Ghana’s Educational Policymakers and Their Impact on Information and Communication Technology Education: A Case Study of a Ghanaian Model Senior High School

A dissertation presented to

the faculty of

The Patton College of Education of Ohio University

In partial fulfillment

of the requirements for the degree

Doctor of Philosophy

Ebenezer Malcalm

March 2012

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This dissertation titled

Ghana’s Educational Policymakers and Their Impact on Information and Communication Technologies Education: A Case Study of a Ghanaian Model Senior High School

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Abstract

MALCALM, EBENEZER, Ph.D., March 2012, Curriculum and Instruction, Instructional Technology

Ghana’s Educational Policymakers and Their Impact on Information and Communication Technology Education: A Case Study of a Ghanaian Model Senior High School (333. pp)

Director of Dissertation: David Richard Moore

The main goal of the research was to explore the lived experiences of Ghana’s ICT in Education Policy makers and their impact on ICT education in Ghana. The research used Odorgonno Senior High School (OSHS) as a case study to ascertain how ICT is being implemented. The Assistant headmaster, teachers and students were interviewed to ascertain their ICT use in the school. The study used a phenomenological case study as a research design to explore the lived experiences of the respondents. In all, 30 respondents took part in the study. The findings of the study have shown that as much as Ghana’s ICT Policy makers have immensely worked towards the development of the ICT policy document, the implementation of the policy was fraught with operational and leadership challenges. ICT in education implementation process at OSHS was bedeviled with problems such as inadequate ICT facilities, poor Internet connectivity and lack of capacity of teachers to integrate ICT in education. Students were not given enough time to practice their computer competency skills and the inability of the government and school’s management to provide ICT facilities to the computer laboratories. Most of the computers were broken down and some were obsolete. It was evident from the findings that computers and the Internet are dominant ICT facilities used in the school. Other Internet facilities were not used. To address the challenges facing the implementation of
the Policy, there is need to for a multifaceted approach. There is the need for the provision in ICT facilities to schools, the need for the ICT implementation plan at the national level and technology plans at the school level. Also, there is a need to review the ban on cell phone usage in the schools and professional development training for teachers and school administrators. The Ministry of Education and Ghana Education Service have to put in place persistence monitoring, supervision and evaluation mechanisms in the schools. To alleviate financial pressure on government to provide ICT infrastructural to the schools, there is a call for private-government partnership to provide teaching materials and ICT resources to the schools.

Approved: _____________________________________________________________

David Richard Moore

Associate Professor of Educational Studies
Dedication

I have dedicated this work to my beloved father Christian Malcalm, my mother Rosina Malcalm and to my lovely daughter Elena Malcalm

But to God be the Glory.
Acknowledgments

First of all, I want to express my sincere gratitude to the Almighty God for his blessing, mercy and protection, and for bringing me this far. I would not have completed the dissertation without the tremendous support and contributions I enjoyed from many individuals during my course work, comprehension examination stage, proposal stage, fieldwork, transcription stage and the writing process. I therefore would like to express my sincere gratitude to everyone who was involved directly or indirectly in this study. I would like to extend my deepest appreciation to the chair and members of my dissertation committee namely Dr. David Moore (the chair), Dr. Adah Ward-Randolph, Dr. Phyllis Bernt, Dr. Francis Godwyll and Dr. Albert Akyeampong. I am grateful for your advice, support, and supervision during the entire process of this dissertation. I extend my sincere gratitude to Dr. Teresa Franklin, for her support. I also would like to thank Professor Jophus Anamoah-Mensah, the Chair of 2007 Ghana’s Education Reform Committee for the support given to me during my fieldwork in Ghana.

I am also indebted to Debra Rayford, Erica Leslie, Fidelia Kukah, Jenny Wadee, Adwoa Wadee, Johanna Wadee, Kojo Van-Ess Kuranchie, and Anita Dawson-Amoah for their support during the gathering of data and at transcription stages. Finally, my sincere appreciation goes to my wife for her patience during my entire sojourn in USA for my further studies.
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List of Abbreviations

AED Academy for Educational Development
AFRC Armed Forces Revolutionary Council
AITI Advanced Information Technology Institute
AOL African on Line
CA Continuous Assessment
CAL Computer Assisted Learning
CAT Computer Assisted Technology
CD-ROM Compact Disc- Read Only Memory
CENDLOS Centre for National Distance Learning and Open Schooling
CEE Common Entrance Examination
CHASS Conference of Head of Assisted Secondary Schools
CICs Community Information Centers
CPI Computer Programmed Teaching
CREATE Consortium for Research on Educational Access, Transitions and Equity
CRDD Curriculum Research and Development Division
EdSAC Education Sector Adjustment Credit
EFA Education for All
EMIS Education Management Information System
ERP Economic Recovery Program
ERT European Round Table of Industrialists
ESAR Education Sector Annual Review
ESPR Education Sector Performance Report
EU European Commission
DfES Department for Education and Skills
DL Distance Learning
DSL Digital Subscriber Line
DPV Development Partner Unit
ENRNWCA The Educational Research Network for West and Central Africa
ETSIP Education and Training Sector Improvement Plan
FCUBE Free, Compulsory, Universal Basic Education
GeSCI Global e-School and Communities Initiative
GETfund Ghana Educational Trust Fund
GES Ghana Education Service
GIFEC Ghana Investment Fund for Electronic Communication
GLOBE Global Learning and Observation to Benefit the Environment
GNAT Ghana National Association of Teachers
GoG Government of Ghana
GPRS Ghana Poverty Reduction Strategy Paper
GSS Ghana Statistical Service
GT Ghana Telecom
GTP Global Teenager Project
GTV Ghana Television
ICTE  Information and Communication Technologies in Education
ICT  Information and Communication Technologies
IT  Information Technology
ICT4AD  Information and Communication Technology for Accelerated Development
IEARN  International Education and Resource Network
InfoDev  Information for Development
INASP  International Network for the Availability of Scientific Publications
JHS  Junior High School
JSS  Junior Secondary School
ISTE  International Society for Technology Education
ISP  Internet Service Provider
ITU  International Telecommunication Union
KNUST  Kwame Nkrumah University of Science and Technology
LAN  Local Area Network
MDGs  Millennium Development Goals
MMDAs  Metropolitan/Municipal/District Assemblies
MLG  Ministry of Local Government
MOE  Ministry of Education
MOES  Ministry of Education and Sports
MOEYS  Ministry of Education, Youth and Sports
NAGRAT  National Association of Graduate Teachers
NCHE  National Council for Higher Education
NCTE  National Council for Tertiary Education
NDC  National Democratic Congress
NEF  National Education Forum
NERP  National Education Reform Program
NEPAD  New Partnership for African Development
NFED  Non-Formal Education Division
NLC  National Liberation Council
NPP  National Patriotic Party
NRC  National Redemption Council
NSCE  New Structure and Content of Education
NSP  National Service Personnel
ODA  Overseas Development Agency
OECD  Organization for Economic Co-operation and Development
OSHS  Odorgonno Senior High School
PCAST  President's Committee of Advisors on Science and Technology
PIL  Partners in Learning
PNDC  Provisional National Defense Council
PNP  People’s National Party
PTA  Parent Teacher Association
PP  Progress Party
PSI-DL  Presidential Special Initiative for Distance Learning
SACOST  Centre for School and Community Science and Technology Studies
<table>
<thead>
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<th>Abbreviation</th>
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<tr>
<td>SEU</td>
<td>Secondary Education Unit</td>
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<tr>
<td>SHS</td>
<td>Senior High School</td>
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<tr>
<td>SRCs</td>
<td>Science Resource Centers</td>
</tr>
<tr>
<td>SSS</td>
<td>Senior Secondary School</td>
</tr>
<tr>
<td>TOTs</td>
<td>Train of Trainers</td>
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<tr>
<td>STME</td>
<td>Science Technology and Mathematics Education</td>
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<tr>
<td>TVET</td>
<td>Technical, Vocational and Agricultural and Training</td>
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<tr>
<td>UCC</td>
<td>University of Cape Coast</td>
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<td>UEW</td>
<td>University of Education, Winneba</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environment Program</td>
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<td>UG</td>
<td>University of Ghana</td>
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<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
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<td>VCD</td>
<td>Video Compact Disc</td>
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<td>WAEC</td>
<td>West Africa Examination Council</td>
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<td>WASSCE</td>
<td>West Africa Secondary School Certificate Examination</td>
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<td>WB</td>
<td>World Bank</td>
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<td>WorLD</td>
<td>World Links for Development</td>
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<td>WSIS</td>
<td>World Summit on the Information Society</td>
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Chapter 1: Introduction

“One of the Millennium Development Goals (MDGs) is achievement of universal primary education by 2015. We must ensure that information and communication technologies (ICTs) are used to help unlock the door to education.” By Kofi Annan. UN News Centre (2005, para. 2).

Background of the Study

The challenges for modern educational systems call for the learning of new technologies to create engaging and relevant learning materials for both educators and learners (U.S. Department of Education, 2010). According to International Society for Technology Education (ISTE) (2006), diffusing technologies in education have become vital process for preparing a new generation of students. One of the main elements of educational standards for the 21st Century classroom is a place where learners are being taught to learn new ideas and skills to successfully meet a high standard of ICT knowledge and skills. Abu-Ramaileh and Hamdan, (2006) indicate that utilization of new technologies in classroom settings could help remodel the traditional ways of instruction and help learners to be responsible for the new ideas and skills learned and enhance their performance.

In March 2006, the Ghana Government ushered in the draft Ghana ICT in Education Policy. However, the final policy document was published in November 2008. (Ministry of Education 2008). The intention of the policy document is to provide guideline for the deployment of ICT in educational institution of Ghana. Even though the document is still in its draft stage, it is being use in all-educational institutions in Ghana.
In many parts of Sub-Saharan Africa, including Ghana, ICT in education policy reforms have not eliminated hydra-headed problems facing heads of schools, teachers and students in their daily experiences. Hence, educational reform efforts to ensure viable ICT integration in education have become rhetoric rather than reality. In Ghana, the enormous studies conducted to investigate the impact of ICT policies on education are paltry and lack details. The situation has resulted in very little empirical information to convey the stories and experiences of those affected based on their understanding of the ICT in education policies. In addition, this state of affairs makes it difficult for Ghana’s policy makers and other stakeholders in the education sector to grasp adequate insights into how ICT integration in education could enhance teaching and learning in schools. It is therefore important to conduct a study understand nuances of how ICT policy impact learning and teaching in Ghanaian senior high school context. The purpose of this study therefore is to explore the role of Ghana’s policy makers and their impact on ICT education.

**Brief History of Ghana**

The Republic of Ghana, formerly known as the Gold Coast, is centrally located in West Africa and has a total land area of “238,538 sq. km. (92,100 sq. mi.); about the size of Illinois and Indiana combined” (U.S. Department of State, 2009, para.1). The capital city is Accra. Ghana is bordered on the East by the Republic of Togo, on the North by Burkina Faso and on the West by Cote d’Ivoire - all French speaking countries. The Gulf of Guinea lies to the South and stretches across the 560 kilometers of the country’s coastline. Ghana is generally a lowland country except for a range of hills that lie on the Eastern border, stretching up to join Mount Afadjato, the highest mountain in Ghana with
the highest point of about 884 meters above sea level. The country is divided into 10 regions with their capital towns (The World Factbook – Ghana, para. 2).

The U.S. Department of State website states that:

First contact between Europe and the Gold Coast dates from 1470, when a party of Portuguese landed. In 1482, the Portuguese built Elmina Castle as a permanent trading base. Thomas Windham made the first recorded English trading voyage to the coast in 1553. During the next three centuries, the English, Danes, Dutch, Germans, and Portuguese controlled various parts of the coastal areas. In 1821, the British Government took control of the British trading forts on the Gold Coast. In 1844, Fanti chiefs in the area signed an agreement with the British that became the legal stepping-stone to colonial status for the coastal area. (Para. 12)

According to the Ghana Statistical Service portal (http://www.censusghana.net/index.html) the country’s population as of 2010 has been estimated at 24,223,431. The annual growth rate in 2007 was estimated at 2.4 percent.

“The main religions are Christian 69%, Muslim 15.6%, traditional and indigenous beliefs 8.5% (U.S. Department of State, para. 2). English is the official language of the country. About Ghanaian dialects, Akan comprises 49% of the total population. The Akan-speaking dialect includes Akwapim Twi, Fanti, Akyem and Asante Twi. Mole-Dagbani is the second dialect that comprises of 16% of the total population, Ewe (13%) is the third largest speaking dialect follows by Ga-Adangbe that is made up of 8% of the total population. Guan dialect is made up of 4% of the total population. Other minority dialects made up of 10% of the total population. “The literacy rate as of 2007 is 53.7%.
Infant mortality rate (2003 est.) was 64/1,000. Life expectancy for women is 59.2 years and 55.5 years for men” (U.S. Department of State, para. 2).

Figure 1. Ghana Map showing Regions and Capital Town

Historical Overview of Ghana's Pre-Tertiary Educational System and The State of Education in Ghana

The Ghana's Government puts a premium on basic education. This is evident in The Directive Principles of State policy of Ghana’s 1992 Constitution. Article (38) of Directive Principles of State Policy of Ghana’s Fourth Republican Constitution, Government of Ghana (1992) stipulates the main elements of the Free, Compulsory, Universal Basic Education (FCUBE) program. Clause (1) of article 38 states: “The State shall provide educational facilities at all levels and in all the Regions of Ghana, and shall,
to the greatest extent feasible, make those facilities available to all citizens”

Article 38, Clause (2) of the Constitution further mandates the National Democratic Congress government to implement the policy with two years of the first parliament of the Fourth Republican Constitution. The article states:

The Government shall, within two years after Parliament first meets after the coming into force of this Constitution, draw up a program for implementation within the following ten years, for the provision of free, compulsory and universal basic education. (Government of Ghana, para. 2)

According to Akyeampong (2004) the FCUBE initiative was an effort by Rawling’s government to render free compulsory basic education to Ghanaian children by the year 2005. Akyeampong (2004) asserts the government created:

1. motivation for a coordinated sector program by providing a framework for donor support to education, and

2. a drive for educational decentralization with greater recognition of the important role of community participation in school management for school improvement. (p. 4)

U.S. Department of State (2009) indicates that FCUBE was introduced in 1996. The FCUBE was described “as of the most ambitious pre-tertiary education programs in West Africa” (para. 9).

U.S. Department of State (2009) indicates:

Primary and Junior Secondary School education is tuition-free and mandatory under the policy. “Since the early 1980s, Government of Ghana expenditures on
education have risen from 1.5% to nearly 3.5% GDP. Since 1987, the share of basic education in total education spending has averaged around 67%. (Para. 9)

The Ministry of Education, Science and Sports (MOESS), now known as Ministry of Education (MOE), is responsible for initiation of educational policy directives and the implementation of these policies are under “Ghana Education Service (GES), which administers pre-university education; the National Council on Tertiary Education; the National Accreditation Board; and the National Board for Professional and Technician Examinations (NABPTEX)” (U.S Department of State 2009, para. 9).

In 2003, the Government of Ghana (2003) indicated:

GES is the agency that implements the Basic and Senior Secondary education components, including Technical and Vocational institutes. GES is therefore responsible for schools and, by virtue of the size of these sub-sectors, about four-fifths of the annual expenditure on education. The other agencies cover the rest of the education sector. Of these the National Council for Tertiary Education (NCTE) and the Non-Formal Education Division (NFED) important sub-sectoral areas of responsibility regarding education delivery. (p. 5)

In terms of management and supervision of examination at Junior High School (JHS) and Senior High School (SHS) levels, U.S. Department of State (2009) states: the West African Examinations Council (WAEC), a sub-regional consortium of five Anglophone West African Countries (Ghana, Nigeria, Sierra Leone, Gambia, and Liberia) is responsible for developing, administering, and grading school-leaving examinations” (para. 9).
According to Quist (2003) Ghana's second cycle education system started in 1876 when the then pioneer second cycle institution, Mfantsipim School was established as a boys’ secondary school at Cape Coast. At the later part of the year, the Mfantsipim type of educational system was expanded and introduced in various urban areas in Ghana. The Mfantsipim type of second cycle institution was structured in the form of the British colonial educational system. Final year students have to write both Ordinary and Advanced Levels examinations before being admitted to the nation’s universities. According to Quist (2003) the second cycle educational system under the late President Dr. Kwame Nkrumah regime was described as the “lynchpin for educational progress, manpower development, and overall national development” (p. 189). During that era, the Nkrumah government established an educational trust fund known Ghana Education Trust Fund (GET Fund). The main goal of the GET Fund was to increase accessibility to education and improvement of the rural based educational system.

The late Dr. Nkrumah’s Accelerated Development Plan of Education of 1951 increased enrollment at basic educational levels. However, the efforts led to the fall of standard of education and that resulted in high unemployment and high school dropouts. According to Graham (1971) Ghana introduced an ambitious seven-year educational program under the late Dr. Kwame Nkrumah regime in 1957. The key elements of the educational development plan were free tuition and textbooks for basic education. The educational development plan also saw the construction of massive educational facilities such as classrooms to cater for the increasing number of students. By 1965, new twenty-five secondary schools, three new teacher training colleges, three Polytechnic institutions and two Agricultural colleges were created to provide middle level and technical
manpower to the nation. In addition, the Cape Coast University was created alongside with University of Ghana to train future teachers and managers for the country.

Graham (1971) asserts that the expansion of educational facilities and programs demanded for the creation of new educational programs to reflect on the growing needs and aspirations of the country. As a follow up, “Curriculum Development Center” was created by GES to design and develop curricula, for syllabi, timetables and teaching pedagogy for schools. The purpose of the Curriculum Development Center was also to change the by then existing “colonial inheritance curricula” that was couched heavily on European culture, traditions and civilizations. It is worth noting that the curricula changes did not affect the fundamental methods of instruction in schools. For example the country continued to use the English language for instructional purposes and other core subjects that were been in the schools. It was not until 1987 that comprehensive educational reforms were introduced.

Quist (2003) contends that in the1980s, the enrollment figures at the secondary schools and the number of secondary schools shot up. According to Quist (2003) during the period of 1966 and 1981, the then governments restructured the educational system. The Kwapong Review Committee for example in 1966 addressed the issue of many pupils from elementary schools who could not get admission to secondary schools due to the restricted number of secondary schools, by, ushering the continuation school system. This policy was later criticized as an elitist type of education. The late Prime Minister Abrefa Busia’s government (1969-1972) started a very important initiative known as the junior secondary school pilot project focused on transforming the secondary school system.
During Rawlings’ era (1979–2000), there was total transformation of Ghana’s educational system. In 1987, the then PNDC government introduced educational reform. The MOE replaced the five-year secondary school system and the of two-year sixth form system with the American type (K-12) basic educational concept. The 1987 educational reform took precedent over Dzobo’s Educational Reform Report of 1974. Dzobo’s Committee’s Report called for a new educational direction for the nation. The Dzobo Review Committee of 1974 introduced the concept of ‘comprehensive’ Junior Secondary Schools that sought to instill academic, technical and vocational skills among students. The nation-wide implementation of the Junior Secondary School (JSS) concept started in 1987 (Government of Ghana, 2007). The full-scale implementation of the National Education Reform Program (NERP) commenced on September 1, 2007.

According to Government of Ghana (2003) the NERP intends to tackle problems associated with the previous educational system within the context of the decentralization process of public services taking place in the broader framework of public administration. The new educational program seeks a complete overhaul of the educational system at the basic educational system level up to the higher education level to make the system more relevant to the key economic and employment priorities of the country.

The U.S. Department of State (2009) states that:

Since 1986, pre-tertiary education in Ghana includes six years of primary education, three years at the junior secondary school level and three years at the senior secondary school level. A new educational reform, beginning September 1, 2007, has introduced two years of kindergarten education beginning at age four and increased the three years senior secondary to four years. Successful
The completion of senior secondary school leads to admission eligibility at training colleges, polytechnics, and universities. (para. 10)

The adoption of the K-12 system is virtually a reduction by five years of pre-university education compared to the previous British type of education. The current National Democratic government decided to reduce the four-year duration of SHS to a three-year duration and maintained the Junior High School (JHS) system to three years starting from the 2010/11 academic year.

The U.S. Department of State (2009) states that there are quite a number of Senior High School (SHS) in Ghana numbering around six hundred. “Private secondary schools play a very small role in Ghana, with only a handful of institutions offering international curricula such as the British-based A-levels, International Baccalaureate, and U.S. high school. Combined, they graduate fewer than 200 students a year” (para. 10). After JHS, those students who qualify may decide to proceed to different levels at SHS, involving Vocational and Agricultural and Training (TVET), General Education and Technical, or they may choose to enroll in an apprenticeship scheme with some assistance from the Government (Government of Ghana, 2007). According to Government of Ghana (2007) the educational reform provides a new three-year SHS that offers General Education with specialties in Vocational and Agriculture, General Arts, Business and Technical opportunities for either entering tertiary institutions or seeking a job. The Agricultural Institutions and Technical and Vocational institutions provide three-year courses in addition to the core SHS subjects. SHS graduates can choose to continue at Teacher Training Colleges. The pre-service training colleges run a 3-year program that leads to a diploma in teacher training.
Figure 2. Structure of Education Proposed by Ghana Government in 2002
Purpose of the Study

The research explores the experiences of Ghana’s ICT policy makers and their impact on ICT education at Odorgonno Senior High School (OSHS) in Ghana. Specifically, the study targets how ICT in education policies have had an impact on OSHS in Ga South District in Greater Accra region of Ghana. Consequently, this research seeks to address whether Ghana’s ICT in Education Policy of 2008 is helping to support teaching and learning at OSHS.

The goal of the inquiry is to apprehend the experiences of the sample population in terms initiation and the use of ICT policies in teaching and learning. Moreover, the phenomenological case study will help to analyze interactions between selected Ghanaian policy makers, heads of schools, teachers and students.

Rosen and Well (1995) and Thierer (2000) indicate the importance of ICT in learning and teaching. They argue that if ICT are used properly, it will go along way to improve teaching and learning in schools. ICT according to them are becoming one of the major issues being discussed in modern educational policy documents. Adeyinka, Omoba and Tella (2007) contend that while there is a dramatic use of ICT in education in African countries, there has not been enough information to depict how ICT are being used in the schools. Aduwa-Ogiegbaen and Iyamu (2005) also note that there are perceptions of wide gaps of ICT use between schools in urban and rural areas.

Kumar, Che Rose, and D’Silva (2008) argue: “despite the tremendous increase in the role of IT in education, it is facing considerably high resistance” (p. 606). In related studies (Hu, et al., 2003; Gilbert, 1996), it was revealed that even though there has been a vast increase in ICT integration in education, there remains some major challenges. Rovai
and Childress (2003) reveal that many educators actively lag in using ICT in schools despite the fact that research succinctly proves the benefits of ICT use in schools.

According to Kumar et al. (2008)
Fostering technology usage among individual teachers remains a critical challenge for school administrators, technology advocates and policy makers. Thus, it is reasonable, then, to identify conditions and determinants of technology usage among teachers in order to realize the shift of paradigm in the usage of computer with the advent of IT. (p. 606)

**Statement of the Problem**


The creation of awareness in information access is recognised as being of prime importance. With respect to ICT usage and application, an information technology policy framework is currently being developed which recognises that the dynamics of global economic growth are changing at a very fast pace. The role of the Internet as a pervasive phenomenon and its implications for the traditional factors of production is taken into account. Economic potential is recognized as being increasingly linked to the ability to control and manipulate information.
Within this policy context also, the need for an effective legal and regulatory framework is identified. (p. 75)

The poverty reduction strategy document put in place pragmatist strategies such as the creation of “Information Technology (IT) parks and incubator areas equipped with the necessary infrastructure for ICT related business and to develop human resources that support the deployment and rehabilitation of modern ICT” (Government of Ghana 2003a. p. 76).

