

UNIVERSITY OF CAPE COAST

TEACHERS AND STUDENTS PERCEPTIONS ON THE USE OF MOBILE  
TECHNOLOGY TO FACILITATE TEACHING AND LEARNING IN SENIOR  
HIGH SCHOOLS IN THE CAPE COAST METROPOLIS

DANIEL KWEKU AINOOSON – NOONOO

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BY

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Coast, in partial fulfilment of the requirements for award of Master of Education  
Degree in Information Technology

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## DECLARATION

### Candidate's Declaration

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

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

Name: Daniel Kweku Ainooson-Noonoo

### Supervisor's Declaration

*I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with guidelines on supervision of dissertation laid down by the University of Cape Coast.*

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

Name: Dr. Paul Nyagorme

## **ABSTRACT**

The purpose of this study was to investigate the perceptions of teachers and students towards the use of mobile technology in the teaching and learning process. Also the study sought to recommend a model for teaching and learning using mobile technology tools.

The descriptive research was used for the study. In all, 375 respondents participated in the study. They were made up of 300 students and 75 teachers selected from senior high schools in the Cape Coast Metropolis. Structured questionnaire was the main data collecting instrument.

The study found that majority (84.7%) of the students in Cape Coast Metropolis had mobile phones as compared to those with personal computers and the majority (73.0%) of the students also had their mobile phones with them very often than their personal computers. The study also found that more than half of both the teachers and students also indicated that they would like to use mobile devices to support their teaching and learning. It was recommended that school administration should organize in-service education and training (INSET) on mobile devices and technologies for teachers and students.

## ACKNOWLEDGEMENTS

Even though we learn from each other, it should be stressed that it is not everybody who has the courage, patience and expertise to guide neophytes in academic pursuits such as this dissertation. Custom and courtesy demand that appreciation be shown to special individuals who have contributed to the dissertation. I am particularly thankful to my supervisor, Dr. Paul Nyagorme for his immense guidance, assistance and professional advice which motivated and gave me sense of direction. I am also equally grateful to Mr. Hilary for his help when difficulties and frustrations set in.

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Last and not least, I want to express my heart-felt gratitude to my friends for their encouragement and enormous contributions for making this work a reality.

## **DEDICATION**

To my Parents and Brother.

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## **CHAPTER ONE**

### **INTRODUCTION**

#### **Background to the Study**

Throughout the world there is awareness of the fundamental role of new Information and Communication Technologies (ICTs) in the field of education. The use of technology in our world is prevalent and significantly impacts the lives of students in the classrooms. The need only to use an ATM and mobile money systems to withdraw and deposit cash, have purchases scanned at the supermarkets or warm food in the microwave is what brings to recognition the impact of technology. Information and Communication Technology (ICT) use in education is at a particularly dynamic stage in Africa, which means that there are new developments and announcements happening on a daily basis somewhere on the continent.

At the high school level of Ghana, the Ministry of Education (MOE) and Ghana Education Service (GES) have started to integrate ICT as a subject of study in the curriculum. The Algerian government has also been committed to set forth a policy for the integration of ICT into the education system. The reform of the educational process and inclusion of ICT with a set structure was formally included in the country's formal ICT policy in June 2002 with an allocation of three billion dinar. The Ministry of Education is working on building the infrastructure for enabling the ICT environment. All secondary

schools were equipped with computer labs (15 computers: 10 for students, five for teachers) connected to the Internet through ADSL, and 30% of this foundation had Internet access via cable modem. Half of the middle schools have adopted ICT as an integral part of the educational programme (Salmon, 2004).

Viewing ICT as a subject in the senior high school is in itself important; a more significant view is to identify and view ICT as an application tool. Again considering ICT tools to be only computers is erroneous but mobile technology in addition and can be used in teaching and learning of all other subjects. Teachers hardly integrate technology into their curriculum. Mobile technology is now a vital tool in this twenty first century information age and it is affecting the lives of people globally. This effect is very significant in the education sector.

Mobile technology is the technology used for cellular communication. Mobile Code Division Multiple Access (CDMA) technology has evolved rapidly over the past few years. For some time now, a standard mobile device has emerged from being no more than a simple two-way pager to being a mobile phone, GPS navigation device, an embedded web browser and instant messaging client, and a handheld game console (Patil, Karhe, & Aher, 2012).

Mobile technology encompasses technological tools that can be moved around with much ease. Examples are mobile phones, digital cameras, calculators, Personal Digital Assistants (PDAs), handheld game consoles, pagers, tablets and camcoders. All of these equipments are examples of mobile technology tools which can be used in the classrooms to promote effective teaching and learning interaction. These can all be integrated into the

educational curriculum for successful teaching and learning. Mobile learning represents more than a mere moment of technological fascination: it is clearly identified as the fourth generation of the electronic learning environment (Salmon, 2004), where "the value of deploying mobile technologies in the service of learning and teaching seems to be self – evident and avoidable" (Wagner, 2005, p. 42).

The current impetus towards mobile learning is identified by Wagner (2005, pp. 49 – 50) as follows:

1. There are more wireless networks, services, and devices than ever before.
2. Consumers are demanding better mobile experiences than ever before.
3. People want 'anytime, anywhere' connections more than ever before.

It is widely recognised that in the current environment where mobile infrastructure is reaching the point of being pervasive, educators need to adapt from a role as transmitters of knowledge to guiders of learning resources. In addition, technology developers need to respond to concerns of security and privacy while designing devices and services that learners both want and will pay for (Naismith, Lonsdale, Vavoula & Sharples, 2004). Since mobile technology has taking turn in the technological environment it would be much easier to integrate it into education as the general result for these unfortunate situations is that students cease to be ICT oriented and thus place them behind in the global market if they complete in whatever subject area they embarked.

Integrating mobile technology into every subject is important for the growth and development for every society and country and should be fun to teach with, especially at the senior high school level. The question therefore



is: how do teachers and school students perceive mobile technology integration into the teaching and learning processes in senior high schools?

The overall purpose of the project is an attempt to demonstrate that the use of mobile technology in education will make a difference in improving the teaching/learning process. This could best be done through the systematic integration of mobile technology into the existing educational curricula at the senior high school level.

Many experts argue that the future of computer technology rests in mobile computing with wireless networking and mobile computing by way of tablet computers becoming more popular. The most popular tablet at the moment is the iPad by Apple. Tablets are available on the 3G and 4G networks which tend to prove that mobile technology does not just imply to the use of mobile phones. Most teachers at the senior high school level are aware of the benefits of technological advancement in teaching and learning interactions. In as much as teachers are aware of the benefits in the use of ICT in teaching and learning, students are also aware of the skills they would get if the tools of ICT are integrated into the teaching/learning process. Since they want to learn at their own rate, time and decide their own learning approach, students no prefer the learner centred approach. This can be enhanced with mobile technology.

The rapid technological developments in the world are placing many requirements on education. This has brought about the need to inculcate into teachers and students the importance of lifelong learning and critical thinking skills so as to update their knowledge and skills. Additionally, it is also expected that critically thinking could enhance teachers' and student's

preparation for meeting the demands of the fast changing world of education. It is, however, not easy to ascertain the integration of such skills into the education system. Perhaps, the cause of this may be the lack of knowledge the public has on the effective use of mobile technology in education.

There have been many successful efforts with the integration of mobile technology in the field of education. In 1991, Apple Classrooms of Tomorrow (ACOT) in partnership with Orange Grove Middle School of Tucson, Arizona, used mobile computers connected by wireless networks for the 'Wireless Coyote' project (Wayne, 1993). Universities in Europe and Asia developed and evaluated mobile learning for students in their countries in 2012. Palm Corporation offered loans and grants to universities and telecommunication companies who created and tested the use of Mobile Learning on the PalmOS platform. Knowledgegility created the first mobile learning modules for CCNA, A+ and MCSE certification using the core tools that later became LMA (Crompton, 2013).

As a large number of smart mobile devices came onto the market, m-learning developers faced a decision as to which devices (smartphone or tablet) and operating systems they would target. Apple, Android and Blackberry are currently the three most popular operating systems. Multi-device learning design is becoming increasingly important as learning designers set out to design once and deliver to all three operating systems as well as a variety of device sizes (Phillip 1996). The years 2011 and 2012 saw the increasing availability of multi-device authoring tools such as Captivate, Articulate Storyline, Lectora and GoMoLearning (Thippu, 2014). These tools allow e-learning courses to be delivered to a variety of mobile operating

systems and devices as well as to PCs, although not all resources are accessible on all operating systems and devices.

The need to inculcate among students the importance of lifelong learning, that is, to constantly seek new information, to think critically and to take initiative has become ever more pressing in this fast changing world. With this, countries in Asia and the Pacific have responded to these challenges in different forms at varying levels so as to enable their people to adapt to change, inspire creativity and innovation, and enhance their ability to apply knowledge and solve emerging problems with confidence using mobile technology.

Also, still recognizing the impact of new technologies on the workplace and everyday life, today's educational institutions are trying to restructure their educational programmes and classroom facilities in order to bridge the teaching and learning technology gap between developed and the developing countries. This restructuring requires effective diffusion of technologies into existing context in order to provide learners with knowledge of specific subject areas, to promote meaningful learning and to enhance professional productivity (Tomei, 2005). There is no other electronic device that has as many applications in the educational setting as the computer. The power and outstanding software of the computer makes it an important teaching aid in the classroom.

However, while there is a great deal of knowledge about how ICTs are being diffused and used in Senior High Schools in developed countries, there is not much information on how ICTs are being diffused and used by teachers in Ghanaian schools. There is also an assumption that there are wide gaps in

the use of ICTs between the rural and urban schools. Throughout the world, many countries have ICTs into schools via different courses of action. Their use is also underlined by Organization for Economic Co-operation and Development (OECD, 2001) as a necessity for improving quality in teaching and learning.

Technology involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. In other words, technology can change or alter how people access, gather, analyze, present, transmit and simulate information. The impact of technology is one of the most critical issues in education, according to Webber (2003). At the inception of the millennium, Ghana's education authorities set up especially at the basic and secondary school levels. For instance, in the middle of 1990s, educational providers realized that Ghanaian professionals could not compete on the global market for jobs because they were limited in skills, especially in the area of information technology. Subsequently, the authorities incorporated the study of ICTs as part of the study of science.

The use of ICTs creates a powerful learning environment as it transforms the learning and teaching processes in which students deal with knowledge in an active, self directed and constructive way. ICT is not just regarded as a tool, which can be added to or used as replacement of exciting teachers' method. ICT is same as an important instrument to support new ways of teaching and learning. It should be used to develop student skills for co operations, communications, problem solving and lifelong learning.

As suggested by Pelgrum (2001), teachers are the most important agents of change on the educational work floor. Hence, any attempt to

implement computers in education would need to address teachers' attitudes towards computers as a prerequisite for its success. Studying teachers' attitudes is particularly important in developing countries, where computer technology is not usually part of the school culture. Due to its novel presence in society at large and in schools in particular, technology may not be well received by developing country teachers Benzie (1995) indicates that many national programmes have failed partly because they did not consider the prevailing school culture. He warns that the mismatch between the culture of techno centric mindedness and the teachers' pedagogic culture results in the alienation of the teachers from the use of technology. Educational systems around the world are under increasing pressure to use ICT to teach students the knowledge they need in the 21st century and beyond.

In Ghana, many schools are changing into computerized systems but are failing to integrate computing in the normal day classroom teaching and learning process. Hawkins (2004) posits that while many educational ministries around the world have made the commitment to computerize schools, few have developed coherent strategies to integrate its use fully as a pedagogical tool in the classroom. Hence, developing countries have the responsibility not to merely provide computers for schools, but also to foster a culture of acceptance amongst the end user of these tools. Unless teachers develop positive attitudes towards the new machines, they may simply ignore them. The delicacy of this situation calls for an investigation of teachers' attitudes which will then mean that teachers who are able to use this system of instructional strategy will be able to kindle in the hearts of learners, a desirable attitude towards information technology tools in their entire life.

## **Statement of the Problem**

In Ghana, there is a growing concern about the use of computers to support teaching and learning in educational institutions. Information and Communication Technologies (ICTs) are used to gather, analyse, modify and exchange information. The government and the private sector have undertaken a number of initiatives to install ICT-infrastructure in Ghana in order to bridge the digital divide between Ghana and the global north (Intsiful, Okyere, & Osae, 2003).

However, it appears that most teachers neither use technology as an instructional delivery system nor integrate technology into the delivery system since most of the tutors in the Senior High Schools (SHS) in Ghana developed their career with little or no ideas about how the use of mobile technology can support teaching and learning interactions. Therefore, the use of mobile technologies in the senior high schools of Ghana has been banned but recently, the Director of Information, Communication and Technology (ICT) of the Ghana Education Service (GES), Mr. Francis Avugbey, has advocated the revision of the ban on the use of mobile phones in schools. He said in the current ICT world, technology had moved from static desktop machines to mobile phones, which were easier to carry and accessible, making it the first choice gadget to any research work. “They will be able to download and transfer documents easily as well as make teaching and learning more fun and interactive in the classroom as they share ideas,” he added (Daily Graphic, August 15<sup>th</sup>, 2013).

Regardless of the usefulness of mobile technology equipment, most students and teachers appear to be doing very little with regards to

supporting teaching and learning. Additionally, the traditional classroom, students and teacher interaction seems to dominate curriculum delivery in most SHSs in Ghana.

### **Purpose of the Study**

The main purpose of the study is to investigate the perceptions of teachers and students towards the use of mobile technology in the teaching and learning process in SHSs in the Cape Coast Metropolis in the Central Region of Ghana.

Specifically, the study seeks to:

1. Determine the perceptions of students towards the use of mobile technology in the teaching and learning process.
2. Determine the perceptions of teachers towards the use of mobile technology in the teaching and learning process.
3. Find out how the perceptions of students will affect the use of mobile technology in teaching at the senior high school if integrated.
4. Investigate the best mobile technology tools and applications to be used for teaching and learning.

### **Research Questions**

The following research questions will guide the study:

1. What are the perceptions of students towards the use of mobile technology in the teaching and learning in SHS in Cape Coast Metropolis?
2. What are the perceptions of teachers towards the use of mobile technology in the teaching and learning in SHS in Cape Coast Metropolis?

