device on their campuses.
2. To determine the pattern of mobile device use among students of senior high school.
3. To determine if the use of mobile device in senior high schools have significant impact on students' learning.

4. To determine if the use of mobile device in senior high school effect student's achievement.

1.6 Significance of the Study

This study investigates the impact of mobile technology use senior high school students‟ learning achievement. Its main significance is to describe the present situation of mobile technology usage in teaching-learning process senior high schools. The findings of this study would also complement other studies and provide appropriate data about the effectiveness and the usefulness of mobile phones applications for learning. The study may provide literature so as to add more information on innovation uses of mobile phone technologies to enhance educational experience of high school students. Teachers would be guided on how integrating mobile phone technology will create a richer environment for teaching and learning. Curriculum planners and policy makers would be aware of the numerous possibilities of using mobile phone technologies in learning, so as to assist in implementing and designing activities to support the various learning styles. The findings of this study would also complement other studies and provide appropriate information for content developers and mobile learning developers in designing mobile phone applications for science learning at the second cycle level.

1.7 Assumptions of the Study

The study is based on the assumptions that:

1. Most students and teachers in Ghanaian senior high schools have mobile phones.
2. Students‟ demographic characteristics will directly or indirectly influence how the mobile phone technology is used to support learning experiences.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature on what others have done globally, in African countries and in Ghana.

2.2 ICT and Education

Information communication technology (ICT) is of great significance in the area of education as it facilitates access to published information and data. It is considered to be a very socially oriented activity, as particularly in education the use of ICT lends itself to a more comprehensive student-centered learning setting (Player-Koro, 2012). The trend was developed by the beginning of ICT in 1992. During this time, the concept of email had begun to be available to the general public. According to Gold (2012), the field of education has been affected by ICT, which has resulted in having a direct effect on teaching, learning and research. Over the years, research conducted by Lowther et al.(2008) indicates that ICT has proven the benefits of the quality of education. Through the use of ICT, there is a better possibility of innovation, motivating and engaging students and also can result in strengthening teaching and helping schools change (Martinovic and Zhang, 2012). Today, educators have increased their interest and have become more focused on using technology to improve student learning, which is a rationale for investment. Lopez-Nicolas and Soto-Acosta (2010) detailed that in terms of education, ICT implies the creation of information and communications technology for the purpose of education and learning. On the other hand, in education, and during the teaching learning process, ICT includes the taking on of

common constituents of information and communication technologies. Initially, conventional teaching practice involved written content around textbooks. Over the years, research has been conducted which shows that information and communication technologies have played a major part in terms of improving student learning and better teaching methods. The use of ICT in education offers a more interactive learning experience as it makes use of images which improves the retentive memory of students (Rajasingham, 2011). At present, teachers are employing tactics such as interactive classes which make lessons enjoyable and interesting for students (Valk et al., 2010). As a result of these practices, students' levels of attention and concentration have also been improved (Samarji, 2015).

The key uses of ICT in education are access, support, and communication, according to Ochieng (2006). In regard to access, the use of ICTs can make learning available to anyone, at any time, and in any place. With the use of ICT in the delivery of knowledge and skills, the classroom is no longer limited to a physical space but rather is extended to become what is referred to as a virtual classroom, "distinguished by an open collaborative learning environment" (McCann et al., 1998, p. 17). In this way, ICTs enable larger numbers of students to engage in learning and complete university-level courses (Unwin, 2008), provide opportunities for students to study part-time and off-campus (Unwin et al., 2010), and make it possible for distance education students to engage in aspects of learning that were previously unavailable to them (Unwin et al., 2010). In addition, the use of ICTs increases student access to high quality international educational resources (Unwin et al., 2010). For example, internet access enables students to freely access websites all over the world, which can help facilitate their learning. The use of ICTs for support and communication purposes

serves to enhance learning as an interactive process, such as between the teacher/lecturers and students/learners and among the learners themselves (Kristiansen as referred to in Brown, 2003). This process will also strengthen the contact between the academic staff of institutions of higher learning and the students (Butcher, 2009; McCann et al., 1998; Shrestha, 1999), with much potential for collaboration and problem-solving on many levels (Kristiansen as referred to in Brown, 2003; Ochieng, 2006), building on Freire's (2006) ideology of the student-teacher relationship (referred to later on). Moreover, technology can easily be applied in higher education in a variety of ways "to support an almost endless combination of teaching and learning strategies, and it is essential to keep options as open as possible" (Butcher, 2009, p. 1). Ghana has demonstrated a general commitment to using ICTs to improve the quality of education at the presidential and ministry levels, as can be demonstrated by the fact that education receives the highest amount of national budget resources (Mangesi, 2007). At the national level, Ghana passed the ICT for Accelerated Development (ICT4AD) policy in 2004, which addresses 14 areas of focus for ICT development (Mangesi, 2007). One of these areas is the promotion of ICTs in education, and this policy outlines clear strategies for achieving ICT growth in this area (Mangesi, 2007). However, coordination among all the agencies involved in implementing these policies has been poor (Mangesi, 2007). The use of ICTs is most advanced in Ghana's tertiary education system (Mangesi, 2007). The higher education system consists of universities, university colleges, professional institutes, preservice training institutes, and polytechnics (Mangesi, 2007). All of the major universities have ICT policies, including an ICT charge for students that enable them to have access to computer labs with internet connections (Mangesi, 2007). Nevertheless, "having Internet connectivity is one thing, maximizing utilization of the tool is

another" (Boaffo-Arthur, 2006 as cited in "Ghana," n.d., p. 30). In order to address this issue, the Global e-Schools and Communities Initiative (GESCI) is currently collaborating with the Ghanaian Ministry of Education to help them "expand the deployment of ICTs in schools in Ghana and to promote the effective use of these ICTs to achieve Ghana's educational and community development objectives" (Mangesi, 2007, p. 6).

2.3 Theories of Learning

Over the past century, educational psychologists and researchers have posited many theories to explain how individuals acquire, organize and deploy skills and knowledge. To help readers organize and apply this extensive body of literature, various authors have classified these theories in different ways. This summary focuses on the so-called modern learning theories namely, Behaviorism, Cognitivism and Constructivism.

2.3.1 Behaviorism

Behaviorism is primarily concerned with observable and measurable aspects of human behavior. In defining behavior, behaviorist learning theories emphasize changes in behavior that result from stimulus-response associations made by the learner. Behavior is directed by stimuli. An individual selects one response instead of another because of prior conditioning and psychological drives existing at the moment of the action (Parkay & Hass, 2000). Behaviorists assert that the only behaviors worthy of study are those that can be directly observed; thus, it is actions, rather than thoughts or emotions, which are the legitimate object of study. Behaviorist theory does not explain abnormal behavior in terms of the brain or its inner workings. Rather, it posits that all behavior is learned habits, and attempts to account

for how these habits are formed. In assuming that human behavior is learned, behaviorists also hold that all behaviors can also be unlearned, and replaced by new behaviors; that is, when a behavior becomes unacceptable, it can be replaced by an acceptable one. A key element to this theory of learning is the rewarded response. The desired response must be rewarded in order for learning to take place (Parkay & Hass, 2000).

In education, advocates of behaviorism have effectively adopted this system of rewards and punishments in their classrooms by rewarding desired behaviors and punishing inappropriate ones. Rewards vary, but must be important to the learner in some way.

John B. Watson (1878-1958) and B. F. Skinner (1904-1990) are the two principal originators of behaviorist approaches to learning. Watson believed that human behavior resulted from specific stimuli that elicited certain responses. Watson's basic premise was that conclusions about human development should be based on observation of overt behavior rather than speculation about subconscious motives or latent cognitive processes (Shaffer, 2000). Watson's view of learning was based in part on the studies of Ivan Pavlov (1849-1936). Pavlov was studying the digestive process and the interaction of salivation and stomach function when he realized that reflexes in the autonomic nervous system closely linked these phenomena. To determine whether external stimuli had an effect on this process, Pavlov rang a bell when he gave food to the experimental dogs. He noticed that the dogs salivated shortly before they were given food. He discovered that when the bell was rung at repeated feedings, the sound of the bell alone (a conditioned stimulus) would cause the dogs to salivate (a conditioned response).

Considering the broad perspective, behaviourism assumes a learner to be passive as they have the ability to respond to environmental stimuli. B.F. Skinner developed the idea of

radical behaviourism, which describes a certain school of thought that emerged during the control of behaviourism (Olson, 2015). Radical behaviourism is considered to be different from other schools of behaviourism as it differs in the role of emotions, acceptance of mediating structures and so on. In psychology, the behavioral theory is a pretty extensive field. Considering the use of behaviourism in an educational setting, it suggests the dominance of the teacher. A significant advantage of using behaviourism theory is that it can clearly define behaviour and can be used to measure changes in behaviour. Considering the humanistic psychology, it is assumed that people have autonomy and thus make their independent choices in life and are not liable to pursue the deterministic science laws (Torcasio and Sweller, 2009). In addition, humanism rejects the nomothetic approach of behaviourism for the reason that it views human beings as unique creatures and believes that humans are not comparable to animals. Keeping in view the psychodynamic approach, Freud criticised behaviourism since it does not consider one's unconscious mind influencing the behaviour (MacNab, 2012).

Rather, this theory tends to be more focused on externally observable behaviour. In addition, Freud is known for rejecting the idea that as an infant we are born with a blank slate, rather it is argued that human beings are born with instincts (Bygate et al., 2013). In terms of the application of behaviour theory, it is considered to emphasise objective measurement and is highly applicable. However, in terms of limitations, this theory tends to ignore meditational processes and is considered to be too deterministic (Yadavendu, 2013).

2.3.2 Cognitive Theory

The Cognitive theory aim at explaining certain mechanisms and processes, such as an infant developing into an individual who has the ability of reasoning and thinking using a hypothesis (Olson, 2015). For Piaget, the process of cognitive development is a progressive reorganisation of mental processes which result due to biological maturation and environmental experience. Being a child, one tends to understand the world they live in and tend to question what they already are aware of and what they discover by living in certain environment. The Cognitive Learning theory has been made use of in order to explain mental processes which are affected by intrinsic and extrinsic elements equally. These elements are responsible for bringing about learning in an individual. Considering the Cognitive Learning theory, it has been implied that mental processes can be used to explain the different processes concerning learning (Hwang and Tsai, 2011). Further, it has been pointed out by Torcasio and Sweller (2009), which effective cognitive processes involve the learning practice being easier so that new information can simply be stored in one's memory for a long time. On the other hand, ineffective cognitive learning occurs with one's learning difficulties that can happen anytime during one's lifetime. The three variables involved in Cognitive Learning theory include: behaviour, personal factors and environmental factors. These variables are considered to be interrelated with one another, thus learning occurs. Keeping in mind the perspective of Cognitive theory it states that new experiences are evaluated by the learner once they analyse their past experiences with the same determinants (Valk et al., 2010). As a result, learning is through evaluation of one's present experience versus the past. In terms of strengths of Cognitive theory, research has provided a lot of

knowledge regarding how people think and perceive. In addition, this theory has been able to provide a lot of support.