To place a premium on the importance of ICT, the government in 2004 promulgated Ghana’s ICT for Accelerated Development (ICT4AD) policy into law. It is worth noting that the Ghana Government recognized the value of using ICT in teaching and learning in the schools and at other higher level of education as well as enhancement of the education system in general.

The study is being conducted based on perception that the introduction of ICT in senior high schools in Ghana is at its nascent stage as compared to some other African countries and there have not been enough empirical studies to ascertain the progress on how Ghanaian schools are using ICT in education. Furthermore, the use of modern ICT in education has the propensity to enhance teachers’ effectiveness in teaching and students learning skills, therefore, affording a country large numbers of well-trained personnel to harness untapped resources.

There is also limited number of empirical study reports on Ghana’s ICTE policy issues. In addition, those existing research reports rarely include the impact of the policies on educational goals and objectives or how the policies impact on the experiences of the beneficiaries such as, heads of schools, teachers and students. Most of
the research done by the Ministry of Education and other funding agencies generally focused on school enrolment, school drop out, and the number of computer in schools among others. Other studies examined e-readiness of ICT usage in senior high schools, Government of Ghana (2009) and pedagogical integration in education ENRNWCA (2006). However, these studies fail to account for holistic ICT in education indicators like access, participation, interactions, and the impact of ICT integration on learning and teaching.

There is an assumption that ICT provides favourable situations for governments to provide online courses that could create opportunity for workers and people living in remote areas or rural areas far from the learning centres, to enrol in some of these courses to acquire knowledge and skills. While there have been studies to understand the state of ICT use in Ghana there has been a paucity of research to draw similarities and differences in ICT diffusion in rural and urban schools. This study, attempts to provide empirical information to scrutinize the role Ghana’s ICT policy makers impact in a senior high school. This research was focused on how ICT was being used in teaching and learning at OSHS. OSHS is being used as a case study to ascertain the impact of ICT integration in an ICT model school in Ghana.

**Research Questions**

This inquiry addressed the following questions:

1. What are the experiences of Ghana’s policymakers in policy creation and implementation in education in Ghana?

2. What are the experiences of heads of school, teachers, and students with the use of ICT in teaching and learning at OSHS?
3. How do Ghana ICT4AD and other policy documents support the ICTE Policy?

Significance of the Study

It is anticipated that this study will provide empirical data to education policy makers and other major stakeholders to help them understand how ICT policies impact on the senior high school system in Ghana. In addition, the study provides information on how ICT are being integrated in the senior high school systems. Also, the study will fill the knowledge gap by adding the voices of policy makers about their quest with developing ICT policy and the experiences of head of school, teachers and students about their ICT usage in education.

Furthermore, it is hoped that the study results serve as guide to the main stakeholders of education about the use of ICT and other related technologies are integrated in model senior high schools in Ghana. The study adds to a pool of information to Ministry of Education, especially to the Curriculum Research Division Directorate to be used to review ICT pedagogy in curriculum in Ghanaian schools. A study of this nature provides feedback to the authorities and stakeholders on how ICT are being integrated at OSHS, or even if the schools are integrating ICT in pedagogy at all.

The study identifies political and socio-economic conditions that influence the diffusion of ICT in an urban area school. In addition, the study results examine how an urban senior high school like OSHS utilizes ICT in teaching and learning in accordance with some major Ghana’s policies, namely: [The Ghana ICT for Accelerated Development (ICT4AD) Policy (2003) Document, National Development Policy Framework (Ghana Vision 2020), Ghana Education Strategic Plan 2003-2015 and
Ghana ICT in Education Policy (2008) to accelerate the use of ICT in senior high school.

The research provides a thorough scrutiny and results of how an urban school with special reference to OSHS deploys ICT in Education Policy in senior high school settings in an urban environment. The study of this nature is important because some previous studies have shown disproportionate prevalence of ICT in urban schools (Parthermore, 2003; Mangesi, 2007). The study also provides clarity regarding questions relating to ICT policies and implementation challenges in the Ghanaian educational system.

In sum this study explored the Ghana’s policy makers on ICT in education policies issues, head of school, teachers and students’ knowledge and experiences of ICT integration in education through their own understanding, views, narratives and interpretations. The researcher also provided an avenue for respondents to narrate their experiences in ICT integration policies and opportunities in the educational system in Ghana.

Limitations of the Study

The research inherited some limitations. The sample size for example was small, thus the study covers only one school and selected policy makers, the assistant headmaster, teachers and students that might result in reducing transferability of the findings. Due to this, the researcher draws limited inferences. However, the sample size for the study, thus 30 respondents is strength and the researcher anticipates that the findings will set the tone for broader national research on Ghana’s policy makers and their impact on ICT education.
The case study covers only one region in Ghana; the Greater Accra region. Nevertheless, the literature reviews provided contextual content for the study and that assisted in drawing results, findings and conclusions. It is noteworthy that ICT use in education in Ghana is an ongoing process, which means new developments within the education sector occur on a daily basis that might not be captured by the researcher. The research has to be regarded as a snapshot of ICT implementation at OSHS at a particular time.

It is worth noting that change and use of new ideas or adoption occur within time span. The research scrutinizes deployment of ICT by OSHS at a particular time. The ongoing adoption process by teachers and students will not be considered. The study focused on experiences of ICT policy makers, heads of school, teachers and students’ utilization of ICT for teaching and learning purposes. In addition, since this is qualitative research, emphasis is not to generalize the findings, but it is on particularization that intends to provide deep understanding and nuances of experiences of Ghana’s ICT Policy makers in developing ICT policy and the state of ICT use at OSHS. Although these findings will be particular to selected ICT Policy makers and OSHS, the findings could be peculiar to conditions in other schools.

**Definition of Terms**

The research used some definitions in this study. To avert any discrepancies or confusion of the terms, the researcher provided beneath definitions to determine the context in which they were used in the research.

_E-readiness_: According to Ministry of Education (2010) E-readiness is defined as “the ability of educational institutions to effectively use ICT in fostering the achievement
of educational and management objectives, through the use of appropriate tools, processes and skilled human resources” (p. 20).

*Information and Communication Technologies (ICT):* According to MOEYS (2003) ICT is being defined as: “Information and communications technology (ICT) is a means of capturing, scoring, processing and presenting information electronically through a number of media. Computers and microelectronic devices are built into variety of educational context tend to focus around the delivery of content and information to support formal learning process” (p. 7).

*ICT diffusion:* is defined as the use of ICT tools or computer-mediated hardware, software and other technology tools to create or reorganize learning and teaching in schools.

*ICT integration:* for this study is defined as integrating ICT in the school’s curriculum to enhance teaching and learning.

*ICT in education* for the purposes of this study means the use of ICT tools such as computer and its accessories, the Internet, video games, CD ROM, broadcasting technologies (radio and television) and telephony among others to deliver teaching and learning, improve record keeping, management efficiency and service in schools.

*Junior High School (JHS):* The junior high school system in Ghana replaced the previous junior secondary school system during the new educational reform in 2007. It is a three-year post primary education system that precedes senior high school.

*Phenomenology:* According to Patton (2002) phenomenology “seeks to grasp and elucidate the meaning, structure, and essence of the lived experiences of a phenomenon for a person or group of people” (p. 482).
Policy is a systematic plan of action to guide decisions in achieving expected outcomes. According to Haddad and Demsky (1995) policy is “an explicit or implicit single decision or group of decisions which may set out directives for guiding future decisions, initiate or retard action, or guide implementation of previous decisions” (p.18).

Policy Makers: According to Postlethwaite (1985), policy makers are politicians and senior government officials, members of parliament, technocrats, and consultants from academia and other senior members representing special interest groups.

Technology in this research refers to computer and its accessories, electronic gadgets, other ICT tools for the purposes of teaching and learning in schools.

Senior High School (SHS): The senior high school system in Ghana replaced the previous senior secondary school system during the new educational reform in 2007. During the New Patriotic Party regime (2007- 2010), it was a four-year post JHS education system. However, during the current National Democratic Congress regime the duration has reverted to a three-year period. It is worth noting that the Ghanaian SHS is equivalent to the K8-12 North American Educational system.

Rural school is defined in this study, as a school located in a sparsely, remote and deprived area (country side). Rural areas lack basic community services and infrastructure such as health, education, water and sanitation, access roads and etc. (Nkum & Ghartey, 2000).

Urban school is defined in this study, as a school located in a densely populated area and endowed with social and economic infrastructure. The Local Government Act, 1993 (Act 462) defines an urban school as a school in a settlement that has population of
over 15,000. In addition, schools in district capitals are also regarded as urban schools by virtue of their location in these districts (Republic of Ghana, 1993).

Organisation of the Dissertation

Chapter one of the study is devoted to the introduction to the study. The chapter included the background of the study that gives a brief historical account of Ghana and her educational reforms that ended the British type of pre-university education. The chapter also included the statement of the problem, research questions, significance of the study, limitation of study, definition of terms, and the organization of the proposal.

Chapter two addresses the review of the literature for the proposed study. It involved the global outlook of ICT in education, the emergence of ICT in education in Africa, the current state of ICT in Africa, the importance of ICT adoption in schools, factors that hinder diffusion of ICT in schools, teachers’ beliefs towards ICT use, teachers’ ICT knowhow, ICT infrastructure and students’ and teachers’ access to ICT. The chapter ended by including the current state of ICT diffusion in Ghana and theoretical framework of the study.

Chapter three describes the methodology for the study by including the research strategy, site selection and selection of respondents, detailed data collection methods, ethical issues to take care of when gaining entry into the communities, the role and position of the researcher, data analysis and issues of credibility, validity and trustworthiness of the study.

Chapter four contextualizes the evolution of educational systems and ICT in education policies in Ghana. Chapter five presents the findings and discussions of the research, including the analysis of gathered data from interviews, observations and
documents pertaining to the experiences of policymakers. Chapter six focuses on the experiences of the assistant head of school, selected teachers and students use of ICT at OSHS. Chapter seven includes the summary, conclusions, and recommendations for further studies.
Chapter 2: Literature Review

Introduction

The reviewed literatures focused on global outlook of ICT in Education, ICT in Education policy formulation issues in Africa, the global ICT Development Index and the current state of ICT facilities in Africa. The review literature also focused on the current state of ICT facilities and Internet connectivity in Ghana, the emergence of ICT in education situation in Africa that analyzed policies from Namibia, Rwanda, Botswana and South Africa. Literature review covered other areas such as the importance of adopting ICT in schools, factors that affects diffusion of ICT in schools, teachers’ ICT knowledge and skills, teachers’ attitude in ICT use and teachers and students access to ICT facilities. Finally, chapter two touched on the theoretical framework of the study.

Global Outlook of ICT in Education

According to Wagner et. al, (2005) member states ratified the Millennium Development Goals (MDGs) as the vital development indicators for the 21st Century..

Wagner, Day, James, Kozma, Miller and Unwin (2005) state:

Among the most prominent of these goals are those related to education—namely, to achieve universal primary education and promote gender equality, and empower women by eliminating gender disparity at all education levels. These build upon the Education For All (EFA) initiative begun in Jomtien (Thailand) in 1990, and reaffirmed at a second EFA meeting in Dakar in 2000. The MDGs also set as a target to, “in cooperation with the private sector, make available the benefits of new technologies, especially information and communications.” This item is a reference to a growing and increasingly important area that has seen
huge growth over the past decade, namely Information and Communications Technology (ICT) for education. (p. 5)

UNESCO (2009) indicates that varied policy documents “have argued that societies are changing from industrial societies into ‘information societies’ in which creation and dissemination of knowledge is of paramount importance” (p. 11). According to European Round Table of Industrialists (ERT) (1997) in order to keep up with competition in the world economy, education is expected to strive beyond the fundamental structure of early education to provide sustainable long-term educational systems. UNESCO (2009) contends it “is the belief that ICT can play an important role in reshaping education to respond to contemporary information society needs. Furthermore, it is believed that ICT in education will reduce the gaps that exist between socio-economic realities and the outputs of education systems” (p. 11).

It is believed that utilization of ICT in educational systems could enhance learning capabilities in classrooms. ICT integration in education could assist by enhancing the quality of education with improving curriculum, enhancing learning results, and facilitating educational reforms and improve management of educational systems. Trucano (2005) reveals that, even after many years of huge investments in ICT to benefit education in Organization for Economic Co-operation and Development (OECD) nations and its rapid use in under developed countries, information to provide assumed potentials of ICT. The reports shed light on knowledge gaps and call for the “need for international accepted standards, methodologies and indicators to better measure the real benefits of ICT in education” (p. 1).
Over the previous years, school boards in Canada and the United States have been investing huge resources in ICT software and hardware such as computers, digital video, and other peripherals in an effort to improve teaching and learning (Hayes, 2007; Ringstaff & Kelley, 2002). Lazonder (2003) reveals that using ICTs in classrooms can improve student performance and collaboration. According to Hayes (2007), many teachers are struggling with the demand of diffusing ICT in schools. Meta studies reveal that only a limited number of teachers use ICT to enhance students’ learning (Harrison et al., 2002; Hew & Brush, 2007).

In the USA, studies have shown that there are problems in assisting students and teachers with ICT education, and the problems of instituting plans for checking their ICT knowledge, is found wanting in schools in low social and economic status areas and among minority students (Becker, 2000b; Becker & Ravitz, 1997). According to Lenhart, Rainie, and Lewis (2001) while many people argue that the digital divide focuses on basic ICT access, empirical study has shown that there are wider gaps when ICT integration in curriculum in varied schools is taken into consideration.

The study further revealed that half (53%) of educators in public schools that owned computers and other ICTs tools utilize them for instructional purposes during class. The study showed that a larger proportion of teachers in schools where students from higher income families who have computers use them in classrooms as compared to those teachers in schools with low-income families. McCombs and Quiate (2002) reveal that while traditional pedagogies, for example lectures and teacher directed activities, have shown their worth in many contexts, and will continue to do so, ICT integration in education can promote student motivation and achievement.
According to UNESCO (2009) there are major challenges confronting many nations to attain the “Millennium Development Goals (MDGs) and the Education for All (EFA) targets” (p. 11). The report further states: “It seems unrealistic to assume that conventional delivery mechanisms will ensure quality and equal educational opportunities for all in affordable and sustainable ways by 2015” (p. 11).

The report further indicates that the major problem facing many educational systems is the ability to offer sustainable capacity building programs or professional development programs to all nations with much emphasis on under-privileged or marginalized societies. Girls and women were cited as an under-privileged group of people who face deprivation when it comes to access to quality education.

According to Haddad and Draxler (2002) the rigid nature connected to the traditional face-to-face method of instruction results in high costs to most societies. In addition, the authors argue that the formal traditional educational systems offer very limited opportunities to students from low income-earning communities and students from rural and poor communities.

Haddad and Draxler (2002) further argue that the problems facing the traditional formal educational settings are exacerbated by rampant change of skills in demand taking place in the global labor sector. According to the authors, there are emerging trends where educational delivery systems become more about learning and less about teaching. For example more emphasis is being place on self-teaching and the use of self-information research capabilities. Education becomes more globalized through distance learning and less confined within the learners’ geographical location or less dependent on a physical space.
Haddad and Draxler (2002) state that ICT has the potential of expanding new learning opportunities for more different people, beyond their cultural settings, schools and outside their geographical locations. ICT can improve teaching and learning by transforming traditional instructional systems, enhancing quality of learning and teaching outcomes and improving the use of modern ICT facilities within the educational sector. The process will lead to sustaining lifelong learning and improvement of institutional management (Haddad & Draxler, 2002).

According to Kumar et. al, (2008) many efforts have been put in place to form deeper understanding of adoption of ICTs by secondary school teachers. Other scholars such as Gibbons and Fairweather (1998) state that teachers utilize ICT for many reasons and not just limited for teaching and learning alone. Some teachers use ICT to improve students’ grades. In brief, the authors underscore the potentials of ICT in education.

Kellenberger and Hendricks (2000) clarify utilization of computers by teachers into three main categories (i.e administration purposes, teaching purposes and personal purposes). According to Kellenberger and Hendricks (2000) the utilization of computers by the educators in schools is mainly to transfer knowledge and skills to students, to create innovations or knowledge, and to improve student knowledge and skills in the process of teaching. Martin and Ofori Attah (2005) contend that teachers who utilize computers to perform administrative work and to keep data of students’ activities admit reduction on time as compared to those who use the traditional method of teaching and grading. The authors note that the teachers indicated they use computers for personal reasons such as for preparing their lesson notes and for research purposes.
United Nations Conference on Trade and Development (UNCTAD) (2011) underscores countries that heavily rely on utilization of ICT in education are likely to benefit from the potential of teaching, learning and skills that ICT could provide. UNCTAD (2011) states: “Other possible benefits of ICT in education are improved attitudes to learning, development of teachers’ technology skills and increased access of the community members to adult education and literacy” (p. 13). UNCTAD (2011) indicates that students who do not have ICT knowledge and skills may be lagging behind and will be confronted with the effects of the digital-divide. Kozma (2005) underscores the importance of students who have ICT know how. Kozma (2005) states:

In Vadodara, India, in 2000, 100 primary schools were each provided with four computers. A controlled experiment commenced in 2002–03 and ran for two years. Half the schools were randomly allocated with training and educational software. Students in those schools played educational computer games for two hours a week and scored significantly higher on mathematics tests than students in the control schools. The bottom group of students benefitted most, with girls and boys benefitting equally (Abhijit et al., 2007). Controlled experiments from the United States, Kenya and Uganda also showed positive impacts on student learning arising from some types of use of computers in specific school subjects, while more general availability and use of computers at school did not affect student learning. (p. 13)

In a related study, James and Miller (2005) showed a positive relationship between utilization of ICT related mathematics program and math scores on standardized tests.
ICT in Education Policy Formulation Issues in Africa

There are different dimension issues with ICT policy making in Africa. Yosuf (2005) differentiates between vertical and horizontal policies. Yosuf states:

Information and communication technology (ICT) policy, as noted by Rowland (1996) and cited in Hafkin (2002), can be categorized into vertical, infrastructural, and horizontal policies” Vertical ICT policy addresses sectoral needs, such as education, health and tourism. The infrastructural aspect deals with the development of national infrastructure and this is closely linked with telecommunication. The horizontal aspect deals with the impact on broader aspects of society such as freedom of information, tariff and pricing, privacy and security (p. 318).

Haddad and Demsky (1995) indicate that policies vary according to the nature of the “scope, complexity, decision environment, range of choices, and decision criteria” (p.18). The authors differentiate between policy makers (actors) and policy initiation (process). Haddad and Demsky (1995) states:

Issue-specific policies are short-term decisions involving day-to-day management or, as the term implies, a particular issue. A program policy is concerned with the design of a program in a particular area, while a multi-program policy decision deals with competing program areas. Finally, strategic decisions deal with large-scale policies and broad resource allocations. (p. 18)
According to Haddad and Demsky (1995) research on policy making in education portrays the complex nature of the process of educational systems and changes. The authors state:

One of the more important characteristics of the education system lies in its salient linkages with the socio-economic structure. Any policy changes, therefore, are not purely technical but have sociopolitical-economic dimensions. For instance, any attempt to modify the system, which is perceived by one group or another as lowering the chances of their children to progress socially or economically, will meet with strong opposition. Therefore, the whole notion of reform for democratization is essentially a political issue (p. 23).

Haddad and Demsky (1995) further state: “another complex set of linkages exists between the education system and the economy, whereby the school is seen as the solution to a wide range of economic problems. This belief is the source of much of the impetus for policy changes” (p. 23).

Yusuf (2005) underscores that even though Nigerian ICT policy document recognized the vital role of ICT in education, the document does not make any provision for vertical or sectoral application to education. Instead, ICT in education issues were placed under vertical application for human resources development sector.

Yusuf (2005) states:

Under this sectoral application objectives 1 to 4 relate to education as follows:

- to develop a pool of IT engineers, scientists, technicians, and software developers;
- to increase the availability of trained personnel;
- to provide attractive career opportunities; and
to develop requisite skills in various aspects of IT. (pp. 318-319)

Yusuf (2005) further states:

In order to achieve the objectives for human resources development, nine major strategies are outlined. These strategies are targeted at the building of knowledge and skills in information technology. These include (a) making the use of ICT mandatory at all levels of educational institutions; (b) development of ICT curricular for primary, secondary, and tertiary institutions; (c) use of ICT in distance education; (d) ICT companies investment in education; (e) study grant and scholarship on ICT; (f) training the trainer scheme for National Youth Service Corp members (g) ICT capacity development at zonal, state, and local levels; (h) growth of private and public sector dedicated ICT primary, secondary, and tertiary educational institutions; and (i) working with international and domestic initiatives for transfer of ICT knowledge. In spite of these objectives and strategies that are focused on education, the document is inadequate to cater for the needs of the country’s education system. (p. 319)

Yusuf (2005) advances some challenges with the policy document as follows:

First of all, Yusuf (2005) indicates that while the ICT policy document had clear-cut sectoral applications for agriculture, health, culture, art, governance and tourism, the policy do not have specific application to education. This resulted to situation where African Development Fund (1999) recommended sectoral application for education.

Secondly, Yusuf (2005) states:

the objectives and strategies related to education as reflected in the sectoral application for human resource development are market driven. Students are only
being prepared to acquire knowledge and skills for future jobs. The focus is only on learning about ICT, which is regarded as ‘Topicality’, whereas for primary and secondary schools the focus is regarded as the early stage of ICT use in education (Cloke and Sharif, 2001). This philosophy limits the potential of ICT in education to a central force in economic competitiveness. Its potentials as a tool for addressing challenges in teaching and learning and as change agent are thus neglected (Culp, Honey and Mandinach, 2003). Students need not learn about computers only; ICT should be integrated for the development and management of teaching and learning in Nigerian schools. (p. 319)

Thirdly, Yusuf (2005) underscores that Nigeria ICT policy lacked professional development strategy for teachers. It is important to note that extensive empirical studies have shown that professional development programs assist teachers to integrate ICT in education (Davis, 2003; Selinger and Austin, 2003; Pearson, 2003; Watson, 2001).

Yusuf (2005) further states that the Nigerian ICT policy document failed to address “nationally relevant context software for school use” (p. 319). Most of the existing software being used in the schools is imported. It is worth noting that Culp et al., (2003) recommend the development of indigenous software to be used in schools.

Yusuf (2005) reveals, “none of the issues relevant to ICT application in the Nigerian education system address the issue of research, evaluation and assessment” (p.319). Culp et al, (2003) underscore that summative study, evaluation and assessment are crucial in ICT integration in schools. The literature reviewed also reveals that the Nigerian ICT policy document does not have a technology plan (Yusuf, 2005). Lack of a technology plan will result in a situation where ICT in education policy activities will be
implemented haphazardly. As an ideal situation in developed nations, Selinger and Austin (2003) made mention of the existence of a technology plan alongside with ICT in education policy at school levels in United Kingdom and Northern Ireland.

Evans et al (1995) indicate that the process of formation of education policies in most African countries varies widely according to the traditions and culture of their colonial masters. Evans et al (1995) reveal that most studies on policymaking and the processes by which they occur have features similar to those in North America and mainly expatriate consultants have executed these policy developments. The authors reveal that most educational policies in developing countries tend to draw their policy frameworks from developed nations. Maslak (2008) stresses that educational policies in third world nations are confronted with challenges due to the fact that these policies are fraught with internal and external requirements.