3. How do the perceptions teachers have about mobile technology affect the use of mobile technology in the teaching and learning process in SHS in the Cape Coast Metropolis?
4. How do the perceptions students have about mobile technology affect the use of mobile technology in the teaching and learning process in SHS in the Cape Coast Metropolis?
5. What mobile technology tools and applications would be effective when integrated in the teaching and learning process at SHS in Cape Coast Metropolis?

### **Research Hypotheses**

The research will be guided by the following hypotheses:

- i. There is a statistically significant difference in the perception of teachers and students with the use of mobile technology in the teaching and learning process.
- ii. The perceptions of teachers towards the use of mobile technology have no statistically significant effect with the integration of mobile technology in teaching.
- iii. The perceptions of students towards the integration of mobile technology have no statistically significant effect with the use of mobile technology in learning.

### **Significance of the Study**

The study expects to come out with some useful findings that can further deepen the integration of mobile technology into Ghana's education system. Education policy makers, telecommunication operators and



curriculum developers also stand to benefit from the development of the framework for integrating mobile technology into the teaching and learning process at the senior high school level in Ghana.

The results of this study would be significant since it would inform stakeholders (government, managers of education, headmasters, teachers, and students) how mobile technology is being integrated into the teaching and learning processes. The government would tend to know the cost benefit and the ease of use upon the integration of mobile technology in the schools as compared to the one child – one laptop project.

Also, it would enable school heads to know whether teachers would benefit and be able to adequately use mobile devices in the classroom to teach effectively and the main type or types of mobile devices that they would love and find it easy to use.

Students would also benefit from the project by knowing the benefits of mobile technology with regards to education and the various software and ways on how to integrate them into their learning process. Additionally, it would provide the Cape Coast Metropolis Directorate of Education the necessary opportunity to facilitate the provisions of adequate infrastructure such as ICT resource centres and computers in various Senior High schools. It would also check whether the various action plans for achieving the purpose of ICT education policy of all students having compulsory ICT all over Ghana is being accomplished. This would also serve as an input for the Ghana Education Service and the Government as a whole in integrating mobile technology in the implementation of the ICT policies for the nation. Finally,

the study further expects to add up to the body of knowledge on mobile technology use in schools.

### **Delimitation of the Study**

The study will be delimited to SHS students and teachers in the Cape Coast Metropolis. The study will also explore concepts such as mobile technology and curriculum delivery. The scope of this study was limited to selected secondary schools in the Cape Coast Metropolis.

The study was focused on the perceptions of teachers in teaching various subjects at the senior high school level with mobile technology. Other sections of the Ghana educational system such as Junior High School and Colleges of Education were not considered. Although, there are over 20 secondary schools in the Cape Coast Metropolis and only five were selected for the study which might affect the outcome of the study because all the schools or more than half of the schools would have given a better result to the study. Findings, conclusions and recommendations were not extended beyond the population.

### **Limitations of the Study**

Due to time constraints and the nature of the research, the researcher used stratified sampling in selecting the sample for the study.

### **Operational Definition of Terms**

**Mobile learning:** The term m-learning or "mobile learning", has different meanings for different communities, that refers to a subset of e-learning, educational technology and distance education, that focuses on learning across contexts and learning with mobile devices such as

Personal Digital Assistants (PDAs), Digital Cameras, Mobile Phones, Tablets.

**Mobile technology:** Mobile technology is the technology used for cellular communication.

**Electronic learning:** E-learning refers to the use of electronic media and information and communication technologies in education.

**Teaching:** It is the ideas or principles taught by an authority through a mobile technological device.

**Learning:** The acquisition of knowledge or skills through study, experience, or being taught through a mobile technological device.

**Technology:** It is the machinery and devices developed from scientific knowledge.

### **Organization of the Rest of the Study**

The study consists of five chapters. Chapter one covers the background to the study, the statement of the problem, the purpose of the study, the research questions, significance of the study, limitations and delimitations. The second chapter constitutes the review of related literature of the study.

Chapter three forms the methodology and procedure for conducting the study. It describes the research design, population, sample and sampling techniques as well as research instruments. It also discusses the data collection and analysis procedure.

The fourth chapter is the analysis and discussion of data. It unfolds the emerging trends from the data using descriptive statistics to bring out the key

findings of the study. Chapter five gives the summary, conclusions, recommendations and suggestions for future research.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

This chapter primarily reviews literature related to the study. It focuses on the work of several authors concerning the perceptions of students and teachers in the integration of mobile technology into the teaching and learning process in schools and culture. The essence of this review is to provide a framework which constitutes the basis for drawing similarities and differences between this study and those of other writers, and to identify areas that require further investigations.

Mobile technological devices, especially mobile phones, from my observations, are increasingly widespread, influencing many aspects of social and economic lives these are also social. As more tasks involve human-computer interaction, computer skills and knowledge have become more positively correlated with both occupational and personal success. Therefore, as society moves into a mobile technology based society, it is important that children's classroom experiences with technology be equitable and unbiased for males and females.

In most cases, the teacher is key to effective implementation of the use of computers in the educational system and given that teachers have tremendous potential to transmit beliefs and values to students, it is important to understand the biases and stereotypes that teachers may hold about the use of computers (mobile technologies) and the reasons that act as facilitators to teachers' positive computer usage.

I focused on these sub topics:

1. The Use of Mobile Technology in Education in Developing Countries
2. The Post-PC Era: From Computers to Mobile Devices
3. Using Mobile Devices in Education and its Impact on the Stakeholders
4. The Education Providers
5. The Teachers and Mobile Technology
6. The Students and Mobile Technology
7. Mobile Device Technologies Currently Being Used in Education
8. Readiness for the Integration of Mobile Technologies in Teaching and Learning
9. Technology Acceptance Model (TAM)

### **The Use of Mobile Technology in Education in Developing Countries**

It's been my observation that the use of mobile phones in Ghana is on the rise with which both the literates and illiterates are able to use with comfort which according to Kam, Kumar, Jain, Mathur, and Canny (2008), cell phones are increasingly adopted in the developing world, and an increasing fraction of these phones feature multimedia capabilities for gaming and photos. These devices are a promising vehicle for out-of-school learning to balance formal schooling. In particular, Kam et. al. (2008) believe that learning English as a Second Language [ESL] by playing games on cell phones presents an opportunity to dramatically expand the reach of English learning, by making it possible to acquire ESL in out-of-school settings that can be more convenient than school.

With mobile devices increasing ubiquity in developing countries, Brown (2003) argues that it is reasonable to envision a future where the

mobile devices play a pivotal role in education. According to Brown, while there are as many people using mobile technologies as there are opinions on how mobile technologies will impact on education; the majority agree that m-learning will play a major role in e-learning. Already, there are numerous applications for mobile technologies in education – from the ability to wirelessly transmit learning modules and administrative data, to enabling learners to communicate with lecturers and peers.

The National Educational Technology Plan of 2010 for the U.S. Department of Education dated March 5, 2010 states that our model of an infrastructure for learning is always on, available to students, educators, and administrators regardless of their location or the time of day.

There are a lot of mobile software applications that I see them to be very useful resources for teaching and learning and Donner (2009) states a good number of studies that consider mobile devices as a resource for e-learning in Tanzania (Stone, Lynch, & Poole, 2003) and Thailand (Whattananarong, 2005). All did agree that the mobile device's portability, simplicity, and affordability makes it a natural fit for education initiatives in places where PCs and internet connectivity may be scarce as I have observed in Ghana.

It's been on the News often that most rural Ghanaian children have been absenting themselves from school because they go to work for their parents in their farms mostly during the raining season and on market days of which this problem can be resolved using mobile technology since they can learn from the farm and market at their own pace even if they get to absent themselves from school and Kumar, Tewari, Shroff, Chittamuru, Kam, and,

Canny (2010) also agree that mobile devices like cell phones are a perfect vehicle for making educational opportunities accessible to rural children in places and times that are more convenient than formal schooling. They conducted a 26-week study to investigate the extent to which rural children will voluntarily make use of mobile devices like cell phones to access educational content. Their results show a reasonable level of academic learning and motivation. Akers, Ksoll and Lybber, (2010) also report the short-term results from a randomized evaluation of a mobile phone literacy and numeracy program (Project ABC) in Niger, in which adult literacy students learned how to use mobile phones as part of a literacy and numeracy class. Students in ABC villages showed substantial gains in numeracy exam scores. There is also evidence of heterogeneity in program effects across regions, suggesting the impact is context dependent. The results were stronger in one region, for women and for participants younger than 45. There was also evidence of persistent impacts: six months after the end of the first year of classes, students in ABC villages retained what they had learned better than the non-ABC students. The effects do not appear to be driven by differences in teacher quality and motivation, nor student attendance.

The Ghanaian public most often have their mobile devices with them which give them easy access to information every now and then, they would intend prefer to use the mobile devices to learn as argued by Ally (2009), that rather than acquiring another technology to receive learning materials, people throughout the world will want to access learning materials on their existing mobile devices. As a result, educators and trainers must design learning materials for delivery on different types of mobile devices like the short



messaging system (SMS), Whatsapp Messages, Telegram Messages among others. The roaming learner and worker who travels frequently from place to place will similarly use mobile technology to access information and learning materials from anywhere and at anytime. A major benefit of using wireless mobile technology is to reach people who live in remote locations where there are no schools, teachers, or libraries. Additionally these remote locations have geographic terrains that are difficult for normal networking and cabling infrastructure.

Not being so sure of the extent to which mobile devices will impact the educational system Valk, Rashid, and Elder (2010) have examined the extent to which the use of mobile phones have helped to improve educational outcomes in two specific ways: 1) in improving access to education, and 2) in promoting new learning. Valk et. al. reviewed the evidence of the role of mobile phone-facilitated m-Learning in contributing to improved educational outcomes in the developing countries of Asia by exploring the results of six m-Learning pilot projects that took place in the Philippines, Mongolia, Thailand, India, and Bangladesh. Valk et. al. concluded that the analysis of these projects indicates that there is important evidence in the developing world that mobile phones impact educational outcomes by facilitating increased access.

### **The Post-PC Era: From Computers to Mobile Devices**

It is obvious that as computing power has increased, size and price has decreased. From mainframe computers of the 1970s that was the size of a room and could ADD  $2 + 2$  and give an answer of 4 in two minutes, there is now a computing device that fits into the palm of our hands and does

everything while costing almost nothing. The computing environment started off with distributed computing platforms where organisations were doing their own computing within their own networks and moved to centralised computing when the need for online electronic transactions between business-to-customers [B2C], business-to-business [B2B] and business-to-government [B2G] became apparent.

Now with cloud computing technology and the widespread use of mobile devices for computing power and connectivity, once again the computing platform is becoming centralised. Cloud computing infrastructure and applications are able to interact with users who have mobile phones, Tablet PCs, and other mobile devices. Users of mobile phones and devices are not required to store data and information on their devices. Whatever data and information they need are stored with their cloud service providers. When the need arises to use that data or reference that information, access is obtained via their mobile service provider as long as they are within the network connectivity range. Access to data and information is not confined to any location, and that is the essence of cloud computing (Goundar, 2011). The primary computing platform has changed from a central computer server doing everything and controlling all to a multiple functionality mobile device that builds on the existing power of desktop computing network to enable computing applications that were hither to impossible.

The general public now prefer to purchase mobile phones other than other technological devices like laptops and desktop computers and according to Steve Jobs, Apple sold its one millionth iPhone 3G, just three days after its launch, and they now sell ten mobile devices for every one laptop or desktop

computer sold (Contacto, 2011). Mobile digital devices rocketed to popularity around ten (10) years ago with the release of the iPod. Mobile computing went conventional with the release of the iPhone in 2007. With the release of the iPad just one year ago, the world is now seeing a significant shift in the dynamics of computer purchase and practice – moving away from desktops and laptops to iPads and other mobile devices (Pinola, 2011). Their cost relative to laptops along with the promise of mobile computing has raised tremendous interest in iPad use in education. Pinola reports that global laptop sales have collapsed, from pre-iPad double-digit growth rates to just 1 percent in the first quarter of 2011. Deutsche Bank analyst Chris Whitmore estimated that around 30% of iPad owners are using it as a laptop replacement, rather than as a supplement. Morgan Stanley an analysts also confirmed this trend in September 2010, reporting that the iPad cannibalized 25% of the laptop market since the tablet was first announced (Pinola, 2011).

There have been various mobile device learning application software on the technological market like the apple store, android playstore and windows marketplace which are both open source and for sale and according to Gliksman (2011), from iPads in Education, an online network that provides guidance on educational usage of iPads, allowing users to ask questions and gain from others' experiences; mobile devices may have an impact now and in the future in the following way:

1. The structure factor that is the easiness to handle when compared with laptops and notebooks;
2. Long battery life and instant-on: that is mobile devices would last longer without power connection and has instant connectivity;

3. Price which is would costs twice as less and decreases dramatically;
4. Touch interface which is there would be less clumsier mouse or touchpad;
5. Improved digital reading (crisp quality of the display);
6. Integrating multimedia (images, audio and video), and
7. Collaboration (educational value of social networking).

Gliksman also discusses the immediate future of mobile devices in education, and notes:

1. The mobile apps market will mature and the world will move from single task, short session apps to more sophisticated offerings. The release of GarageBand and iMovie are the first steps in that direction.
2. The barrier to entry for creating and distributing e-Book content will become lower. Increasingly, teachers and communities will create their own e-Book content.
3. Social reading is an imminent phenomenon that combines the reading of e-Books with social networking. When reading e-Books, users can connect to friends and other readers, asking questions and sharing notes or opinions. Apps such as InKling are a bold first step in that direction to promote social collaboration.
4. While the iOS browser is adequate, it still lags behind desktop offerings. As mobile continues to expand, the people of the world can expect a consolidation of desktop and mobile systems and browsers resulting in better mobile web editing, more collaboration

tools and support for a wider range of web technologies that support the use of mobile devices in education.