Therefore, due to the positive findings of this theory, it has been determined that it gained popularity both in professional and modern psychology areas (Harris et al., 2009). Akin to other theories, this theory is not free from criticism either. Firstly, behaviourists view this theory to be weak due to the abstract nature of thought and difficulty in defining them. Efklides and Volet (2005) have criticised the Cognitive theory for being fairly new and whilst a lot of research has been done the underlying theory of personality development is weak. Therefore, whilst there may well be positive outcomes after using this theory, it fails to provide a solid understanding of development (Torcasio and Sweller, 2009).

2.3.3 Constructivism

The last three decades, constructivism has played a crucial role in education. It is basically a means that involve thinking about knowledge and then coming to know, which includes both difficult concepts and the processes of science (Vavolua, 2005).

Constructivism has its pioneers as Piaget (1954), Vygotsky (1978) and Papert (1980). This philosophy of education moves emphasis from a teacher-centered to a learner-centered approach (O‟Malley *et al*, 2005). Constructivism is when students take an active role in their own learning and develop new and existing knowledge from their prior experiences through collaboration, conversation and interaction with others as well as contextualizing and reflecting what they are learning (Fisher & Baird, 2007). The constructivist learner basically interacts with the environment and therefore achieves an enhanced understanding of the world. Learners develop their own ideas and discover solutions to their own problems.

The theory states that the learner actively constructs new ideas build on their current knowledge (Vygotsky, 1978). Just as Piaget‟s (1954) describes how a child forms their own understanding that was build on prior understanding. Papert (1980) further developed the Piaget‟s theory to older children's learning with computers. Papert saw an era of the PC that presented text, graphics, sound and video through input devices such as mice and joysticks, which offered numerous potential for interactive learning activities. Constructivists assert that students understand knowledge and the world according to their personal experiences. Students also learn by observing, processing, interpreting and then personalizing knowledge as well as contextualizing what they learn. For instance, this may involve application and acquiring of personal meaning that allows students to develop problem-solving skills through learning by doing (Ally, 2004). Zurita and Nussbaum (2004) suggested that mobile phones could be utilized to encourage constructivist educational activities through group collaboration, motivation improvement, interactive learning promotion, cognitive skills development and its association with real world experiences. Mobile learning, therefore, enlightens existing ways of learning from a different angle in which learning can be dealt with across life transitions (Haythornthwaite & Andrews, 2007). Within the constructivist learning paradigm, mobile phone technologies are able to engage students in learning activities that allow them to think and understand a particular learning scenario (Fisher & Baird, 2007).

Fisher and Baird (2007) asserts that m-learning supported by the constructist theory points out the growth of a software that has numerous advantages which includes the application of collaborative and communicative tools as well as accessing information in order to permit students to learn from different perspectives. In line with this, mobile phone technologies

can be supported to provide concise course notes, summaries, assignments and tutorials directly to students after each class or topic is covered. An example of constructivist approach is a system where the student is involved in a realistic situation and utilizes support tools from previous experiences and prior knowledge in order to deal with the situation at hand and transmits, interacts and conveys their knowledge with other students (Averianova, 2012). With mobile phones students can construct their own knowledge and share it freely with their course mates at any time in any place (Naismith *et al*, 2004).

2.4 Concept of E-Learning

E-learning is the practice of using information and communication technology to create learning experience that can be formulated, organized and created with ample freedom without any boundaries (Horton, 2006). It is a process where a set of lessons is provided on digital devices like computers or any mobile devices that supports the learning. E-Learning is interactive learning in which the learning content is available online and provides automatic feedback to the student's learning activities (Paulsen, 2003). Besides acquiring general knowledge one of the other main goals of e-learning is to develop professional skills and understanding to help learners to achieve their learning objectives (Clarke, Mayer, 2008). In an era where educational and technological modernizations are redefining the standards of higher education, the converging point of interconnection is e-learning (Garrison, 2002). E-learning system is a concept in evolution. E-learning systems have their roots in the concept of Computer-Assisted Instruction (CAI). According to Zinn (2000) a CAI "refers to the use of computers to present drills, practice exercises, and tutorial sequences to the student, and perhaps to engage the student in a dialogue about the

substance of the instruction." The concept of computer-assisted instruction appeared for the first time in 1955 as a result of the way of teaching problem solving (Zinn, 2000). Some definitions of computer-assisted learning and teaching have their focus on contents, other are focused on communication or even on technology (Mason and Rennie, 2006). The basic elements of an eLearning process can be identified as: technological infrastructure, e-learning platform, e-learning content and participants. The two major perspectives/aspects of e-Learning are technological and pedagogical (Devedzic, 2006). The technology including the infrastructure and the platform should enable development, hosting and delivery of e-learning content for its users. The pedagogical aspect concerns the e-learning content and its use for expanding the knowledge of the learners. The two significant modes/types of e-learning are synchronous training and asynchronous training. When both, the instructor and the learner participate in e-learning activity at the same time, via internet is known as synchronous learning. Communication between them can happen in various means such as webinars, instant messaging, video chat etc. Whereas in asynchronous learning, the instructors posts the content in advance then users can engage in web based training at their own pace whenever they need it (Rosen, 2009). The process of E-Learning is not always supported by and only by LMS. The technologies that enable E-Learning are personal computer, internet connection, web browser, media players, e-mail programs, client software for online meetings, microphone for audio conferencing, video camera for video conferencing (Horton & Horton, 2003). Audio broadcasting methods like webcasts and podcasts; video broadcasting methods in YouTube, Skype, Adobe Connect and webcams; using tools like Microsoft Word, PowerPoint, Excel and PDF and through blogs, whiteboards, screen casting are some of the technologies also used in E-Learning (Patil,

2014). E-learning has several advantages but also some disadvantages when compared to traditional learning.

The study by Welsh et al. (2003) found that organizations can accomplish numerous benefits from implementing e-learning programs, including consistency in training, reduced cycle time, increased convenience for learners, improved tracking capabilities, and reduced cost. Potential drawbacks, according to the authors, can include higher up-front cost, lack of trainee interaction, etc. Some of the disadvantages of E-Learning are compensated with the introduction of blended learning a combination of e-learning and traditional learning.

Computer-based training (CBT) is a training method in which the primary data transfer takes place in a computer through software over internet or intranet (Rouse, 2011). In 1960's, Computer assisted instruction (CAI) progressed into computer bases learning (CBL). Computer-based learning was not only used for education but also for communication. Computer- based training's pioneer system is PLATO (Programmed Logic for Automatic Teaching Operation) which began in 1960. It had the basic layout that is used in modern e-learning method, comprising of graphic elements, text along with graphics, forums and chat rooms (Shimura,2006). Multimedia learning models have created a number of ideologies and guidelines to ease the design of computerbased training (CBT). With computer-based training practical training can be made more operative, where student-teacher ratio is one to one and where the training is workshop based or job based (Dean, Whitlock, 1992). In early 90's CD-based training was considered as the new training technology of e-learning. Occasional workshops were held as a part of CD-ROM based training. More than 95% of the content comprised of Information Technology lessons. Public chat boards were created in websites and it was called "mentoring". Around 1998, Web took over CD based training

not only by providing learning instructions and materials over the web, but also by providing a 'personalized' learning experience aided with chat rooms, study groups, newsletters and interactive content (Cross, 2004). When internet and personal computers became phenomenal and started to flourish in the late 20th century, it was really when the concept of e-learning began to take form. The technology, the concept and the device complemented each other well, providing new learning trend. The first web based Learning management system (LMS) named Cecil was launched in 1996 (Sheridan, et al, 2002). LMS is a software application that organizes, documents, records and delivers e-learning courses. The modern LMS are mainly web based and enable hosting and/or delivering of different types of learning content including but not limited to: reading materials, video and audio, wikis, web conferencing, chats, forums, blogs, learning games, testing, grading etc.

2.5 E-Learning Tools

The word e-learning (electronic learning) defines a type of learning based on information and communication technologies. This way to learn makes easier to create, adopt and contents distribution. Independently of time-limit or geographical limits, this way allows students exchange opinions and information by TIC (information and communication technologies). There are many tools to compose this new educational strategy; however some of them are remarkable: utilities to present contents (texts, animations, graphics, videos…), tools for asynchronous or synchronous communication between students and teachers like for example, email, chat, forums, blogs, wikis… In short, e-learning can be traduced by "virtual learning" and it is the future of remote education based on telematic networks connected usually to Internet. An e-learning solution is built by three basic

components: platform, contents and communication tools. Platform is hardware and software environment designed to automate and manage development academic formation activities. It is known like online platform or LMS (learning management system). A LMS is a software program installed in a server and it is used to administer, distribute and check activities for face-to-face formation o e-learning in an organization. The main functions of a LMS are: manage and register users, resources and formation activities, access check, control and monitoring learning process, doing evaluations, informs, managing communication services like forums and teleconference amongst others. Generally, a LMS doesn't include possibilities to create its own contents, but it is in charge of administrating contents created by different sources. A LCMS (Learning Content Management Systems) is used to create contents for courses [Pan and Bonk 2007].