According to Grindle (2002) most developing countries educational reform policies have been influenced by external factors. Internally, most developing countries educational policies have been influenced by cultural attitudes, political ideologies, and the economy policies a particular government pursues. Grindle (2002) further indicates that most times some of these policies are implemented with little or no consultations with educational stakeholders such as head of schools, teachers and professional teachers unions.

Antwi (1992) underscores that the World Bank (WB) heavily influenced Ghana’s 1987 educational reform implementation. The WB exerted undue pressure on the implementation of structural changes in Ghana’s educational system. Antwi (1992) reveals that Mr. Harry Sawyer the former the former Secretary of Education confessed in
his address to the national delegates conference of the Ghana National Association of Teachers (GNAT) in January 1987, that the government implemented the 1987 educational reforms in haste.

Antwi (1992) states:

The impression that the government was either trying to forestall the abandonment of the programme or was trying to meet the deadlines set by the WB for approval of aid . . . He suggested that if the Provisional National Defense Council (PNDC) could not (have told) the donor agencies to give more time for preimplementation work, “we ought to have (had) the courage at least to explain the rush to our own people. (p. 50)

World Bank (2004) on the other hand revealed that there were attempts where the officials of the bank influenced implementation of educational policies during the implementation process of Ghana’s 1987 educational reform. Some of these influences by the Bank officials were described as failures. World Bank (2004) states:

While the reforms were government-driven, the Bank did have some influence on the shape of the program. For example, the government was persuaded to restrict vocational training at JSS level to an introduction to tools. But there were other areas where the Bank was the one to give ground. For example, the Bank went ahead and supported senior secondary schools in a more full-fledged program that proved a costly failure, with $18 million wasted on workshop equipment that not used. (p. 30)

Haddad and Demsky (1995) made reference to Burkina Faso as one of the West African country that received huge sums of funds from France, its colonial master, to
develop educational policy in the 1980s. Burkina Faso’s education system was structured on France’s model. According to Haddad and Demsky (1995) Burkina Faso is regarded as:

One of the poorest countries of the world due to its landlocked location, poor soils, hard climate, water shortages, lack of known mineral resources, lack of educated and skilled manpower, high infant death rate, low life expectancy, and low GNP per capita. The Voltaic education system was based on the French model, providing six years of primary schooling and seven years of secondary schooling with a highly academic curriculum. Illiteracy was pervasive. (p. 60)

Haddad and Demsky (1995) underscore the situation where Burkina Faso’s educational policy consultants who were French expatriates developed the policy in line with that of the French system. Haddad and Demsky (1995) state:

French team had developed what they thought to be a consistent, comprehensive and 'correct' solution to the problems in the education sector. This 'imported' policy came attached with funding from the French government, which greatly influenced the Voltaic government's decision. (p. 62)

Evans et al, (1995) mention that policy makers often overlook the important role being played by stakeholders of the educational sector, namely school authorities, teachers, students and identified professional bodies who normally influence the implementation of the policies.

Evans (1995) et al, state:

Failure to involve these cadres in the policy process at an early stage may increase their resistance during implementation. Under some circumstances, these actors
can block or reverse policies when they reach local levels. A good example is
found in countries where the teachers, who feel more comfortable teaching as
they have always done without texts. (p. 5)

**Global ICT Development Index**

*Figure 3.* Beneath depicts, the figures of the ICT Development Index (IDI) for
2002 and 2007. The table illustrates the global ICT development index values. In general,
al countries apart from Sweden (which ranked first in both 2002 and 2007 respectively)
enhanced their rankings over the five-year duration. The trend was expected, since the
growth in ICT access and usage were increasing worldwide. It is worth noting that nations
with high IDI values in 2002 recorded moderately high ICT access values in the same
year. By 2007, the majority of nations have increased their ICT use values. It is worth
noting that based on critical analysis of the ITU data, nations that recorded low IDI values
in 2002 raised their ICT access rankings in 2007 (ITU, 2009).
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Figure 3. ICT Development Index 2009
From the table, it is evident that, apart from the Republic of Korea (that ranked second on the table), all the top ten countries are from Europe. It is interesting to note that four Scandinavian countries (Sweden, Denmark, Norway and Finland) continue to be in the ten leading countries. The first ten countries have increased their sub-index ICT utilization although these countries already had good ICT access, and ranked very high in the use of ICT skills in 2002. According to ITU (2009), broadband use had moved very fast among the top ten Internet using countries. The report indicates:

Fixed broadband penetration in Europe has grown steeply during the past few years. Mobile broadband, which practically didn’t exist in 2002, has been introduced in most of these countries, rising their ICT use levels significantly. Luxemburg for example shot up from 21st position in 2002 to the seventh position in 2007. This shows remarkable improvements in ICT infrastructure in that country. (p. 37)

According to ITU (2009) member nations with low ICT levels and rankings basically came from under-developed countries. Most of these countries are from Sub-Saharan Africa. Regarding to determinants between ICT level and Gross Domestic Product (GDP), the majority of the poorer nations, to be precise the Least Developed Countries (LDC), rank very low in the IDI, with very insignificant changes in ranking since 2002. Mauritius tops African countries on the table both in 2002 and 2007 with 61st and 62nd position respectively. Ghana ranked 122nd in 2002 and climbed to 114th in 2007. This suggests Ghana has made some improvements in its ICT infrastructure. Niger ranked least on the table (refer to Table 2.).
The Current State of ICT Infrastructure in Africa

Connect Africa (2007) underscores the importance of ICT as a means for enhancing Africa’s developmental process. Two major United Nations Conferences were cited as setting ICT agenda for Africa’s ICT development. Connect Africa (2007) states:

Recognizing the significant role of ICT as a catalyst to help realize the United Nations Millennium Development Goals, leaders from Africa and around the globe at the World Summit on the Information Society (WSIS) in Geneva in 2003 and Tunis in 2005 agreed to a set of specific targets, including ten ICT connectivity goals to be achieved by 2015. (para. 6)

The WSIS goals were re-echoed by communication ministers from African countries “as part of the Accra Commitments for Tunis 2005” (para. 8). Africa Connect (2007) indicates that the initiative has been strengthened by:

African Regional Action Plan on the Knowledge Economy, under the aegis of the African Union and the UN Economic Commission for Africa, as well as the Doha Action Plan Regional Initiatives adopted at the 2006 ITU World Telecommunication Development Conference. (para. 8)

Adeya (2001) contends that since the beginning of the twentieth century, there have been varied ICT projects to enhance Africa’s ICT infrastructure. According to Adeya (2001) in past years “There are also a number of discussions and initiatives towards e-commerce developments in Africa - for example, in Kenya, Senegal, Ghana and Nigeria. The most advanced developments are in South Africa, while other countries such as Egypt are also fairly advanced in this field” (p. 3).
The Educational Research Network for West and Central Africa (ENRWACA) (2006) indicates that even though ICT occupy a crucial place in the lives of the majority people in the world, it is an undeniable fact that ICT deployment has not cut across all segments of the societies. There is a wide gap among the people. According to Hudson (2006) the term digital divide was coined in the 1990s to describe the gap between the ICTs “haves” and “have-nots” (p. 63). Hudson (2006) explains: “In developing countries both income and location still divide telecommunications haves and have-nots. Poorer countries have fewer telephone subscribers per 100, and within poorer countries, there are greater disparities between urban and rural access than in wealthier countries” (p. 63).

Most of these developing countries are in Africa and most of these African countries are poor and lack technological infrastructure.

The OECD (2006) report mentions lack of basic technological infrastructure and inadequate international links to other parts of the world. The report places the blame on the digital divide among the world’s poor countries. The report further made special reference to slow development of ICT infrastructure in some parts of the Africa continent. OECD (2006) report reveals that apart from those Africa countries at war, the Western and Central parts of the continent fell below the rest of the world of ICT infrastructure. Niger was cited as one of the poorest where lack of ICT infrastructure is deepening the lack of development and slow growth of the economy.

Despite the gloomy picture painted by the review literature, ENWARCA (2006) argues that some African countries have made major strides in ICT sector. Senegal was mentioned as one of such countries that had high-speed Internet speed facility for those living in the capital city. However, there exists a gap between urban dwellers and that of
rural dwellers areas with regards to Internet access. ENWARCA (2006) summed the state of affair as:

Despite the great divide between Africa and the Northern countries and within African countries as well, regions technologies appear to be gaining ground with exponential speed. To illustrate, the Senegalese capital Dakar has a constantly growing number of households with high-speed connection, which was almost inconceivable a few short years ago. (p. 15)

Connect Africa (2007) reveals that investments in Africa’s ICT infrastructure have increased dramatically in previous years. The report attributed the rapid expansion of the mobile phone network to competition among major telecom operators in the region. The report states:

Representing a total of USD 8 billion in 2005, up from USD 3.5 billion in 2000. These figures reflect an increasingly vibrant private sector investment, which has been stimulated by the opening of most African telecommunication markets to competition, and coupled with the establishment of independent regulators in almost 90 per cent of countries in the region. This increasingly dynamic environment has resulted in lower prices for consumers and significantly widened access to telecommunications, particularly for mobile services in urban areas. The African mobile market has been the fastest growing market of all regions, growing at twice the rate of the global market, with a leap from 16 million to 136 million subscribers between 2000 and 2005. Mobile now outnumbers fixed line penetration by nearly five to one in Africa. (para. 9)
African Business Source (2009) indicates that even though the year 2008 was not the best for most ICT companies globally, many companies in African recorded remarkable profits. The research report further shows that the Telecom operators proved to be “the fastest growth rates in the world increasing by at least 50% over the last few years. That’s twice the rate of the global market. Internet usage rates increased well over 1000% between 2000 and 2008” (African Business Source, 2009. Para. 1). The report underscores that the ICT sector in Africa continues to attract large amount of foreign and private sector investments in the telecom sector. It is worth noting that a series of major undersea cable projects are being constructed, of which at least two were completed in 2009 and the rest are ongoing. (African Business Source, 2009)

To buttress the state of ICT infrastructure on the continent, African Business Source (2009) states:

Realizing the advantages of future potential growth, action is being taken by various African Governments to position themselves as more competitive in a global marketplace. Record investments in ICT infrastructure signal the importance of this sector as a conduit to realizing key development goals, in many cases. A good example is Kenya’s government, which set up the Kenya ICT board to oversee, and coordinate its ICT initiatives. The board which was set up almost two years ago, has already set its sights on making Kenya a top ten global ICT hub (para. 2).

African Business Source (2009) indicates there have been increases in African ICT sector investment, the results show significant dividends of vibrant private sector involvement in the telecommunication sector, which has been influenced by a privatization policy that
led to the opening up of most of the African telecoms. According to African Business Source (2009) the rise in the telecom sector had resulted in reduction in cost of services and rapid increases and expansion of enhanced telecom services, especially mobile phone services, in rural and urban areas.

According to Connect Africa (2007) even though there have been improvements in mobile phone access in Africa, the Internet cost on the continent is quite high. Connect Africa (2007) states:

Effective high-speed Internet services needed for important business, government and consumer applications continue to be either very expensive especially when compared to average local incomes or not available, depending on the location. This is due to limited broadband infrastructure investment in many parts of Africa. Where available, the cost of broadband Internet access in Africa is on average three times higher in Asia, for example where such infrastructure investments have been made. It is not surprising, then, that broadband penetration is below one percent in Africa, compared to close to 30 per cent in some high income countries. (para. 11)

The above stated assertions are evident in Figure 4, where statistics for Internet penetration in African within nine-year period was provided. It is worth noting that the small island countries in Africa are doing better than the inland countries. For example, from the table, Seychelles Island recorded the highest Internet usage penetration from (2000-2009). The country recorded (36.6%), followed by Reunion, 3(4.4%)
63
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Figure 4. Internet Usage Statistics for Africa (2000-2009)


Morocco an inland and North African country recorded (32.9%). Ghana recorded only (4.2%). It is evident from the report that war torn African countries recorded the least Internet penetration, the reason being that most of the infrastructures were destroyed during the war and political instability in these countries is not conducive for Direct Foreign Investments and private investments within the telecom sector. The table shows the war torn countries such as Ethiopia, Democratic Republic of Congo, and Central Africa Republic, and Ethiopia recorded (0.4%) as Internet penetration respectively. Liberia and Niger recorded (0.6%) each, while Sierra Leone recorded (0.3%) as the lowest Internet penetration country.

According to Connect Africa (2007) while main cities are reaping the benefits from rapid access to Internet services and mobile telephony, rural area dwellers on the other hand lack those services. The situation was succinctly described by Connect Africa (2007) as:

Many smaller towns and rural communities remain without any ICT access. And, locally relevant content, applications and services, for both Internet and mobile, which would support growing usage, are not yet widely available. These market gaps present challenges, but they also reveal new opportunities for private investors and innovative “win-win” public-private partnerships to complement the successful experience of mobile telephony in Africa. (para. 12)

Lange (2009) underscores that Africa’s growth in Internet broadband has improved tremendously in the recent era due to massive infrastructure improvements received by the telecommunication sector. The report further shows the emergence of enhanced mobile phone services and reduction of prices are some of the factors that
account for the growth. Lange (2009) further stresses that broadband access to Internet is gradually replacing dial-up access in most African countries. Most African countries are now using commercial Digital Subscriber Lines (DSL) services. It is worth noting that the growth of DSL is limited to the main cities due to lack of fixed-line networks in remote and rural parts of the countries. Lange (2009) reports that the introductions of 3G broadband and mobile data services are changing the situation, since the rapid deployment of mobile networks is bringing Internet access to many remote and rural parts of African countries.

Figure 5. African Top Internet Countries. March 31, 2011
Source: http://www.internetworldstats.com/stats1.htm
Figure 5 Shows Africa’s top 10 Internet countries as at March 31, 2011. On the top of the chart is Nigeria with 44.0 million Internet users. The next on the chart is Egypt with 20.1 million users. Zimbabwe with 1.4 million users was the least among the top ten countries. It is noteworthy Ghana has 1.2 million Internet users (Internet World Stats, 2011).

According to Lange (2009) the rapid deployment of 3G broadband and mobile data services came about due to the fact that many fixed-line telecom operators in Africa have realized the high demand for Internet access in remote and rural areas of Africa. It is worth noting that international cost of broadband access is highly expensive in Africa due to factors such as access to international undersea fiber optic cable networks, which have been monopolized and controlled by national telecom providers in most countries. The situation has resulted in other Internet Service Providers (ISPs) depending entirely on satellite access. Lange (2009) predicts changes in the state of affair due to competition after the undersea fiber cable networks are launched in a few years time.

Lange (2009) underscores that even though Africa’s mobile telecom sector is growing, the fixed line telecom sector is also expanding. But most of these services are limited to urban areas. However, Africa lags behind other continents. The situation prompted Mwathi (2010) to described Africa’s telecom infrastructure as:

Most backbone infrastructure in sub-Saharan Africa is low-capacity wireless networks. Only 12% of terrestrial infrastructure in the region is fiber-optic cable; the rest is microwave, some 99% of the length of backbone networks is made up of microwave technology; just 1 percent is fibre. (para. 15)
The Current State ICTs Infrastructure and Internet Connectivity in Ghana

Literature reviewed on Ghana’s ICT infrastructure shows that the country is making strides in putting in place the necessary ICT infrastructure. The Research-Africa.net report (n.d.) states:

In August 1995, Ghana became the second country in sub-Saharan Africa to have full Internet connectivity. The country is directly connected to the world’s first submarine fibre-optic cable system, SAT-3/WASC/SAFE, which links Africa to Europe and Asia. (p. 22)

Lange (2010) mentions that Ghana is one of the emerging African countries in the mobile phone telecom sector. Currently, there are six telecom-operating companies, namely Vodafone, Millicom Ghana, Zain, Expresso, MTN and Glo. Lange (2010) further indicates that more than 20 companies provide national and international public data services and more than 50 Very Small Aperture Terminal (VSAT) networks are in operation in the country. In 2004 alone, almost 100 new Internet Service Providers (ISPs) were issued licenses, bringing the number of ISPs to over 140. The report further states that in 2003, broadband Asymmetrical Digital Subscriber Lines (ADSLs) services were introduced in the country. It is important that Ghana was among African countries to pave the way for liberalization and deregulation of the telecom sector. For example, Ghana Telecom was privatized in the early part of 1996. The two national telecom carriers: Ghana Telecom and Westel have been protected by a duopoly policy on international service until February 2002.
The end of the duopoly policy has created the opportunity for other telecom operators in the telecom market. This has led to licensing of new operators, with the emergence of competition and improved efficiency within the sector. After the main Ghana Telecom investor Telekom Malaysia is contract expired, the operator was sold to Vodafone in 2008 (Ghana Telecommunication Research, 2009). In the same vein, the second carrier, Westel was re-sold in the later part of 2007 to Bharti (Zain) one of Africa’s leading mobile phone companies. (Ghana Telecommunication Research, 2009)

According to Ghana Telecommunication Research (2009) the growth of Ghana’s infrastructure has seen marked improvement during 2008/09 fiscal year. The mobile sector for example has recorded high results with mobile phone subscribers surpassing those with fixed lines. Ghana Telecommunication Research (2009) states:

At a combined teledensity of only around 35% and an Internet user penetration of 3%, enormous further potential exists for basic voice as well as data services.

(para. 4)

It is worth noting that despite the growth of the mobile phone networks, Internet penetration in Ghana still remains very low. This comes as a result of the high cost of Internet connectivity and poor nature of the fixed-line network. (Lange, 2010).

According to Ghana Telecommunication Research (2009):

The Internet sector is highly competitive with more than 140 licensed ISPs, although the bulk of the market is in the hands of only a few. Internet penetration is still very low, mainly due to the poor condition of the national fixed-line
network and the high cost of connectivity. The emergence of wireless and mobile broadband technologies is now speeding up developments, and the newly privatized GT is expected to be more effective in the future in driving the broadband market by expanding its retail as well as wholesale offerings. (p. 67)

From the recent survey conducted by *InterMedia Survey* on ICTs situation in Ghana, Bowen (2010) underscores that traditional media (radio and television) continue to be dominant media in Ghana. The report reveals that even though Internet and mobile phones are being used, their usage is low as compared to the traditional media. According to Bowen (2010), financial resources prevent most Ghanaians, especially those living in rural areas, from accessing information through newspapers, televisions and Internet. The research report reveals that mobile phone and radio are mostly used throughout the country. Bowen (2010) contends that Ghanaians read newspapers and listen to radio programs through the Internet. This is visible in *Figure 6*. The figure demonstrates the differences of media use and Internet accessibility in urban and rural areas.

*Figure 6*, shows that radio use is dominant in both rural and urban areas in Ghana. Urban users account for 89% and rural dwellers with 84%. The proliferation of community radio stations and Frequency Modulation stations are determinants for the high increase of the usage of radio in both urban and rural areas. Television usage in urban areas is higher with 76% users as compared to 46% being those who use it in rural areas. Mobile phone usage continues to rank high in urban areas with 81% of mobile phone users in urban areas as against 65% of those in rural areas. The figures corroborate the earlier reasons given in the reviewed literature.

Bowen (2010) states:
mobile phone access is at relatively high levels across the board; even the existing urban/rural gap in mobile phone access should be viewed with caution, given indications that rural access is catching up quickly. Note that the urban/rural gap for mobile phones is already narrower in relative terms than that for access to computers, TVs or landline telephones, even though the latter three technologies have been commercially available in Ghana for longer periods. (p. 24)

Figure 6. Access to Information and Communication Technologies in Ghana

From Figure 6, fixed or landline users are statistically insignificant in rural areas (only 2% of rural dwellers use land line). Internet usages in both rural and urban areas are very low. 7% of urban of urban dwellers use Internet with only 1% of rural dwellers use Internet. The trend follows the usage of computers with only 18% in urban areas use computer with only 4% of those who use computers in rural areas.
The Emergence and ICTs in Education situation in Africa

ENRWACA (2006) reveals that the emergence of computers in some educational institutions in North Africa during 1960s for managing school records. In the later part of 1970s, computers were used in schools and other higher educational institutions in Europe and North America. According to ENRWACA (2006) in the 1970s, few well-endowed schools in North African countries used obsolete and costly gadgets that frequently broke down and took long man-hours to repair. There was problem of incompatibility between the different components. Michel (1981) explains that these few well-endowed schools were not familiar with the electronic gadgets.

To compound the problem, the educators were not certain on the type of instructional strategy is to be used in terms of integrating ICT across all course syllabi and curricula. The first computers were introduced in Sub-Saharan Africa countries’ schools at the later part of 1970. Massachusetts Institute of Technology (MIT) for example established the LOGO project in partnership with the Senegalese government. African countries by that time were motivated by two main goals of diffusing computers in their schools; the first goal is to introduce students to the computers, secondly to introduce particular software programs. It is worth noting that two main programs were introduced. Thus, Skinner’s program of teaching and the LOGO language. ENRWACA (2006) indicates the pioneer computer language – LOGO, was in use in North America schools.

During the 1970s, computer word processing was a dominant software program taught in many schools in the 54 African countries. There was also dominance of the
behaviorist educational approach, thus the introduction of a new form of instruction known as Computer Programmed Teaching (CPT). Educators and other instructors were interested in using the technique for instruction purposes. It is noteworthy that another instruction program known as Computer-Assisted Teaching (CAT) preceded the teaching of computer programming which was widely used in Europe and North America.

After some years, series of educational tutorials programs had been developed and used in schools in Africa. According to Clark and Mayer (2003) educational software or tutorials were developed to assist students to acquire knowledge and develop skills. During early parts of 1980, Computer Assisted Learning (CAL) program was developed to enhance teaching in schools in Africa. Clark and Mayer (2003) underscore that halfway through 1990, ICT was being used across various subjects in African schools. Since that time, ICT integration in curriculum seems to have increased in schools in Africa.

UNESCO (2004) explains that, the state of modern African education requires innovative ways of teaching and learning to help respective member states to achieve their MDG targets. Karsenti et al., (2005) indicate that with the support from the World Bank's WorldLinks, some schools in Africa have made tremendous progress in acquiring computers and other accessories and connecting to Internet. However, ENRWACA (2006) reveals that the investments made by the WorldLinks projects were not sufficient to ensure genuine ICT integration in pedagogy. ENRWACA (2006) further indicates that once the WorldLinks funding ceased, ICT use gradually faded in the supported institutions. The situation raises the issue of lack of sustainability of projects introduced by the World Bank.
Karsenti and Larose (2005) assert that even though there is political will among many sub-Saharan African countries to introduce ICT into educational systems, there are no clear-cut national ICT policies developed by the various governments. ICT programs are lumped with other school programs, without any budget allocated for ICT programs in the schools. Karsenti and Larose (2005) further indicate that in Cameroon and Nigeria, funds for ICT equipment and operations were generally derived from fundraising activities from local benevolent organizations and funds from international donor organizations and partners.

In a related study, Glen and Isaacs (2007) report that while most African countries have welcomed ICT in education policy development, implementation of these policies are fraught with numerous problems. (For example, South Africa, with its huge ICT infrastructures, finds it difficult to implement its ICT in education programs due to financial constraints). The North Africa countries have made remarkable progress because they have allocated financial resources to ICT implementation plans and easy accessibility to high bandwidth Internet connectivity with European countries. Morocco, Libya, Tunisia. Algeria and Egypt are some of the countries that are good models of implementers of ICT in education in Africa.