This literature has made several reference to the mobile devices and tools and applications that are necessary for the integration of mobile technology in to the teaching and learning process but fails to indicate the levels of education and the appropriate mobile technology tools and application to be used and this research shall therefore seek to indicate the appropriate tools and application that can be integrated into the SHS of Ghana's teaching and learning process successfully.

### **Using Mobile Devices in Education and its Impact on the Stakeholders**

There are many stakeholders in the education system, namely the education providers (schools, colleges, teacher training institutions and universities), the teachers (class teachers, subject teachers, heads of departments, and principals), the students (primary, secondary, and tertiary), their parents (as individuals, in school boards, and in school management committees), the ministry of education, the government (politicians and their policies), and funding agencies. All stakeholders need close collaboration if they want to benefit from successfully integrating classroom curriculum with mobile devices. Many stakeholders in the education system are already struggling to deliver education as it is – let us look at what is required of them and how they are to be supported if educationist are going to use mobile devices in delivering education.

Research suggests that despite the barriers of online and mobile learning it is touted as the newest and best educational practice to remedy the difficulty of access to quality education (Sener & Stover, 2000).

## **Mobile Technology and the Education Providers**

For those education providers that were constrained by funds and expertise from using computers in education, using mobile devices in education seems like their savior. Nalder (2011), reasons that education providers using ICT in Education have struggled to:

1. Find the time to provide basic computer technology skills training to staff or
2. Get past the time intensive operating systems and user interface lessons or
3. Keep technology repaired and working so that it is available in the first place.

Nalder (2011) again argues that education providers using mobile devices may now be able to:

1. Spend staff training time on improving pedagogy.
2. Spend valuable student lesson time on using technology instead of wasting time learning to use technology first and then having the lessons.
3. Spend less money on supporting existing technology and more on supporting its use in classrooms.

Many developing countries do not have or cannot afford the level of electricity supply required by computers, or the money to buy enough computers for their students and to subscribe to the Internet. Given such constraints, they readily embrace cheaper mobile devices such as mobile phones which require less infrastructure, support and skill (Goundar, 2011).

Digital classroom curriculum creation offers two significant business enablers for sustainable education futures:

- 1) The marginal cost of replicating digital learning materials is near zero, and
- 2) Sharing course design and development costs among institutions is cheaper than doing this alone. Therefore, it is possible to provide affordable access to high quality learning materials and eBooks, even for learners who may not have reliable or low-cost access to the Internet. Moreover this would not necessarily require new money or investment as it would be done by teachers who are already on the taxpayer's payroll (Goundar 2011).

Mobile technologies are becoming more embedded, ubiquitous and networked, with enhanced capabilities for rich social interactions, context awareness and internet connectivity. Such technologies can have a great impact on learning. Goundar, (2011) reports that mobile devices are on track to become the main technology for use in education in the future. It is going to advance, improve, and become enhanced with each generation of students learning with them.

Learning will move more and more outside of the classroom and into the learner's environments, both real and virtual, thus becoming more situated, personal, collaborative and lifelong. The challenge will be to discover how to use mobile technologies to transform learning into a seamless part of daily life to the point where it is not recognized as learning at all which this study will find out.

## **The Teachers and Mobile Technology**

Teachers are probably the most important and critical factor at the moment of the movement towards using mobile devices in education. Weinberger (2011) suggested that technology should not add burden to teachers and the failure of almost all educational technology initiatives can usually be traced to the additional burden placed on the teacher. Ideally, teachers' burdens should be reduced by technology.

Teachers require training to understand how to teach differently. How methods like student centric learning can be applied to the classroom and shown how this learning style will increase educational outcomes but this is not done since it is a lot easier to show off a technology implementation than a trained teacher, and children and their voting parents can see a quick difference with a computer that is not so noticeable with a trained teacher (Vota, 2011, p. 62).

So regardless of how amazing the mobile device technology is, until stakeholders invest in trained teachers who know how to use technology to improve their teaching activities, there is not going to be much difference with the current generation of teachers and learners. There is a need for parents and politicians who are focused on learning outcomes and not the new mobile device technology and what it can do, because regardless of how many applications or how easy the technology is, "I fear that using mobile devices in education initiative will be wasted" (Vota, 2011).

The issues that face developing countries using mobile devices in education are very different from those in the developed countries. In the



developing countries, there is no training available for teachers on how to use technology to teach or to improve students' learning (Goundar, 2011).

This literature has been reviewed on teachers and their perceptions to mobile technology but had no reference to the Ghanaian society and research seeks to fill that gap by identifying the various perceptions of Ghanaian teachers in the Cape Coast Metropolis towards the use of mobile technology in the teaching process.

### **The Students and Mobile Technology**

Students also get their portion of benefits with the use of mobile devices which was realized in an interview, where a teacher at a residential school specifically for the disabled (both mentally and physically) in rural Transkei in South Africa shared an anecdote. She pointed to a crude sketch of an ATM that they used to teach basic life skills to their students and said that it often took years before the children were able to get their numbers right. However ever since they all got mobile phones (they receive special grants from the South African government) they had all figured out their numbers, how to maximize the use of their phones and often showed the teacher how to use hers or top up her airtime or some such assistance. She said she had been teaching for 35 years and had never seen anything like it, until the mobile phones came (Bhan, 2011).

Similarly there is a movement of consumers who are embracing mobile devices due to their simpler, more personalized nature. Generally these are older users such as the 99 year old Virginia Campbell of Oregon, USA, for whom an iPad was her first ever computer, and one she was able to use unaided. She has been writing limericks as well as reading books again after

having not been able to for ten years due to poor eyesight. If Virginia can overcome encumbrances older than the PC era to take advantage of the lower entry level of skill and IT support that Post-PC devices provides, as well as go on to explore new applications and uses suited to her personalized needs, then anyone, including Education can (Nalder, 2011).

M – Learning can help in the improvement students retentive memory because it is adaptive. Ison, Hayes, Robinson and Jamieson (2004) initiated a project aimed to test the hypothesis that m-learning strategies and mobile phone technology could motivate and support the retention of disengaged youth in learning programs and aid the development of lifelong learning skills through supporting collaborative, networked learning environments. It aimed to include m-learning strategies in a blended approach, incorporating learning delivery in community, workplace and/or institutional contexts. This project targeted 15–19 year-old students who have not previously succeeded in traditional classroom-based learning, and examined the option of mobile learning (m-learning) for vocational education and training (VET) providers. The project recognised that mobile phone use has become a pervasive communication tool among youth culture, and created recommendations and guidelines for VET providers on using this communication technology to support a sustainable learning culture with disengaged youth. Mobile phone Short Message Service (SMS) prompting was found to be very successful in both enhancing student participation and motivating them to meet deadlines for assessment. Both of these contributed to improved learning.

This literature gives evident that M-learning is very beneficial to students learning and that various mobile technologies can be integrated in

students learning to make it much improved but did not bring into discussion the taught that the students have about the use of mobile technologies in the teaching and learning process which this research seeks to bring to light.

### **Mobile Device Technologies Currently Being Used in Education**

**TeacherMate** handheld computer system is designed to support the teacher. TeacherMate system was developed by Innovations for Learning, a Chicago-based nonprofit organisation.

According to Weinberger (2011) who is the Executive Director of Innovations for Learning:

- 1) Effective education requires individualized instruction and;
- 2) Technology can greatly assist teachers in individualizing instruction.

These ideas have led to the development of TeacherMate, which creates an effective system of individualized instruction that is affordable, replicable and scalable. To achieve this goal they have focused on the following principles: focus on supporting the teacher in the classroom; support the existing curriculum (from paper-based to TeacherMate); add no burden to the teacher (adding burden will lead to failure – teachers' burdens should be reduced by technology); and the device needs to be affordable (Weinberger, 2011).

**Worldreader** is currently working with 500 teachers and students across three grade levels in Ghana to measure the impact of e-readers, and the effects have been pretty dramatic (Risher, 2011). According to Risher, they have loaded e-readers with about 80 books each – a combination of local textbooks and storybooks have been digitized along with international books donated by Random House, including the entire Magic Tree House series.

That's 40,000 books already delivered – nearly impossible to contemplate without the use of e-readers.

If Worldreader's experience so far is any guide, e-readers are set to transform the developing world, both in – and outside the classroom. But this change will not be driven by e-readers by themselves – it will be driven by human curiosity, ever-increasing connectivity, enlightened self-interest, and a gentle push from organizations like Worldreader (Risher 2011).

But beyond that, two-thirds of the children are downloading an average of one free book a week, along with numerous free samples, free trial subscriptions to magazines like Popular Mechanics, and more. At the moment, Risher's team are measuring the children's reading levels, and are conducting mid-term evaluations. Preliminary results based on the number of books downloaded and read so far, educationist expect to see some remarkable progress in a short amount of time.

"**School of One**" in New York highlights so many of the possibilities related to "smart" teaching with mobile devices. This school is a fascinating example of using mobile devices in education. The students' individualized instruction plans are produced by a "Learning Algorithm" that the teachers plug with data. This in turn leads the teachers to come up with individualized "playlists" of lessons that meet the students' abilities and interests at the needed pace. Although this model would not work in many places, it does provide important details on the resources and inputs required for cutting edge integration of mobile devices and truly "smart" teaching (Kipp, 2011).

**BBC Janala Project** - one interesting use of mobile phones in education in developing countries can be found in Bangladesh, where the BBC

World Service Trust and BBC Learning English have implemented the Janala Project, an initiative that is providing English language lessons to citizens via their mobile phones as part of the wider English in Action program in Bangladesh, funded by the UK's Department for International Development (UKAid). Audio lessons and SMS services turn the mobile phone into a powerful low-cost learning device for people previously denied the benefits of English education. While it is still in its early stages, the service appears to have found an audience: To date over two million audio lessons have been accessed (listened to), 177,000 short audio have been taken and stories and feedback recorded. In addition, over 100,000 audio lessons have been downloaded from BBC Janala mobile internet site (some observers consider this rather remarkable, given the difficulties for many to access the mobile internet and the fact that it has not been advertised).

**Drona – Mobile Learning Management System:** provides not just an m-Learning environment, but also helps users to create their own mobile applications, as and when required. Drona won the World Summit Awards (WSA) in the category of m-Learning & Education in 2010. Given that the penetration of broadband is poor in developing countries, mobile phones have surfaced as a better mechanism for learning and collection of information - Drona is a mobile learning management system. It allows users to author content ranging from texts to images, audio and video. Different types of courses can be created, such as learning slides, multiple choice questions, multiple response questions, true/false type assessment, surveys, and feedback. With Drona, users are truly liberated from the confinement of classrooms and computers, thus providing high accessibility and convenience. In addition,

Drona is extremely user-friendly in terms of course development and management, as well as end-usage. Furthermore, Drona Analytics allows tracking and reporting of different parameters, with different access for administrators, managers, trainers and end-users respectively.

**BridgeIT Project** in Tanzania provides access to digital video content in classrooms on demand' via cellular technology, teacher training and ongoing support, and learner-centered lesson plans and teacher's guides. It is a USAID funded 3 – year pilot project with significant leverage support from private and public sectors involving 150 schools in 17 districts from 7 regions in Tanzania. The BridgeIT Project aims to significantly increase educational quality and student achievement in maths, science and life skills through the innovative use of cellular and digital technology (Goundar, 2011).

### **Readiness for the Integration of Mobile Technologies in Teaching and Learning**

The integration of mobile technologies in education is dependent on the various perceptions that teachers and students have towards the use of mobile technologies in general and according to West (2012), for the first time in history a majority of teachers, whether in developing or developed countries, have individual access to influential communications technology, and this opens up stimulating educational prospects. Mobile phones may be used for teacher and educator professional development. Furthermore, West (2012) indicated that teachers are vital in order to assemble an educational process that embraces mobile learning, which is required to effectively teach educators as well as recruit their own support. Hence, educators play an important role in promoting quality education through mobile technology

(Attawel, 2005; Daniel, 2008; Ferry, 2009). In other words, according to Yusof, Daniel, Low, and Aziz (2011), for adopting and implementing mobile learning, teachers' willingness and preparedness are a critical success factor. According to Ferry (2009), teachers must have the need to establish a dissimilar and innovative set of skills and knowledge for applying this technology (mobile technology) in their classrooms. Mobile learning can facilitate improved interaction among teachers, administrators and students.

A study was conducted by, Uzunboylu and Ozdamli (2011) in Cyprus on teachers' perception for mobile learning, and found that teachers showed above moderate levels of awareness of mobile learning. Kafyulilo (2012) conducted a study in Tanzania to explore the access, practice and insights of teachers and students toward mobile phones as a device for facilitating teaching and learning beyond the classroom. From the findings, it is seen that all pre-service and in- service teachers, college instructors and students owned mobile phones.

A recent research by Serin (2012) showed that prospective teachers' (teachers at a university in Turkish Republic of Northern Cyprus) mobile learning perception levels were low. The author also found misconception of the prospective teachers who claimed to have knowledge regarding mobile learning and also their wrong insight that effective communication environment will be continued by using mobile learning. It was determined that prospective teachers' mobile learning perception does not differ significantly (Serin, 2012).

In Ghana, I have observed that teacher's insight knowledge on the use of mobile technology in education is imperfect. Yusof et al. (2011)

investigated teachers' insight on mobile learning application in typical education classes and the benefits and challenges of applying combined learning for special education. The findings of this research indicate that teachers used different teaching strategies to meet different students' requirements. And teachers possess imperfect knowledge in integrating mobile learning technologies in their teaching and they have inadequate resources of equipment. Consequently, Yusof et al. (2011) claimed, "Suitability can be discovered through teachers' understanding of the mobile devices as well as whether or not they possess the abilities to make use the mobile devices like a tool for teaching". According to Buckenmayer (2008) and Ferry (2009), to adopt mobile technologies as an added value on the educators' existing teaching, readiness should be considered and studied in learning environment.

Mobile learning and teaching systems help teachers to capture and analyze students' learning performance. To examine the preferences and intention of educators to implement mobile learning in higher education, Zulkafly, Koo, and Shariman (2011) conducted a study in Multimedia University in Malaysia. The investigators observed that Multimedia University is one of the adopters of mobile learning. Consequently, the educators preferred to use mobile devices for managing learning activities such as taking attendance, delivering announcement and scheduling class events and assessment activities (Zulkafly et al., 2011). However, Ferry (2009) viewed that educators had lower proficiency of mobile learning than the students in terms of using technology.