A Course Management System (CMS) is a web-based system with a database back-end. A CMS assists lecturers in obtaining resources on the web for students and to facilitate the management of course activities and tasks (Tan 2004). Some of common e-learning systems available are WebBoard, WebCT, and Blackboard; from the open source there are: MOODLE, and Sakai (Knorr 2005). A study conducted by the University of Queensland (UQ) demonstrates that one of the most common successful strategy in teaching large classes is the use of web-based course material (e.g., course website, online resources, discussion boards etc.) and use of mixed media in lectures (e.g., power point, overhead, etc.). Nowadays, use of online course management systems is widespread in education [Posato et al 2007]. There are three strengths of web-based course management systems are: accessibility of course resources to students, timely communication between lecturers and trainees and reduce paper usage (paperless systems). A CMS is different from a face-to-face

course. Face-to-face course is a traditional learning, used in classroom and it does not require a Web environment. Whereas, the web-enhanced course is a hybrid (traditional and online) and it can almost be used in local environment. On the other hand, web-based course is always online, can be used in distance learning and all the operations in web-based course require a Web connection (Macphee et al 2005)

2.5.1 Moodle

MOODLE is a free software package designed to help lecturers and students as a tool to provide in creation of quality teaching. The MOODLE is abbreviated to Modular Object Oriented Dynamic Learning Environment built by Martin Douglas at Curtin University, Australia (Posato et al 2007). MOODLE has a number of advantages in education. MOODLE is easy to install, upgrade and use. It can be installed on as many servers as involved without an additional cost. MOODLE does not also require modification on Unix, Linux, Windows, Mac OS and any other systems [Kibble et al 2007]. It is implemented for educational aspects which some other e-learning platform is lack off. MOODLE 1.6 (Tan 2004) supports user name authentication. Each user is given an account and password to access the MOODLE portal site. Once logged in, users have access to the courses they are registered in. Lecturers are registered as users that can edit the course's site, including modifying the activities and marking students. The contents of course and activities almost are in the middle of the page. The types of resources are: text files, (X)HTML files, links to WebPages, images, multimedia files and links to uploaded files; while the activities commonly used are quiz, chat, forum, choice and assignment.

MOODLE [Tan 2004] has a module to conduct survey on the users and it supports built-in template for the questionnaires, however it does not have facility to generate or insert a new questionnaire. An online survey using different tools was built then uploaded the survey website on the course page in MOODLE. Students participate in the online survey in their free time (any time).

2.5.2 Blackboard and WebCT

The blackboard is considered a hybrid teaching tool [Herdiana and Shafie 2008]. The blackboard can be used by lecturers throughout the lecture to discuss ideas or identify main points. It is suggested that only main points or ideas be written instead of long drawn out pieces of information. The blackboard can be a useful tool to help students visualizing key aspects of the lesson but may make things hard if lecturers attempt to teach a large group. Blackboard assessment tools include:

- Tests
- Surveys
- Assignments
- Grading can be automatic and/or manual
- Control over quiz/test features and functionality
- Availability, grading, reporting, and others
- Important technical/software considerations
- Alternative forms of assessment

WebCT (Course Tools), now owned by Blackboard and being phased out, is an online proprietary virtual learning environment system which is sold to colleges and other institutions and is used in many campuses for e-learning. Instructors could add to their WebCT courses tools such as discussion boards, mail systems and live chat, along with content such as documents and web pages.

2.5.3 Sakai

Sakai is a free and open source product that is built and maintained by the Sakai community. Sakai's development model is called "Community Source" because many of the developers creating Sakai are drawn from the "community" of organizations that have adopted and are using Sakai. Sakai is an online Collaboration and Learning Environment. Many users of Sakai deploy it to support teaching and learning, ad hoc group collaboration, support for portfolios and research collaboration. (Sakai. At http://sakaiproject.org/). Sakai is a set of software tools designed to help instructors, researchers and students to create websites on the web. For coursework, Sakai provides features to supplement and enhance teaching and learning. For collaboration, Sakai has several tools to help to organize communication and collaborative work on campus and around the world. Using a web browser, users choose from Sakai's tools to create a site that meets their needs. To use Sakai, no knowledge of HTML is necessary. The Sakai software has several options for communication among teachers and students, reader news RSS, distribution teaching content, to do exams, management of works, etc. A set of generic collaboration tools forms the core of Sakai: Announcements, Drop Box, Email Archive, Resources, Chat Room, Forums, Threaded Discusión, Message Center, Message of the Day, News/RSS, Preferentes, Presentation,

Profile / Roster, Repository, Search, Schedule, Search, Web Content, WebDAV, Wiki and Site Setup. The core tools can be augmented with tools designed for a particular application of Sakai. Teaching Tools: Assignments, Grade book, Module, Editor, QTI Authoring, QTI Assessment, Section Management, Syllabus and Portfolio Tools: Forms, Evaluations, Glossary, Matrices, Layouts, Templates, Reports and Wizards.

2.6 M-Learning

M-Learning, which means learning through mobile devices (such as smart mobile phones and tablet PCs), is changing the educational environment by offering learners the opportunity to engage in asynchronous, ubiquitous instruction (Hymanet al., 2014). M-learning is a teaching method that has the intersection between mobile computing and e-learning (Quinn, 2000; Keengwe, 2014) that integrates several software and firmware technology in multimedia applications (Lavín-Mera et al., 2008) which facilitate learning through a variety of wireless mobile devices (Kukulska-Hulme, 2005; Stevens & Kitchenham, 2011) using wireless networks (WiFi) or broadband services (Caudill, 2007) without limit in terms of location or time. (Kukulska-Hulme, 2005; Hussin et al., 2012; Quinn, 2000). Furthermore, Keegan (2002) contemplates the possibility of M-Learning as a harbinger of the future of learning. Early perspectives of m-learning were focused on technology, and defined as the delivery of training by means of mobile devices such as mobile phones, PDAs and digital audio players, as well as digital cameras and voice recorders, pen scanners, etc. For example, MoLoNET (2007) defined it as “The exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning.” Another view of

m-learning focuses on mobility. Keagen (2005) suggests that m-learning should be restricted to learning on small and portable devices. According to him, mobile devices could be carried everywhere. For example, a lady can carry in her handbag or a gentleman can carry in his pocket. So this definition also relates to a techno centric perspective because of concentrating on the size of mobile devices. Some researchers characterize mobile learning as an extension of e-learning. For instance, Kadirire (2009) defines m-learning as a form of e-Learning, which can take place anytime, anywhere with the help of a mobile communication device such as a mobile phone, a personal digital assistant (PDA), iPod or any such small portable device. But new mobile learning perspectives accept m-learning as a paradigm change. One of these perspectives is the learner-centred perspective. It asserts that m-learning is any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning opportunities offered by mobile technologies (O' Malley et al, 2003). The other perspective focuses on individualism. According to this perspective, m-learning is defined as any activity that allows individuals to be more productive when consuming, interacting with, or creating information, mediating through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity, and fits in a pocket or purse (Wexler et al, 2008). There are some researchers who associate m-learning with ubiquitous learning, as well (Ng et al, 2009). While it is typical for an emerging field to have varied definitions, the lack of conceptual frameworks and robust theories has been frequently addressed as a concern in the literature (Peng et al., 2009). Definitions of mobile learning emphasize mobility (Sharples et al., 2009), access (Parsons & Ryu, 2006), immediacy (Kynäslahti, 2003), situativity (Cheon, Lee, Crooks, & Song, 2012), ubiquity (Kukulska-Hulme et al., 2009), convenience (Kynäslahti, 2003), and contextuality

(Kearney, Schuck, Burden, & Aubusson, 2012). According to Sharples et al. (2009), mobile learning includes the characteristics of mobility in physical, conceptual, and social spaces. The "relationship between the context of learning and context of being" is unique to mobile learning, as learning may occur in independent, formal, or socialized contexts (Frohberg et al., 2009, p. 313).

M-Learning, or "mobile learning", obviously has different meanings for different communities. Although related to e-learning and distance education, it is distinct in its focus on learning across contexts and learning with mobile devices. One definition of mobile learning is: Learning that happens across locations, or that takes advantage of learning opportunities offered by portable technologies. In other words, mobile learning decreases limitation of learning location with the mobility of general portable devices.

The term covers: learning with portable technologies, where the focus is on the technology (which could be in a fixed location, such as a classroom); learning across contexts, where the focus is on the mobility of the learner, interacting with portable or fixed technology; and learning in a mobile society, with a focus on how society and its institutions can accommodate and support the learning of an increasingly mobile population that is not satisfied with existing learning methodologies.

M-learning is convenient, in the sense that it is accessible virtually from anywhere (class, taxi, laundry room, bathroom) which provides access to all the different learning materials available. Moreover, it is collaborative; that is sharing is almost instantly among everyone using the same content, which will in turn also lead to receiving instant feedback and tips. M-Learning also brings strong portability by replacing books and notes with small RAMs, filled with tailored learning contents. In addition, this kind of learning is engaging and fun.

With this kind of learning, it is much easier to combine gaming and learning for a more effective and entertaining experience.

The use of mobile devices for educational purposes, recognized as M-Learning has gained substantial attention from researchers in the technology-enhanced learning discipline. Recent research findings on using mobile devices in different learning environments have exemplified their ability to effectively enhance students' learning knowledge. Understanding and experience in divergent subject areas such as science (Looi et al., 2011; Hwang Wu, & Ke,2011; Ahmed & Parsons, 2013), mathematics (Huang et al., 2012; Mahamad et al., 2010; Lan et al., 2010), language and art (Yu et al., 2013; Martin & Ertzberger, 2013), social science (Shih et al., 2010), engineering (Yang et al., 2013) and others. This promising role in education can tremendously be noticeable within the informal and formal learning context, such as guiding an interactive tour withmuseum visits (Sung et al., 2010; Hou et al., 2014) facilitating knowledge acquisition in field trips (Menkhoff & Bengtsson, 2012), game-based learning (Young et al., 2012), in-class collaboration learning (Echeverría et al., 2011). Nevertheless, there is always a contrasting scenario in every context, including M-Learning as Chu (2014) argued that the performance of students, known to be "effective," might be disappointing or may even negatively affect the students" learning achievements if without proper treatment employed.

M-learning is a new paradigm that creates new learning environment. Its learning style is unique because it allows students to access course materials, instruction, and other courses related applications regardless of time and place. Mobile learning is a field which combines two very promising areas mobile computing and e-learning. Mobile learning or M-learning is a process of learning that have intersection between mobile computing and e-learning

(Quinn2000), that integrates multiple technologies software and hardware to the application of multimedia (Lavin-Mera *et al*., 20o8) which helps learning through a variety of mobile devices wirelessly Kukulska-Hulme & Traxler 2005), by using a series of wireless internet (Wi-Fi) services without limit in terms of location or time (Franklin 2011). Mobile devices for M-learning can cover a large scope, which includes laptops, mobile phones, smartphones, tablets and so on which has the function of wireless technology and portable.