Glen and Isaacs (2007) identify another group of African countries that are making progress in ICT in education by making it economically viable placing a high premium on integration of ICT in schools. Some of these countries are Rwanda, Mauritius, Cameroon, Ghana and Botswana. Another category of African countries are those emerging from a period of conflict and dictatorial regimes. These countries tend to use ICT to help in their quest to enhance educational standard in their countries, but they
are saddled with economic problems due to prolonged civil wars. Examples of some of these countries are Burundi, Togo, Sierra Leone, the Gambia, Cote d’Ivoire, and Liberia among others. Glen and Isaacs (2007) reveal that there are another crop of African nations that are saddled with civil war and precarious political regimes that are hindering their efforts to integrate ICT in schools. Such countries are Somalia, Sudan, Democratic Republic of Congo, and Guinea among others (Glen & Isaacs, 2007).

Glen and Isaacs (2007) identify lack of educators to teach ICT and technicians to repair broken down ICT equipment in African schools. There is also lack availability of ICT infrastructures and knowledge of how to diffuse ICT to benefit the schools. Djibouti has extensive telecommunication networks that could be used to benefit schools in that country through the use for ICT in education programs. However, the country has not utilized the huge ICT infrastructures at their disposal.

**ICT in Education Policy Initiatives in Africa**

According to Dzidonu (2010) some governments in African countries have shown commitment to development of ICT in education policies within their ICT for development programs. These governments identified education as a major priority area for diffusion of ICT in education.

Dzidonu (2010) singled out Ghana as one of the countries that placed a premium on ICT in education policy. Dzidonu (2010) states that the Government of Ghana (GoG) sees the deployment of ICT within the educational system as a means for facilitating the transformation of the “educational system to provide the requisite educational, and training services and environment capable of producing the right types of skills and
human resources required for developing and driving Ghana’s information and knowledge-based economy and society” (p. 7).

Dzidonu (2010) avers that the GoG translated Ghana’s ICT4AD policy commitment directed:

- at using ICTs to facilitate education and learning within the educational system and to promote e-learning and education as well as life-long learning within the population at large.
- Put in place policy measures to strengthen science education at all levels of the educational system, as well as promote technical and vocational training with emphasis on the use of ICTs to facilitate the training and learning process. (p. 7)

It is worth noting that Ghana is among African countries that had put in place the ICTE policy to regulate prudent use of ICT tools in schools. There are also other African countries governments that have shown commitments to ICT in education policies. Notable among these countries are Namibia, Rwanda, Botswana and South Africa.

**Namibia ICT in Education Policy**

According to Shafika (2007) Namibia gained independence in 1990 from South Africa. The country developed and adopted its ICT in Education policy and program in 2003 with the focus on integrating ICT in education. The Namibia ICT in education policy is in conformity with the aims and objectives of Vision 2030 and Education and Training Sector Improvement Plan (ETSIP) documents. Dzidonu (2010) stress that the Namibian Ministry of Education stated the ICT in education policy goal as:

To produce ICT literate citizens; produce people capable of working and participating in the new information and knowledge based economy and society;
leverage ICT to assist and facilitate learning for the benefit of all learners and teachers across the curriculum improve the efficiency of educational administration and management at every level. (p. 8)

Shafika (2007) indicates that the ICT in education policy document focus on priority areas such as:

- Colleges of education and related in-service programmes, schools with secondary grades, teacher education programmes at tertiary institutions, vocational training, primary schools, libraries and community centres; adult education centres; and special need education. (p. 6)

With reference to the diffusion of ICT in education, it is based on five main priorities namely primary schools, junior and senior secondary schools, vocational centers and community development centers, pre-service and in-service teacher education institutions, national, regional, community libraries and community and non formal educational system.

The Namibian ICT in Education Policy document made provision for specific strategies for deploying ICT programs. Some of the strategies are the development of pedagogy and educational standards, national technical standards, public-private partnerships, professional development, education management, library, community open and distance learning, financing, sport and culture, and societal issues (Shafika, 2007).

**Rwanda ICT in Education Policy**

According to Republic of Rwanda (2008) as part of Rwanda government’s ICT strategy to enhance ICT diffusion in the society and economy, the Vision 2020 seeks to
develop an IT literate country and to promote personnel in ICT and other ICT related sectors. Republic of Rwanda (2008) states:

The Vision seeks to transform Rwanda into a middle-income country by the year 2020. This transformation will not be achieved unless Rwanda transforms from a subsistence agriculture economy to a knowledge-based society. (p. 6)

Republic of Rwanda (2008) states that the ICT policy statement was designed to guide the process of the deployment and exploitation of ICTs within the ministry of education to support its organizational activities and operations within the framework of the national ICT-led development vision. (p. 10)

The main goal for the ICT in education policy seeks the development and delivery of educational materials to enhance learning and teaching in Rwanda. The policy document identified four main areas:

- Preparing all sectors of the education system to understand the investment in and value of technology.
- Preparing schools to accept technology, procuring and installing the technology.
- Implement Education Management Information System (EMIS) and providing ongoing technical support.
- Developing and Managing content and integrating the Curriculum. (Rwanda 2008, p. 10)

Dzidonu (2010) outlines some of the successful initiatives introduced by the Rwanda government to deploy ICT in education. These initiatives are being implemented throughout the country. Some of these initiatives are:
• Program to promote the acquisition of computer equipment by Educational Institutions

• Computers in Schools -- “Operation ICT Knowledge for the Youth” Program

• An Initiative to Develop a National Computer Curriculum for Primary Secondary Schools and Coordinate Computer Education in Rwandan schools

• National Program to Speed-up the Deployment, Exploitation and Development of ICTs in Higher Education Institutions

• An Educational Management Information System Development

• A Computer Based Training and eLearning Content Development in Kinyarwanda Project

• An Initiative to Promote the Use ICT for Informal Education. (pp. 9-10)

Botswana ICT in Education Policy

According to Shafika (2007) Botswana’s Vision 2016 is connected to the development of nation’s ICT policy. The first goal of the Vision 2016 made reference to ICT as a key element. The long-term vision for the country is Botswana will enter the information age on an equal footing with other nations. The country will seek and acquire the best available information technology and become a regional leader in the production and dissemination of information. (p. 5)

Shafika (2007) indicates that in 1994, Botswana’s MOE issued a reviewed National Policy on Education. The policy document called for computer knowledge and skills education at all levels of education. In addition, the document recommended for computer science as an integral course at both junior and senior secondary schools. Based
on this, a new curriculum on computer education was introduced and tested in 11 of
the nation’s junior secondary schools. According to Shafika (2010) the ICT in education
policy focus on the following priority areas:

- Provide all schools with modern PCs and Internet access
- Increase the ratio of PCs to learners to 1:7
- Design and implement an ICT content and curriculum development programmes
  for the primary, secondary, vocational, and tertiary sectors
- Design and implement professional development among teachers
- Develop ICT skills programs for adult and non-formal learners
- Introduce a strong ICT proficiency measurement and skills monitoring
  programmes
- Support e-education research and development
- Secure funding to sustain ICT use in education. (p. 6)

Dzidonu (2010) reveals that all government assisted schools have been supplied with 20
computers, server and networked all computers at the computer laboratory. Education
centers were also supplied with computers and are being used to support administration
activities of MOE. Is it also worth noting that most private schools have well endowed
computer laboratories that were connected to Internet for teaching and learning.

**South Africa ICT in Education Policy**

Shafika (2007) indicates that the South African ICT in education policy
framework spans back to 1995. The ICT document like that of other African countries
emanates from National ICT policy framework. The ICT in education policy document
evolved when the government set up Technology Enhanced Learning Initiatives (TELI).
After setting up TELI, the government commissioned feasibility study that led to the setting up of an educational network purposely for education activities. South Africa’s Department of Communication in collaboration with the Department of Education issued ICT in education strategy document in 2001. The strategy document paved the way for a White Paper on ICT in education that was adopted in 2004.

Shafika (2007) states: “the goal of the policy is that every learner in the primary and secondary school sectors should be ICT capable by 2013” (p. 8). The policy called for transforming all South Africa’s schools into e-schools by 2013 deadline. The E-school is made up of teachers and learners.

Shafika (2007) explains that E-schools are:

- Learners who utilise ICTs to enhance learning
- Qualified and competent leaders who use ICTs for planning, management, and administration
- Qualified and competent teachers who use ICTs to enhance teaching and learning
- Access to ICT resources that support curriculum delivery
- Connections to ICT infrastructure in such institutions, the teachers and learners will be able to function across three dimensions:
  - Operational – referring to skills to use ICTs
  - Cultural – developing cultures that support the practices of using ICTs
  - Critical – ability by teachers and learners to challenge assumptions embedded in the success stories about ICT. (p. 8)
Shafika (2007) avers that the policy document explicitly defined E-education as “developing computer literacy skills and the skills necessary to operate various types of ICTs” (p. 8). E-education also focuses on how to:

- Apply ICTs, access, analyse, evaluate, integrate, present, and communicate information
- Create knowledge and information by adapting, applying, designing, inventing, and authoring information
- Function in a knowledge society by using appropriate technology and mastering communication and collaboration skills. (p. 8)

The Importance of Adopting ICT in Schools

Ministry of Education (2008) indicates that the diffusion of ICT in education will create new opportunities for students and educators to learn new things about how to acquire information for lifelong learning. The ICT in Education policy document places a premium on ICT to transform teaching and learning in schools. The MOE’s effort to introduce ICT in education was primarily through the GES and its ICT development partners and other private sector agencies (Ministry of Education, 2008). Initiatives have spanned pre-tertiary (both public and private schools) and tertiary levels. Efforts have largely been geared towards deployment of ICT to these facilities by providing computers and establishing ICT laboratories. Access, however is still below the standards and numbers demanded. Though comparatively better, concerns remain for tertiary level-institutions.

Mangesi (2007) avers that there were many initiatives by private entities to establish community information centers. However, these initiatives have been largely
confined to urban areas with few available examples of how they have been used to support educational objectives. Available literatures have shown that the uses of ICT in Ghanaian schools were concentrated in urban schools leaving rural schools behind (Parthermore, 2003; Mangesi, 2007). Ministry of Education (2008) made reference to ICT in education framework document that was developed in 2002 to avert the uncoordinated manner in which ICT initiatives were deployed in the country. MOE developed ICT in Education Policy in 2008 to integrate ICT in schools.

ICT has wide spectrum of applications and consequences in educational practice. It is worth noting that ICT has revolutionized educational systems all over the world by offering flexible educational courses and programs in terms of temporal and spatial parameters. For example, it provides real time access to resources to learners worldwide, provides technology-mediated asynchronous materials, and communication media connecting both learners and educators. (Young & Norgard, 2006; Song, Singleton, Hill, & Koh, 2004). ICTs allow teachers to show knowledge and reality in different representations to provide students with several types of knowledge resources and media (Jonassen, Howland, Moore, & Marra, 2003), and to collect different types of information about student interaction with the content, which might be used to evaluate the students’ learning (Nachmias, 2002).

Malcalm and Godwyll (2008) underscore that education and employment are key strategies in eradicating poverty. Malcalm and Godwyll (2008) state:

ICT is increasingly being used to improve access to education and employment opportunities. ICT has the potential to improve young peoples’ access to educational opportunities as well as to enhance the
quality of that education through the new modes of learning they enable. Through ICT, curricula can be more easily updated, adapted, enriched and personalized to satisfy a broad range of learning needs. Using ICTs access to a curriculum can be made available more efficiently over a wider area. Even within more traditional learning environments, ICT is changing the way classrooms operate; the integration of multimedia subject presentations, online research, changing teacher-student dynamics, and innovative project approaches are making the learning process more interactive and participatory. (para. 39)

The integration of ICTs can be used to support traditional, teacher-directed pedagogies. That is, teachers can control students’ ICT access and educational purposes. While this teacher control may be beneficial, the uses of ICTs have been found to be most valuable when students are given more ownership in controlling access and educational purpose (Hennessy, Ruthven & Brindley, 2005). This ownership can lead to learner-centeredness (McCombs & Quiate, 2002).

McCombs and Quiate (2002) described a learner-centered pedagogy as:

(a) Creating a positive classroom climate and relationship with each student, (b) honoring student voices and providing individual learning challenges, (c) encouraging higher order thinking and learning skills, and (d) adapting to a variety of individual developmental differences. (p. 479)

The technology provides course developers and teachers with several types of asynchronous and synchronous communication tools. For example chat, email, computer
conferencing for the design and implementation of learning tasks (Levy & Stockwell, 2006). ICT allows the course developer to create effective learning tasks and environments for interaction and communication between students and teacher and among students (Vonderwell, 2003; Chizmar & Walbert 1999). The implementation of technologies changes the roles of instructor and students, where the teacher, in technology-rich environment is being viewed as a collaborator, tutor, facilitator, encourager, and community builder rather than controller and transmitter of knowledge; the student is being viewed as an active, collaborator, constructor of knowledge, and self-monitoring learner (Rovai, 2004).

Jonassen (1995) states that IT has created avenues for teachers to diffuse ICT related resources into instructions in the schools and also help to enhance learning successes of learners. In addition, the uses of technology-mediated programs in the schools inspire both educators and students to aspire for high academic standards.

Kumar et al., (2008) indicates that large amounts of current information on varieties of ICT in education of subject-based resources are abundant on the Internet. The authors argued that access to the Internet provides learners and educators with recent resources that are better than some textbooks.

Kumar et al., (2008) state:

It is also an undeniable fact that the multimedia and interactive nature of software programmes on CD roms and on the World Wide Web assist with students’ learning. The computer motivates and caters to different learning abilities. Students generally enjoy using the computer and with enjoyment come motivation. In particular, the presence of computer-based
technology changes the way subjects such as science and mathematics is being taught. (p. 604)

Dywer (2000) contends that learners of the millennium age connect very well to computers and other ICT tools in their learning process. Some of these students use ICT tools at home. Dywer (2000) reveals that computers, for example, are changing the mode of how instructions are provided in schools. Angers & Machtmes (2005) indicate that recent improvement in IT innovations usage is rapidly changing the work culture for most teachers.

Kumar et al, (2008) state:

Being prepared to adopt and use technology and knowing how that technology can support student learning must become integral skills in every teacher’s professional repertoire. District and school policy and professional development workshops and training are designed to positively influence teachers’ adoption and usage of computer technology.

However, the usage of computer technology in the classroom has been slow over the years. (p. 604)

**Factors that Affects Diffusion of ICT in Schools**

Despite the importance of adoption of ICT in schools, many factors have been identified as challenges to its integration in schools. According to Pelgrum (2001) there are ten problems that affect ICT diffusion in educational institutions. Among these ten problems, Pelgrum (2001) listed crucial ones as lack of teachers’ know how on ICT tools and how to use them to teach in classrooms; inadequate computers and ICT facilities are also challenges that confront educators who seek to integrate ICT as media of instruction
in classrooms. Ely (1993) identifies three major factors that promote ICT integration in classrooms. These factors are: availability of ICT infrastructure, lack of teachers’ ICT competencies and teachers’ confidence to use ICT to teach in classrooms.

According to Malcalm and Godwyll (2008):

The two categories identify, more or less, the same issues: Ely’s (1993) existence of knowledge and skills relates to Pelgrum’s (2001) factor relating to teachers lack knowledge and skills. Also Ely’s (1993) availability of resources is similar to Pelgrum’s (2001) insufficient number of computers and ICT infrastructure. Finally, Ely’s (1993) dissatisfaction with the status quo, is directly related to what Zhao and Cziko (2001) term as discrepancies that activate the individual. The problem of teachers’ confidence in their ICT competence as a major factor for integrating technology in teaching is reported in other studies as well. Mooij and Smeets (2001) explain that if teachers’ are not confident in their ability or competence to handle computers may hinder their willingness to introduce technology in to their classrooms. In their study, Smeets et al., (1999), cited in Mooij & Smeets, (2001) it is also reported that the most important reason teachers give for not using ICT is that they are not familiar with ICT or they feel unsure about it. (para. 26)

Malcalm and Godwyll (2008) further explain: “This ICT competence factor is the same Zhao and Cziko (2001) refer to as the “Control Principle” (para. 27). In related study conducted in Malaysia to explore the state of ICT diffusion in teaching mathematics in schools, Chong, Sharaf, and Jacob (2005) identify six major challenges confronting ICT
use in schools; lack of ICT facilities at home for the students to use for educational purposes, inadequate time allocated for ICT on school schedule, inadequate technical support for ICT integration in curriculum, lack of ICT integration competency on the part of teachers, difficulty, and insufficient teacher-training opportunities for ICTs integration in curriculum.

**Teachers’ Attitudes and Beliefs in ICT Use**

Extensive literatures have revealed that educators' attitudes influence the way of their technological innovation application. Teachers tend to utilize technology based on their own pedagogical practices and their personal perspectives with the curriculum (Lai et al., 2001; Czerniak & Lumpe, 1996; Cohen, 1987; Cuban, 1986). According to Bullock (2004) teachers’ beliefs and interests are major determinants in either deciding to adopt the use of technology in teaching or not. In a related study, Kersaint et al., (2003) reveal that teachers who have generated interest towards technology have the affinity to use them in their teachings.

Other research findings have shown that providing educators with ICT knowledge does not imply they will use them in their teachings. In addition, teachers who lack knowledge of ICT integration in pedagogy and the skills to design and conduct meaningful learning will find it difficult to integrate technology in classrooms (Waigt & Abd-El-Khalick 2007; Koehler & Mishra, 2005; Hughes, 2004). Fredriksson et al, (2007) and Niederhauser and Stoddart, (2000) argued that educators who believes in constructivist theory are more likely to integrate ICT in education.

Teachers' formal education and training programs also influence their attitudes and beliefs and how they use technology in schools (Pajares, 1992; Zeichner et al., 1987;

Teachers’ ICT Knowledge and Skills

Several studies (Ashton & Webb, 1986; Madsen & Sebastiani 1987) show that effective utilization of ICT by educators does not depend only on their attitudes, but rather the type of professional development and training they have had. Cox and Marshall (2007) assert that teachers’ ICT skills and their eagerness to use them are often connected to their utilizing ICT in their pedagogy and learning process. According to (Albirini 2004; Beck, 1997) apart from influencing educators’ attitudes towards the utilization of ICT, there is the need for teachers to understand potentials of ICT and their intention to utilize them in teaching. Two important factors that promote and maintain ICT integration are professional development and teachers’ positive attitudes toward ICT (Christensen, 2002; Hew & Brush, 2007). Training program for educators is one of the vital components of the two factors and must be based on the context and the expressed needs of teachers (Haughey, 2002; Hennessy et al., 2005; Hew & Brush, 2007). Continuous professional development paves the way for ICT competency, with subsequent enhancement of teachers’ skills in teaching.

Ringstaff and Kelley (2002) underscore that training is one of the most vital supports for teachers who want to diffuse ICT into the classroom. Professional
development has to be formulated to address educator’s desire towards when and how to use technology (Roberts, 1999). According to the Department for Education and Skills (2004), over 90% of educators indicated they received support from other colleague educators in terms of primary source of technology training and professional advice, of how to use ICT in education.

The study throws light on the peer-to-peer mentorship as another form of ICT training for teachers. Traditional modes of training like a day’s workshop sometimes are not adequate since they do not cover many areas. There is the need, therefore, for both professional development and mentorship. Haughey (2002) asserts that to ensure effective ICT integration in the curriculum, teachers need to learn from colleagues. Lai et al., (2001) on the other hand assert that for a school-based professional development training to have an intended impact on teachers, it will be ideal for such training to be facilitated by the school’s ICT coordinators that can provide role modelling and mentorship for teachers.

According to Yaghi (1997) and Yildirim (2000) lack of adequate teacher training colleges programs and in-service professional development are some of the challenges facing many teachers to adopt educational technology in their classrooms. Several literatures also support the idea that there is the need for teachers to receive effective, timely persistence professional development to enhance technology integration in educators’ teachings (Wilson, Notar, & Yunker, 2003; Yildirim, 2000; Yildirim & Kiraz, 1999; Lemke, 1999). According to Dupagne and Krendl, (1992) in-service training program is one of the key factors in enhancing educators’ positive attitudes about
computer use. Wood and Bennett (2000) underscore that teachers’ decisions to integrate ICT into pedagogy is closely tied up with their professional growth.

Other related studies on integrating ICT in schools depict that plenty of schools failed to diffuse technology into school curriculum. According to Bauer and Kenton (2005) even though teachers have sufficient skills in technology, they failed to integrate their technical know-how in pedagogy. Reynolds, Treharne and Tripp (2003) reveal persistence problems confronting teachers on how to use ICTs as tools in teaching. The reviewed literature fell short in exploring how ICT policies enable ICT diffusion in African schools. It is important noting that the absence of ICT in education policy, ICT integration would be implemented on an ad-hoc basis.

**Access of ICT and ICT Facilities to Students and Teachers**

One of the major problems facing schools in their quest to integrate ICT in schools is lack of ICT facilities. Howell and Lundall (2000) reveal that lack of sufficient funds and inadequate numbers of computers are impeding ICT diffusion into different subject areas. Howell and Lundall (2000) further cite unreliable supply of electricity, and insufficient accommodation capacities are also inimical to integration of technology in education in most schools in Africa. Other researchers (Intsiful, Okyere & Osae, 2003; Tunca, 2002; Bakhom, 2002; Selinger 2001;2002; Oladele, 2001) have listed major problems facing schools in Africa from integrating technology in their educational system. Among some of the factors listed are: fluctuating electric power supplies and recurrent power blackouts, rampant computer break down, incompatible software, lack of ICT infrastructures like telephone lines, inadequate and old communications networks and many more.
In similar research, Norris et al., (2003) assert having access to ICT networks is important in diffusing ICT in education. The research indicates that there is positive relationship between ICT access and use. Yildrim (2007) avers that access to technological facilities could enhance ICT integration in classrooms.

Waite (2004) indicates that while educators express great desire and urge to explore about the opportunities of ICT in education. In reality, ICT utilization in schools are focused on limited number of computer programs, with the word processor, the most common software being use. Waite (2004) further reveals that the use of other ICT applications namely the use of Internet, emailing and video conferencing, are not common. The study cites lack of ICT facilities as one of the challenges of most schools not using ICT in education. Other studies (Zhao & Cziko, 2001; Cox et al., 1999; Pedretti et al., 1999) reveal teachers are not using ICT as tools to promote teaching and learning in schools. Van Belle and Soetaert (2001) state: “information technology in the classroom is used in an ineffective way and it has proven difficult to integrate within traditional curriculum settings” (p. 38).

Theoretical Framework of the Study

Introduction

As indicated in chapter one, the study is being grounded on Fiedler’s Contingency Leadership Theory (FCTL). The primary usage of FCTL is to demonstrate how Ghana’s ICT in education policy makers initiate policies and how these policy makers are implemented at a model senior high school - OSHS. The theory is being utilized as the theoretical framework in this study to help explain how school authority,
teachers and students at Odorgonno senior high schools accept and implement ICT in the school. 

In his book: *A Theory of Leadership Effectiveness* Fred Fiedler (1967) attempts to fill some of the gaps of leadership theory. Fiedler (1967) proposes a theoretical framework for understanding leadership effectiveness. Miner (2005) indicates that FCTL has had a long history that spans back to 1951, and has transformed slowly till 1960s. 