In France, Cruz, Assar and Boughzala (2012) investigated the usage and acceptance of mobile technologies by instructors in a business school.



Fourteen teachers in a business school participated in this qualitative research. They comprehended that to organize mobile materials, to include relevant information, to inspire replication, and to generate communicating activities with timely response in mobile environment, current teaching practices should be changed. Furthermore, the authors claimed that they identified technological, institutional, pedagogical and individual obstacles that threaten Mobile learning practices. Educator readiness is based on how educators perceive the mobile technology as a new medium for their teaching and learning (Zulkafly et al., 2011).

In the United Kingdom, Wishart (2009) conducted a study on the use of Mobile Technology for teacher training. This study aimed at constructing mobile learning and mobile teaching aptitude, to facilitate school based associate teachers to join the e-learning municipal interrelated to the indigenous initial teacher preparation course, and to inspire reflective training among trainee teachers. It found that for accessing course information, teachers did not utilize their handhelds. Mobile learning using mobile device is still incomprehensible to the teachers and remains in an initial stage to them. This is due to limited research on educators' concerns and preferences of utilizing the innovative mobile technologies in their teaching and learning (Ferry, 2009; Litchfield, Dyson, Lawrence, & Zmijewska, 2007). In so doing, the objective of this study is to assess the lecturers' readiness of mobile learning in Saudi Arabian higher education terms of perceived usefulness and perceived ease of use. The present study applied the Technology Acceptance Model (TAM) to evaluate the lecturers' readiness for mobile learning as explained in the next section.

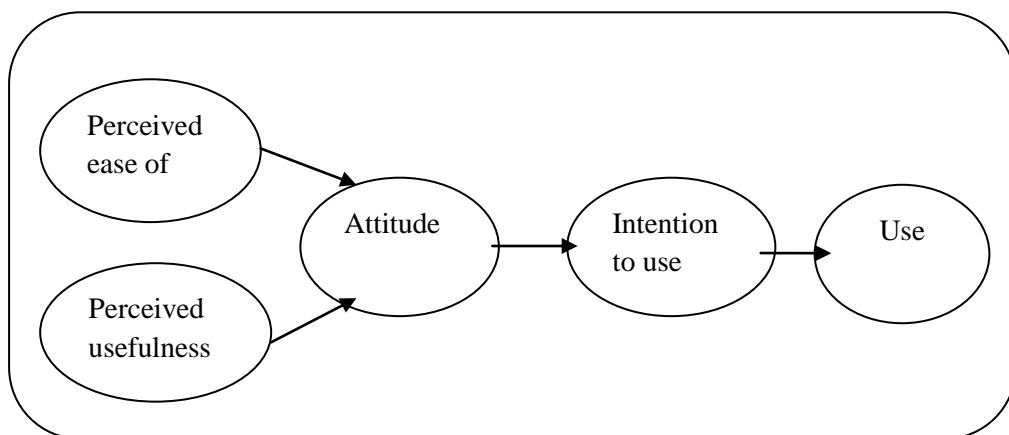
## **Technology Acceptance Model (TAM)**

To find out the perception of mobile technology towards its integration in the teaching and learning process, Davis (1989) developed the Technology Acceptance Model (TAM). Huang (2005) stated that the goal of Davis's classic TAM is to explain individuals' use of a specific system under organizational settings. Tsai and Su (2007) argued that the TAM has become an important research model for assessing the factors of information technology acceptance and utilization among users and it was the most adopted model. Similarly, Raaij and Schepers (2008) cited that TAM is a widely used theory among several models in the information system literature to explain individuals' acceptance of information technology. According to Davis (1989), when consumers are ready with a new software package, TAM suggests them that numerous numbers of factors influence their decision regarding the process and the time of using it. Bagozzi, Davis, and Warshaw (1992) stated that TAM predicts an individual forms an intention to act, and that the individual will be free to act without constraint; though, in the real world, there will be several limitations, such as limited abilities, time constraints, organizational or environmental limits, or unconscious habits, which limit the freedom to act.

The implementation of the Theory of Reasoned Action (TRA) according to Fishbein and Ajzen (1975), led to the Davis' (1989) Technology Acceptance Model which identified two dogmas, such as perceived usefulness (PU) and the perceived ease of use (PEU) respectively. Davis (1989, p. 320) explained PU as "The degree to which a person believes that using a particular system would enhance his or her job performance". Furthermore, he also

delineated PEU as “the degree to which a person believes that using a particular system would be free of effort”. Indeed, a substantial figure of TAM research has displayed that perceived usefulness is a robust factor of consumer reception, implementation, and practice behavior (Venkatesh, Morris, Davis, & Davis, 2003) wherein individual professional users may differ from other technology users in terms of acceptance (Chau & Hu, 2002).

Good perceptions of technology acceptance leads to positive attitudes towards technology use and Allport (1935) indicated, “An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual’s response to all objects and situations with which it is related” (p. 810). Davis, Bagozzi, and Warshaw (1989) recommended that usefulness and ease of use calculate system practice through the intermediating variables of attitude and intention. The direct influence of perceived ease of use and perceived usefulness on attitude and again these perceived ease of use and perceived usefulness have also influenced the intention to use and use indirectly mediated by them as indicated in Figure 1.



**Figure 1:** Technology Acceptance Model (TAM) Source: Islam, (2011b)

From Figure 1, a positive perception results leads to a positive attitude and good use of technology and vice versa. A study by Mayorga (2010) using the established TAM foundation verified the significant role played by the perception of usefulness and ease of use on attitude. According to Robey (1979) the work environment and organization attitudes can ensure an important encouragement on an individual's perception. This experimental and hypothetically determined TAM exploration is advantageous to the assessment of various professional manipulators because it openly explains the importance of definite theoretical variables assessed. The overall research goals were achieved, as the research objectives were to clearly identify pertinent "change agents" that can assist management and academia in fostering a culture of technology acceptance and usage (Mayorga, 2010).

Some researchers hold that technology acceptance is more complicated than initially thought, and have scrutinized other variables that stimulate acceptance (Taylor & Todd, 1995; Thompson, Compeau, & Higgins, 2006). According to Thompson et al. (2006), TAM has two paramount and prominent themes which are parsimony and instrumental determinants. The slimness of the model is also measured as its fundamental restriction, while the ungenerousness of TAM makes it relaxed to relate to a variety of conditions (Shen, Hiltz & Bieber, 2009). Again, Thompson et al. (2006) argued that although these major premises have provided the technology acceptance stream well, perceived ease of use and perceived usefulness are not the only valid determinants related to technology adoption, particularly with newer technologies.

In addition, many researchers have extended TAM by incorporating new constructs into the model (Ahmad, Basha, Marzuki, Hisham & Sahari, 2010; Islam, 2011a, 2011b; Hanafizadeh, Behboudi, Koshksaray & Tabar, 2012; Shittu, Basha, Rahman & Ahmad, 2011, 2013). On the other hand, some studies were conducted after dropping a few factors from the original TAM (Wang, Lin & Luarn, 2006; Zejno & Islam, 2012). As a result, this study will recommend a model by dropping attitude and use to assess the students and teachers' perception on the integration of mobile learning in senior high school where perception is treated to be similar to intention to use.

### **Summary of Literature Reviewed**

This literature review has been discussed extensively. The purpose of the study is to seek the perceptions of teachers' and students towards the integration of mobile technology into the secondary school classroom as they would be required to use mobile devices as teaching and learning tools with regards these sub – topics; ICT policy in Ghana, the use of mobile technology in education in developing countries, the post-pc era: from computers to mobile devices, using mobile devices in education and its impact on the stakeholders, the education providers, the teachers and mobile technology, the students and mobile technology, mobile device technologies currently being used in education are discussed in the study and have thoroughly been reviewed with supporting literatures developed by other researchers from different educational backgrounds and authorities. However most of these studies are from outside Ghana and Africa so therefore the current study fills the gap of mobile technology and education in Ghana and Africa.

## **CHAPTER THREE**

### **METHODOLOGY**

This chapter outlines the methods used in the research work. The research method and procedures used in the study are described under the following sub – headings: Research Design, Population, Sample and Sampling Procedure, Instrument, Data Collection Procedure and Data Analysis.

#### **Research Design**

Dawson (2002) posits that a research design is the conceptual structure within which research would be conducted. In this regard, this study adopted the descriptive research design. Descriptive research was used because; the data that was collected examined the perceptions of both teachers and students in mobile technology tools into the teaching and learning of Senior High School subjects. Descriptive research was deemed most appropriate for the study because it involved the collection of data in order to answer questions concerning current status of the subject matter under study. It was meant to determine and reveal the way things are. The survey method of descriptive research was used to determine and search for information about the situation at hand and included data from questionnaire and the researcher's own observations. Descriptive research was considered equally appropriate in the sense that it describes a phenomenon in a real life situation, and also generates new knowledge about a topic (Burns & Grove, 2005).

## **Population**

Population can be seen as the entire aggregation of cases that meet a designed set of criteria (Ary et al. 2002). The population comprised of all staff and students of the twenty eight (28) Senior High Schools in the Cape Coast Metropolis. The target population comprised of all staff and students of five (5) selected Senior High Schools in the Cape Coast Metropolis. The targeted teachers were estimated at four hundred (400) and targeted students population were estimated at 3500. The respondents provided the needed information to make this research accurate and authentic; however the target population was the subject teachers and Form two students of the selected Senior High Schools in the Cape Coast Metropolis area.

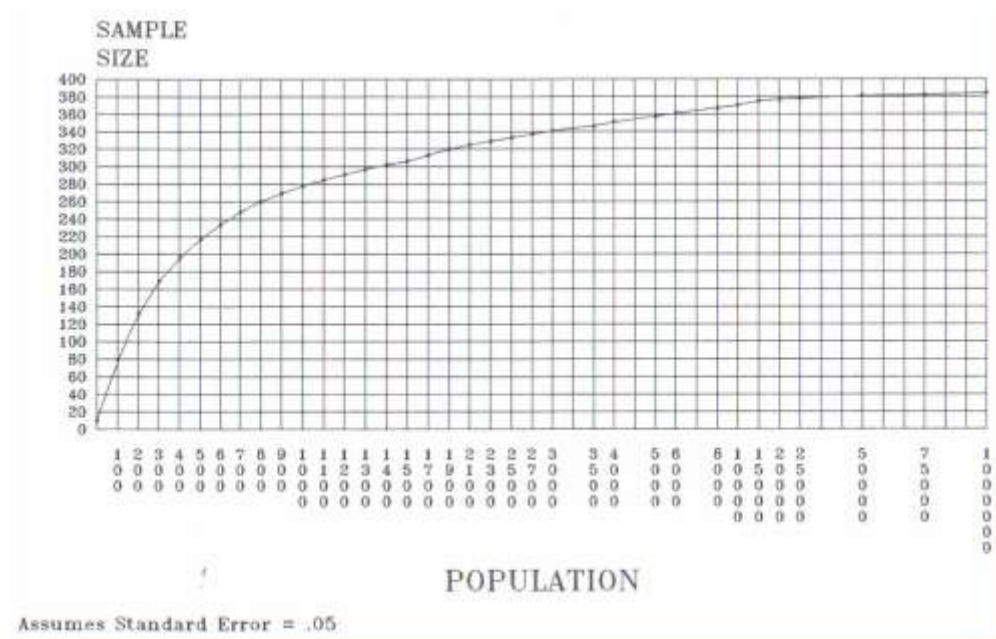
## **Sample and Sampling Procedure**

The fact that it was impractical to collect data on the whole population, considering the size, as well as the time available to the researcher, was the need to select a sample that will represent the whole population. Simple random sampling was used to first select the schools that questionnaires were administered to, by assigning numbers and choosing without replacement (lottery).

According to Van Dalen (1979) a survey should contain at least ten (10) to fifteen (15) percent of the target population. In agreement with this 5 (17.9%) of the senior high schools in the Cape Coast Metropolis were selected by simple random for the study and 75 (18.8 %) of the teachers in the senior high schools were also selected at random. Using the Krejcie and Morgan (1970) chart shown in Figure 1, a sample of 350 students were selected.

In all 425 respondents were chosen. Seventy five (75) and three hundred and fifty (350) teachers and students were respectively chosen as the sample size from the selected schools, 15 teachers and 70 students from each school.

I employed simple random sampling technique in selecting the respondents. The method of selecting the student was such that cards were distributed to students without looking at what was written on it and those who had theirs with inscription “chosen” were selected. In the same way, the teachers were also selected. Random sampling according to Gupta (1993) is one where each item in the universe has an equal or known opportunity of being selected which is also affirmed by Kane (1990) who defines a simple random sampling as a procedure in which each member of the universe must have equal chance of being selected for the sample.



Source: Krejcie and Morgan (1970)



## **Instrument**

I used a self-constructed questionnaire. Essel (2007) indicates that questionnaire is widely used for collecting data in educational research because it is very effective for securing formal information about procedures and conditions, for inquiry into opinions and attitudes and perceptions of subjects. He further added that it is an efficient method in the sense that many respondents can be reached in a short space of time. Sidhu (1984) also affirmed that the questionnaire is helpful in the field of attitudes, opinions, and judgment. A structured type of questionnaire was administered by me to generate the data. The questionnaire was designed to be simple and straight to the point.

The instrument will consist of four sections. The first section will be on the socio - demographic data of the respondents. These will include gender, age, and teaching experience.

The second and third sections identified the perceptions of students and teachers respectively towards the use of mobile technology in the teaching and learning in SHS in Cape Coast Metropolis.

The fourth section also determined how the perceptions of teachers about mobile technology will affect the use of mobile technology in the teaching and learning process in SHS in the Cape Coast Metropolis whiles the fifth section further considers how the perceptions students about mobile technology will affect the use of mobile technology in the teaching and learning process in SHS in the Cape Coast Metropolis.

The final section considered the mobile technology tools and applications that would be most effective for the integration in the teaching and learning process at SHS in Cape Coast Metropolis.