The greatest added value of mobile learning vis-a-vis PC learning lies in the aspects that extend classroom interaction to other locations via communication networks. Recent advances such as imbedded sensors, cameras, motion detection, location awareness, social networks, web searching, and augmented reality present the potential to foster learning and engagement across multiple physical, conceptual, and social spaces, both indoors and out (Newhouse et al., 2006). Mobile learning enables teachers and learners ubiquitous and seamless access to information (Kukulska-Hulme et al., 2009; Seppälä & Alamäki, 2003), and convenience, expediency, and immediacy are valuable to teachers and enhance students' learning (Kynäslahti, 2003). These features provide opportunities for individualized, situated, collaborative, and informal learning without being limited to classroom contexts (Cheon et al., 2012). While portability and mobility have already made these devices attractive tools, developments such as geospatial technologies, search capabilities, image and video capture, and context awareness have further increased their versatility by promoting situated learning experiences and allowing exploration within authentic settings, particularly supporting inquiry-based learning (Martin & Ertzberger, 2013).

The role of m-learning in the future of e-learning in Africa cannot be easily ignored (Brown, 2003; Butcher, 2009; Stevens, n.d.). *E-learning* is a macro concept that refers to any form of

electronic transfer of knowledge and/or skills and encompasses both online and mobile learning environments (Brown, 2003). *M-learning*, or mobile learning, is a form of e-learning; it is "an emerging concept as the development of an adoption rate of mobile technologies increase rapidly on a global scale" (Brown, 2003, p. 1), and Africa represents the untold story of taking advantage of this modern technology. In fact, the adoption rate of mobile technologies in Africa's developing countries is among the highest rates globally (Brown, 2003).

2.6.1 Tools and technology for M-learning

According to Chen, 2011, approximately eight percent of Apple"s applications are specially designed for educational purposes and Android has over 50, 000 mobile phone applications (Dawson, 2010). Electronic books (e-books) are digitized forms of books that can be read on mobile phones. They have been fundamentally suggested as educational tools since they present a less expensive access to textual materials, avail more updated information and provide a more interactive experience with content (Savill-Smith & Kent, 2003). In a study by McConatha and colleagues (2008), 112 university students found out that reading on mobile phones was more productive than reading on paper when preparing for examinations. Public Universities in Ghana have integrated ICT tools in teaching and learning and are steadily shifting from lecture notes and textbooks only, to electronic resources (Afari-Kumah & Tanye, 2009).

In another study, teachers were offered strategies on how they could simply convert educational materials into e-books, multimedia resources or interactive exercises with the aim of being utilized on a variety of mobile phones (Lam *et al*, 2011). This study found that

teachers were eager to find new methods in presenting information to their students and therefore found the mobile phone as a relevant teaching tool. Furthermore, some universities have recently started utilizing PDAs or mobile phones for storing and retrieving information such as e-books, educational materials and timetables (Kim, Mims, and Holmes, 2006; Ferry, 2009). As a result, students found this technology useful in storage and retrieval of information and believed that this learning tool provided greater accessibility and convenience. This technology enhanced the means for learning and collecting information which was used to support learning beyond the classroom environment (Goundar, 2011). One of the most prevalent features of the mobile phone is SMS. Most students own mobile phones and are communicatively competent with SMS in higher education institutions in Ghana. SMS is also an application available on mobile phones that can be intentionally used for science learning. Brown (2005) observed that SMS offered information that was "in mass and almost immediate." He went further to explain that there was a decrease in cost of distributing relevant important information and provided just-in-time information by using messaging services. Text messaging provides feedback on lectures, ideas or projects as well as alerting students of important dates, deadlines and cancelled/rescheduled classes, homework, quizzes, exams or updates on marking or on assignments available for collection. Lecturers can ask their students questions or share views or information with their students.

Another mobile phone technology that can be used in science learning is QR codes. This type of technology is a two-dimensional bar code that can be read on any mobile phone that has a built-in camera. Many mobile phones have the ability to download free QR code readers. Once the code is accessed, it allows users to receive immediate information, such as

text, video, an image or link to a web page and so on. QR codes can be utilized in learning in order to display printed materials such as lecture notes, links to reading materials or labels of equipment in a science laboratory (Williams & Pence, 2011). Chen and Chung (2008) considered the effectiveness of mobile devices in improving English learning of Taiwanese students and assessed the attitudes of students towards using mobile devices for English learning. An experimental design was employed in which the results revealed that m-learning can promote students‟ English learning and interest. Most students rated the mobile device as being positive. Mobile devices allow learning to take place in a more flexible way. English vocabulary lessons were emailed to 44 Japanese university students on their mobile phones. The results revealed that students preferred receiving vocabulary lessons on mobile phones rather than PCs and 99% of them considered this to be a valuable teaching method. Also a Web site explaining English idioms was created where students created animation shows, in which each idiom‟s literal meaning would show a video of the idiomatic meaning. Materials in text form included explanations, scripts and quizzes. Seventy percent of the students rated these videos as being highly effective (Thornton & Houser, 2005). Therefore, through m-Learning, students are given the flexibility of submitting assignments, downloading notes, discussing and performing activities according to their needs and time requirements. Students were also willing and interested in using SMS and MMS, voice calling, video conferencing, Bluetooth and Wi-Fi as mediums for learning as well as the internet, organizer and calculator (Marwan *et al*, 2013).

2.6.2 M-Learning: Trend in Africa

To tackle educational challenges in Sub Saharan Africa (SSA), systemic integration of ICT has been outlined as an opportunity for improving the quality of teaching and learning as well as expanding access to learning opportunities (UNESCO 2011). Secondary school attendance and completion rates in SSA are strongly influenced by poverty, location and gender (EFA, 2011). Mobile based solutions can help to compensate the lack of infrastructure; mobile devices offer access to educational content by providing access to knowledge through technology and are also one of the primary ways that youth interact with and learn from each other (NMC 2012, p.11). Furthermore access to learning material via mobile phones does not only support formal settings but is often the only chance for informal learning. While mobile phones become more capable students can get education into their own hands, options like informal education and online learning are reaching students who are not in the position to enter traditional educational settings (NMC 2012). Delivering education in SSA by using mobile phones is widely seen as a chance for change, because mobile networks are widely spread, and as learning device, the mobile phone has several key advantages. Especially, distribution channels are already in place and everyone knows how to use the device for basic interactions, people value their phones and more likely take good care of them. Due to the fact that phones are all the time be carried around by their owners, learning can take place anywhere. Furthermore the phones are also shared among family members, and people have the option of upgrading their mobiles anytime by switching their SIM cards. (Young, 2009).

Some of the African universities offer virtual learning environments (VLEs) as a way of collaborating in the area of content development as well in terms of delivery practice

(Gunga & Ricketts, 2006). A good example of this in Kenya, is the African Virtual University (AVU), whose main goal is "to promote and support initiatives in open, distance, and electronic learning (ODEL) in Africa" (Dzvimbo). In Kenya for example, Access to electricity is limited, as are phone lines (Farrell 2007). For example, fixed-line phones numbered 281,800 in 2005, whereas mobile/cellular phones numbered 4,612,0000 in 2006; Internet users numbered 200,000 in 2000, increasing to 1.05 million in 2006; and Internet hosts numbered 13,724 in 2001 (Farrell, 2007). And although many Kenyans own mobile phones and use the internet at access centers and internet cafés, few own a home computer (Farrell, 2007). The National ICT Policy was developed in 2006 with the goal of ensuring that ICT services are available, reliable, and affordable to Kenyans (Farrell, 2007). Currently, the government of Kenya, through ICTs, is making efforts to introduce electricity in rural areas to help equip primary and secondary schools with computers and the Internet. In addition, this policy includes a section on ICTs and education, the objective of which is to foster the use of ICTs in educational settings in order to improve teaching and learning quality (Farrell, 2007). This objective was deemed to be a national priority by the Ministry of Education, leading to the development and implementation of the National ICT Policy for Education and Training in 2006 (Farrell, 2007).

All Kenyan universities have an ICT policy, but they struggle to implement these policies due to a lack of resources (Farrell, 2007). The Kenya Education Network (KENET) strives to aid in the integration of ICTs in education by providing fast, reliable, and more affordable ICT services to Kenyan educational institutions (Farrell, 2007; KENET, 2014). This initiative plans to install permanent infrastructure for high-speed internet access and node infrastructure for a number of educational institutions over the next two years (Farrell,

2007). Members of KENET also receive access to staff training and technical support services (Farrell, 2007).

Despite this fact, e-learning is beginning to take a prominent place in Kenya, particularly because it allows many more students to access education, both on campus and through distance learning. This is of particular importance in Kenya given the fact that in 2006, of the 68,000 students who qualified for entry to the public universities, 58,000 failed to gain admission, primarily due to the competitiveness among institutions as well as considerations of financial availability (Otieno & Ngolovoi). All of the public universities offer distance learning programs, whereas only two private universities offer this form of learning. E-learning via the use of ICTs encompasses a wide range of activities, from supported/traditional learning to solely on-line learning to a combination of the two—blended learning. Moreover, in regard to use in distance learning programs, e-learning is conducted via mobile phones, CD- ROMs, video conferencing, interactive TV, e-mail, websites, satellite broadcasts, and Internet usage (Gunga & Ricketts, 2006). The use of ICTs is most advanced in Ghana's tertiary education system (Mangesi, 2007). The higher education system consists of universities, university colleges, professional institutes, preservice training institutes, and polytechnics (Mangesi, 2007). All of the major universities have ICT policies, including an ICT charge for students that enable them to have access to computer labs with internet connections (Mangesi, 2007). Nevertheless, "having Internet connectivity is one thing, maximizing utilization of the tool is another" (Boaffo-Arthur, 2006). In order to address this issue, the Global e-Schools and Communities Initiative (GESCI) is currently collaborating with the Ghanaian Ministry of Education to help them "expand the deployment of ICTs in schools in Ghana and to promote the effective

use of these ICTs to achieve Ghana's educational and community development objectives" (Mangesi, 2007).

Although government attitudes about the use of ICTs in education are positive, these attitudes are less positive among educators and administrators (Mangesi, 2007). This may be partially due to this group's lack of exposure to and skills with ICTs (Butcher, 2009), which results in uncertainty and fear (Unwin, 2005). Indeed, it is well established that many lecturers are not familiar with computer technology, and some are not even able to use the Internet for basic e-mail communications due to a lack of formal training, inadequate access to computers, and the unavailability of Internet connectivity ("Ghana," n.d.). If teachers do not have ICT skills themselves, then they will experience difficulty transmitting these skills to their students and integrating the use of ICTs into their teaching. On the other hand, some teachers with some ICT skills are using the internet for research purposes, and smart boards and projectors are also in use in some Ghanaian schools (Mangesi, 2007).