**Definition of Leadership**

To grasp FCTL, it is important to operationalize the term *leadership*. Stogdill (1950) defines leadership as “Leadership may be considered as the process of influencing the activities of an organized group in its effort toward goal setting and goal achievements” (p. 3). In this context, two key elements emerged. Thus, *leader* and *group*. Fiedler defines a *leader* as “the individual in the group given the task of directing and coordination task- relevant group activities or who, in the absence of a designated leader, carries the primary responsibility for performing the functions in the group” (p. 6). Fiedler (1967) defines group as “a set of individuals who share a common fate, that is who are independent in the sense that an event which affects one member is likely to affect all” (p. 6). According to Bryman (1986), “The common elements in above definitions denote that leadership involves social influence process in which a person steers members of the group towards a goal” (p. 12). In this study, the leaders are the Policy makers and the groups are school administrators, teachers and students. 

**Fiedler’s Contingency Theory of Leadership (FCTL)**

Fiedler (1967) postulates that Contingency Theory of Leadership approaches clearly draw attention to the notion that there are no universally appropriate styles of leadership.
In addition, the contingency theory of leadership basically states that that situation variables interact with leader behavior and personality. Fiedler (1967) further postulates that there are two main types of the leaders namely; the task-oriented type and the people oriented type. According to Fiedler (1967) situational favorableness connotes three conditions of how far the context by which the leader facilitates the ability to influence the followers. The three elements of the situation are:

- How clearly the task is structured or how defined the task structured;
- The relationship between the leaders and the followers;
- How much positional power the leader has.

**How clearly the task is structured or how defined the task is structured**

Fiedler (1967) postulates that the positionality of a leader is influence by clear-cut jobs, which he/she is expected to perform. Accordingly, the leaders who are confronted with structured jobs and ascertain how to accomplish these jobs are likely to provide directives and supervise their group members effectively. In addition, the followers or group members are likely to have clear cut understanding on how to accomplish jobs assigned to them. In relations to this study, FCTL will assist to determine how Ghana’s policy makers clearly define and structure ICT in education policies, what are their relationships with the policy implementers? Do the implementers and beneficiaries better understand of what has to be done in terms of policy implementations? How clearly defined and structured is the job scope?

In this study, Fiedler’s leadership theory will assist to determine if the ICT in education policy goal and objectives are clear or vague. According to Fiedler (1967) having clear policy goals, objectives and scope are crucial to policy implementers and
beneficiaries to comprehend the elements of the policy. It is worth noting that unclear or vague policy goal, objectives and scope will result in vague results. It is worth noting that it is vital for policy makers who act as leaders to clearly define ICT in education policy goals and objectives to avoid ambiguity. Furthermore, it is crucial to spell out to the implementers what is expected from them at particular point in time. In addition, by ensuring clearly defined policy and structured scope, the policy makers face the task of balancing the need to select goals and objectives the people suiting the values of against the need to meet organizational objectives for economic efficiency and performance.

**The relationship between leaders and followers**

Fiedler (1967) underscores the importance of the quality of personal and effective relations between the leader and the group members. This type of leader-member relations is often referred to as group atmosphere. According to Fiedler (1967) if the relationship between the leader and the followers or group members are cordial, such that the leader is liked and accepted by group members, it will be easier for the group members to comply with the directives from the leader.

Fiedler (1967) postulates that to ensure a formidable team, a leader must have strong relationship with his/her followers, because a strong relationship with followers is a necessary ingredient for leadership. Fiedler (1967) reveals that without a strong relationship between the leader and the followers, the leader cannot have control over the team and influence them. In this study, FCLT will help to determine if there were strong relationships between Ghana’s ICT in education policy makers’ and the implementers and the beneficiaries.
How much positional power the leader has?

According to Fiedler (1967) the positioned power implies to the level to the leader’s power influence his/her ability to ensure group members are rewarded for good work done and reprimand those who could not live up to expectations. If the leader is weak within an organization, then the leader’s ability to lead may affect that of his followers or group members. Fiedler (1967) indicated that a good leader must have a good relationship with his/her followers. In this study, FCTL will assist to determine if Ghana’s ICT in education policy makers really wield positional power and are in a good position to lead effectively to reward and punish policy implementers to enforce compliance of ICT implementation in schools.

A Continuum of Approaches to ICT Development Model

Continuum of Approaches to ICT Development Model is being adopted as a framework to demonstrate how ICT is being use at OSHS. The model will assist me to determine how ICT being diffuse in the school.

![Figure 7. A Continuum of Approaches to ICT Development Model](source)

According to UNESCO (2002) research of development ICT in schools in developing and developed nations identified four main approaches by which schools
adopt and use ICT. The four approaches or a Continuum of Approaches to ICT Development model are: Emerging, Applying, Infusing and Transforming.

**The Emerging Approach**

According to UNESCO (2002) schools at Emerging Approach level or schools at nascent stages of ICT development show the characteristics of those schools that begin to buy some computer and other accessories. Some of these computers can be those donated by benevolent individual or organizations. It is worth noting that school authorities and teachers at this nascent stage are “just starting to explore the possibilities and consequences of using ICT for school management and adding ICT to the curriculum” (UNESCO, 2002. p. 15).

It is noteworthy that at Emerging Approach stage, schools still uphold the traditional didactic mode of instructions, where teacher-centered methods of teaching are the order of the day. However, there are some elements of basic ICT skills among school authorities, educators and learners.

UNESCO (2002) states:

Schools at this emerging phase are still firmly grounded in traditional, teacher-centred practice. The curriculum reflects an increase in basic skills but there is an awareness of the uses of ICT. This curriculum assists movement to the next approach if so desired. (p. 15)

**The Applying Approach**

UNESCO (2002) states that Applying Approaches stage is the situation where schools are applying the new things and skills learned from ICT integration in schools. At this level, “administrators and teachers use ICT for tasks already carried out in school
management and in the curriculum. Teachers largely dominate the learning environment” (p. 15). In addition, schools at Applying Approach stage “adapt the curriculum in order to increase the use of ICT in various subject areas with specific tools and software. This curriculum assists movement to the next approach if so desired” (p.15).

**The Infusing Approach**

According to UNESCO (2002) schools at infusing stage integrate or diffuse ICT across curriculum. Schools at this level employ wide knowledge and skills of computer related technologies in school’s offices and computer laboratories. UNESCO (2002) states: “Teachers explore new ways in which ICT changes their personal productivity and professional practice. The curriculum begins to merge subject areas to reflect real-world applications” (p. 16).

**The Transforming Approach**

UNESCO (2002) indicates that at Transforming Approach stage, schools utilize ICT tools as integral part of teaching, learning and management system. UNESCO (2002) states: “The focus of the curriculum is now learner-centred and integrates subject areas in real-world applications. ICT is taught as a separate subject at the professional level and is incorporated into all vocational areas. Schools have become centres of learning for their communities” (p. 16).

**Summary**

The FCTL was used as a theoretical framework to ascertain how Ghana’s ICTE Policy makers experiences of policy development and implementation in schools. The FCTL portrays the connection between the leader and his/her style of leadership and
how the group performs under varied situations. The FCTL is contingent on the style of the leadership of the leader. The UNESCO’s Continuum of Approaches to ICT Development Model is being adopted as a framework to demonstrate how ICT being used at OSHS. Specifically, the model will assist the researcher to determine how ICT being diffuse in the school.
Chapter 3: Methodology

Methodology, Methods and Procedures of Data Collection

Introduction

Chapter three describes the qualitative approach used in the study and explains the rationale behind the selection of the research method and literature of the methodology. The chapter also deals with the description of the research site, the participants, description of the instruments used, the data sources, the data collection methods, data analysis and the management of the research’s role. Chapter three describes the methodology used and explains in detail the processes that were used to seek answers to ascertain how ICT policy influences the diffusion of ICT in a typical ICT model school in Ghana. Deciding on a methodology remains a crucial issue in research. The researcher was very careful in determining the most appropriate methodology to be chosen. The main determinants of choosing qualitative methodology is based on my research questions:

1. What are the experiences of Ghana’s policymakers in policy creation and implementation in education in Ghana?
2. What are the experiences of heads of school, teachers, and students with the use of ICT in teaching and learning at OSHS?
3. How do Ghana ICT4AD and other policy documents support the ICTE Policy?

In this study, the qualitative methodological approach was used because my purpose is to explore, describe, and understand dearth and breadth of the lived experiences of my participants. The research seeks to answer the questions: “what,”
“how,” and “why” of the policy makers, head of school, teachers and students lived experiences. Creswell (2007) contends that qualitative researchers intend to explore the experiences of respondents have to answer the “what” and “how” of their respondents’ experiences. Glesne (2006) indicates that questions on “what” and “how” are well answered in qualitative study.

A study of Ghana’s policy makers and their impact on ICT education relied on the use of such approaches as “the importance of context, setting, and subjects’ frame of reference” (Marshall & Rossman, 1989, p. 46). The idea is not to generalize but to understand experiences of policy makers, heads of schools, teachers and students regarding ICT education (Patton, 2002; Glesne, 1999). To be precise, I am interested in the role of ICT policy makers and how ICT policy is being diffused in OSHS in the Greater Accra Region of Ghana.

Patton (2002) states:

Qualitative data describes. They take us, as readers, into the time and place of the observations so that we know what it was like to have been there. They capture and communicate someone else’s experience of the world in his or her own words. (p. 47)

Denzin & Lincoln (2005) indicate: “qualitative researchers study things in their natural setting, attempting to make sense of, or interpret, phenomena in terms of the meaning people bring to them” (p. 3). Van Maanen (1988) argues there is “no one way of seeing, hearing, or representing the world to others that is absolutely, universally valid or correct” (p. 35). Marshall and Rossman (2006) contend, “Qualitative research then is a broad approach to the study of social phenomena. Its various genres are naturalistic,
interpretative, and increasingly critical, and they draw on multiple methods of enquiry” (p. 2).

Qualitative inquiry therefore is ideal for the study since the methodology sought to unveil the experiences and meanings of the respondents. Qualitative study provides the opportunity for a researcher to explore phenomena in details. Creswell (2007) and Patton (2002) argue that researchers are the instruments of inquiry. Creswell (2007) states: “researchers collect data themselves through examining documents, observing behavior, and interviewing participants” (p. 38).

Research Design

The researcher used a phenomenological case study as the research design. In other words, details for the justification of my design strategy follows. Patton (2002) states “What these various phenomenological and phenomenographic approaches share in common is a focus on exploring how human beings make sense of experience and transform experience into consciousness both individually and as shared meaning” (Patton, 2002, p. 104). Consequently, the use phenomenological case study in this research is to explore the experiences of Ghana’s educational policymakers and how ICTE Policy impact on teaching and learning at OSHS.

Phenomenology

Phenomenological case study design is being adopted for this study because the focus is to “describe the meaning of several individuals of their experiences of a concept or a phenomenon” (Creswell, 2007 p. 57). In this study, the combination of both phenomenology and case study helped in unveiling the lived experiences of Ghana’s educational policymakers and their impact on ICTE teaching and learning at OSHS.
According to Patton (2002) phenomenological studies seeks to understand the “lived experiences of people as opposed to second hand experience” (p. 104). These fields contain individual experiences, the social construction of group reality and the language of communication. It is considered as philosophy, an inquiry paradigm and a social science analytical perspective or orientation (Patton, 2002).

Van Manem (1990) states: “phenomenology asks for the very nature of phenomenon, for that which makes a some-‘thing’ what it is-and without which it could not be what it is” (p. 10) According to Patton (2002), Edmund Husserl, a German philosopher, used and developed this phenomenology as a philosophical tradition. Husserl’s philosophical assumption was: “we can only know what we experience by attending to perceptions and meanings that awaken our conscious awareness” (Patton, 2002, p. 105). Phenomenological study therefore requires carefully and systematically gathering, analyzing and presenting people’ experience.

Van Manen (1997) describes phenomenology as:

The aim [of phenomenology] is to construct an animating, evocative description (text) of human actions, behaviors, intentions, and experiences as we meet them in the life world. But although this knowledge can be written and presented in textual form, ultimately it must animate and live in the human being who dialogues with the text. (pp. 21-22)

Kupers (2009) states:

Phenomenology is discernible as a specific style and “movement of thought. It is characterized by a flexible and vivid way of inquiry, as it takes different directions, tries out continuously new ways of reasoning. Thus, it approaches the
experienced phenomena in question and its various and inexhaustible dimensions of meaning and ambiguities in perspective. Phenomenology can be seen as an attempt to understand what experience is and means, better to say a formalized account of conscious experience and its implications. (p. 52)

At the center of phenomenological research is the human experience of an occurrence. Phenomenology asks the question, what makes something what it is? (Van Maanen, 1988). Phenomenological researchers have the notion that there are different modes of interpreting phenomenon. (Bogdan & Biklen, 1982). Tesch (1988) intimates that what distinguishes phenomenology “from other qualitative research approaches is that the subjective experience is at the center of the inquiry” (p. 2).

It is worth noting that the phenomenological research tradition relies on the assumptions that the perceptions of the person being interviewed are valid and that the experience and background of the researcher are sufficient to analyze the findings in a scholarly and responsible manner. Phenomenological researchers depend almost exclusively on in-depth interviews as their main investigative strategy, using observation only where verbalization is inadequate (Tesch, 1988). In this study, I used phenomenological study to explore the lived experiences of Ghana’s policy makers in their quest of developing ICT in education policy. I also used phenomenology in the study by examining the meaning of the lived experiences of assistant headmaster of the school, teachers and students use of ICT at OSHS. Phenomenology therefore helped to unravel the lived experiences of the respondents of the study.
Case Study

To deepen the study, the researcher combined phenomenology with another type of qualitative research design, the case study. My objective is to handle each participant in a unique way, so as to draw fully from them, and the use of the case study approach became useful. Because the use of case study helped the researcher to collect data by using different methods like interviews, document analysis and observations. Case studies fall under qualitative methodology, used to explain the possible factors related to some outcome, a type of qualitative study used on small group of people or large group. In this study, the selected Ghana’s ICT educational policymakers, the assistant headmaster, teachers and students were used as case study.

Baxter and Jack (2008) indicate that both Stake (1995) and Yin (2003) “base their approach to case study on a constructivist paradigm. Constructivists claim that truth is relative and that it is dependent on one’s perspective” (p. 545). Miller and Crabtree (1999) indicate, “case study recognizes the importance of the subjective human creation of meaning, but doesn’t reject outright some notion of objectivity. Pluralism, not relativism, is stressed with focus on the circular dynamic tension of subject and object” (p. 10). Baxter and Jack (2008) underscore the relevance of case study. The report states: “One of the advantages of this approach is the close collaboration between the researcher and the participant, while enabling participants to tell their stories (p. 545).

Snow and Anderson (1991) contend that case study creates an avenue for researchers to provide a holistic scenario of the case being studied. Goode and Hatt, (1952) on the other hand state: “This approach includes the development of that unit, which may be a person, a family, or other social group, a set of relationships or processes
or even an entire culture” (p. 331). Goode & Hatt (1952) further argue to: “keep together, as a unit those characteristics which are relevant to the scientific problem being investigated” (p. 333). Creswell (2007) avers that there is a time element and rigorous nature of using case study as a method of data collection.

Creswell (2007) defined case study as: “A qualitative approach in which the investigator explores abounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information “e.g., observations interviews, audiovisuals materials and documents and reports” (p. 73). Miles and Huberman (1994) defined case study as, “a phenomenon of some sort occurring in a bounded context. The case is, “in effect, your unit of analysis” (p. 25).


Yin (2003) and Stake (1995) use different terms to describe a variety of case studies. Yin categorizes case studies as explanatory, exploratory, or descriptive. He also differentiates between single, holistic case studies and multiple-case studies. Stake identifies case studies as intrinsic, instrumental, or collective (p. 547).

In this study, the researcher was interested in exploring the role of Ghana’s ICT educational policy makers and the state of ICT use at OSHS. In the process, I have observed how the selected respondents described their experiences and the real situation in which they occurred.

Baxter and Jack (2005) state:
Stake (1995) uses the term intrinsic and suggests that researchers who have a genuine interest in the case should use this approach when the intent is to better understand the case. It is not undertaken primarily because the case represents other cases or because it illustrates a particular trait or problem, but because in all its particularity and ordinariness, the case itself is of interest. (p. 548)

According to Baxter and Jack (2005) the descriptive type of case study was explained by Yin (2003) as “This type of case study is used to describe an intervention or phenomenon and the real-life context in which it occurred” (p. 548). In the context of my study and as part of the objective to gain deeper understanding of how experiences and roles of Ghana’s ICT policy makers impact on ICT education and how ICT is being diffused at OSHS, the descriptive type of case study provided the best design for answering my research questions.

**Phenomenological Case Study**

In this research, the researcher combined the two study designs, namely phenomenology and case study. A phenomenological case study unveiled the lived experiences of the respondents based on their contexts. The researcher’s choice of phenomenological case study emerged since the research focus is to understand the experiences of policy makers in their effort in developing ICTE policy and the experiences of head of school, teachers and students use of ICT at OSHS.

Yin (1994) underscores the relevance of combining phenomenology with case study, since; the two research approaches explore phenomena within their natural contexts. Patton (2002) states: “There are no perfect research designs. There are always
trade-offs” (p. 223). Phenomenological case study therefore helped by complementing and deepening the lived experiences of the respondents and the power of their stories.

The phenomenological case study approach helped in addressing the nature of the case, a brief descriptive profile of the policy makers, a description of the background setting of OSHS, and the socio-economic and political situation under which the study was undertaken. Reviewing historical documents that informed Ghana’s ICT policy documents, personal interviews and observations helped in this context. The study of ICT use at OSHS sought to determine how the various respondents- (assistant head of school, teachers and students) were using ICT in teaching in the school.

**Site Selection**

The criteria for selecting OSHS are dependent on two main factors. The first is the fact that the school is a public senior high school in an urban setting. Secondly, the school is one of the model schools in Greater Accra in Ghana. The two conditions suited the nature of the study conducted. The researcher is interested in how ICT policies are being diffused in a supposed model public senior school, where ICT Infrastructures are in place.

**Public Senior High Schools Urban Setting**

*The Model School Project*

According to Ministry of Education (2002) the 2007 Anamuh-Mensah educational reform committee recommended upgrading at least one Senior High School (SHS) in each of the 270 districts to model school status. The report states: “Immediate action should be taken on the Government’s policy of setting up one model SSS in each
district, through the provision of well-equipped libraries and workshops especially in Community Senior Secondary Schools” (pp. 29-30).

Ghana Districts (2006) indicates that in 2001, after the New Patriotic Party government took control of governance in Ghana, two new programs connected to education were introduced; the first one was to comply with the recommendation of the Anamuah-Mensah’s committee by upgrading one SHS in each district to a model school status. The second program was to link all SHS with telephones and Internet. The model schools are expected to be provided with the modern state-of-art facilities such as computer laboratories with ICT gadgets, broadband Internet services, telephones and libraries among others. The model school project was the then government’s policy to increase access to senior high school education and to ensure equilibrium in the education sector in Ghana. The policy also intends to help alleviate the pressure that was being exerted on the well-endowed and popular senior high schools in the country. Another expected result is to increase enrollment figures and enhance teaching and learning in these model SHSs. One such school is the OSHS.

**Odorgonno Senior High School**

OSHs was selected as one of the model schools because the school is located in an urban area and is an ideal school to represent urban-setting characteristics. It is located in Awoshie in the Ga South District of the Greater Accra Region. According to Ghana Districts (2006) as part of re-demarcation process of districts in Ghana, President, J.A Kufuor created Ga South Municipal with its capital Weija in 2008. Ghana Districts (2006) states:
The Ga South municipality forms one of the newly upgraded municipal assemblies in the Greater Accra region. This step was taken by the government of Ghana as a result of the large size of some of the then 138 MMDAs which was not one way or the other allowing the government to fully implement its policies of local governance to the benefit of the entire citizenry. (para. 1)

The late Mr. Joseph T. Leigh a Sierra Leonean and the late Jerome K. Acquah, a Ghanaian, established Odorgongno Senior High School (OSHS) on January 25, 1940. Both founders were tutors from Accra High School. OSHS derived its name from river “Odaw” because the school was sited on the crest of the ridge over looking the river, thus, "Odor (river ‘Odaw’) and “gonno" (meaning crest of the ridge) giving the combined name Odorgonno. OSHS’ motto is "Nobis Nitendum Est" meaning ("We must strive or struggle"). The school was set up initially as a boy’s school. However, since the introduction of the new education system in 1987, the school became co-educational system. The current total student population is 1,900, with 1,100 being males and 800 females. There are 96 teaching staff all of them being university graduates. Out of the total 96-teaching staff, 51 of them are male while the rest 45 are females.

The OSHS was initially situated behind the Adabraka Police Station in Accra. However, in 1972, the Government of Ghana acquired a piece of land at Awoshie the current location of the school. The then government of the day, the National Redemption Council (NRC) in 1974 built 3-story five-classroom blocks, science laboratory, and a headmaster's bungalow.

During the 2003/2004 academic year, the then New Patriotic Party (NPP) government, selected the school as one of the Model Senior High Schools in the country.
This led to improvement of the school’s infrastructure. The government built 16 buildings, which include classroom blocks, administration block, dormitory for students, accommodation for staff, two computer laboratories, a sick bay, an assembly hall, home economic unit among others. The library project is still under construction. The school has a vast land that could be developed through the provision of other facilities to serve more students.

The coordinator of ICTE at Ghana’s Ministry of Education, Rev. Emmanuel Dadebo described OSHS as one of the best ICT model schools and is well endowed in terms of ICT infrastructure in Greater Accra region of Ghana. There are two rooms being used as computer laboratories. The laboratories are labeled Computer Laboratory "A" and ‘B’. Laboratory ‘A’ has 40 computers and Laboratory ‘B’ also has 40 laptops donated by Intel Computer Incorporated for Intel Computer program training purposes.

The OSHS laboratories are well networked and hooked up to an Internet facility sponsored by Intel Computer Inc. There is a 36-inch television set and a video camera recorder player in Laboratory A. The school was selected to determine how the above-described ICT infrastructures are being used to diffuse ICT education in the school and how such facilities are enhancing teaching and learning.
Figure 8. Photo showing the sign post of Odorgonno Senior High School
Source: Field Work, 2011.
Selection of Respondents

Selecting participants for a research requires tact and caution. Since the goal of the study was to gather data on the experiences of Ghana’s ICT policy makers in developing ICTE policy and how ICT was diffused and used in teaching and learning at OSHS. At OSHS, the assistant headmaster helped me by selecting knowledgeable respondents who can provide me with the information.

Miller (2000) writes about negotiating or reaching a contract with respondents. He also mentions selective sampling as a method of selecting respondents for qualitative interviews. Miller (2000) draws a distinction between selective sampling and probability sampling. According to him, “selective sampling differs from the technique of probability sampling that is used by survey researchers. In selective sampling, the people used in the
study are chosen on a conceptual basis” (p. 76). Patton (2002) indicates that qualitative interviews focus on relatively small samples, even single cases. Patton (2002) further stresses selecting the interviewees based on purposeful sampling to allow in-depth understanding of the phenomenon. My research is being completed on the conceptual basis; for that matter, in this study, the researcher adopted selective and purposive sampling method of selecting my sites and respondents.

**Selective Purposive Sampling**

The researcher deliberately adopted selective purposeful sampling to select policy makers, assistant headmaster in charge of academic affairs, students and teachers with relevant ICT knowledge. Merriam (1998) states that: “Purposeful sampling is based on the assumption that one wants to discover, understand and gain insight therefore, one needs to select a sample from which one can learn the most” (p. 48). Patton (2002) asserts that purposive sampling is the process where a researcher selects respondents due to some characteristic or when he/she want to access a particular group of people.