### **Pilot Test**

Validity and reliability indicates how best the instrument used in the study best measures the parameters it is meant to measure and it is the measure of accuracy in terms of results attained in the study (Cook & Campbell, 1979).

My supervisor reviewed the questionnaire to assist in establishing face validity and content validity. The face validity by the supervisor though may not possess strong evidence of validity. It is relevant in allowing an expert to find out if the instrument looks like it is measuring what it is expected to measure (Polit & Beck, 2012). Likewise, the content validity relates to the extent to which a tool is measuring adequately what it intends to measure (Polit & Beck, 2012).

To ensure validity and reliability of the tool for the study, a pilot test was first organised at the Edinaman Senior High School as it has similar characteristics as the secondary schools in Cape Coast Metropolis. Questionnaires were distributed to 20 students and 5 teachers of the Edinaman Senior High School who were selected at random. I discussed the questionnaire with the respondents to ensure the respondents understood the questionnaire before answering.

Respondents' scores from the pilot test were then correlated using the Spearman-Brown formula used in reliability testing. The value of the reliability coefficient was 0.70. This value indicates a good degree of reliability of the instrument as asserted by (Fraenkel & Norman, 2000) and is

supported by Gliem & Gliem, 2003, as cited in Kowalczyk, Hackworth, and Case-Smith (2012) that the nearness of the Cronbach's reliability coefficient alpha to 1 will indicate a greater internal consistency of the scales. Any redundancies and misunderstandings were corrected based on the received feedback.

### **Data Collection Procedure**

Data collection was a very important section of this dissertation as decisions were drawn after collecting data from the field. Fraenkel and Wallen (2000) indicated that the collection of data is an extremely important part of all research endeavours, for conclusions of the study are based on what the data reveals.

I used both primary and secondary data collection methods in the completion of this research. The primary data gathered for this study was retrieved through questionnaire. The structured method of survey therefore involves the development and administration of questionnaire with a fixed list of questions in a standard sequence which has mainly fixed or pre-categorized answers (Ahiadeke, 2008). In this study the structured survey technique was therefore used. This method is considered one of the most effective and detailed forms of gathering data. The secondary data was collected through the internet and books. I personally collected the data for the study. I administered the questionnaires to the respondents through the help of Assistant Heads in charge of Academics in the selected Senior High Schools. The questionnaires were very simple and direct. It consisted of mainly closed – ended questions and some few open - ended questions. Both open and close ended questions were used to elicit responses needed to answer the research

questions and achieve the objectives set for this study (Waltz, Strickland & Lenz, 1991). The *Open-ended* question allow respondents to answer in their own words and is also useful where additional insights are sought and the researcher is less familiar with the subject area and cannot offer specific response options (Salant & Dillman, 1994). However, the disadvantages are that open ended questions are a bit difficult to answer and also more difficult to analyze. It is therefore not advisable to use it when data is needed from a large sample since analysis could be a problem (Saris, 1991).

In contrast, the latter (*closed-ended*) questions require the respondent to choose from among a given set of responses and require the respondent to examine each possible response independent of the other choice. This type of survey question is easy to answer and it is less time consuming. However, although it does force the respondent to choose from provided answers and therefore prevents more analytical thinking, it was used more in this study as it was easier to administer (Saris, 1991). I administered and collected the data within a period of two weeks. This was done to ensure that respondents had adequate time to respond well to the questionnaires. This is believed to give the required data with a minimum number of errors. The questionnaire was designed to enable easy reading and understanding and this helped ensure and maintain a higher level of objectivity and flexibility. The gathered data was then presented, presenting and conclusions were drawn.

### **Data Analysis**

Descriptive analysis was used. I used Statistical Package for Service Solution (SPSS) v.21 for the data analysis. In analyzing the collected data, tables, pie charts, and frequencies were used. This made the data more easily

comprehensible. Percentage analysis and frequencies were also used to represent the views of the respondents. This presented a clearer picture of the responses of the respondents.

Research Question 1 sought to find the perceptions of students and teachers towards the use of mobile technology in the teaching and learning in SHS in Cape Coast Metropolis. Research Question 1 was analysed using descriptive statistics like frequencies and percentages.

Research Question 2 sought to find the perception of teachers and student about mobile technology affect the use of mobile technology in the teaching and learning process in SHS in the Cape Coast Metropolis. Research Question 2 was analysed using descriptive statistics like frequencies and percentages.

Research Question 3 and 4 was set to find the perceptions teachers and students respectively have on how mobile technology will affect the use of mobile technology in the teaching and learning process at SHS in Cape Coast Metropolis. Frequencies and percentages were employed for the variables in the questionnaires pertaining to research Question 3 and 4.

Research Question 5 sought for the ways to use mobile technology in teaching and learning in SHS in Cape Coast Metropolis. Frequencies and percentages were employed for the variables in the questionnaires.

Research Hypothesis 1 was analysed using inferential statistics, to be specific the Independent Sample T Test to find out if there is a statistical difference between the perception of teachers and students towards the use of mobile technology in teaching and learning at the Senior High School level and the Multiple Regression Model was used to validate research hypothesis 2

and 3 which sought to find out if the perceptions of teachers and students on mobile technology will influence the integration of mobile technology in the teaching and learning process.

### **Summary**

This chapter is devoted to the various methods used for the study. The design for the study is described and the rationale for its adoption has been provided. The population for the study, that is, those who are to be studied in this study, the number targeted from the population that are to be studied are also examined (sample size). The sampling procedures, research instruments, data collecting procedures, and data analysis were also looked at.

## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

The study sought to explore the perceptions of teachers and students towards the use of mobile technology and examined how their perceptions affect the teaching and learning of mobile technology in selected five SHSs in Cape Coast Metropolis in the Central Region of Ghana. Two sets of self-developed questionnaires were administered to 75 teachers and 350 students for the purpose of data collection and the data were analyzed by using a combination of descriptive and inferential statistics. The return rate for teachers was 100% and that of students was 85.8%. The results are therefore presented and discussed in this chapter. The chapter is organized into two sections. The first section deals with the presentation of the background information while the second section focuses on the presentation and discussion of the main results of the study.

#### **Background Information of Respondents**

Items in the first sections of each questionnaire were meant to elicit responses on the background information on the respondents. Table 1 shows the results on the gender of the participants.

**Table 1: Sex of Teachers and Students**

Gender	Teachers		Students	
	No	%	No	%
Male	49	68.1	176	58.7
Female	26	31.9	124	41.3
<b>Total</b>	<b>75</b>	<b>100</b>	<b>300</b>	<b>100</b>

Source: Field Survey

The results in Table 1 indicate that out of the 72 teachers who participated in the study, the majority of them 49(68.1%) were males while 23 (31.9%) teachers were females. Moreover, it is also clear from Table 1 that a majority of students 176 (58.7%) that participated in the study are males as compared with the smaller percentage of female students (124 being 41.3%) that also took part in the study.

The researcher also sought to find out the age range as well as the teaching experience of the teachers who were selected to participate in the study. The results are presented in Table 2.

**Table 2: Age Range (N = 75)**

Variable	No	%
Age Range (Years)		
24-30	44	56.9
31-40	27	37.5
41-50	4	5.6

Source: Field Survey



From Table 2, 44(56.9%) teachers fell within the age range of 24-30. Moreover, 27 (37.5%) teachers were within 31-40 age range while only four (5.6%) teachers were more than 40 years old. This implies that most of the teachers at the senior high level are quite youthful and are more likely to be abreast with modern technology. These respondents would therefore be able to provide the relevant information that relate to the thrust of this study.

**Table 3: Teaching Experience of Teachers (N=75)**

Variables	No	%
Teaching Experience (Years)		
1-5	47	61.1
6-10	22	30.6
11-15	5	6.9
16-20	1	1.4

Source: Field Survey

Table 3 illustrates the teaching experience of the teachers, it was found that out of the 75 teachers, 47 (61.1%) of them have been teaching for the past five years while 22 (30.6%) teachers had 6-11years of teaching experience while only one teacher had taught for more than 15 years.

**Table 4: Age of Students**

Age	No	%
14	6	2.0
15	37	12.3
16	106	35.3
17	80	26.7
18	50	16.7
19	12	4.0
20	8	2.7
21	1	0.3
<b>Total</b>	<b>300</b>	<b>100.0</b>

Source: Field Survey

The study revealed that most students at the Senior High School belonged to 16-18 age range. The results in Table 4 show that out of the 300 students that participated in the study; only six (2.0%) students were 14 years old while one (0.3%) was 21 years old. This result clearly reflects that most students in various senior high schools are 16 years old and hence, they are relatively young.

### **Main Results**

This section focuses on the discussion of the main findings of the study. The results are presented and discussed in line with the various research questions of the study. Each student was first of all asked to indicate whether he/she possesses a personal computer and/or mobile phone. The results are shown in Table 4 as follows.

**Table 5: Students in Possession of Personal Computer and Mobile**

Statement	Yes		No	
	No	%	No	%
Do you own a personal computer?	150	50.0	150	50.0
Do you own a mobile phone?	254	84.7	46	15.3

N=300

The study revealed that 150 (50%) of the students own personal computers while the remaining 50% of the students did not own personal computers. This means that half of the total student population do not own personal computers. However, out of the 300 students, a great proportion of 254 (84.7%) students stated that they own mobile phones while only 46 (15.3%) students indicated that they did not own mobile phones. Thus, most students own mobile phones as compared to the number of those who own personal computers. This confirms Brown's (2003) assertion that there are as many people using mobile technologies as there are opinions on how mobile technologies will impact on education.

Students were further asked to state how often they use these IT tools. Table 6 shows the results.

**Table 6: Personal Computer and Mobile Phone use by Students**

Statement	Very Often		Often		Not Often	
	No	%	No	%	No	%
How often do you have personal computer?	43	14.3	93	31.0	164	54.7
How often do you have mobile phone?	112	37.3	107	35.7	81	27.0

Source: Field Survey

It is clear from Table 6 that out of the 300 students who participated in the study, a majority of 164 (54.7%) students stated that they do not often have their personal computers with them while 43 (14.3%) students stated that they very often have their personal computers with them. Thus, although half of the student population had personal computers, most of them do not often have their personal computers with them. Moreover, the results in Table 5 show that a majority of 112 (37.3%) students very often have their mobile phones with them whereas 107 (35.7%) students often have their mobile phones. Only 81 (27.0%) students stated that they do not often have their mobile phones.

By implication, students own mobile phones and often have their phones with them. These are more than the number of students who own personal computers and often have their computers with them. Mobile phones are commonly owned by students in the country. Similarly, Goundar (2011) stated that many developing countries do not have or cannot afford the level of electricity supply required by computers, or the money to buy enough

computers for their students and to subscribe to the internet. Given such constraints, they readily embrace cheaper mobile devices such as mobile phones which require less infrastructure, support and skill to operate.

The teachers were also asked to indicate whether they possess a personal computer and/or mobile phone and the results are shown in Table 7 as follows.

**Table 7: Teachers in Possession of Personal Computer and Mobile Phone**

Statement	Yes		No	
	No	%	No	%
Do you own a personal computer?	65	86.7	10	13.3
Do you own a mobile phone?	75	100.0	0	0.0

Source: Field Survey

From Table 7, a majority of 65 (86.7%) teachers indicated that they owned their personal computers while only 10 (13.3%) teachers stated they did not own personal computers. However, all the 75 (100.0%) teachers answered in the affirmative that they owned mobile phones. Thus, every teacher owns a mobile phone while some teachers do not possess personal computers. This could be attributed to the fact that mobile phones are cheap to acquire and easy to use relative to computers that are expensive and more complex in usage.

**Table 8: The Use of Personal Computer and Mobile Phone by Teachers**

Statement	Very Often		Often		Not Often	
	No	%	No	%	No	%
How often do you have personal computer?	17	22.7	40	53.3	18	24.0
How often do you have mobile phone?	53	70.7	21	28.0	1	1.3

Source: Field Survey

From Table 8, it was found that 40 (53.3%) teachers often have their personal computers while 18 (24.0%) teachers indicated they do not often have their personal computers with them. With regard to mobile phones, the majority 53 representing 70.7% of teachers very often have their mobile phones with them while only one (1.3%) teacher stated that he/she does not often have his/her mobile phone. Thus, most teachers often have their personal computers and mobile phone with them.

**Table 9: Teacher Receiving a Call from a Friend to Help Him or Her with an Assignment or Discuss What Happened In Class Before**

	Frequency	Percent
Yes	13	17.3
No	62	82.7
<b>Total</b>	<b>75</b>	<b>100.0</b>

Source: Field Survey

From Table 9 it is noted that the vast majority that is 62 representing 82.7% of teachers who responded to the questionnaire have never received phone calls from students to discuss or help them with what went on in class. This might be due to the ban placed on the use of mobile phones on Senior

High School students by the Ministry of Education and Ghana Education Service.

The 13 teachers representing 17.3% who responded that indeed they have received calls from some students as shown in Table had 6 teachers 10 representing 8.0% as shown in Table 9 being very happy to help the students that called them and 1 teacher was also happy to help them although it was a bit difficult since it was mathematics. 5 of the teachers representing 6.7% were also glad to know that their students are still learning wherever they happen to be and 1 representing 1.3% felt that the students disturbed him or her with the call because of the time at which the call was made.

**Table 10: Experience of Teacher after Receiving a Call**

	Frequency	Percent
Happy to help	6	8.0
Disturbed me with the call because of the time.	1	1.3
Glad to note that my students are still learning	5	6.7
I was happy but it wasn't easy to explain things to him since it was mathematics	1	1.3
No phone calls received from students	62	82.7
Total	75	100.0

Source: Field Survey

**Table 11: Student Receiving a Call from a Friend to Help Him or Her with an Assignment or Discuss What Happened In Class Before**

	Frequency	Percent
Yes	201	67.0
No	99	33.0
Total	300	100.0

Source: Field Survey

Out of the 254 students who owned mobile phones, 201 representing 67.0% of the total population had received calls from their peers and classmates to help them with assignments or discuss what happened in class. This means that a majority of students use their phones not just for entertainment purposes but also for academic purposes and also most students prefer to call their mates on phone to ask for academic help more than teachers. Teachers might have the upper hand in helping them but because of the ban placed on the use of mobile phones by Senior High School Students they are afraid to call teachers as far as they are still in school.