Another major challenge in the development and implementation of ICTs in the Ghanaian education system is "brain drain" (Intsiful, Okyere, & Osae, 2003). The most talented people in the field of science and technology have either left Ghana for more attractive opportunities elsewhere or are seeking careers in the private sector of the economy (Intsiful et al., 2003). This has resulted in a lack of ICT engineers and scientists who are competent in understanding ICT-related projects on a professional level, which will hinder the growth of ICTs in Ghana. Overall, although there has been enormous investment in the country's ICT infrastructure as well as ICT capacity building, Ghana is still "largely isolated digitally from the Global Village because it lacks the critical drive and strategies to harness the full potential of ICT for the socio-economic development of the country" (Frempong, 2004)

2.6.3 M-learning Challenges

Research indicates that m-learning offers considerable benefits to build and support creative, collaborative, and communicative learning environments (Alhazmi et al, 2014; Sharples et al 2009). The implementation of efficient m-learning project, however, within educational environment is still a challenge due to the complex environment that incorporates management, pedagogical, technological elements, and socio-cultural issues. The following sections address and discuss some of the challenges imposed by the implementation of m-learning projects, these are: network infrastructure challenges; Integration to Technology Challenges; Technical Challenges; Design Challenges; Cultural and Social Challenges

2.7 Network Infrastructure

Access to Internet and Local Area Network (LAN) in developing countries is low and Internet price was high to them. In most developing nations such as Ghana and Kenya, institutions were built without provision for Internet and Local Area Network (LAN) wiring [6]. Many buildings are being erected without these facilities. The most common solution today is to either cut into walls and floors or to use trunks to lay cables for LANs external to the building sites or campuses, which acts to destroy the aesthetics and characters of many areas in African cities/towns.

In developing countries, telephones and local telephones voice communication activities are done using dual copper cables. It is a complex process when some institutions try to put in place. Existing trunks and cables have to take out to put new ones, sometimes for LANs extra nodes have to be added. In developing countries most building designs did not have separate room for ducts which is necessary to lay down telecommunication cables and

others. In the case of existing ducts some underground cables are inaccurate or not reliable. These ducts are done by digging which causes accidental damage. Wireless LANs (WLANs) which are more expensive to install and implement usually help developing nations do away with the situations and problems listed above and place them in the better position to adopt and change more easily. A positive offshoot of WLANs with recommended standards is the provision of mobile learning. If put in place, WLANs used with wireless Internet devices such as laptops could help transform every lecture hall into an m-learning/e-learning. Access to mobile phone/device is on the rise. In Ghana and other developing countries, statistics shows that mobile phone/device penetration is on the rise.

2.8 Integration to pedagogy challenges

It is challenging to properly integrate technology into their wider educational activities, and serious consideration must be given to teaching and learning strategies. The main drivers of innovation of m-learning should not be just deploying technology; there must be an integration of pedagogy and new methodologies that achieve educational goals. In order to develop successful mobile educational applications, design guidelines and new methods for the learning process must be followed, and, it is important to consider the methodological issues to develop appropriate pedagogical models. Significant efforts and steps have been made to provide methodologies and strategies in order to integrate mobile devices into teaching and learning practices (Johnson et al, 2011). Dahlstrom and Bichsel (2014) urge researchers to look at pedagogical insights that will help instructors to better embrace mobile technologies. It is stressed by McGreal (2012), that to accomplish this, mobile learning requires a successful integration between educational content and technology to achieve

educational goals and to provide a successful teaching and learning environment. Alhazmi and Rahman (2012) argued that the technological features of mobile applications such as mobility and interactivity are essential to successfully integrate this technology into wider educational settings.

2.9 Design Challenges

Mobile devices are equipped with various features such as: Camera, location, recording, sensors, search, media player, calculator, calendar, etc. Understanding these capabilities of mobile devices will help designers to explore the potential of mobile learning, which can truly support informal and social learning models (Alhajri, 2016). Designers of m-learning applications need to understand the three types of design, that is: instructional design, which is the educational design of the application; interface design, which is the transparent to the user; and screen design, which is the design of the graphics and the visual display (Alhajri, 2016). Al-Hunaiyyan (2000) pointed that the more emphasis the developer puts in these designs, the more useful and functional the application will be. It is essential for instructional designers to design e-learning courses effectively for mobile devices, he pointed out that m-learning should be viewed differently from that of e-learning, due to mobile characteristics such as the screen size, screen orientation, mobile storage and memory, and network bandwidth.

On the other hand, user interface design is important factor for successful application. Thus, designing and developing an efficient educational interface within a learning environment is still a challenge for most developers, facilitators, and educators (Alhajri and Hunaiyyan 2016). Udell (2012) stated that user's interface for mobile must be consistent and stressed to

keep the application simple when designing interfaces on mobile devices. M-learning applications must be simple and intuitive. In addition, the organization of elements and media on the mobile screen will undoubtedly influence the ease and quality of learning, and has an important impact on learners' cognitive load. Good screen design attempts to impose consistency on the layout of the screens, and the content of information displayed on the screen is very important in determining the success of a user's interaction with the system (Al-Hunaiyyan, 2000). It is important to consider the number of pixels available on target users' device. This will help in providing the best quality of images, and higher resolutions on users' devices. Considering the aspect ratio is also important, designing for landscape display (Horizontal) should be different than designing for portraits (Vertical).

2.10 Technical Challenges

Technical difficulties are a significant aspect in the implementation and integration of m-learning technologies in education. Qureshi et al. (2012) listed some of these difficulties which include "installation, availability of latest technology, fast Internet connection, and uninterrupted supply of electricity, maintenance, administration, security and absence of technical support". There are technical challenges related to the infrastructure, mobile device, application development, technical support, security, and technical knowledge of instructors, learners, and other stakeholders, which must be considered when employing m-learning project. These challenges resulted from the rapid change in technologies, programs and devices. Furthermore, Park (2011) listed some technical limitations related to the physical attributes of mobile devices such as: small screen size; insufficient memory; limited battery; network reliability; excessive screen brightness outside; limitation of software

applications; safety and privacy. In addition, connectivity and bandwidth need to be considered when developing m-learning. Bakari et al. (2005) pointed that most of the developing countries lack quality and expert in technical support and maintenance of Information and Communication Technologies (ICT).

2.11 Cultural and Social Challenges

There are cultural norms and social concerns while accepting the deployment of m-learning. Kadirire and Guy (2009) pointed a drawback to mobile learning is the personal uses of the device with less control over the students makes mobile learning activities are subject to frequent interruptions. Ethical and practical implications such as: resistance to change amongst lecturers; concerns about new social practices affecting lecturers' personal time; increasing amount of information to be stored on his device; privacy issues; data security; and cyber-bullying, were addressed by (Aubusson, 2009; Chushing, 2011). The accessibility of mobile devices is another challenge. If mobile learning is to be implemented successfully, students and instructors must own a mobile device. Naismith et al. (2000) addressed issues related to the implementation of m-learning including technology ownership and the digital divine. Furthermore, Park (2011) listed social limitations of m-learning such as: Accessibility and cost issues for end users; frequent changes of mobile device models; and risk of learners' distraction. Cultural differences in relation to perceptions and attitudes towards types of technology are key factors for both the acceptance of these types of technology and for their future use (Al-Oteawi, 2002). Introducing m-learning applications to a new culture brings many issues that need to be investigated. Resistance to change is a great challenge; it is believed that mobile technology increases the work for the instructors

because it adds additional preparations. Some educators resist the idea of integrating this technology into their practice, because of the constraints it present to them. Studies report that resistance to change plays an essential role in accepting technology in education (Kim & Kankanhah, 2009; Nov & Ye, 2008). Tai and Ting (2011) believe that the success of the m-learning project depends on the participation of instructors and their belief in the possibilities of this technology, and its effectiveness to enhance teaching and learning. Creating a professional development and teacher training course can foster collaboration among instructors to become comfortable environment while using this technology in and out the classroom (Al-Hunaoyyan, 2012).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter explains the models and methods that use in analysing the data to address the objectives of the study. It focuses on the data source and description of the variables that will employ in the study as well as the software used for the data analysis. The chapter describes sampling methodology in terms of the target population, sampling frame, sampling method and size. Thereafter, the questionnaire and interview schedule used to collect data are explained and validity and reliability are discussed (Golafshani, 2003).

3.2 The Research Design

The research design focused on the plan used in the research study. Aaker, Kumar and Day (1998) explain a research design as a detailed blueprint used to guide a research study towards its objectives. Mwirira and Wamahius (1995), Gray (2009), Gratton and Jones (2010) and Creswell (2012) state that a research design is an overall plan for enhancing the researcher's internal and external plan in order to improve the research's internal and external validity. McMillan (2007) and Ngulube (2013) add that research design embraces techniques or tools for generating thorough, accurate and ethical data and strategies for data collection. In other words, research design refers to the theoretical framework under which the study is carried out. To satisfy the information needs of any study, an appropriate methodology has to be selected as well as suitable tools for data collection (Wiersma & Jurs, 2008; Saunders, Lewis & Thornhill, 2009; Creswell, 2012).

This study will use the mixed-method approach in order to strengthen and complement the findings obtained by questionnaire through further probing using interviews in sequential order. The researcher used qualitative data from interviews to complement quantitative data collected through questionnaires

3.3 Population and Sample

The study will focus on SHS 1, 2 &3 students and teachers in Senior high schools in the Ejisu Municipality who were using cell phones with internet services in the teaching and learning. Ngulube (2013) and Creswell *et al*., (2011) state that a research sample consists of individuals selected from a larger group of persons known as the sample's population. Fisher formula was used to determine the sample size

3.4 Sampling Techniques

Purposive sampling technique will be use to select three public schools in the study area. There are 9 public schools in the study area: Five mixed day schools, one mixed day and boarding school, and three girl's boarding schools. All the 9 public schools were included in the study. Stratified random sampling will be use in each school using the various classes as strata's: that is form 1 to form 3 to get study representatives from each of the forms. Simple random sampling using the lottery method will be use to get the specific participants in the study from the forms.

3.5 Data Analysis

The statistical package for data analysis will be SPSS. The data will be analyzed using statistical methods such as descriptive, binary and multinomial logistic regression procedures.