Patton (2002) further indicates that purposive sampling method normally has an advantage of gathering rich information and reduces differences in sampling. Purposive sampling is usually used in pilot studies. However, Patton (2002) reveals that purposive sampling inherits some weakness. For example the method makes it difficult to draw strong inferences or conclusions from samples. Nonetheless the method is ideal for this study. Snowball, or chain sampling method was used in selecting 10 policy makers for the study. Miles and Huberman (1994) contend that snowballing method is an ideal strategy of detecting potential respondents for research.
The strategy for selecting 10 students (five males and five females) was to have representation from all the classes or courses being taken at OSHS. The assistant headmaster in charge of academic affairs assisted by identifying students who can confidently take part in the interview. 10 teachers (five males and five females) were selected across the academic spectrum in the school. The assistant headmaster of the school was also interviewed. In all, 30 respondents were interviewed. Each of the 30 respondents was interviewed through one-on-one in depth interviews. Semi-structured interview guides (as shown in Appendix A) were used in conducting the interviews. Each of the respondents was given a consent form to complete before the interview. The breakdown of the respondents is as follows
Table 1.

Detailed breakdown of respondents interviewed for the study

<table>
<thead>
<tr>
<th>Model School Respondents</th>
<th>Males</th>
<th>Females</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odorgonno Senior High (Students)</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Odorgonno Senior High (Teachers)</td>
<td>5</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Odorgonno Senior High (Assistant Headmaster)</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Policy Makers

<table>
<thead>
<tr>
<th>Policy Makers</th>
<th>Males</th>
<th>Females</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of ICT in Education</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Assistant Director of CRDD</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Director of EMIS</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Director of CENDLOS</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Former Director of GES</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Former Chief Director- MOE</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>ICT in Education Consultant</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
</tbody>
</table>

Members of Parliament/Former Ministers of Education

<table>
<thead>
<tr>
<th>Members of Parliament/Former Ministers of Education</th>
<th>Males</th>
<th>Females</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
</tbody>
</table>

Total                                      | 19    | 11      | 30     |

Grand Total= 30 Respondents

Fieldwork or Data Collection Process

The fieldwork began with a visit to OSHS, where the researcher presented the Institutional Review Board (IRB) approval letter and copy of consent form from Ohio University to the school authority indicating the purpose of the study and permission to conduct interviews at the school. After the initial visit and permission was granted for the
study, a follow up visit was conducted to acquaint myself with the headmaster, teachers and students. The researcher spent four weeks in the school to build trust, rapport and confidence among students and teachers prior to interviews. Glesne and Peshkin (1992) emphasize that “time is a major factor in the acquisition of trustworthy data” (p. 16). Glesne and Peshkin (1992) state: “Time at your research site, time spent interviewing, time to build sound relationships with respondents- all contribute to trustworthy data” (p. 16).

21 respondents were interviewed at OSHS. The policy makers were interviewed at their various offices after the researcher introduced himself and stated the purpose of the study. In all, nine policy makers were interviewed. The breakdown of the policy makers is: a former minister of education during the NPP regime and former minister of education of the current NDC government. Both personalities are current members of parliament, The rest are a former chief director of MOE, a former director general of GES, an ICT in education consultant and vice chancellor of University of Winneba, current director of ICT in education at MOE, the assistant director of Curriculum Research and Development Division (CRDD) of MOE, current director of Education Management Information System (EMIS) and the current director of Center for Distance Learning and Online Schooling (CENDLOS).

**Detailed Data Collection Methods**

Patton (2002) defines three types of data collection in qualitative research as direct observations, written documents and in-depth open-ended interviews. The data from interviews becomes quotations, which present respondents’ direct experiences, opinions, feelings and knowledge. The purpose of open-ended questions is to gather
salient information and views of respondents without assuming that information through selected questions. The data from observation demonstrates detailed descriptions of respondents’ activities, actions and interpersonal interactions. As basic assumptions of qualitative research, Best and Kahn (2003) cited Merriam’s six assumptions: 1) it is descriptive; 2) it examines fieldwork; 3) it is focused on the process rather than results or products; 4) it is inductive that researchers build abstractions, concepts, theory, and hypotheses from data; 5) the researcher is the instrument of information gathering and analysis; and 6) it is important to understand experiences of respondents and their world views.

The research design method used to collect data includes Interviews, observations and document analysis. Glesne (1999) contends that qualitative interviewing enables researchers to determine their respondent’s cultures, values and social life, and to comprehend issues that confront them. Even though analyzing data is a slow progress and be a laborious and time-consuming, this procedure provides meaningful results. For this research, semi-structured interviews were utilized for the 30 respondents. Other data collection methods used are observation and document analysis. Observations were conducted in the school, the school’s administration buildings, computer laboratories and classrooms to ascertain how assistant headmaster, educators and learners use of ICT in the school. Detailed observation report can be found in chapter six.

**Interviews**

An interview is an information-gathering process in which there are exchanges of views and ideas. Rubin and Rubin (2005) state, “qualitative interviewing projects are especially good at describing social and political processes” (p. 3). Interviewing can also
generate answers about how things change. Researchers employ interviews to dig into important personal issues leading to the shedding of new light or a new approach to old problems. There are reasons why qualitative interviewing is implemented. Weiss (1994) outlines valid reasons for conducting interviews, as they develop detailed descriptions since researchers need to learn as much as they can about events in which they did not participate. To integrate multiple perspectives, researchers can observe various respondents for description of events from multiple perspectives, to learn how events are interpreted through the lenses of the respondents.

This research employed interview to collect the respondents’ understanding of general questions and follow-up with specific questions. The interview guide or semi-structured questionnaire helped the researcher to conduct systematized interviews for all the 30 respondents.

Borg and Gall (1989) states:

Semi-structured interview has the advantage of being reasonably objective while still permitting a more thorough understanding of the respondent’s opinions and the reasons behind them than would be possible using the mailed questionnaires; ……and they are generally more appropriate for interview studies in education because it provides a desirable combination of objectivity and depth, and often permits gathering valuable data that could not have been successfully obtained by any other approach (p. 452).

It is worth noting that semi-structured interviews are more of a discussion. According to Malinowski (1989) open-ended types of questions are normally questions asked in a semi-structured interview. The semi-structured interview guide for the
respondents at OSHS centered on their knowledge, understanding and attitudes towards ICT integration in the school. The interviews were conducted in English, since English is the official language of teaching in Ghanaian senior high schools. The semi-structured interview guide used for the policy makers centered on their experiences in developing ICT policies and factors that influenced the development of policy statements, the rationale of the policies and the implementation strategies among other factors. The interview guide for the assistant headmaster, teachers and students focused on their experiences on ICT use in the school.

(See appendices A-E for the detailed interview guides).

**Recording of the Interviews and Data Management**

As Lofland (1971) puts it, “field notes provide the observer’s *raison di etre*. If… not doing them, [the observer] might as well not be in the setting” (p. 102). One of my basic recording devices was my field notebook, which the researcher used to record the process of the entire study. The researcher continued to use the field notebook to record the appointments, take notes of events, and record the interview process. The field notebook was also used to record observations and related issues of the entire data collection process. The researcher used two digital tape recorders for the interviews process. After each interview process, the researcher downloaded the data to my personal computer that he carried along to the field. The researcher created separate electronic folders on my external drive in which he saved all recorded interview. This approach allowed the researcher to easily retrieve the recorded interviews for transcription processes. Finally, the researchers also backed-up the recorded interviews on his personal computer.
Observations

McMillan (2004) provides interesting aspects of observation in research. According to him, “observation allows the description of behavior as it occurs naturally. Observation of behavior in natural settings also allows the researcher to take into account important contextual factors that may influence the interpretation and use of the results” (p. 164). He reiterates that observations range from qualitative to quantitative, with the quantitative observation being more controlled, while the qualitative observation is less controlled. Glesne (2006) clearly draws a distinction between an observer of an event or people and an observer who participates and still observes. According to Glesne (2006) “the researcher carefully observes, systematically experiences, and consciously records in detail the many aspects of a situation” (p. 52).

The researcher observed how ICT policy in education is being implemented at OSHS. As an observer, he took note of what occurred between teachers, students, and assistant headmaster. The researcher meticulously observed teachers’ use of ICT in teaching in classroom and students’ use of ICT to enhance learning in the schools. Detailed reports on my observations can be found in subsequent chapters.

Document Analysis

According Patton (2002) document analysis in qualitative research provides “records documents, artifacts and archives” (p. 293). Documents provide historical and contextual dimensions to enrich, support, challenge and expand such other forms of data collection as interviews and observations (Patton, 2002). Researchers rely most heavily on the use of documents because as cited by Glesne (2006), documents not only support
interviews and observations but also they have the ability to develop the researcher’s knowledge and understanding of the phenomenon under enquiry.

Generally, the researchers see documents in the role of providing information, which a qualitative researcher could not achieve through observation. They reveal things that took place before the study began. Documents help a researcher get the historical context of the issue under scrutiny. Glesne (2006) points out that “Documents help to know which aspect to develop in your topic” (p. 66). In Glesne’s view, documents “may also raise questions about your hunches and thereby shape new directions for observation and interviews” (p. 65). This means that if a researcher does a thorough job in document analysis, the research issue under study may take a very different direction, owing to what existing documents say about it. Glesne (2006) states that documents help in making the researches findings trustworthy.

Whatever a document contains, it has to be analyzed for the contents to be contextualized. According to Marshall and Rossman (1995), “Probably the greatest strengths of the content analysis method are that it is unobtrusive and non reactive. It can be conducted without disturbing the setting in anyway” (p. 86). The use of documents becomes more useful especially in the process of triangulation. The documents helped me to double check information obtained in the field through, for instance, interviews and observation. One hopes to arrive at a situation in which one method complements the other.

The documents analyzed under this study were: Millennium Development Goals (2000), World Education Forum declaration (2000), World Summit on Information Society Plan of Action (2005), National Development Policy Framework (Ghana Vision
The researcher explored other sources of documents that relate to OSHS such as teachers’ lesson plans/notes, minutes or records of Parent Teacher Association meetings, newspaper clippings, and any related documents that helped the researcher to understand the state of ICT integration in the school. I reviewed some of these documents before and after entering the field. This approach assisted the researcher to identify the gaps between the documents and the actual implementation at OSHS.

**Before Gaining Entry into the Field – Ethical Issues to be Considered**

The researcher took note of ethical issues before entering in the field to conduct the study. The IRB approval and consent forms from Ohio University were used as formal approval to conduct the study. All selected respondents were given formal consent forms to read to determine if they would like to take part in the study. Apart from one of the policy makers who decided to be anonymous, the rest of the respondents expressed their willingness for their official names to be used. For the sake of respondents at OSHS, it was agreed among all the respondents to use pseudonyms. All the respondents read and signed the consent forms before the interview was conducted. The researcher ensured high sense confidentiality without leaking any information to any of the respondents in interviews held with their counterparts.
My Role and Position as the Researcher

My role as the researcher and position in this context is very crucial. Patton (2002) indicates that in a qualitative study, the researcher serves as the instrument for the information gathering process. It is worth noting that researchers are hardly devoid of being total neutral since researchers are normally influenced by their professional background, cultural beliefs and attitudes. Based on that I was conscious about assumptions and my biases that could influence my findings of the study I relied on the information provided by my respondents. As Geertz (1973) advises on how to reduce bias in qualitative studies, in this study I kept to the interpretation of the data gathered from my respondents based on their contexts.

I was born in Ghana and lived and worked there for over 15 years. I have been a program manager of an ICT in education program known as the Global Teenager Project (GTP) and the country coordinator of International Education and Resource Network (IEARN). I have managed the GTP for 12 years before migrating to Ohio University to pursue my graduate studies. The GTP seeks to build capacity of teachers and students to use ICT as tools for teaching and learning. Before migrating to Ohio University, I had my education in Ghana and obtained bachelors and masters degree. I have worked in various capacities as monitoring and evaluation manager and chief executive officer of an NGO.

I have also worked closely with officials at both MOE and GES to build capacities of teachers and students to integrate ICT in education. For that matter, I have had experiences of integrating ICT in education. During my 2009 summer break in Ghana, I had the opportunity to be part of a committee that interviewed and short-listed a group of ICT tutors vying for “the Best ICT in Education Teacher Award.” In the course
of interviewing the teachers, I gained a better understanding of some of the challenges facing the teachers in their quest to integrate ICT in teaching. My further studies have provided me the opportunity to understand challenges, concerns and prospects of teachers in their efforts to integrate ICT in education.

My role as the researcher was served as the tool, thus, being the data collector, listener, transcriber and the reporter. My efforts in the data collection process further enhanced my understanding of the situations. I took an active role in the entire study process. Patton (2002) avers that the qualitative research person has to be proactive in the entire study process. The assertion by Patton (2002) provided me the impetus that ingrained me throughout data collection analysis and interpretation process.

As a researcher, I brought both an insider and outsider views into the study. As an insider, I am conversant with ICT integration in Ghanaian schools. In addition as an insider, I entered the field as someone who understands the dynamics of the topic studied. I also comprehend the state of affairs in the school and policy with regards to ICT in education issues.

As an outsider, I observed, analyzed documents and listened to the stories and experiences of my respondents.

Using Fedlter’s Contingency of Leadership theory as a lens to examine the role of Ghana’s ICT policy makers and their impact on education and using UNESCO’s Continuum Approach of ICT Development model to ascertain how ICT is being integrated in OSHS also requires recognizing my personal values, believes and biases. As the research instrument, I identified myself as a Ghanaian and an educator. Being born and brought up and educated in Ghana up to graduate school, I must have my biases as a
former Ghanaian student and as a Ghanaian educator who understands the system very well. However, for six years, I have been in the USA pursuing my masters and doctoral programs. Staying away from home qualified me as an outsider to the current educational system in Ghana. The outsider view that I brought to this research enabled me to maintain neutrality from the respondents. My role as the researcher in this situation capitalized on such a relationship that created a rapport or alliance formation by drawing upon the shared experiences and attributes as points of connection (Hopkins, 2007).

Data Analysis

The major steps the researcher used in analyzing the data are development of themes or classify and the use of the theoretical framework and model for analysis. After classification of the emergent, themes arising from the data, the researcher later coded these themes. In addition, to enable the researcher present coherent research analysis, he used the research questions to provide emergent themes from the data. The study was analyzed within the Fielder’s Contingency of Leadership theory as a lens to examine the role of Ghana’s ICT policy makers and their impact on education and using UNESCO’s Continuum Approach of ICT development in OSHS framework.

First, the researcher examined background information of the policy makers interviewed and their contribution towards ICT in education policy development and implementation processes. The researcher also analyzed background of OSHS, the backgrounds of assistant headmaster, teachers and students and how they are using ICT in teaching and learning in the school. It is important to obtain all above stated information in order to comprehend the origins and context of the respondents’ point of
view. After analyzing the data, the subsequent chapters focused on discussion, recommendations and conclusions of the study.

During the data analysis processes, the researcher cross-checked the collected data and used a variety of analysis methods which included coding to identify themes, patterns and categories which, included open and axial coding to identify themes, patterns and categories which eventually led to the findings, recommendations, and conclusions.

**Trustworthiness, Validity and Credibility in the Data Collection Process**

In terms of ensuring trustworthiness, validity and credibility of the study, the researcher upheld the following principles of qualitative study: Confidentiality, rigor, prolonged engagement, persistent observation, member check, triangulation, validity and reliability.

**Confidentiality**

Confidentiality was one of the hallmarks of the study. The dignity, integrity and privacy of the participants were respected at all time (Guba & Lincoln, 1989). Where qualitative research methods were used, the issue of informed consent can often be tangled and contested (Howe & Dougherty, 1993). In the case of respondents at OSHS, anonymity and confidentiality was accorded to assistant headmaster, teachers and students interviewed. Each one of the respondents was asked to read and sign the informed consent forms to take part in the study. Those who were not willing to take part in the study were not to be coerced to do so. Each of the respondents had a ‘voice’ in the data collection and analysis process. Maykut and Morehouse (1994) believe that collaboration helps to reduce the power differential between researchers and respondents. It has been suggested that the consent by the respondents for a study needs to take place as an ongoing dialogue as the
study unfolds (Howe & Dougherty, 1993). The researcher ensured constant contact with my respondents throughout the study. To ensure confidentiality and privacy of my respondents the researcher sought their permission in case there is possibility of any material or artifact meant to be published.

**Rigor**

In qualitative study, the data collected and the resultant findings need to be consistent and dependable (Merriam, 1988). By ensuring trustworthiness of the study the following criteria were used: prolonged engagement; persistent observation, and member check (Lincoln & Guba, 1987).

**Prolonged engagement**

Since the study was conducted within an eight-week period, the researcher’s substantial time and energy every day on average four hours was to conduct interviews, observe how ICT is used in teaching and learning in the school and established rapport with the respondents. This built the trust necessary trust was built it assisted in observing and understanding the context of the study.

**Persistent observation**

In the study, the researcher was persistent in the participant observations by fully immersing himself in the life of the teachers and students. The object of persistent observation, according to Guba and Lincoln (1989), is to add depth to the scope that prolonged engagement affords. It is worth noting that the intensity and duration of the observations contributed to the overall trustworthiness of the study.
**Member check**

During the study, I conducted debriefings and discussed with the assistant headmaster, teachers and students the researcher’s initial observations and interpretations of teaching and learning observed in the classroom. The debriefing sessions occurred at both the formal and informal level. At the formal level, the researcher debriefed the teachers immediately after each session. The researcher also checked with the teacher any preliminary categories of data that he formulated. These processes occurred continuously throughout the data collection, analysis and at the report level.

**Triangulation**

Another criterion the researcher used to ensure the trustworthiness of the study was by employing the concept of triangulation which Guba and Lincoln (1989), refers to the crosschecking of specific data items of a factual nature. To ensure triangulation, the researcher used multiple methods of data collection and analysis process. The researcher used different data collection methods in gathering data for the study. Berg (2001) states that “triangulation does not merely involve a combination of different data collection methods; rather, it is aimed at relating the different methods in order to counteract the threats to validity identified in each method” (p. 5).

Berg (2001) contends that “triangulation does not merely involve a combination of different data collection methods; rather, it is aimed at relating the different methods in order to counteract the threats to validity identified in each method” (p. 5).

The researcher used non-participant observation and document analysis methods to cross check facts with interviews conducted. As such, triangulation can be considered an approach that strengthens reliability as well as internal validity (Merriam, 1988). In the
study, the researcher used a variety of data sources that included field notes, observations and examination of policy documents, newspaper cuttings, notes from interviews and debriefings to ensure triangulation and validated the information gathering processes.

The entire interview processes with the policymakers, the assistant headmaster, teachers and students were merged with observations and documents to identify the emergent themes and common trends. Patton (2002) underscores the importance of using different data collection methods to ensure validity. Patton (2002) states:

Some studies inter-mix interviewing, observation, and document analysis. Others rely more on interviews than observation and vice versa. Still there are studies that use multiple methods in which different types of data provide for cross-data validity checks (p. 248).

Validity and Reliability

Walcott (1995) contends that validity in qualitative research has to do with description and explanations that fits the description. Maxwell (1996) underscores the importance of ensuring validity in qualitative study. Maxwell (1996) states: “the correctness or credibility of a description, conclusion, explanation, interpretation, or other sorts of account” (p. 87). To ensure validity of the study, the researcher relied on the interviews, observations and document analysis in interpreting and explaining the data. The researcher ensured validity and reliability of the study by comparing interpretations provided by the various policy makers, the assistant headmaster, teachers and students, what was observed in the school and the information gathered from document analysis.
Conclusion

To conclude, the above-stated description helped me in the research process by guiding me to collect data and subsequent analysis. In addition, as a potential Ph.D. holder the process helped me to gain experience in designing, gathering data, managing data and analyzing data. The above stated useful guidelines were also crucial for every researcher to utilize in conducting a research. As indicated earlier, the researcher utilized them in ensuring that the research remains rigorous and subjective (Glesne, 2006. Yin, 2003).
Chapter 4: Contextualizing Ghana’s Educational Policy and ICT in Education

Policy

Introduction

Chapter four attempts to contextualize Ghana’s educational policy before and after independence. The chapter also discusses the evolution of Ghana’s ICT4D policy and ICT in education policy development process. The chapter finally discusses the current state of ICT integration in Ghanaian senior high schools.

Evolution of Gold Coast (Ghana) Educational Policies before Independence (1821-1946)

According to Little (2010) Ghana’s current basic education structure dates back to its colonial period. Between 15th and 19th centuries, the French, Portuguese and the British colonial merchants built a limited number of schools along the coastal areas. Some of these schools still exist. Early Christian missionaries were also instrumental in providing educational access to the people of Ghana. Little (2010) contends that between 1821 and 1840 the British Crown authorities financed a number of government schools, including one for girls. “Both government and church-funded schools were based on the public ‘monitorial’ schools then current in England” (p. 5). Little further notes that there was acute educated unemployment during the 1850, caused by a lack of white-collar jobs for school graduates. It is also worth noting that there was an increment in construction of new schools between 1881 and 1901. In 1901, for example, the Basel Mission constructed 61 schools and the Wesleyan Mission built 49. Most of these schools were restricted to educated elite children, and whites.
According to Little (2010), there was a distinct change of the colonial government policy towards development of education in 1919. By then Governor of the Gold Coast Gordon Guggisberg put forward a 16-point guiding principle for the development of education in the colony. Little contends that the principles:

- Stressed equal opportunities for boys and girls, co-education in certain stages, the importance of a vernacular education as the base for English education, the provision of trade schools to equip young men with craft skills and high quality teachers. (p. 5)

Little (2010) indicates that by the 1946 academic year, the crown colony had developed a 10-year educational program intended to enroll all pupils into primary school by 1970. It is worth noting that prior to the development of the 10-year educational program, there was no comprehensive educational policy.

**Evolution of Gold Coast (Ghana) Educational Policies Before Independence (1951-1956)**

Little (2010) underscores the development of education in Gold Coast (Ghana) in 1951. According to Little, 1951 was the turning point in the colony’s education transition. In that year the Convention People’s Party (CPP), under the leadership of the late Dr. Kwame Nkrumah, won the legislative assembly election. The era marked the transition from colonial rule to independence. Dr. Nkrumah set up an educational policy review committee known as the Accelerated Development Plan (ADP) for Education that ushered in the new educational policy. Little reveals that during that era, the colony’s education program was more extensive than that of any other African country.
The authors of the Accelerated Development Plan (ADP) for Education of 1951 proposed a massive expansion of provision for primary and middle school education. The plan laid down a revised structure for general education comprising six years of primary, four years of middle school, five years of secondary and two years of sixth-form education. This structure was introduced gradually and became the blueprint for the system until the 1970s when the structure of the middle and secondary schools was experimented with and until the late 1980s when the structure was changed more fundamentally. (Little, 2010, p. 7)

Little (2010) explains that the educational policy provided an opportunity for school leavers, popularly known as “pupil teachers”. The pupil teachers were enrolled in teacher training colleges while still in active service. Little (2010) states:

Under the ADP, Teacher Training Colleges were opened and ‘pupil teachers’ were trained while in service. The ADP introduced tuition fee-free primary education and undertook ‘emergency’ training of large groups of teachers. The emphasis was on an expansion of access to education for all groups in society. The authors of the ADP introduced the term ‘Universal Primary Education’ (UPE) into the policy discourse. Enrolment growth was rapid. (p. 7)

**Evolution of Ghana’s Educational Policies (1957-1966).**

According to Addae-Mensah et al. (1973), after Ghana became independent on March 6, 1957, the late Dr. Kwame Nkrumah became the first President of the country. He adopted a socialist ideology, introducing free education in the Northern region and northern parts of the Brong Ahafo region of Ghana. The idea was to bridge the gap
between children from the northern parts of Ghana and those in the Southern parts because children in the northern parts were from impoverished homes and development in the region could not be compared to that in the south. When Ghana became a republican state in 1960, Dr. Kwame Nkrumah ushered in the Education Act of 1961. Addae-Mensah et al. (1973) indicate that this made elementary (primary and middle school) free education to all school going pupils. However, parents were tasked to provide textbooks.