**Research Question 1: Students' Perceptions towards the Use of Mobile Technology**

The first objective of this research was to explore perceptions of students towards the use of mobile technology in the teaching and learning process. Frequencies and percentages were employed to analyze the data collected on students' perceptions and the results are in Table 8.



**Table 12: Students' Perceptions towards the Use of Mobile Technology (N=300)**

Statement	CU		SU		Not Sure		SC		CC	
	No	%	No	%	No	%	No	%	No	%
Comfortable installing and operating third party software on a mobile phone	24	8.0	15	5.0	159	53.3	40	13.3	62	20.7
Comfortable allowing your teachers to contact you through your mobile phone	43	14.3	21	7.0	98	32.7	52	17.3	86	28.7
Comfortable receiving student grades through text messaging	25	8.3	15	5.0	69	23.0	50	16.7	141	47.0
Comfortable having subject materials available on your mobile phone would be beneficial to your learning process	10	3.3	8	2.7	65	21.7	41	13.7	176	58.7

Source: Field Survey

NB: CU= Completely Uncomfortable; SU= Somewhat Uncomfortable; SC= Somewhat Comfortable; CC= Completely Comfortable

The results in Table 12 show that a majority of 159 (53.3%) out of the 300 students who participated in the study were not sure of their perception towards installing and operating third party software on a mobile phone. This high level of uncertainty among the respondents obviously reflects the case in Ghana in which most students at the senior high school level are ill-equipped with the requisite knowledge and skill on installing and operating third party software. This may therefore pose a burden to users of such mobile technology.

In consonance with this, Weinberger (2011) suggested that technology should not add burden to users. However, 40 (13.3%) students perceived the installation and operation of third party software on a mobile phone to be somewhat comfortable. Moreover, 62 (20.7%) students felt completely comfortable to install and operate third party software on a mobile phone. It therefore follows that a majority of 102 (34.0%) students perceived installing and operating third party software on a mobile phone to be comfortable as compared with the 39 (13.0%) students who felt that installing and operating third party software on a mobile phone is uncomfortable.

Moreover, from Table 12, the results show that 138 (46.0%) students felt comfortable when their teachers contact them through their mobile phones while 64 (21.3%) students felt uncomfortable allowing their teachers to contact them through mobile phones. This means that most students are comfortable to allow their teachers to contact them through mobile phones.

Similarly, a majority of 191 (63.7%) students felt comfortable receiving student grades through text messaging.

Finally, out of the 300 students, a majority of 217 (72.4%) students had the perception that they will feel comfortable having subject materials available on their mobile phone and would be beneficial to their learning process.

### **Research Question 2: Teachers' Perceptions towards the Use of Mobile Technology**

The study also sought to find out the perception of teachers towards the use of mobile phones in the teaching and learning process. The results that were generated from the analysis of data are presented in Table 13. It was found that out of the 75 teachers, 31 (41.4%) of them stated that they felt comfortable with installing and operating third party software on a mobile phone. While 31(41.4%) teachers were uncertain with how they perceived installing and operating third party software on a mobile phone, only 13 (17.2%) teachers felt that installing and operating third party software on a mobile phone is uncomfortable. This means that teachers who are comfortable with installing and operating third party software on a mobile phone are more than those teachers who perceive it to be uncomfortable.

The study also revealed that 42 (56.0%) out of the 75 teachers indicated that they were comfortable allowing their students to contact them through their mobile phones while only 18 (24.0%) teachers were of the perception that allowing their students to contact them through their mobile

phone is uncomfortable. This implies that most teachers are more comfortable with allowing their students to contact them through mobile phones. It was further revealed that 47 (62.7%) teachers felt comfortable with keeping subject materials that are beneficial to teaching and learning process available on mobile phones while only eight (10.7%) perceived it as uncomfortable. The perspectives of the teachers who participated in the study indicate that they are comfortable with the various uses of mobile technology in the teaching and learning process. This suggests that mobile technology is not a burden on teachers. Hence, this contradicts Weinberger's (2011) view that the failure of almost all educational technology initiatives can usually be traced to the additional burden placed on the teacher.

**Table 13: Teachers' Perceptions towards the Use of Mobile Technology (N=75)**

Statement	CU		SU		Not Sure		SC		CC	
	No	%	No	%	No	%	No	%	No	%
Comfortable installing and operating third party software on a mobile phone	6	8.0	7	9.3	31	41.3	17	22.7	14	18.7
Comfortable allowing your student to contact you through your mobile phone	9	12.0	9	12.0	15	20.0	29	38.7	13	17.3
Comfortable sending student grades through text messaging	19	25.3	9	12.0	12	16.0	19	25.3	16	21.4
Comfortable having subject materials available on your mobile phone would be beneficial to your teaching process	6	8.0	2	2.7	20	26.7	29	38.7	18	24.0

Source: Field Survey

NB: CU= Completely Uncomfortable; SU= Somewhat Uncomfortable; SC= Somewhat Comfortable; CC= Completely Comfortable

**Research Question 3: Teachers’ Perceptions on How to Use Mobile  
Technology in Teaching and Learning**

It remains obvious that computer and mobile phone technology plays a significant role in the advancement of education in every country. Brown (2003) posits that mobile devices play a pivotal role in education in developing countries. Therefore, the study also sought to elicit the perception of both teachers and students on how to use mobile technology in teaching and learning in the SHS in Cape Coast the Metropolis. The views of teachers on how to use mobile technology are presented in Table 14.

**Table 14: Teachers’ Perceptions on the Use of Mobile Technology**

Statement	Agree		Disagree	
	No	%	No	%
I want to teach at anytime and anywhere	52	69.3	23	30.7
I would like to use my mobile devices to support my teaching	70	93.3	5	6.7
I would like to use my mobile device in a formal teaching and learning environment	68	90.6	7	9.3
I would not want to use my mobile device in class or for teaching; it is for staying in touch with my family and friends	38	50.7	37	49.3

Source: Field Survey

The results as depicted in Table 14 show that a majority of 52 (69.3%) teachers agreed that they want to use mobile technology to teach at anytime and

anywhere while only 23(30.7%) out of the 75 teachers disagreed with the view that they want to teach at anytime and anywhere by using mobile technology. Most people would prefer to use mobile technology at anytime and anywhere because of the great flexibility and portability associated with such mobile devices. Obviously, teachers would also invariably like to use mobile technology at anytime and anywhere because such devices are intrinsically mobile to be carried for use. This result supports Wagner's (2005) assertion that people want 'anytime, anywhere' connections more than ever before.

Furthermore, the study revealed that 70 (93.3%) teachers agreed that they would like to use their mobile devices to support their teaching while only five (6.7%) teachers disagreed with that idea. Thus, besides using mobile devices for communication purposes, most people also use them to enrich and deepen their knowledge and understanding of issues. Similarly, a greater proportion of 68 (90.6%) teachers also agreed that they would like to use their devices in a formal teaching and learning environment. This implies most teachers would like to use their mobile devices to support their teaching in formal environment. Mobile technology can be used to promote meaningful learning and to enhance professional productivity (Tomei, 2005).

It is also evident from Table 14 that 38 (50.7%) of the respondents indicated that they would not want to use a mobile device in class or for learning since it is for staying in touch with my family and friends. This underscores the indispensable role of mobile devices in the lives of their users. This shows that

mobile devices are used by teachers as instruments of communication and formal learning.

**Research Question 4: Students’ Perceptions on How to Use Mobile Technology in Teaching and Learning**

The researcher also sought to find out from the 300 students who participated in the study how they also use mobile devices. The results are shown in Table 15.

**Table 15: Students’ Perceptions on the Use of Mobile Technology**

Statement	Agree		Disagree	
	No	%	No	%
I want to learn at anytime and any where	273	91.0	27	9.0
I would like to use my mobile devices to support my learning	274	91.4	26	8.6
I would like to use my mobile device in a formal learning environment	274	91.4	26	8.6
I would not want to use my mobile device in class or for learning; it is for staying in touch with my family and friends	32	44	168	56

Source: Field Survey

From Table 15, the results show that an overwhelming majority of students are favourably disposed towards the use of mobile technology as a tool for formal learning. It found that out of the 300 students who participated in the study, 273(91.0%) students agreed that they would want to use their mobile device to learn at anytime and anywhere. Mobile technology offers portability and



flexibility to both students and teachers for the purpose of teaching and learning. Consequently, users would want to use them at any point in time and at any place (Wagner, 2005).

The results as shown in Table 15 also indicate that a greater majority of 274 (91.4%) students answered in the affirmative that they would like to use my mobile devices to support their learning in formal environment. This means that most students use mobile devices as learning devices. According to Kamet, al. (2008), cell phones are increasingly adopted in the developing world as promising vehicles for out-of-school learning to balance formal schooling. However, 168 (56%) students disagreed with the statement that they would want to use their mobile devices in class or for learning; it is for staying in touch with my family and friends. Thus, although students use mobile devices for learning, they do not use these mobile devices in the classroom.

#### **Research Question 5: Best Mobile Technology Tools and Applications to be used for Teaching and Learning**

In order to design an appropriate mobile technological integration model for use by the Senior High Schools and the Ghana Education Service, teachers and students' internet connectivity, teachers and students' likely devices to be used and teachers and students' likely software to be used in the classroom teaching and learning process has been discussed into detail to know the appropriate format that the model is to take.

**Table 16: Teachers Internet Connectivity**

Statement	Yes		No	
	No.	%	No.	%
Do you have internet access through a wifi connection on your mobile phone?	54	72.0	21	28.0
Do you have internet access through a cellular network on your mobile phone?	63	84.0	12	16.0

Source: Field Survey

Fifty-four representing 72.0% of the 75 teachers had internet access through a WIFI connection with their mobile phone as 63 representing 84.0% of the 75 teachers had internet access through a cellular network on their mobile phones. This is because, from my observation, all mobile phones have access to cellular networks but not all mobile devices have access to wireless networks.

**Table 17: Students Internet Connectivity**

Statement	Yes		No	
	No.	%	No.	%
Do you have internet access through a wifi connection on your mobile phone?	165	55.0	135	45.0
Do you have internet access through a cellular network on your mobile phone?	197	65.7	103	34.3

Source: Field Survey

Hundred and sixty-five representing 55.0% of the 300 students had internet access through a WIFI connection with their mobile phone as 197 representing 65.7% of the 300 students had internet access through a cellular network on their mobile phones. This is because from my observation all mobile phones have access to cellular networks but not all mobile have access to wireless networks.

**Table 18: Devices to be used by Teachers in a Teaching Environment**

Statement	Very Likely		Likely		Not Likely	
	No.	%	No.	%	No.	%
Mobile phone	38	50.7	23	30.7	14	18.7
Personal Digital Assistant (PDA)	6	8.0	25	33.3	44	58.7
Pager	3	4.0	22	29.3	50	66.7
Laptop	41	54.7	31	41.3	3	4.0
Digital Camera	14	18.7	37	49.3	24	32.0

Source: Field Survey

The majority (72) representing 96.0% of the 75 teachers found it more likely to be using laptops to support their teaching in the classroom and 61 (81.4%) of the 75 teachers also found it more likely to use mobile phones to support their teaching in a teaching environment. Also, 51 representing 68.0% of the 75 teachers would like to use Digital Cameras in their teaching process. PDA's and Pagers had 31 (41.3%) and 25 (33.3) of the 75 teachers who would like to use them in their teaching environments respectively.

**Table 19: Devices to be used by Students in Learning**

Statement	Very Likely		Likely		Not Likely	
	No.	%	No.	%	No.	%
Mobile phone	195	65.0	77	25.7	28	9.3
Personal Digital Assistant (PDA)	60	20.0	130	43.3	110	36.7
Pager	30	10.0	108	36.0	162	54.0
Laptop	206	68.7	71	23.7	23	7.7
Digital Camera	75	25.0	109	36.3	116	38.7

Source: Field Survey

The majority (277) representing 92.3% of the 300 students said it is more likely for them to use laptops to support their learning in the classroom and 272 (90.7%) of the 300 students also said it is more likely to use mobile phones to support their learning in a classroom. Also, 190 representing 63.3% of the 300 students would like to use PDA's in their learning process. Digital camera and Pagers had 184 (61.3%) and 138 (46.0) of the 300 students who would like to use them in their learning environments respectively.

**Table 20: Softwares to be used to Support Teaching in Schools**

Statement	Yes		No	
	No.	%	No.	%
Whatsapp	24	32.0	516	8.0
Viber	4	5.3	719	4.7
Text Messaging (SMS)	14	18.7	618	1.3
Text Messaging (MMS)	6	8.0	699	2.0
Internet	42	56.0	334	4.0
Phone calls	17	22.7	587	7.3
TeacherMate	2	2.7	739	7.3
WorldReader	1	1.3	749	8.7
School of One	0	0.0	751	00.0
BBC Janala	2	2.7	73	97.3
DRONA Mobile Learning Management System	1	1.3	74	98.7
BridgeIT Project	0	0	751	00.0

Source: Field Survey

From Table 20 the Internet had the majority of 42 teachers representing 56.0% finding it likely to help in their teaching process, followed by Whatsapp with 24 teachers representing 32.0% as a likely software or application that would help with the teaching process. Phone calls also had 17 of the teachers representing 22.7% and text messaging (SMS) had 14 of the teachers representing 18.7% of the 75 teachers finding them as alternate quality softwares that will make a great experience when integrated with the teaching process. Text

Messaging (SMS) had 6 of the 75 teachers agreeing to it as a likely application for use in the teaching process. BBC Janala and TeacherMate had 2 of the teachers each saying its likely software or application to be used with WorldReader and Drona Mobile Learning Management System with 1 teacher each agreeing to them as a like application to be used in the teaching process. BridgeIT project and School of One had no responses from any of the 75 teachers as likely software to be used to aid their teaching process.