CHAPTER FOUR

RESULTS ANALYSIS AND DISCUSSIONS

4.1 Introduction

This chapter focuses on presentation, interpretation and discussion of the findings. It first reports the data on background characteristics of the respondents and then the data in response to the research objectives and the research questions. Descriptive and inferential statistics were used in the analysis. For meaningful interpretation and discussion the data were further illustrated with the presentation of tables, bar graphs and pie charts. The background characteristics of the students were examined in terms of the name of senior high school, gender, age and name of department. In total, four public senior High schools provided the study sample. Information concerning the distribution of students in the three public senior High schools is shown in Figure 4.1 below

4.2 Demographic Characteristics of Students

This section presents the results on the demographic characteristics of the respondents of the study. The demographic variables considered in the study include the gender of the respondents, age of respondents, programme of study by respondents and year of study. These characteristics are considered by the researcher as factors that facilitate the understanding of how students use mobile devices in the context of secondary school education learning environment.

Table 1: Demographic characteristics of the study participants

Attribute	Frequency (n=200)	Percentage (%)
Age Category (years)		
15-17years	119	59.5
18-20years	76	38.0
21-23years	3	1.5
24-26years	2	1.0
Gender		
Male	84	42.0
Female	116	58.0
Course of study		
Arts	133	56.5
Science	64	32.0
Business	23	11.5
Form		
Form 1	55	27.5
Form 2	42	21.0
Form 3	103	51.5

Gender

Most of the participants were female. Gender balance can be important in a study. The distribution of males and female respondents shows that males 116 (58.0%) were higher than males 84 (39.4%). This sample was occasioned by the greater ratio of female in the participated schools. It is clear that the number of females is higher than the number of males. Also, the gender distinctions are a crucial element in any research investigation as it helps to find out the learners‟ learning styles and individual differences.

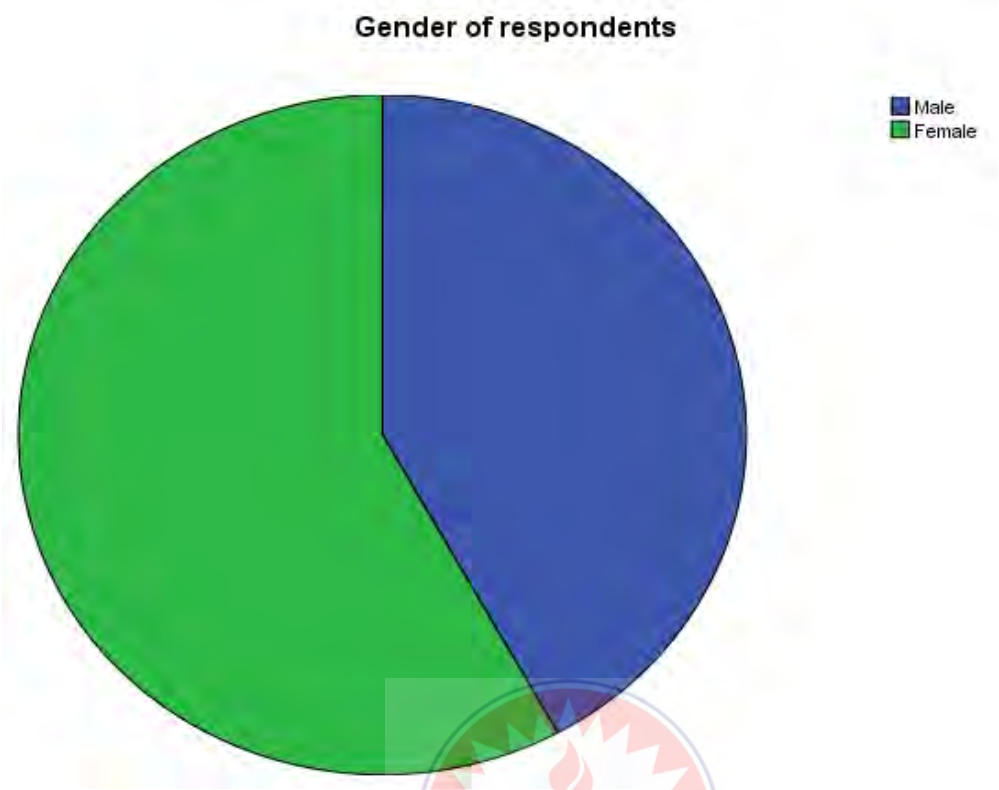

Table 1 shows the students‟ age ranged between 15 to 26 years old. Nearly, all of them are between 15 to 17 years old making up 59.5% of the total number of participants. Then, equal to 38% are aged between 18 to 20 years old. After that, only 1% of the participants are aged between 24 to 26 years old. Hence, the majority of secondary school students are the youngest generation who use technology in their classes in general and mobiles in particular.

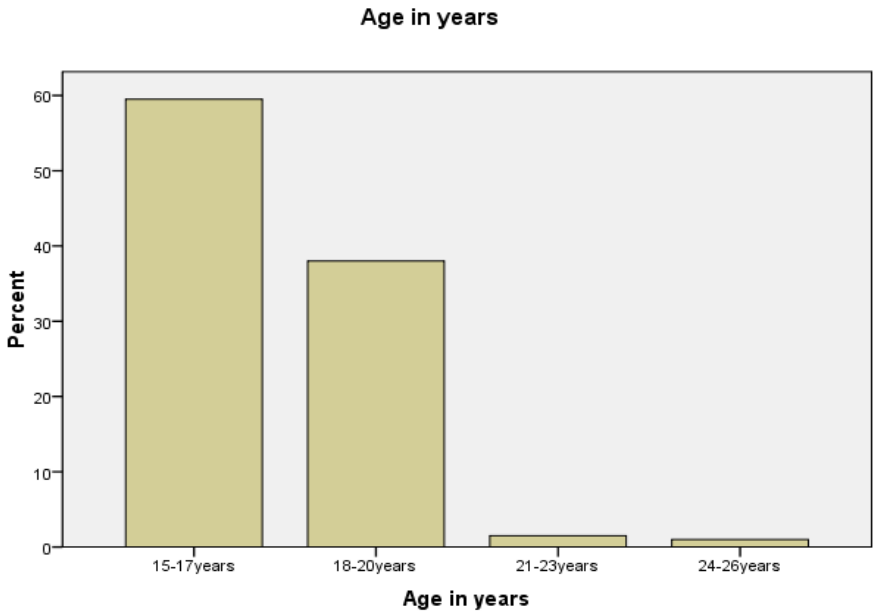

Figure 1 Age of Respondents

Students were asked to indicate whether they owned a mobile phone and the type of mobile device they own. The results are indicated in various forms as observed in Table 4.2 and Figures 4.5and 4.7.

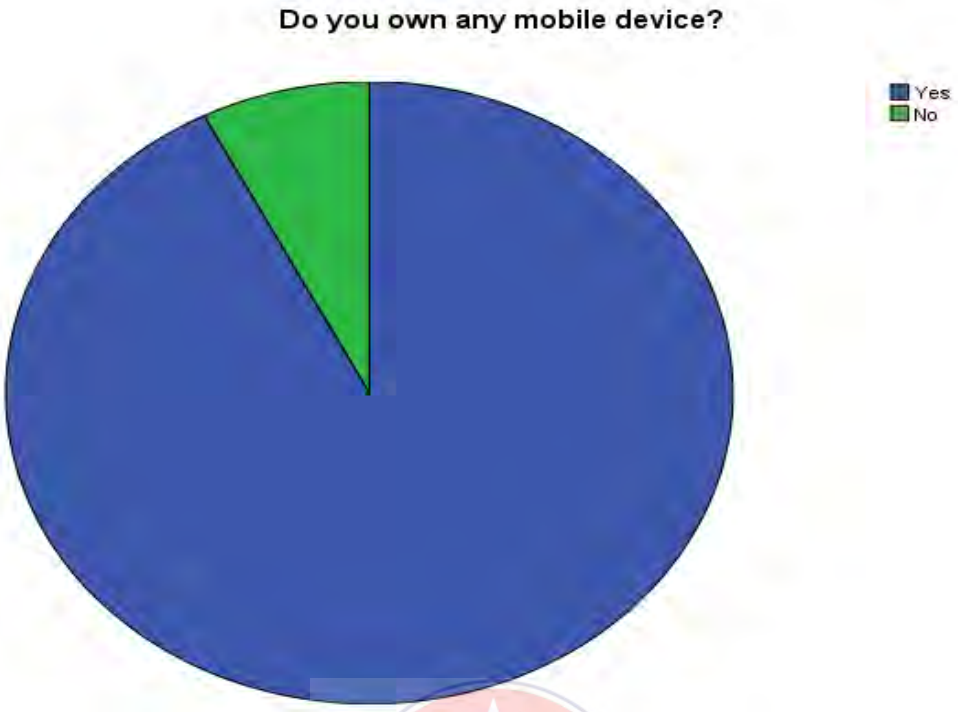

Figure 2 Ownership of mobile device and internet utilization

Most students in this study owned a mobile device. This finding confirmed that the mobile phone has become "a do without" tool for young people. This is not surprising, since majority of the Ghanaian population has access to mobile phones and young people. This agrees with research conducted with 963 students, in which all students reported owning a cell phone (JMU, 2012). Since, virtually all students had mobile phones, the use of this technology as a tool to support their learning is feasible. The high level of ownership of mobile devices among the respondents is an indication of easy access to m-learning resources with the propensity to be translated into improved learning.