According to Little (2010) there was tremendous increase in enrolments at elementary education level. She states:

In the six years between 1960/1 and 1966/7 enrolments in public elementary schools more than doubled. By the early 1960s social stratification in access to education in Ghana was already clear. By the early 1970s only about five percent of those who entered primary made the transition to secondary education for which tuition fees continued to be charged. (p. 7)

Little (2010) reveals that when the late Dr. Nkrumah was overthrown in a military takeover on February 24, 1966, the new government the National Liberation Council (NLC) led by its chairman Major-General Ankrah, set up an Educational Review Committee under the chairmanship of Professor A. A. Kwapong. The committee was tasked to review the existing educational policy. The military junta criticized the Educational Act of 1961 as a major contributor to the increase the unemployment rate in the country. Little (2010) states:
The rapid expansion of access to education in the 1960s was raising concerns in some quarters about the low quality of educational provision. This led to calls to decelerate plans to expand enrolments and to focus on quality. (p. 8)

According to Little (2010), the review committee proposed that after two years of middle school education, a group of pupils should be selected to continue with secondary school education. The remaining pupils are expected to continue their education at pre-vocational education known as continuation school for an extra two years. Little (2010) states:

The committee’s report also recommended that a long-term objective for the system should be a course of six years at primary school, four years of secondary education, and two years of sixth-form leading to three or more years at university. Although the introduction of ‘continuation school’ was intended to meet the demand for education relevant to the world of work, its implementation reinforced social divisions between rich and poor as it channeled poorer children into an inferior education oriented to lower status jobs. (p. 8)

It is worth noting that pupils in primary class six (final year of primary school) could enter secondary school by passing the Common Entrance Examination (CEE).


Little (2010) states that the Progress Party (PP) won the 1969 election after Ghana reverted to constitutional rule. The PP government, under the leadership of the late Dr. Abrefa Busia, was said to be against Nkrumah’s policies and that of the NLC. Dr. Busia introduced liberalized political and economic policies. His educational policy focused on quality as compared to that of Nkrumah that was described as quantity in focus. Even
though the government initiated some changes in educational policies, they could not be implemented before the regime was overthrown in another coup d’etat on January 13, 1972. A new military junta known as National Redemption Council (NRC) took over the reign of the country.

Little (2010) observes that during the NRC regime the focus on education shifted from elementary to secondary school education. Little contends:

While the education policy discourse had shifted between 1966 and 1970 to a concern with education quality, it was clear that attention to quality rather more than general levels of access was favoring the educational chances of the elite and ruling classes. By the early 1970s educational access had resurfaced as a prime concern. By now, it was the issue of access to secondary rather than primary school that had moved center-stage. (p. 8)

Addae-Mensah et al (1973) conducted an empirical study to ascertain the state of educational access to pupils in private schools and their counterparts in the public schools. The study focused on demographic analysis of the parents of the wards in both category schools and pupils’ performances at CEE. The research report reveals a wide gap in terms of performances among pupils in private schools and public schools. In addition, it was revealed that pupils at private schools normally transit to secondary schools after class six, while their counterparts at public schools transit to secondary schools after going through middle school that normally takes them between eight to ten years of primary and middle schools.

Little (2010) states:
In 1972, 21% of students from special primary schools appeared among the first 1,000 best performing candidates, compared with less than one percent of students from government schools. Successful candidates from special schools entered the high reputation secondary schools disproportionately. Many of the middle classes used the private primary schools to give their children a head start in the race to gain access to the best government secondary schools via the CEE without recourse to the middle school. Access to secondary education was not only unequal across the social classes but it was also inequitable. (p. 9)

Against the backdrop of inequality in access to education and low standards of education, the NRC government tasked the late Professor Noah Dzobo to review the basic education structure and curricula. In 1974, Dzobo’s educational review committee came out with a new policy known as New Structure and Content of Education (NSCE). It is worth noting that Dzobo’s committee made reference to the 1971 educational policy recommendations that Dr. Busia could not implement before he was overthrown in 1972.

Little (2010) indicates the Dzobo Committee recommended eradication of the “middle school” system, to be replaced by Junior Secondary School (JSS). Little states:

The NSCE proposed a common, diversified and extended basic education cycle in which all children would follow a common curriculum for nine years, six in primary schools and three in the newly established junior secondary schools (JSS), followed by four years of senior secondary school (SSS) split into two stages of two years each. The recommendation was partly motivated by concerns in relation to equity which had surfaced following the appearance of favorable routes through the basic-school system for those able to access better quality
education (often through private schooling) at the earlier stages, which afforded a considerable selection advantage at secondary-level. (p. 9)

According to Little (2010) for the first time, the Dzobo’s Committee proposed a practical and skill-oriented type of curricular at both primary and JSS levels. In order to ensure smooth running of the new educational reform policy, the Ghana Education Service (GES) was established to take charge of the implementation processes. The Ministry of Education (MOE) remained the body in charge of policy initiation and coordination issues. Yet there were problems in implementing the new educational policy throughout the entire nation.

One major problem was lack of financial resources to implement the policy nationwide. World Bank (2004) cited oil price hikes, low direct foreign investments and general national economic decline as factors that contributed to problems in the implementation of the educational policy. World Bank (2004) asserted that the implementation of the JSS concept was fraught with such fundamental problems as lack of inadequate learning materials, lack of trained teachers and a mass exodus of Ghanaian teachers to look for “greener pastures” in neighboring Nigeria.

Little (2010) cited an initial problem of resistance to implementing the policy from middle class bureaucrats within MOE and GES. The bureaucrats were afraid of losing their power and authority. Little (2010) avers: “Although 118 experimental JSS were established between 1974 and 1986, this plan was not extended to the whole country. There was considerable resistance to the JSS concept, not least from among the middle-class bureaucrats of the newly established GES” (p. 9). Palmer (2005), on the other hand, reveals that Dzobo’s educational reforms failed to achieve their intended
purpose. Palmer states: “This reform failed to achieve the expected quality outcome and exposed the education sector to public criticism” (p. 34.).

**Evolution of Ghana’s Educational Policies (1979-1987)**

According to Little (2010), Ghana experienced a third military intervention in government on June 4, 1979, when then Flight Lieutenant Jerry John Rawlings overthrew the NRC regime that later metamorphosed to be known as the Supreme Military Council (SMC). Rawlings formed the Armed Forces Revolution Council (AFRC). The AFRC regime sought to purge the society of a high rate of corruption, malpractices and a great lack of discipline. The AFRC relinquish power to an elected People National Party (PNP) government in September 1979. The late Dr. Hilla Limann took the helm of governance in the country.

Antwi (1992) avers that Dr Hilla Limann’s government introduced two key policy reforms, namely, the de-boardinization and curriculum enrichment programs. The de-boardinization policy put a premium on construction of community day schools instead of boarding schools. The policy was intended to introduce community participation in school management. The curriculum enrichment program introduced cultural studies in Ghanaian schools. The de-boardinization policy increased enrollment rates in the schools. Unfortunately, Dr. Hilla Limann’s short-lived government was overthrown on December 31, 1981.

It is worth noting that the PNP government lasted for only two years. Flight Lieutenant Rawlings overthrew the NPP regime on December 31, 1981 and second *coup d ’etat* ushered in Provisional National Defense Council (PNDC). The World Bank (1989) indicates that in the early part of the PNDC era, the economy was in shambles.
For example, in 1982 per capita incomes were 30% lower than that of the 1970s level. The economy could not support the educational system.

**1987 Educational Reforms**

Pedley and Taylor (2009) note that in 1983 the leadership of the PNDC regime approached the International Monetary Fund (IMF) and the World Bank for financial assistance to salvage Ghana’s ailing economy. In 1983, the government launched the Economic Recovery Program (ERP) that brought about socio-economic policies within the country. One of the major initiatives was Education Sector Adjustment Credit (EdSAC), which became operational with assistance from development partners, especially the World Bank, and the Overseas Development Agency (ODA) and grants from other international funding sources.

According to the National Educational Forum (1999). Ghana’s educational system, once described as one of the best in West Africa had deteriorated in quality. For example, morale of teachers and supervisors was low, enrollment rates had dropped and there was a mass exodus of teachers to neighboring countries. The World Bank (1989) indicated the government’s ERP called for reform within the educational system. The World Bank (1989) states:

> The PNDC government realized that if the ERP was to succeed, the skill and attitudes of Ghanaian youth would have to be changed so that they would be prepared to become productive farmers or skilled artisans and craftsmen ready to work for their own, their community’s and their country’s development. (p. 2)

Little (2010) reveals that in 1983, the PNDC government initiated educational reform policy that was later known as PNDC Law 42. It called for the dissolution of the
National Council for Higher Education (NCHE) and the Ghana Education Service Council. The statutory powers of the two bodies were arrogated by the then PNDC Secretary for Education (Minister for Education). As a follow up to the enactment of PNDC Law 42, a conference of Directors of Education reviewed the Dzobo educational reform report. The outcome of the conference led to establishment of the National Education Commission in 1985 to advise the Secretary for Education.

Little (2010) contends:

The commission held extensive consultations across the country that involved trade unions, the heads of secondary schools, civil servants and university students. Technical advice from foreign consultants and the World Bank was employed alongside technical advice from a wide range of Ghanaian professionals. In essence, the NEC’s recommendations echoed those made nine years earlier by the Dzobo committee under the military regime of the National Redemption Council. (p. 13)

Little (2010) stresses that the functions of NEC were later taken over by the Ministry of Education. The NEC recommendations, among others, gave birth to the 1987 educational reform policy. According to Little, the 1987 reforms were developed to address the numerous challenges confronting the educational sector.

Antwi (1992) recounts that in 1987, the Chairman of the PNDC appointed Dr. Evans Anfom, a renowned educator, lawyer and statesman to review the educational policy. The 1987 educational reforms had features very like Dzobo’s educational reforms. The content and structure of education have the same goals to reform of education and curriculum with the main idea of enhancing more active learning,
diversifying the curriculum, increasing community participation in education and reducing the years of pre-tertiary education.

Anum-Odum (2009) avers that Anfom’s committee introduced a new curriculum and content, the main purpose of which was to enable the students to acquaint themselves with agricultural science, sciences and technology. As a follow up, the committee introduced pre-technical, agricultural science and pre-vocational courses. It is noteworthy that the reform placed a premium on the arts of analytical and critical thinking, arts and creativity and acquisition of skills. Other elements of the new curriculum were teaching of social and cultural studies, French language, Ghanaian languages, health protection courses and environmental studies.

Little (2010) indicates that one of the major goals of the 1987 reform was to improve access to education with emphasis on the junior secondary level and to improve the quality of teaching in schools. In terms of the structure, the new reforms were intended to reduce the pre-university educational system from 17 to 12 years. The new system included six years of primary school education, a three-year junior secondary school education and a three-year senior secondary school education as compared to six years of primary education, four years of middle school education, five years ordinary level secondary education and two years advanced level education (sixth form). As indicated earlier, the Anfom’s 1987 educational reforms had major features from Dzobo’s committee that in turn had had major elements from the 1971 committee set up by Dr. Busia (Little, 2010).

According to Anum-Odum (2009), Anfom’s committee reforms were intended to enhance Ghana’s developmental agenda. First of all, the reforms were focused on
providing broad-based manpower for all sectors of the economy. This involved human capacity building in agriculture and harnessing the necessary raw material for industrialization processes. Secondly, the reforms were focused on providing training of students in technology and science education for the development of a technology based-economy.

The World Bank (1989) indicates that the implementation of the new reforms were full-fledged in 1987. There was no form of piloting the reforms. Fobih et al., (1995) reveal that the main aim of the first phase of the reform was to restructure and rehabilitate first-and second-cycle educational systems in the country. Resources such as textbooks, in-service training for teachers, and classrooms were provided. However, the inputs were not enough to change the style of educators’ teachings in the schools. The second level of reforms centered on rationalization of the curriculum, motivation of teachers, school and community participation and improving quality of instruction in schools.

Anum-Odum (2009) indicated that a policy analyst credited the 1987 education reforms that established comprehensive basic education that improved pupils’ educational access. The government provided JSS nationwide assisting in transforming education at the basic level. For the first time, reform introduced a Continuous Assessment (CA), a type of internal assessment that formed part of the final examination.

Little (2010) shows how the backdrop of implementation of the 1987 educational reform was the transition from military to constitutional rule. Flight Lieutenant Rawlings resigned from the military and resumed as the leader of the National Democratic Congress (NDC) political party that contested political power in 1992. The NDC party won and Rawlings was sworn in as president under the Fourth Republican regime.
According to Little (2010), the 1992 Constitution that ushered Ghana into the fourth republican regime put a premium on free compulsory education at the basic education level. Little (2010) states:

This constitutional duty added new impetus to the implementation of the 1987 reforms through the Free, Compulsory, Universal Basic Education program (fCUBE). The enshrinement of free and compulsory basic education in the constitution reinforced more strongly than before the principles of free primary education set out in 1951 and the free and compulsory education clauses in the 1961 act. The constitutional mandate gave citizens of Ghana the legal right to free and compulsory education. It also offered legitimacy to the civilian government. (p. 22)


Evolution of Ghana’s Information Communication and Technology for Accelerated Development of Ghana’s ICT4D Policy Document

According to the Government of Ghana (1995), the national development strategy stresses the use of ICT to increase the socio-economic development of the nation. Yidana (2007) intimates that as a follow up of the general goal, the government set up a national commission on ICT in 2002 to draft a national policy. Yidana asserts that:

In furtherance of this national goal, a national commission on ICT was set up in 2002 to develop a national ICT policy. The development of this policy was based
on an extensive nation-wide consultation with stakeholders from the public and private sectors, the academic community, as well as civil society, including members of various political parties and groupings. (p. 1)


The Ghana ICT4AD policy statement set the tone for the framework for the ICT for the nation’s development. The policy document outlined 14 pillars for ICT4AD. The 14 pillars were based on sectoral or various ministries of the state. One of the 14 pillars of the ICT4D policy is promotion of ICT in education (Government of Ghana, 2003). The ICT in Education Policy resulted from an extensive consultation process, in which various sector stakeholders – public, private, civil society and development- partners were represented. In defining the strategic use of ICT to achieve developmental objectives for the sector, a number of guiding principles were adopted. These reflect national needs and priorities as they relate specifically to the education sector. Several international declarations and national documents have influenced the policy, including:

4. The Ghana ICT for Accelerated Development (ICT4AD) Policy (2003) that recognizes education as a cross-cutting issue within the national framework crucial to the support of the 13 other national pillars.


The development of the policy represents a critical step in streamlining efforts towards diffusion of ICT into the educational sector (Ministry of Education, 2008). The process included the following steps:


2. The development of the *Introduction of Information and Communications Technology in Education: a Policy Framework* (2002) as a part of the initiative of the Ghana Education (GES) to streamline implementation of ICT programs in pre-tertiary institutions.


4. The development of the Education Strategic Plan (2003) which addressed policies, targets and strategies including the need for ICT in Education.

5. A survey of the education platform that provided a situational analysis of the sector and was presented in the Ghana e-Schools Initiative High Level Business Plan (2003).

6. The development of the actual draft policy document for the sector including
a number of sector stakeholder consultations (January–December 2006).

(Ministry of Education Science and Sports, 2008, p. 3)

Gasu and Akakpo (2011) indicated that the Government of Ghana’s ICT4D policy visions and goals are clearly stated, as a result of efforts by the Ministry of Communication in collaborating with local government authorities since 2004 to set up Community Information Centers (CICs) at the various municipal and district assemblies nationwide.

Gasu and Akakpo further averred:

The Ministry of Education has also been keen to set up ICT laboratories, especially in high schools, to equip the young with the requisite capacities to make them competitive in this digital age. The Advanced Information Technology Institute (AITI), established in 2003, at the Kofi Annan Centre of Excellence in Accra, is at the apex of the programs in capacity building. (p. 265)

Gasu and Akakpo (2011) reveal that Vodafone Ghana, formerly Ghana Telecom (GT), constructed fibre–optic network loop’s in both the North and the South of the country.

They elaborate:

It is also noticeable that in the past few years’ mobile telephony has been quite vibrant and competitive in ways that have contributed to the expansion of ICT coverage in the country. The coverage can be utilized for the purposes of e-governance and related electronic applications. (p. 265)

1999 Ghana National Education Forum

According to the Republic of Ghana (2004), when getting to the end of the 20th century it became necessary for the government to review the education sector to enable
the country to position itself for the 21st century. The National Education Forum (NEF) was subsequently organized in November 1999. The main purpose of the forum was to restructure what by then were senior secondary school programs and to identify challenges facing tertiary education funding. The main outcomes of the forum that focused on the second-cycle educational system were:

- Drafting of education national education strategic plan to provide direction to education;
- the conduct of needs assessment by educational consultants to identify technical assistance for all the divisions of GES;
- establishment of incentive packages for teacher teaching in remotest parts in the country;
- creation of Implementation Coordination Unit at GES head office to assist the Director-General of GES to liaise with other divisions within the set up;
- establishment of Development Partner Unit (DPU) at MOE to liaise activities of development partners assisting educational projects. (Republic of Ghana, 2004. p. 10)

The 1999 Ghana National Education Forum was one the main success in the development of second-cycle education in the country

**2007 Educational Reform**

According to Little (2010), the New Patriotic Party defeated the National Democratic Congress during the 2000 presidential and parliamentary elections. Mr. Agyekum Kufour became the president of Ghana on January 7, 2001. At the same time, the MOE developed a strategic plan known as the Education Strategic Plan (ESP) of
2003-2015. The ESP was developed by professional educational planners and consultants with reference to EFA (Dakar Framework of Action) and MDG documents. It is also worth noting that the 2007 Educational Reform made mentioned of ICT integration in Ghanaian high schools.

**Education Strategic Plan (ESP) 2003-2015**

The Republic of Ghana (2004) indicated that to address the challenges confronting the country’s educational system in the 21st century, MOE in collaboration with others of Ghana’s development partners such as the National Commission for UNESCO, Civil Society (CSOs), Non-Governmental Organizations (NGOs) and other partners in education was developed. The Republic of Ghana (2004) states:

The document is informed by relevant sectoral national and regional review documents. These includes:

- Education Sector Review (October, 2002)
- Report of the President’s Committee on the Review of Education Reform in Ghana (October, 2002)
- New Partnership for Africa Development (2001)
- Education for ALL: Dakar Framework (2000). (p. 11)

It is worth noting that the ESP document was expected to guide all the action plans for the education including ICTE implementation process in the country.
Establishment of the Presidential Education Review Committee

According to the Republic of Ghana (2004), as a follow-up to the 1999 NEF, the Ghanaian president, John Agyekum Kufuor, set up a 30-member Educational Reform Committee chaired by Professor Jophus Anamuah-Mensah, a former vice chancellor of University of Winneba. The main task of the committee was to review Ghana’s Education Policy. The Republic of Ghana (2004) states:

The President’s Education Review Committee was of the view that the philosophy underlying the education system in Ghana should be the creation of well-balanced (intellectually, spiritually, emotionally and physically) individuals with the requisite knowledge, skills, values and aptitudes for self-actualisation and for the socio-economic and political transformation of the nations. (p. 10)

The Ministry of Education (2002) indicated that the committee embarked upon massive nationwide consultations through visits to districts and regions, institutions, phone-in radio programs, press briefings and submissions of memoranda. The committee recommended short, medium-and long-term reform of educational curricula at all the levels and reviews the structure of basic, second cycle, technical/vocational and teacher education system in the country. For the first time, the committee also scrutinized and proposed, restructuring of library and information services, introduction of ICT applications in the school system, how to ensure hard to reach pupils and students have access to education. The committee also recommended how special needs students will have access to education.

The Committee proposes a new basic education structure made up of 2 years kindergarten, 6 years primary, and 3 years JSS. The new basic education will therefore be

- 11 years. After basic education, the Committee proposes the following streams:
- 3 years senior secondary, leading to post secondary and tertiary education;
- Parallel technical/vocational education leading to polytechnics and the world of work; and
- Apprenticeship leading to the world of work; 3-4 years tertiary education.

The Committee also recommends the creation of Open Community Colleges and an Open University to provide avenues for work-study programmes and life-long education. The specialized institutions (post secondary institutions which are currently not tertiary) under the new structure would be upgraded to award diploma and would be affiliated to relevant universities and polytechnics. Credit transfer, Distance education, ICT, Special Education and Guidance and Counseling would be critical components of the new structure (pp. xx-xxi).

**2008 Ghana ICT in Education Policy**

Du Vivier (2010) underscores that, even though there have been implementation in Ghana of a series of pilot projects on ICT in education, especially at the tertiary institution level, it took Ghanaian policy makers many years to put an ICT in education policy in place. Du Vivier (2010) states:
Despite being identified as a key goal in the Ghana Poverty Reduction Strategy Paper, the Education Sector Strategic Plan for 2003-2015 (Ghana; Ministry of Education, Youth and Sports, 2003) and the ICTs for Accelerated Development Policy (Ghana, 2003, pp. 24 & 37-39), a policy document on ICTs in Education was only finalized in November 2008 and published the following January. (p. 4)

Du Vivier (2010) notes that the policy document identifies seven key thematic areas that must be adhered to ensure effective ICT utilization in education in the Ghanaian educational system. The thematic areas were:

- management at all levels of the system
- building capacity among teachers, administrators and support staff
- developing the necessary infrastructure for equitable access
- incorporating ICTs in the curriculum
- developing or acquiring educational content
- providing technical support and ensuring sustainable maintenance of installations
- monitoring and evaluating the system. (p. 4)

The ICT in Education Policy document seeks to inform sector stakeholders as to the importance of ICT in modern Ghanaians and its relevance in the education field (Ministry of Education, 2008). The policy is meant to underpin the goal of the Ministry of Education, Science and Sports, with a view to identifying how the sector will use ICT to “develop the requisite human resources for the country to meet the demand of the labor market, locally as well as internationally” (Ministry of Education Science and Sports, 2008, p. 3).
The ICTE Policy seeks to implement and coordinate ICT education in Ghanaian educational institutions:

within a coordinated end to end system with combined inputs of educational objectives, multi-stakeholder partners and funding in planning for the stages of (1) deployment of appropriate platforms (2) content and applications (3) user training and support (4) maintenance and technical support and (5) management, monitoring and reporting. (Ministry of Education, 2008. p. 9)

Ministry of Education (2008) outlines the overall vision statement of the ICT in Education Policy as:

Use appropriate ICT to support and align the sector Ministry’s policies, objectives and strategies, particularly as it relates to equitable access to education, quality of education, educational management, science and technology and labor market needs (p. 13).

The mission statement of the policy document is:

To enable graduates from Ghanaian educational institutions – formal and non-formal - to confidently and creatively use ICT tools and resources to develop requisite skills and knowledge needed to be active participants in the global knowledge economy by 2015. (p. 13)

It is noteworthy that all seven of the objective goals were adapted from Ghana’s *ICT4AD Policy (2003)* document. The 38-page policy document listed teaching and learning, management and administration, communication and access to information as key elements underpinning ICT in education. It sought to address four key issues in
educational institutions. The issues are “equity, access to ICT infrastructure, capacity building, norms & standards” (Ministry of Education, 2008. p. 15).