**Table 21: Softwares to be used to Support Learning in Schools by Students**

Statement	Yes		No	
	No.	%	No.	%
Whatsapp	103	34.3	197	65.7
Viber	26	8.7	274	91.3
Text Messaging (SMS)	82	27.3	218	72.7
Text Messaging (MMS)	21	7.0	279	93.0
Internet	194	64.7	106	35.3
Phone calls	117	39.0	183	61.0
TeacherMate	12	4.0	288	96.0
WorldReader	15	5.0	285	95.0
School of One	10	3.3	290	96.7
BBC Janala	9	3.0	291	97.0
DRONA Mobile Learning Management System	1	13.7	289	96.3
BridgeIT Project	4	1.3	296	98.7

Source: Field Survey

From Table 21, the Internet had the majority 194 of the students representing 64.7% finding it likely to help in their learning process, followed by phone calls with 117 students representing 39.0% as a likely software or application that would help with their learning process, Whatsapp also had 103 of the students representing 34.3% finding it as a likely software to be used in learning and text messaging (SMS) had 82 of the students representing 27.3% of the 300 students finding it as an appropriate alternative software to aid in their learning process. Text Messaging (MMS) had 21 of the 300 students agreeing to it as a likely application for use in the teaching process. BBC Janala and TeacherMate had 9 and 12 of the students respectively saying its likely software or application to be used as World Reader and Drona Mobile Learning Management System with 11 and 15 students respectively agreeing to them as a likely application to be used in the Learning process. BridgeIT project and School of One also had 4 and 10 responses respectively from the 300 students as likely softwares to be used to aid their Learning process.

**Null Hypothesis: Difference in Teachers' and Students' Perception towards the Use of Mobile Technology in the Teaching and Learning Process**

The study also sought to find out whether there is a difference in the perception of teachers and students towards the use of mobile technology in the teaching and learning process. Independent sample t-test was employed to investigate whether there is any statistical difference between these two samples in their perception towards the use of mobile technology in the teaching and

learning process at the senior high school level. The results are presented in Table 22.

**Table 22: Difference in Teachers' and Students' Perception towards the use of Mobile Technology (N=150)**

Perception	N	Mean	SD	Df	T	Sig (2 tailed)
Teachers	30	5.47	5.26	147	-2.119	.036*
Students	120	6.91	5.35			

Source: Field Survey, \*Significance at 0.05 level

From Table 22, the descriptive statistics that emerged from the analysis of the data shows that students have a higher perception towards the use of mobile technology (M= 26.91, SD= 5.35) than their teachers perception the use of mobile technology (M=25.47, SD= 5.26). Thus, students and teachers have different perceptions towards the use of mobile technology. The independent t-test result shows that there was no statistically significant difference between students and teachers in their perception towards the use of mobile technology ( $p > 0.05$ ,  $t = -2.119$ ,  $df = 373$ , 2-tailed). Although students had a slightly higher mean perception score towards the use of mobile technology than the mean perception score of their teachers because students tend to have more preference for new generation technological innovations than teachers. This suggests that students tend to use mobile devices for learning and communication purposes and most students also fancy mobile devices. Thus, students use mobile technology for various purposes more than their teachers who are more selective in their use of mobile technology. Comparatively, most students use mobile devices to watch



movies, make frequent and lengthy phone calls, play various games; and send SMS to a host of friends as well as using such mobile devices for Whatsapp communications.

### **Alternate Research Hypothesis**

It was alternately hypothesized that the perceptions of teachers and students will have no statistically significant effect on the integration of mobile technology in teaching and learning in the Cape Coast Metropolis. This was tested using a multiple regression model to validate the hypotheses. The findings showed that all predictors from teachers accounted 60.9% of the variation ( $F = 88.783, p < .000$ ), thus the hypothesis was statistically significant. The results also indicated that the perception of integration ( $\beta = .598, p < .000, t = 6.496$ ) and perception of mobile technology ( $\beta = .430, p < .004, t = 2.931$ ) were significant valid predictors of teachers' perception towards the integration of mobile technologies in the teaching and learning process in senior high schools in the Cape Coast Metropolis as shown in Table 23.

Table 23 further revealed that all predictors from students accounted 79.6% of the variation ( $F = 98.438, p < .000$ ), thus the hypothesis was statistically significant. The results also indicated that the perception of integration ( $\beta = .758, p < .017, t = 6.996$ ) and perception of mobile technology ( $\beta = .479, p < .093, t = 3.267$ ) were significant valid predictors of students' perception towards the integration of mobile technologies in the teaching and learning process in senior high schools in the Cape Coast Metropolis.

**Table 23: Regression: Integration of Mobile Teaching and Learning**

Model	Unstandardized		Standardized	<i>t</i>	Sig.	Correlations			Collinearity		
	Coefficients		Coefficients			Zero-order			Statistics		
	B	Std. Error	Beta			Partial	Part	Tolerance	VIF		
<b>Teachers</b>	Constant	5.856	2.025		2.892	.005					
	PMT	.430	.147	.257	2.931	.004	.681	.265	.172	.446	2.244
	PI	.598	.092	.570	6.496	.000	.761	.520	.380	.446	2.244
<b>Students</b>	Constant	6.856	2.793		3.221	.005					
	PMT	.479	.199	.257	3.267	.093	.761	.294	.181	.475	2.428
	PI	.758	.096	.673	6.996	.017	.863	.615	.389	.475	2.428

Source: Field Survey

NB: PMT = Perception of mobile technology; PI= Perception of Integration

A multiple regression analysis was conducted to assess the hypothesized mobile technology integration in the teaching and learning process at the SHS level. Firstly, the hypothesis that perception of mobile technologies was found to have a statistically significant impact on teachers' and students' perception on the integration of mobile technology (intention to use) in the teaching and learning process in senior high schools, thereby validating the hypothesis. It was also demonstrated to be the most significant valid predictor of mobile learning. The finding was consistent with previous studies (Islam, 2011a; Lee, Hsieh & Hsu, 2011; Torres, Marín, García, Vázquez, Oliva & Torres, 2008; Venkatesh & Morris, 2000; Wang et al., 2006). However, Davis (1989) revealed that perceived usefulness had a significant indirect influence on intention to use mediated by attitude. Therefore, it is recommended that teachers may enhance their readiness or intention to use mobile learning in senior high education by emphasizing its usefulness.

Finally, the perception of mobile technology use showed a statistically significant impact on the integration of mobile technology (intention to use) in the teaching and learning process at the SHS level, thereby validating the hypothesis. This was consistent with prior studies (Ong, Lai & Wang, 2004; Venkatesh, 2000; Wang et al., 2006; Yoon & Kim, 2007). Nevertheless, Chang et al. (2012) demonstrated that perceived ease of use did not exert any significant direct influence on intention to use mobile technology for English learning. Similarly, Islam (2011a) depicted that perceived ease of use had a negative influence on intention to use an online database.

As proved from the factor analysis, the perception of mobile teaching and learning technologies revealed that teachers and students have intention to use mobile teaching and learning technologies to carry out their teaching, and getting the updated information related to teaching. Similarly, lecturers also showed the intention to use mobile learning to accomplish their academic and research works and adopt the mobile learning environment to teach and interact with students to solve their academic problems. Thus, the findings suggested that lecturers are ready to use mobile learning in higher education.

Regarding the teachers' views on the perception of mobile teaching and learning technologies, it was noted that teachers to download the teaching materials, uploading learning materials, evaluating students' performances and results, increasing academic productivity by wanting to teach and learn at anytime and anywhere; use their mobile devices to support their teaching and learning and also to use the mobile devices in their formal learning environments.

### **Summary**

The hypothesized mobile learning readiness model exhibited that teachers and students of the selected senior high schools in the Cape Coast Metropolis are ready to integrate mobile technologies in their teaching and learning process. Moreover, the findings show that perception of mobile technologies in the teaching and learning process at the senior high school level were significant predictors of the integration of mobile technologies in teaching and learning. However, Serin (2012) showed that prospective teachers' mobile learning perception levels were low. Along this line, Ferry (2009) found lower proficiency of educators than the students in

terms of using technology. This study shows that the use of mobile device is now comprehensible to teachers. This might be due to the increase in research on educators' concerns and preferences of utilizing the innovative mobile technologies in their teaching and learning. This study discovered that teachers showed better understanding of mobile learning and its benefit in senior high schools for teaching and learning purposes.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **Overview of the Study**

The objective of the study was to investigate the perceptions that teachers and students have towards the integration of mobile technologies in the teaching and learning process at the senior high school level. Specifically, the study spelt out to: determine the perceptions of teachers towards the integration of mobile technology in teaching, and also to determine the perceptions of students towards the integration of mobile technology in learning.

Descriptive research design was used for the study. The population for the study were all teachers and students of the selected schools in the Cape Coast Metropolis. The sample for the study was 375 which were generated through the simple random sampling technique. The research instrument used was questionnaire and was designed with the assistance of my supervisor. The content of the questionnaire was about the perceptions of teachers and students towards the integration of mobile technology in teaching and learning. The instrument was administered by the researcher himself. Return rate for the instrument was 100% on the part of teachers and 85.8% on the part of students.

The SPSS was used to analyze the data gathered. The data was edited; coded, presented and analysed using statistical tools such as percentages and frequency

tables. Even though various recommendation techniques were adopted to reduce the cumulative effects of the limitations on the study, their impact on the findings were not entirely ruled out.

### **Key Findings**

1. The study showed that majority of the students in Cape Coast Metropolis had mobile phones as compared to those with personal computers and the majority of the students also had their mobile phones with them more often than their personal computers.
2. The study also showed that all the teachers sampled in Cape Coast Metropolis had mobile phones and a majority also had personal computers and the majority often have both their mobile phones and personal computers with them and in usage.
3. The study indicated that there is a gap between teacher and student communication using mobile technology since few of the teachers had ever received phone calls from students in need of academic help. Among the few minority, they felt very happy about it that students had gotten in contact with them even as they are out of school and proves how well they are learning although there were some few difficulties depending on the subject area.
4. The study also makes it known that peer to peer communication among students was good since a majority of the students have been keeping in touch with their mates and friends in school after school through the mobile phone to clarify certain things they did not understand while in school.

5. The study indicated that there was a high perception among students that the use of mobile technologies will enhance their learning activities and improves learning skills, they further believed that the use of mobile technologies will improve lesson delivery in the classrooms and improve their pedagogical skills and competences.
6. The study indicated that there was a high perception among teachers that the use of mobile technologies will enhance their teaching activities and improves teaching skills, they further believed that the use of mobile technologies will make lesson delivery in the classrooms very comfortable and improve their pedagogical skills and competences.
7. A Majority of the teachers and students also had the perception that they would want to learn at anytime and anywhere; use mobile devices to support their teaching and learning and also to use the mobile devices in their formal learning environments.
8. A Majority of the students and teachers had access to the internet using their cellular networks and were likely to use mobile phones, laptops, and digital cameras as teaching and learning material. The internet also remains the main application that both the teachers and students want to use to assist them in their teaching and learning. Phone calls, whatsapp and SMS text messaging also follows the order respectively.
9. It was also noted from the study that both teachers and students had a high perception of the integration of mobile technology in the teaching and



learning process although that of the students was higher than that of the teachers.

### **Conclusions**

From the findings it could be concluded that the high perception of mobile technologies usage will have a positive effect on teachers' attitudes towards the use of mobile technologies in the teaching and learning process at the senior high schools level.

Integration of mobile technologies in the instructional activities of teachers will lead to improvement in lesson delivery in senior high schools in the Cape Coast Metropolis. This is because it is believed that the use of mobile technologies changes teachers' instructional behaviour into one that will be students' friendly.

Teachers and students are accepting mobile technology usage since they have access and adequate exposure to mobile technology tools; integration of mobile technology into the educational system will be successful when there is access, concepts and its usefulness is understood and finally when there is the availability of technical specialists to handle the subject in the senior high schools.

The use of mobile technology met both students' and teachers' needs possibly because the use of mobile devices initiated and promoted educational practices that catered for individual differences and learning styles based on equitable access. Students and teachers are able to use their phones or personal computers (laptops) via the internet to access information or interact with friends, teachers or other end users and that improved collaboration among students; they

exchanged information with team members and teachers via the use of the internet and phone calls and text messaging.