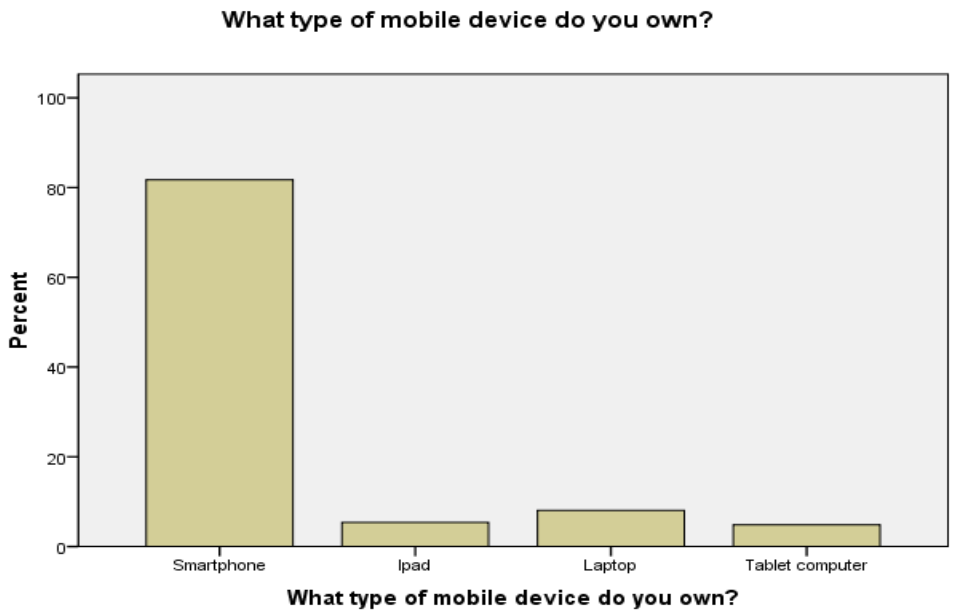

Figure 3 Type of mobile phone device

The survey results clearly demonstrate that Smartphone are the commonly used mobile devices, followed by laptops. One hundred and fifty two students in this sample i.e. exactly 75.6% used Smartphone's in the schools. Laptops, which as mentioned above, are the second commonly used devices, are used by 15 students representing 7.5% of students' respondent. IPads were relatively low in usage with only 10 and student representing 5.0% and 4.5% respectively of student respondents. The high ownership of Smartphone may be due to the fact that other types of mobile devices are quite expensive and may not be affordable to students. The variations could be as a result of the difference in economy and personal appeal.

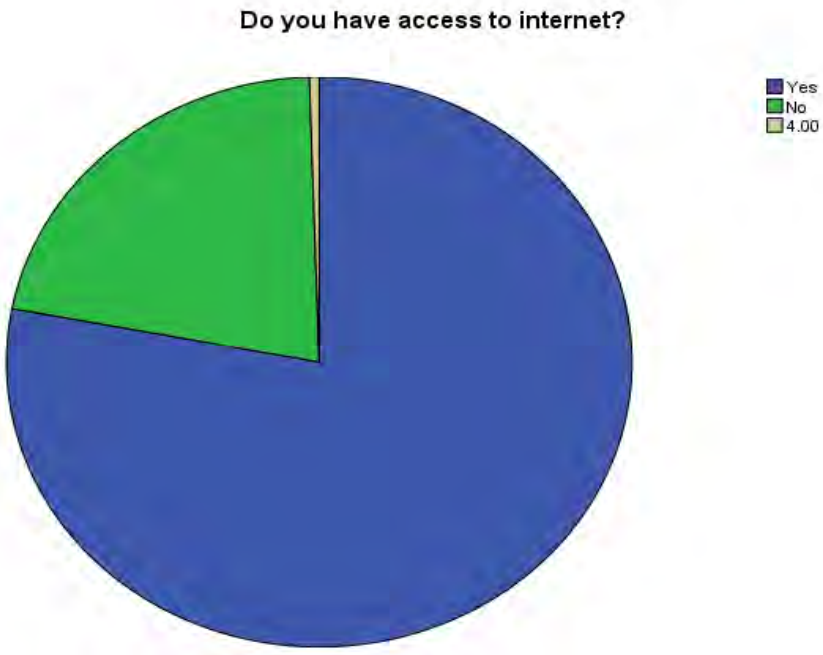

Figure 4 Access to internet

Whether or not the student had access to internet on their phone was presented in Figure the data 4.5 indicate that an overwhelming majority of students, 458 (91.1%) had internet on their phones. Only 45 (8.9%) of respondents did not have internet access. Hence, virtually all students had internet-compatible phones. In a study in Nigeria, it was found that majority of undergraduate students had internet service available on their phones (Utulu & Alonge, 2012). According to Kennedy *et al* (2009), most undergraduate students stated that they had mobile phones that were internet-enabled, which indicates that mobile phones could be used to support learning such as accessing and downloading educational materials as well as capturing and sharing information online. Also, 25% of the students were not having internet available on their mobile phone while 10% of students were not interested and 2% of them were not even aware of the internet feature (Fazenna *et al*, n.d.). From literature, most

modern mobile phones have access to Internet. Therefore, it is appropriate to take advantage of these internet-compatible phones in order for students to support their learning.

Purpose for Respondents' use of mobile device in school

Respondents were requested to indicate whether they used their mobile device for learning purposes or otherwise. In response to whether respondents used their mobile device for learning, 52% of respondents who own mobile device in school indicated they use their mobile device for learning, 25% pointed out they use their mobile device for entertainment , and 19% responded they have their mobile device to keep in touch with friends and family. The fig below summaries the observed responses.

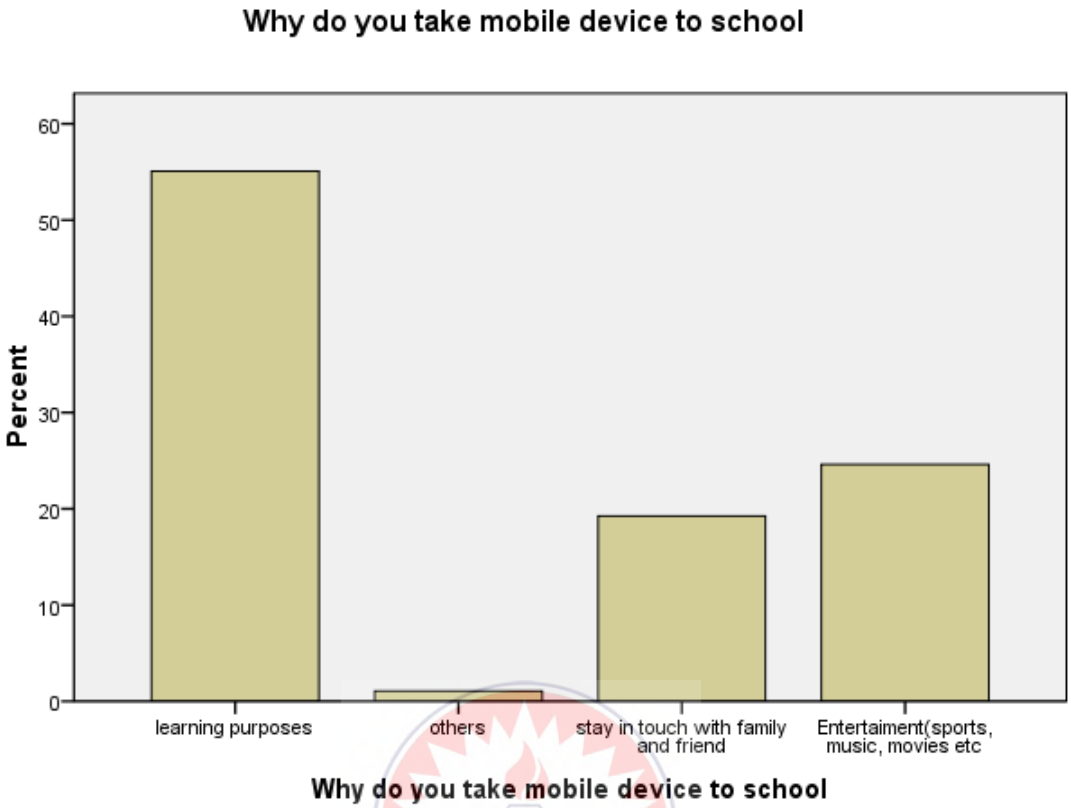

Figure 5 Reasons for taking phones to schools

Having established the reasons respondents take mobile devices to school, the study further enquired if respondents are able to use their mobile device in school. The table below summaries the responses observed

Table 2: Usage of mobile device in school

Usage of mobile device in school	Frequency	Percentage (%)
Yes	162	85
No	33	15

From the response noted in the table above, it is observed that about 85% of total respondents use their mobile device on a campus. 15% indicated they did not use them on campus.

4.3 Impact of Mobile Phone Use on Learning

The impact of mobile phone on student learning is examined in a 5 point Likert scale. Majority (33%) of respondents says that the frequent use of mobile phone sometimes interferes their learning whereas 37% are of the agreement that it also assists them in learning sometimes. However, about 75% of the respondents are of the opinion that the calls/messages received just before class impact on their ability to concentrate and 6% said it happens to them always. Also, 37% said that the uses of mobile during their study time distract them sometimes and approximately 83% said it also assists them in learning. The results revealed that a small portion of the respondents give an opinion against the use of mobile phone on learning and their study.

Mobile phone is also helpful for the students for exchanging of useful information with their classmates about their studies. Students use this fascinating magic device also in a very better way. Some of the studies proved that this technology has increased the academic performance. In this context the study tried to find out the positive effects on learning

achievements of youth. A majority (60%) agreed that they can easily contact the teachers for study purposes and 10.2% strongly agreed that they contact the teachers for this purpose. Also, more than 80% of respondents agreed that they can easily contact their classmates for help in studies. However, about 66% agreed that their academic performance has been increased due to mobile technology whereas about a quarter of the respondent disagreed. Moreover, more than 60% agreed that mobile phone has helped to increase the level of quality of education whereas 28.1% disagreed. Majorities (more than 80%) of the students use it as dictionary/thesaurus/calculator in Classrooms and about 15% disagreed with this statement.

Table 3: Impact of Mobile Phone Use on Learning

Variables		Never	Seldom	sometimes	Often	Always	Total
How often does the use of Mobile Phone in class interfere your learning	Freq	85	20	64	5	26	200
	%	42.5	10.0		2.5	13	100
How often does the use of Mobile Phone in class assist your learning?	Freq	61	10.0	74	23	32	200
	%	30.5	5.0	37	11.5	16	100
How often do the calls /messages received just before class impact on your ability to concentrate?	Freq	110	18	38	16	18	200
	%	55.0	9.0	19.0	8.0	9.0	100
How often does the use of Mobile Phone during your study time distract you?	Freq	82	18	44	17	39	200
	%	41.0	9.0	22	8.5	19.5	100
How often does the use of Mobile Phone during your study time assist you in learning?	Freq	36	14	72	16	62	200
	%	18.0	7.0	36.0	8.0	31.0	100

How mobile phone usage impact on academic performance from table 3 has been analyses below. From the table 85(42.5%) out of the 200 respondents said the use of mobile phone never interfere learning in class. even though 64(32%) said it sometimes interfere with learning and 26(13%) said it always interfere. With respect to Using mobile phone in the class and it assistance to learning, 74(37%) responded it sometimes assist while 32(16%) said it always assist meanwhile 61(31%) said it never assist them. From the table it was observe that 110(55%) respondents attest to the fact that calls and massages receive before classes does not impact on learning concentration, 18(9%) responded it impacted sometimes while the same figure said it always impact on concentration. Response to the question of

whether the use of mobile phone during study times distracts students review 82(41%) of them saying it never distracts them while as 44(22%) said it distract sometimes and 39(20%) responded it always distracts during studies. Also from the table 62(31%) responded that the use of mobile phone during studies assist them in leaning while 36(18%) said it never assist in learning during study time. It was also detected from the result that 72(36%) responded it sometimes assist during learning.