### **Recommendations**

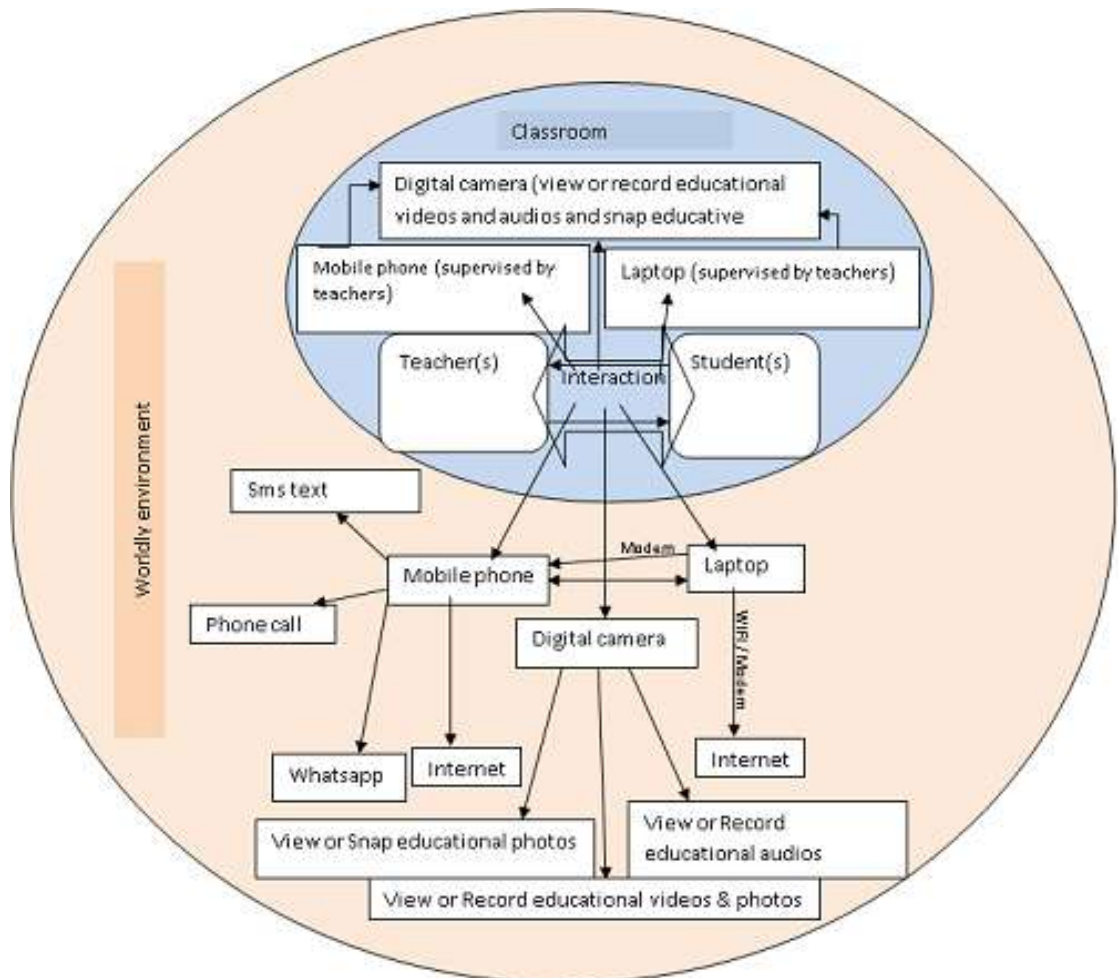
On the basis of the findings and the conclusion drawn, the following are the recommendations were made:

1. School administration should organize in-service education and training (INSET) on mobile devices and technologies for teachers and encourage them to integrate them in their lesson delivery both within and outside the school premises.
2. Teachers should try to encourage students to call them in times of trouble in their studies and learn to use mobile devices in all facets of their preparations, presentation and evaluation in the instructional processes in schools.
3. The Government through the Ministry of Education and Ghana Education Service (GES) should formulate policies that will encourage the establishment of electronic libraries in pre-university levels and guide the use of mobile devices like mobile phones, laptops, and digital cameras which they are currently seized from using in the teaching and learning process in Ghanaian secondary schools.
4. GES in collaboration with telecommunication companies should train Technical Specialists in mobile technologies and post them to Senior High Schools in the Cape Coast Metropolis so that they can help in the integration process.

- School administration should continue to encourage teachers and students to use mobile technologies to teach, learn and share information with the world.

### Suggestions for Further Study

It is recommended that further research be conducted to find out the perceptions of other educational stakeholders towards the integration of mobile technologies in the school curriculum. Also, a further research is to be done to evaluate the proposed model below.



**Figure 2:** Educational Mobile Technology Model for Teaching and Learning

NB: All internet access points in relation to this study are to be with a cellular network and the mobile phones are considered to be smart phones.

The figure depicts two environments where teaching and learning are undertaken and the roles the mobile technologies will play in this process.

1. In the classroom teaching and learning goes on through interactions between the teachers and students.
2. The mobile technological tools in the classroom are not for communication purposes but are for aiding in the teaching and learning process like searching for information in order to further understand a subject area and also record and store classroom records for sharing and future discussions.
3. In the outside worlds the mobile technologies play other important role like using them to help students and teachers to keep in touch at anytime and anywhere using phone calls, whatsapp, internet and SMS text messaging.
4. Teachers can create groups using technologies on whatsapp and the internet in general to help teach the class and permit the students to learn and revise what they want as and when they want. This way, students can learn at their own pace using the mobile technologies.
5. The mobile phone seems to be the best of tool followed by the laptop and the digital camera.

Although the laptop and mobile phone can be used interchangeably, the laptop would require other accessories like a modem and a headset among others before it can function as a mobile phone does. Almost all laptops and mobile

phones can perform as a digital camera. The mobile phone is also handier than the laptop.

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## **APPENDICES**

**APPENDIX A**

**QUESTIONNAIRE FOR TEACHERS**

A study is being conducted into the integration of mobile technology in the teaching and learning process at the senior high school level.

I am happy to inform you that you have been selected to participate in the study by filling in the attached questionnaire. You are therefore respectfully requested to provide objective responses to the items in the questionnaire as they apply to you. You are assured that the information you **GIVE** will be used only for academic purpose and therefore your confidentiality is assured. For this reason, you are kindly asked **NOT** to write your name on this questionnaire.

THANK YOU.

**DEMOGRAPHIC DATA**

**PLEASE TICK APPROPRIATE RESPONSE**

- 1. Sex: male [ ] female [ ]
- 2. Age : 21 - 30 years [ ] 31- 40 years [ ] 41-50 years [ ] 51- 60 years [ ]
- 3. Teaching experience 1–5 years [ ] 6 – 10 years [ ] 11 – 15 years [ ]  
16 – 20 years [ ]

4. Which form do you teach .....

**Do you own a personal computer?** YES [ ] NO [ ]

Do you own a mobile phone? YES [ ] NO [ ]

How often do you have your computer with you?

Very Often [ ] Often [ ] Not Often [ ]

Where do you most often use your mobile phone?

Home [ ] School [ ] In Transit [ ] At Work [ ] Every Where [ ]

Do you have internet access through a wifi connection on your mobile phone?

YES [ ] NO [ ]

Do you have internet access through a cellular network on your mobile phone?

YES [ ] NO [ ]

**Which activity do you most often engage in on your mobile phone?**

SMS/MMS [ ] Phone Calls [ ] Email [ ] Entertainment [ ]  
Free Instant Messaging (Whatsapp, Viber, Skype, Telegram etc) [ ]

**Do you feel comfortable installing and operating third party software on a mobile**

Completely Uncomfortable [ ] Somewhat Uncomfortable [ ]  
Not Sure [ ] Somewhat Comfortable [ ] Completely Comfortable [ ]

**Would you be comfortable allowing your student to contact you through your mobile phone?**

Completely Uncomfortable [ ] Somewhat Uncomfortable [ ] Not Sure [ ]  
Somewhat Comfortable [ ] Completely Comfortable [ ]

**Would you feel comfortable sending student grades through text messaging?**

Completely Uncomfortable [ ] Somewhat Uncomfortable [ ]  
Not Sure [ ] Somewhat Comfortable [ ] Completely Comfortable [ ]

**Would you agree that having subject materials such as slides, class notes, and practice quizzes available on your mobile phone would be beneficial to your teaching process?**

Completely Disagree [ ] Somewhat Disagree [ ] Not Sure [ ]  
Somewhat Agree [ ] Completely Agree [ ]

**Would you invest personal time learning to use and installing software that could make these resources available on a mobile phone?**

No [ ] Probably not [ ] Not Sure [ ] Probably [ ] Yes [ ]

**Would you be willing / able to purchase a new mobile device if you thought it would improve your performance at teaching?**

No [ ] Probably not [ ] Not Sure [ ] Probably [ ] Yes [ ]

**Do you feel that the use of some kind of mobile learning software would improve overall success in your subjects?**

No [ ] Probably not [ ] Not Sure [ ] Probably [ ] Yes [ ]

**Which of the following technologies do you currently own?**

Mobile phone [ ] Personal Digital Assistant (PDA) [ ] Pager [ ]

Laptop computer [ ] Desktop computer [ ] Digital Camera [ ]

**Which of the following technologies do you currently use?**

Mobile phone [ ] Personal Digital Assistant (PDA) [ ] Pager [ ]

Laptop computer [ ] Desktop computer [ ] Digital Camera [ ]

**Which of the following mobile phone software applications do you use?**

Whatsapp [ ] Viber [ ] Text Messaging (SMS) [ ]  
Text Messaging (MMS) [ ] Internet [ ] Phone calls [ ]

TeacherMate [ ] Worldreader [ ] School of One [ ] BBC Janala [ ]

Drona – Mobile Learning Management System [ ] BridgeIT Project [ ]

**Which of the following technologies have you ever used to support your studies in anyway?**

Whatsapp [ ] Viber [ ] Text Messaging (SMS) [ ]

Text Messaging (MMS) [ ] Internet [ ] Phone calls [ ]

TeacherMate [ ] Worldreader [ ] School of One [ ]

BBC Janala [ ] Drona – Mobile Learning Management System [ ]

BridgeIT Project [ ]

**Have you ever received a call from a student to help him or her with an assignment or discuss what happened in class before? Yes [ ] No [ ]**

**If “YES” please state your felt experience**

.....  
.....  
.....  
.....  
.....

**To what extent do you agree or disagree with the following statements.**

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Strongly Disagree</b>
I want to learn at anytime and any where			
I would like to use my mobile devices to support my learning			
I would like to use my device in a formal learning environment			
The internet access is too limited to effectively use mobile learning			
I would not want to use my mobile device in class or for learning; it is for staying in touch with my family and friends			
Using mobile devices for learning will be too expensive for me			

**How likely would you use the following mobile devices for learning if resources such as course materials, textbooks and other learning materials and activities were available for them?**

	<b>Very Likely</b>	<b>Likely</b>	<b>Not Likely</b>
Mobile phone			
Personal Digital Assistant (PDA)			
Pager			
Laptop computer			
Digital Camera			



## APPENDIX B

### QUESTIONNAIRE FOR STUDENTS

A study is being conducted into the integration of mobile technology in the teaching and learning process at the senior high school level.

I am happy to inform you that you have been selected to participate in the study by filling in the attached questionnaire. You are therefore respectfully requested to provide objective responses to the items in the questionnaire as they apply to you. You are assured that the information you **GIVE** will be used only for academic purpose and therefore your confidentiality is assured. For this reason, you are kindly asked **NOT** to write your name on this questionnaire.

THANK YOU.

#### DEMOGRAPHIC DATA

##### PLEASE TICK APPROPRIATE RESPONSE

1. Sex: [ ] male [ ] female [ ]
2. Age : .....
3. Which form are you .....

**Do you own a personal computer?** YES [ ] NO [ ]

**Do you own a mobile phone?** YES [ ] NO [ ]

**How often do you have your computer with you?**

Very often [ ] Often [ ] Not often [ ]

**How often do you have your mobile phone with you?**

Very Often [ ] Often [ ] Not Often [ ]

**Where do you most often use your mobile phone?**

Home [ ] School [ ] In Transit [ ]

At Work [ ] Every Where [ ]

**Do you have internet access through a wifi connection on your mobile phone?**

YES [ ] NO [ ]

**Do you have internet access through a cellular network on your mobile phone?** YES [ ] NO [ ]

**Which activity do you most often engage in on your mobile phone?**

SMS/MMS [ ] Phone Calls [ ] Email [ ] Entertainment [ ]  
Free Instant Messaging (Whatsapp, Viber, Skype, Telegram etc) [ ]

**Do you feel comfortable installing and operating third party software on a mobile phone?**

Completely Uncomfortable [ ] Somewhat Uncomfortable [ ] Not Sure [ ]  
Somewhat Comfortable [ ] Completely Comfortable [ ]

**Would you be comfortable allowing your teachers to contact you through your mobile phone?**

Completely Uncomfortable [ ] Somewhat Uncomfortable [ ] Not Sure [ ]  
Somewhat Comfortable [ ] Completely Comfortable [ ]

**Would you feel comfortable receiving grades through text messaging?**

Completely Uncomfortable [ ] Somewhat Uncomfortable [ ]  
Not Sure [ ] Somewhat Comfortable [ ] Completely Comfortable [ ]

**Would you agree that having subject materials such as slides, lecture notes, and practice quizzes available on your mobile phone would be beneficial to your learning process?**

Completely Disagree [ ] Somewhat Disagree [ ] Not Sure [ ]  
Somewhat Agree [ ] Completely Agree [ ]

**Would you invest personal time learning to use and installing software that could make these resources available on a mobile phone?**

No [ ] Probably not [ ] Not Sure [ ] Probably [ ] Yes [ ]

**Would you be willing / able to purchase a new mobile device if you thought it would improve your performance at school?**

No [ ] Probably Not [ ] Not Sure [ ] Probably [ ] Yes [ ]

**Do you feel that the use of some kind of mobile learning software would improve overall success in your subjects?**

No [ ] Probably Not [ ] Not Sure [ ] Probably [ ] Yes [ ]

**Which of the following technologies do you currently own?**

Mobile phone [ ] Personal Digital Assistant (PDA) [ ] Pager [ ]

Laptop computer [ ] Desktop computer [ ] Digital Camera [ ]

**Which of the following technologies do you currently use?**

Mobile phone [ ] Personal Digital Assistant (PDA) [ ] Pager [ ]

Laptop computer [ ] Desktop computer [ ] Digital Camera [ ]

**Which of the following mobile phone software applications do you use?**

Whatsapp [ ] Viber [ ] Text Messaging (SMS) [ ]

Text Messaging (MMS) [ ] Internet [ ] Phone calls [ ]

TeacherMate [ ] Worldreader [ ] School of One [ ]

BBC Janala [ ] Drona – Mobile Learning Management System [ ]

BridgeIT Project [ ]

**Which of the following technologies have you ever used to support your studies in anyway?**

Whatsapp [ ] Viber [ ] Text Messaging (SMS) [ ]

Text Messaging (MMS) [ ] Internet [ ] Phone calls [ ]

TeacherMate [ ] Worldreader [ ] School of One [ ]

BBC Janala [ ] Drona – Mobile Learning Management System [ ]

BridgeIT Project [ ]

**Have you ever called a friend or teacher to help you with an assignment or discuss what happened in class before?** Yes [  ] No [  ]

**To what extent do you agree or disagree with the following statements.**

	<b>Strongly Agree</b>	<b>Agree</b>	<b>Strongly Disagree</b>
I want to learn at anytime and any where			
I would like to use my mobile devices to support my learning			
I would like to use my device in a formal learning environment			
The internet access is too limited to effectively use mobile learning			
I would not want to use my mobile device in class or for learning; it is for staying in touch with my family and friends			
Using mobile devices for learning will be too expensive for me			

**How likely would you use the following mobile devices for learning if resources such as course materials, textbooks and other learning materials and activities were available for them?**

	<b>Very Likely</b>	<b>Likely</b>	<b>Not Likely</b>
Mobile phone			
Personal Digital Assistant (PDA)			
Pager			
Laptop computer			
Digital Camera			