Table 4: Positive Effects of Mobile Devices on Learning Achievements

Variables		Can't say	Strongly disagree	Disagree	Agree	Strongly Agree	Total
I can easily contact the teachers for study purposes	Freq	28	7	29	86	50	200
	%	14	3.5	14.5	43	25	100
I can easily contact classmates to get help in studies	Freq	13	7	23	93	64	200
	%	6.5	3.5	11.5	46.5	32	100
My academic performance has been increased due to mobile technology	Freq	22	14	34	71	59	200
	%	11.0	7.0	17.0	35.5	29.5	100
The Mobile devices has helped to improve the level of the quality of education	Freq	22	15	35	70	58	200
	%	11.0	7.5	17.5	35.0	29.0	100
The teacher uses mobile devices in the class room	Freq	37	24	42	58	39	200
	%	18.5	12	21	29	19.5	100
Students use dictionary/thesaurus/calculator of mobile phone in classes	Freq	20	26	51	53	50	200
	%	10.0	13.0	25.5	26.5	25.0	100

Table 4 seeks to look at the positive effects of using mobile device as a student on learning achievement and the responses given by students have been summarized in the table, which

the researcher has discuss below. Contacting teachers for study purposes, 86(43%) and 50(25%) students responded agree and strongly agree. Also 29(15%) and 7(4%) they said disagree and strongly disagree respectfully meanwhile 28(14%) were unable to say. From the table 93(47%) and 64(32%) of respondents agree and strongly agree to the fact that, the use of mobile make it easy for them to contact classmates to get help. On the other hand 23(12%) and 7(4%) also responded disagree and strongly disagree while as 13(7%) of the students interviewed said they can't say.

For academic performance increasing due to the use of mobile device 71(36%) and 59(30%) out of the 200 respondents agree and strongly agree to it, 34(17%) and 14(7%) out of the same total responded disagree and strongly disagree to mobile uses increasing performance meanwhile 22(11%) respondents said they can't say. With respect to the use of mobile device to improve quality of education 70(35%) and 58(29%) said they agree and strongly agree to mobile improving quality of education. 35(18%) and 15(8%) said they also disagree and strongly disagree on it improving education quality and 22(11%) respondents can't say whether it use has improve education quality or not. Base on the result, it was observe that 58(29%) and 39(20%) attest agree and strongly agree to the fact that teachers use mobile device in the class. It also came out that 42(21%) and 24(12%) respondents disagree and strongly disagree respectfully while 37(19%) said they can't say whether teachers use mobile device in class. From the table, total of 53(27%) and 50(25%) students responded agree and strongly agree respectfully while as 51(26%) and 26(13%) also said they disagree and strongly disagree respectfully and these were the response to the use of mobile device for dictionary, thesaurus and calculator in the class.

CHAPTER FIVE

SUMMARY, FINDINGS, RECOMMENDATION AND CONCLUSION

5.1 Summary

This research was to look into the using of mobile phone devices by students in school and its impacts on academic performance. From the objectives set by the researcher to look into the impacts and the positive effects, information were gathered to be analysis and the results generated from the analysis has been discuss in the previous chapter, this chapter is to deal with the finding and give recommendation base on the findings.

5.2 Findings

From the analysis, students who are between the ages of 15-17 form the majority of the respondents, they were 199(59.5%) out of the 200 students survey, more female responded amounting to 116.58% than male. Base on the students having mobile phones the research fine out that 162(80%) said they have and 75.6% of the students claim to the facts that they have Smartphone with them in school out of 200 students and 91.11% of students using mobile devices have access to internet but 51.5% of respondents agree to using the device in school for learning while 24.6% said they used them for entertainment.

Base on the objective: impact of mobile phone use on learning, findings show that 85(42.5%) students said the use of the device never interfere their learning while 64 and 26 said sometimes and always respectively. With it use assisting learning 32 students said it always assist them while as 74 (37%) and 61(30.5%) said sometimes and never putting the percentage of the last two (67.5%) students are saying they have little assist to learning with the use of the device

Even though more respondents are saying they have little assistance, 110(55.5%) of the same respondents said calls / massages receive before class does affect concentration in class with the use of it distracting student in class 82 respondents said never.

Base on the objectives the use of mobile phone device and its impacts putting the findings from the respondents together, the researcher finds out that

- 162(80%) have mobile phone devices, 75.6% use smartphone and 91.11% using the mobile device have access to internet.
- 51.5% said they have them for learning, 42.5% are of the view that the use of it never interfere learning and 67.5% respondents give little assistance to learning.
- 110(55.5%) said calls and massages that comes before class affect concentration but using it in class that not distract learning.

The researcher also took the trouble to find the positive effects of the use of mobile devices on academic performance and came out that with a total of 200 respondents,

- 86(43%) said they agree that, it uses aid them to contact their teachers for studies and 93(46.5%) also agree to it helping to contacts classmates.
- Increase in academic performance and improve quality level of education, 71(35.5%) and 70(35%) both agree respectfully.
- 58(29%) agrees to teachers using mobile device in class and 53(26.5%) agrees to they using it as calculators, dictionaries etc.

5.3 Recommendations

These are the recommendations suggested by the researcher

Students using mobile in school must be check by doing so a well-resourced mobile learning facility must be constructed by government, Parents and Teachers Association in each school and schools with it already must be improved, and it should be manager by well-trained facilitators to assist student in other to have the maximum benefit of the use of mobile devices.

There should be a dedicated period for the facilitators to train and also sensitize students on the effect/ appropriate use of the device aside they assisting them to use for academic performance.

Students are to be made to take more active role in the use of mobile device for learning specially department like science should be encourage to use in class with their teachers and teachers must be train to use more videos and audio lessons.

Curriculum planners should consider student learning style base on this content developers and programmers should design and develop educational mobile phones

5.4 Conclusions

The use of mobile devices in a this technological era or age in all aspects of life not withstanding education in its entirety has come to stay hence students using them in school and class should not have been a major issue, from the findings, there is a positive relation (correlation) between the use of mobile devices and academic performance/ quality education. Students having these devices with net, use them to contacts collogues, teachers

and parents all in the name of helping them to improve performance and quality of education and it is confirmed by the result of the findings.

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APPENDIX

QUESTIONNAIRE

Informed Consent

I have read and understood the information sheet. Having been assured of confidentiality and anonymity I accept to take part in this questionnaire voluntarily to help facilitate the accuracy and validity of this study.

Instructions

1. Do not write your name on the questionnaire
2. Tick in the boxes provided where applicable
3. For open ended questions write the answers in the space provided
4. Answer all questions
5. All information obtained will remain confidential

A: GENERAL INFORMATION

1. Age in years_____?

2. Gender
   a. Male { }
   b. Female { }

3. Which form are you in?
   a. Form 1 { }
   b. Form 2 { }
   c. Form 3 { }

4. What is your course of study?
   a. Arts { }
   b. Science { }
   c. Business { }

B: OWNERSHIP AND PATTERNS OF MOBILE DEVICE USAGE BY STUDENTS

5. Do you own any mobile device?
   a. Yes { }
   b. No { }

6. Do you use the mobile device in school?
   a. Yes { }
   b. No { }

7. What type of mobile device do you own?
   a. Smartphone { }
   b. Ipad { }
   c. Laptop { }
   d. Tablet computer { }

8. Do you have access to internet?
   a. Yes { }
   b. No { }

9. Why do you take mobile device to school?
   a. To use in case of emergency or personal safety { }
   b. To keep in touch with friends and other social contacts { }
   c. To keep in touch with parents { }
   d. For information access (phone numbers, internet, email, sports etc) { }

10. Do you use mobile device on campus?
    a. Yes { }
    b. No { }

11. To what degree do you use mobile devices on school premises (any devices, not just your own)?
    a. Not at all { }
    b. A little { }
    c. Some { }
    d. A lot { }

C: TABLE 3: IMPACT OF MOBILE PHONE USE ON LEARNING

Variables		Never	Seldom	Sometimes	Often	Always	Total
How often does the use of Mobile Phone in class interfere your learning	Freq	85	20	64	5	26	200
	%	42.5	10.0	32	2.5	13	100
How often does the use of Mobile Phone in class assist your learning?	Freq	61	10.0	74	23	32	200
	%	30.5	5.0	37	11.5	16	100
How often do the calls/ messages received just before class impact on your ability to concentrate?	Freq	110	18	38	16	18	200
	%	55.0	9.0	19.0	8.0	9.0	100
How often does the use of Mobile Phone during your study time distract you?	Freq	82	18	44	17	39	200
	%	41.0	9.0	22	8.5	19.5	100
How often does the use of Mobile Phone during your study time assist you in learning?	Freq	36	14	72	16	62	200
	%	18.0	7.0	36.0	8.0	31.0	100

TABLE 4: POSITIVE EFFECTS OF MOBILE DEVICES ON LEARNING ACHIEVEMENTS

Variables		Can't Say	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
I can easily contact the teachers for study purposes	Freq	28	7	29	86	50	200
	%	14	3.5	14.5	43	25	100
I can easily contact classmates to get help in studies	freq	13	7	23	93	64	200
	%	6.5	3.5	11.5	46.5	32	100
My academic performance has been increased due to mobile technology	freq	22	14	34	71	59	200
	%	11.0	7.0	17.0	35.5	29.5	100
The Mobile devices has helped to improve the level of the quality of education	freq	22	15	35	70	58	200
	%	11.0	7.5	17.5	35.0	29.0	100
The teacher uses mobile devices in the class room	freq	37	24	42	58	39	200
	%	18.5	12	21	29	19.5	100
Students use dictionary/thesaurus/calculator of mobile phone in classes	freq	20	26	51	53	50	200
	%	10.0	13.0	25.5	26.5	25.0	100