By equity, the policy document means providing equal opportunity for all students regardless of gender, race or color. Students with special needs and disabilities are expected to be catered for under the policy. In terms of access to ICT infrastructure, the ICT in Education Policy is expected to provide access to ICT facilities to students, teachers and school administrators throughout the country. The policy document identifies capacity building as a key element that will enhance ICT competency among students, teachers and administrators. Through norms and standards, the policy document provides for clear-cut norms, guidelines and standards to safeguard the use of ICT tools.

**The Current State of ICT Diffusion in Ghanaian Senior High Schools**

As the review literature above shows, the successive governments after the fourth republican constitution of Ghana have clearly stated the relevance of integrating ICT into pedagogy. The efforts were reflected through the government’s ICT policy initiation process, with some ICT projects being implemented in selected schools. To provide empirical data to ascertain preparedness of ICT use in senior high schools, MOE conducted an E-readiness study in 2009. According to the Ministry of Education (2009), out of 496 senior high schools, 87% reported having computer laboratories. “Closer observation and analysis revealed that the majority of such facilities fell below an acceptable standard that could be used to support teaching and learning objectives” (p. 7). The report further reveals, “Schools had resorted to converting classrooms, which were generally too small to accommodate the large class sizes, or had converted other structures such as libraries, corridors and even parts of hostels” (p. 7).
On the issue of functional computers at school, the study reveals, most of the computers in the laboratories were not in good shape. Most were either broken-down or not functioning well. The Ministry of Education (2009) indicates, that while 494 schools reported having computers, the number of functioning computers in the system was only 56.92%. “From the study significantly, only 231 schools, representing 46.1% had computers that met the minimum computer specifications (p. 8). On the student computer ratio, the report reveals that:

Even though the number of schools having access to computers seemed relatively high, the statistics collected on the student computer ratio at the regional and school levels underscored the significant challenges that schools were facing. Based on the data collected the average ratio of students to computers at the national level is 42:1 (Ministry of Education, 2009. p. 8).

The report further reveals a student-computer ratio at the school level ranging from 3:1 as lowest and 650:1 as highest. It is noteworthy that 40% of the schools surveyed had student populations of more than 1,000. Most of the computers in the schools were acquired from Private computer vendors, NGOs, benevolent associations, individuals, PTAs, churches or alumni associations.

In a related study, Karsenti et al., (2009) reveal that the computer-student ratio at the SHS level was 30:1. This finding corroborates MOE’s E-readiness study. Details of the national student-computer ratio are shown on table 5. On the table, the Northern region recorded the highest student-computer ratio at 50:1 and the Volta region had the lowest (33:1).
According to the Ministry of Education (2009), over 90% of the software applications being used by the schools surveyed were pirated. The report states:

Software application and operating systems posed an issue particularly as it related to licensing. 93.36% of the schools used unlicensed software which poses a major legal challenge, and for which they could be held accountable. (p. 9)

About other ICT equipment, the report reveals that the schools seemed to be fairly well equipped with printers, scanners, photocopiers, TV sets, and radio sets, among others. However, the report indicates, most of this equipment was used mainly to support administrative functions in the schools, not for teaching and learning.
About well-established LAN, the report states:

Of the five hundred and one (501) second cycle schools, one hundred and eleven (111) had local area networks in place, while three hundred and ninety (390) did not. Even fewer schools had access to the Internet. Only eighty-nine (89) representing 17.7% of the total number of schools had Internet, with eighty of the eighty-nine being in urban or semi-urban areas. Further analysis revealed that only 8.3% of the total number of computers in the system was connected to the Internet. (p. 10)

The report underscores poor Internet access and lack of Internet in most of the schools. High Internet subscription bills have caused the schools to discontinue such services. About availability and competency of ICT teachers, the report reveals that even though there were few ICT teachers in the schools, most were not trained to teach ICT. The report indicates that most were teachers of other subject, but the lack of suitable ICT teachers forced them to take on additional responsibilities as ICT teachers. The report further shows that ICT integration in the school curriculum was low. The Ministry of Education (2009) states:

Integration of ICTs for instructional purposes was generally low though it was noted that schools did have ICT tools and equipment that could be used to support this. This low use for integration was seen as having a direct link to the low skills levels in the area of integration by teachers, as well as limited access to ICT facilities as the computer laboratories were constantly in use. (p. 11)
Over 60% of the schools surveyed reported that the computer laboratories were closed when the school closed for normal class session. The situation did not allow students and teachers enough time to practice their computer skills.

It is evident from the statistics and contents of the report that ICT in the education implementation process is bedeviled with myriads of problems. The Government of Ghana (2002) bemoans the unregulated and uncoordinated manner in which ICT is being integrated into Ghanaian schools. In addition, lack of trained ICT teachers and personnel to integrate ICT into schools, and lack of indigenous content materials, among other problems, are challenges facing ICT integration.

The Government of Ghana (2002) states:

ICT training is provided mainly by the private sector in a fragmented, unregulated and uncoordinated manner. It is only recently that attempts are being made to introduce ICT into our educational institutions as a course. This initiative is beset with a number of problems, including the absence of a unified course content, lack of computer laboratories in most of the schools and lack of teachers, trained to teach ICT as a subject. At the tertiary level, there are inadequate training facilities and qualified staff to train high-level ICT personnel. (p. 70)

A research conducted to review *ICTs in Education Initiatives in Ghana* (Mangesi, 2007) sampled 20 initiatives and assessed their impact to ascertain what lessons can be learned. Several positive achievements were noted. Some of these are:

1. Initiatives contributed to a wider number of students and teachers acquiring ICT skills and developing strong interests in ICT and science;
2. Schools involved in the initiatives were motivated to expand...
the project and/or acquire more ICT equipment; a number of private-public partners, including parent.

3. Teachers Associations (PTAs) and civil society collaborated in the efforts;

4. Lessons learned from initiatives provided good examples for other schools to introduce their own ICT programs. (p. 8)

According to Mangesi (2007), the initiatives were confronted with a number of bottlenecks. At least half of the initiatives had been launched as pilots but none expanded into national programs. Some of the implementation challenges include:

1. Poor selection of schools without the involvement of Ghana Education Service;

2. GES and MOE, resulting in duplication. As a result some schools had several parallel initiatives while others (especially those in the remote rural towns) had none;

3. Lack of policy direction at all levels (schools, districts, national) for the integration of ICT in education;

4. Heavy dependency on external funds, with most initiatives stopped after depletion of initial funding;

5. Dumping” of obsolete and inappropriate equipment as support for the initiatives;

6. Low levels of ownership at the school level, due to external motivations, and low levels of understanding on the part of recipients about the potentials of ICT in education;

7. Trained ICT personnel (including teachers) far below the numbers demanded
to support the initiatives, with most capacity-building efforts on a one-time basis with no plans for continuous trainings. (p. 8)

There was further recognition that to ensure success and sustainability, ICTE projects should be implemented not necessarily to increase the number of computers, but rather to support discrete educational objectives. The lessons learned from the initiatives further highlighted the need for a well-coordinated, effective management approach to the adoption and use of ICT in schools. Such an approach could further improve access and implementation of quality education and better manage the impact of ICT in education. A review of the present challenges within the sector has been undertaken to ensure the definition of appropriate strategies for this policy. Existing policy and strategy documents for the sector have been reviewed, ensuring attention to equity, access and quality that are key priorities for the sector ministry.

It is noteworthy that despite the development of ICT infrastructure in Ghana, there is a resultant problem of electronic-waste or electronic and electrical gadgets no longer in use. Some of these include old, end-of-life computers, damaged cell phones, broken-down television sets, handheld devices and radios. Most of these ICT gadgets have been imported and deposited in the schools. According to Glen and Isaacs (2007), E-waste is becoming a major concern across the globe. The United Nations Environmental Program (UNEP) estimates that over 50 million metric tons of e-wastes are generated annually. The alarming situation prompted the United Nations to pass a resolution to halt importation of unregulated e-waste into African countries (Glen & Isaacs 2007). The Ghana government is in the process of enacting bylaws to regulate e-waste in the country (Quandzie, 2011).
Summary

To sum up, it is evident that Ghana’s formal educational reform has evolved since the pre-independence era. It is also evident that the British educational system heavily influenced the nation’s education policies. The long-term consequences were an educational system producing a large segment of “white collar” school leavers, a high rate of unemployment, and the emergence of an elitist society, among others. From the 1970s through 2008, each government’s education reform movement made efforts to shift from the colonial inheritance of an educational system toward a more progressive and transformative one. However, each successive regime was confronted with socio-economic and political challenges that hindered implementation of comprehensive educational reforms. In addition, persistent military intervention in politics was inimical to implementation of educational policies.

Ghana’s ICT4AD policy document of 2003 set the tone for the ICTE Policy in Ghanaian schools. Out of the educational reform initiatives, the Anamuah-Mensah’s educational reform committee of 2007 was a watershed in ICT integration education. The committee proposed for the first in the history of the country, the ICT integration in pre-tertiary and tertiary institutions in Ghana. The committee’s recommendations gave birth to the ICTE Policy and subsequent integration in the schools.
Chapter 5: Results, Discussions of Findings and Policy Implications of Ghana’s Educational Policymakers and their Impact on ICT Implementation in Schools

Introduction

Chapter five presents the results of the study, the discussions and possible policy implications of the results of the interviews conducted with nine Ghanaian educational policymakers. The study objective was to understand Ghana’s policymakers’ role and their impact on ICT in education.

The result of the study was analyzed based on Fiedler’s Contingency Leadership Theory. The primary purpose of the Fiedler’s Contingency Leadership Theory is to demonstrate how the creators of Ghana’s ICTE Policy initiate policies and how these polices are implemented at a model senior high school-OSHS. The theory was used as a theoretical framework in this study to help explain the development of Ghana ICTE Policy and the implementation process at OSHS.

Experiences of Ghana’s educational policymakers in policy creation and implementation in education in Ghana?

Since the main objective of the study was to determine the role of Ghana’s ICT policymakers in education and the impact on ICT education in Ghana, there is a need to profile my respondents to illuminate their background information and experiences.

There were nine respondents purposively selected through purposive sampling. Snowball or chain sampling is a type of purposive sampling whereby one respondent refers the researcher to other potential respondents who could take part in a research or study. The respondents are those perceived to have knowledge of the question under investigation.
According to Patton (2002), snowball sampling “is an approach for locating information-rich key informants or critical cases” (p. 237).

Through snowball sampling, the researcher identified and selected nine respondents (policymakers) to take part in the study. Eight of them willingly provided their background information, one decided to shield his background information for personal reasons. A brief description of each of the eight respondents’ backgrounds is provided below.

**Professor Jophus Ato Anamuah-Mensah**

Professor Jophus Ato Anamuah – Mensah was born on March 27, 1947, at Cape Coast, Ghana. He had his secondary school education at Ghana National College, Cape Coast. After completing Sixth Form, he was admitted to the then University College of Cape Coast, now University of Cape Coast. After completing his Bachelor of Science degree in 1972, he was offered a teaching assistantship at the same university. After a few years of teaching, he secured a scholarship and went to the University of British Columbia, Canada, to pursue his doctorate degree. After earning his doctorate degree, he returned to Cape Coast University where through hard work, dedication and commitment he rose through the ranks to become the Dean of Education at the same university. After years in that position, he was appointed Principal and Vice-Chancellor at University of Winneba in 1998 and 2004 respectively.

Professor Anamuah-Mensah set up the Centre for School and Community Science and Technology Studies (SACOST), to serve as a pan-African research and material development center and to promote community science and technology in African schools. He was the team leader for the Information and Communication Technology for
Development (ICT4D) research projects in Ghana. He was also the leader of the Ghana team of the Consortium for Research on Educational Access, Transitions and Equity (CREATE), which involved research as well as developing a newsletter on issues of educational access. In 2002, Professor Anamuah-Mensah was appointed chairman of the 30-member committee by President John Agyekum Kuffour to review the Ghana education system. The outcome of the committee’s work is the current education policy. Professor Anamuah-Mensah’s committee recommendations featured prominently in Ghana’s ICT in Education Policy of 2008. His committee’s recommendation proposed for the introduction of ICT in educational system in Ghana. During 2007/2008 academic year, the MOE introduced ICT in education in schools in Ghana.

**Professor Jerome Djangmah**

In 1962, Professor Jerome Djangmah received his Bachelor of Science in Zoology from the University of Ghana, Legon. In 1968, he earned a doctorate degree in Marine Biology from the University of North Wales, UK. He taught at the University of Cape Coast, Ghana, where he was promoted to associate and then to full professorship. In 1982, he was elected Pro-Vice Chancellor at the University of Cape Coast, serving till 1984. He was appointed the Director-General of Ghana Education Service between 1986 and 1988. Due to his proactive stance towards education, he was made a member of the National Education Commission from 1985 to 1990. He was a member of the Evans-Anform committee that ushered in the 1987 education reform. Professor Djangmah was also Chairman of the Council of the University of Winneba Ghana for four years. Under the MOE, Professor Djangmah served as chief GoG’s nominee for the West African Examinations Council between 1986 and 1988. Before he retired in 1997, Professor
Djangmah headed the Zoology Department at the University of Ghana from 1991 to 1996. During this period he worked as the Chairman of the Inter-Universities Committee on Senior Secondary School Admissions.

Professor Djangmah was the Resident Scholar of the Ghana Institute of Economic Affairs, where he presided as the Director of the Policy Studies Unit. He was the Chairman of the West African Examinations Council from 2006-2009. Professor Djangmah was the senior author of Ghana’s most recent *White Paper on Education* and is a frequent consultant to the Ministry of Education. He has published on a wide variety of topics including developing education policy for basic education, educational access, expansion and quality, and national educational reform issues in Ghana.

**Professor Dominic Fobih**

Professor Dominic Kwaku Fobih was born on July 6, 1942 at Assin Jakai in the Central region of Ghana. In 1963, Professor Fobih, received a Teacher Certificate “A” and later continued with Secondary school education and obtained a GCE in 1970. He enrolled at the University of Cape Coast in 1974 where he pursued his bachelor’s degree. Professor Fobih earned his masters and doctoral degree’s in Education Psychology at the University of Alberta, Canada. After earning his doctorate degree, he spent most of his time as a professor at the University of Ilorin in Nigeria and the University of Cape Coast.

In 2001, he joined President Kufuor’s government to become Minister for Environment Science and Technology. He held the position till 2002, and then was appointed the Minister for Lands and Forestry between 2003-2005. During the second regime of President Kufuor, Professor was appointed Minister for Mines and Forestry.
During the cabinet reshuffle in 2007, he was appointed the Minister for Education, Sports and Science (MOESS). He held the position till 2008.

**Dr. Ato Essuman**

Dr. Ato Essuman was admitted at Kwame Nkrumah University of Science Technology (KNUST) in November 1975, where he read economics and law and graduated in 1978. Whilst at KNUST he won the Vice Chancellor’s award as the best overall sports student in 1978. He was also admitted to the University of Hawaii in the U.S.A where he earned a Masters degree in Business Administration with a major in Management Operations. He later graduated from the University of Sussex, UK, where he earned a doctoral degree in education. During his professional career, Dr. Essuman served in different capacities. He was business and financial advisor to a firm in the U.S.A. He worked with Nestle Ghana Limited. He was the Chief Director at the Ministry of Education in Ghana, and served on the WAEC, Ghana Education Trust Fund (GET Fund), and Ghana Education Service Council boards. He belongs to numerous professional bodies, notable among them the Ghana Institute of Management, the American Management Association and the British Association for International and Corporative Education. He is currently the executive chairman of Profile Consult Limited and has been a two-term elected member of the Council of State in Ghana.

**Mr. Joshua Caleb Mallet**

Mr. Joshua Caleb Mallet is a Ghanaian and currently the head of CENDLOS. He joined Commonwealth of Learning (COL) on March15, 2004, from the University of Education, Winneba (UEW), Ghana. At COL, he was the Education, Learning and Livelihoods Specialist. His education occurred in Ghana, North America and Europe.
Since 1994, Mr Mallet has been involved in Distance Learning (DL) education activities in Ghana. He was the administrator for the DL Unit at UEW for many years; while there, he served as a trainer of trainers for DL education and worked as an educational consultant for French education and DL. Mr. Mallet has also worked with teacher associations as a consultant.

Mr. Mallet has been associated with projects involving the Simon Fraser University, UNESCO, the World Federation of French Teachers and the Carnegie Corporation of New York. He used to be a counsellor at the Police Academy and Training School of Winneba. The main objective of the training program there was to equip young recruits to take their vocation seriously to encourage their spouses to become involved in income-earning activities. As the current head of CENDLOS, Mr. Mallet is working to set up a sustainable open schooling system in Ghana. His outfit is repackaging the erstwhile PSI-DL course materials for the basic educational system in Ghana.

**Mr. Alexander Narh Tettey-Enyo**

Mr. Alexander Narh Tettey-Enyo was born in 1940 at Akuse in the Greater Accra Region of Ghana. He started his primary school education in 1946 at Akuse Methodist Primary School and continued at James Town Methodist Primary School and later completed Somanya Methodist Middle School in Eastern Region in 1953.

Mr. Tettey-Enyo was enrolled in Volta District Secondary School at Odumase Krobo in the Eastern Region in 1954 and completed secondary school at Presbyterian Boys’ Secondary School, also at Odumase Krobo, in 1957. In 1959, Mr. Tettey-Enyo entered Wesley College, Kumasi in the Ashanti Region and completed with a post-secondary
Teacher Training Certificate in 1960. He was later enrolled in what was the then University of Science and Technology, between 1961-1962, and attended the University of Cape Coast between 1963-1965.

Mr. Tettey-Enyo started teaching at Yilo State School in 1958. He became assistant headmaster and then headmaster at Ghanata Secondary School, Dodowa, between 1982-1990. Mr. Tettey-Enyo was promoted to District Director of Education in the Dangme East District in 1990. He then served as Director of Secondary Education at the GES head office between 1991-1994. He was also the Director of Manpower and Training at GES between 1995-1996. Between 1996-2000, Mr. Tettey-Enyo was appointed Deputy General of GES and Acting Director of GES in 2001. He has been a member of Parliament for Ada Constituency in the Greater Accra region from 2005 to the present. He was also Minister for Education from 2009 till the early part of 2011.

**Rev. Emmanuel Kingsley Dadebo**

Rev. Emmanuel Kingsley Dadebo was born on June 4, 1955. He is an alumnus of a number of foreign and local institutions. He is the current Coordinator of ICT in Education Programs at Ghana’s MOE. Rev. Dadebo was the National Coordinator of the eLearning Africa Conference 2008. He participated in several short courses, workshops and conferences locally and abroad and has been involved in capacity building programs for ICT teachers and educational administrators. Rev. Dadebo has also been involved in a number of consultancies in ICT in education and science education.

He is a member of professional bodies such as Ghana Association of Science Teachers (GAST) where he served as past National President. Rev. Dadebo is the current Country Coordinator for the Global Learning and Observations to Benefit the
Environment (GLOBE). He used to be a weekly feature writer on ICT in the Education Column of Ghanaian Times, a daily newspaper in Ghana.

**Ms. Dzigbodi Ama Banini**

Ms. Dzigbodi Ama Banini is an assistant director, grade one, at MOE. She has a bachelor’s degree in economics and sociology and a Diploma in Education from the University of Cape Coast, Ghana. She pursued her master’s degree in Population Studies at the University in Ghana and another master’s degree in Educational Technology from UEW, Ghana. Ms. Banini is a population researcher and a curriculum developer at the Curriculum Research and Development Division (CRDD) of MOE. She is in the Research, Monitoring and Evaluation Unit of CRDD. She also takes part in curriculum development and training of personnel at GES. Ms Banini had taught for over 19 years in secondary schools in Ghana and at Polytechnic of Sokoto State, in Bernin Kebbi in North Western Nigeria.

**Policymakers Knowledge and Understanding of ICT in Education**

My interaction and the interview process with the nine respondents have shown their in-depth knowledge of ICT in education issues. My question: *What is your understanding of ICT in education?* Elicited responses such as the use of ICT tools to enhance effective teaching, learning and schools’ management. The respondents further mentioned the use of ICT tools such as Internet, television, computers and their accessories, mobile phones and radio among others as a means of delivering teaching and learning in classrooms and managing students’ records.

Here are some of the voices of the respondents: Professor Dominic Fobih, the former NPP minister of education defined ICT in education thus:
Basically it is being able to use or utilize ICT as a vehicle for making education more effective, you know, whether it is in the classroom teaching or whether it is in management of the education enterprise as a whole, you know. All aspects of education are using it as a tool that enables you to deliver better than if there were no ICT at all. (Personal communication, January 17, 2011)

Mr. Alex Tettey-Enyo, the former NDC minister of education defined ICT in education as:

Well, it is the tool for acquisition of knowledge and dissemination of ideas and opinions of information in general and in the schools setting we understand it as a means of even making use of the ICT modules and procedures as an integrated part of the methodology of teaching and learning. (personal communication, January 17, 2011)

Dr. Ato Essuman, the former chief director at MOE, indicated:

My understanding of ICT in education is using information and communication technology and here we are not limiting ourselves only to computers as sometimes people do. By using that wide range of information and communication technologies to enhance education delivery and to achieve quality education as well as increase access to education so it is more of using ICT as a tool rather than an end in itself for education purposes. (Personal communication, January 10, 2011)

From the responses elicited from the respondents, it was evident that the Policymakers were on the same level with the definition and understanding of ICT in education.
The responses also conformed to Ministry of Education, Youth and Sports’ (MOEYS) definition of ICT.

According to MOEYS (2002) the working definition for ICT in education is:

Information and communications technology (ICT) is a means of capturing, storing, processing and presenting information electronically through a number of media. Computers and microelectronic devices are built into a variety of educational contexts and tend to focus around the delivery of content and information to support the formal learning process. (p. 7)

Ghana’s ICTE Policy document puts the working definition as:

ICTs are basically information handling tools – a varied set of goods, applications and services that are used to produce, store, and process, distribute and exchange information. They include “old” ICTs of radio, television and telephone, and the “new” ICT of computers, satellite and wireless technology and the Internet with their attendant tools (Ministry of Education, 2008. p. 7).

Based on the MOE definition of ICTE and the responses solicited from the policymakers, it is evident that there were common understandings among policymakers with regards to the concept of ICTE Policy.

**The Need for an ICT in Education Policy in Ghanaian Schools**

In answer to the question of why the government intended to introduce ICT in education in Ghanaian high schools, the respondents gave varied reasons. Most of them opined that since the term “ICT” is now a household name, it was necessary for the government of the day to introduce ICTE as a policy. Dr. Ato Essuman, the chief director at MOE, during whose term of office the ICT policy was drafted, remarked that, since
Ghana is part of the global village it is imperative to conform to some of the innovations of the system. He articulated that:

The world has now become a global village and Ghana is part of that village. My understanding of this is the fact that a village is a place where it is easy to know everybody and to pass on information to people with ease, and to be reached by any one. We have to align with what the rest of the world is up to. So you have to speak the same language, we have to do the same kind of things and so on. And I think this is why it is important to Ghana as a nation to adopt ICT. In addition, it is important that ICT is placed in the context of education. (Personal communication, January 10, 2011)

In a similar vein, Professor Jophus Anamuah-Mensah made reference to how ICT has transformed the economy of developed nations and countries that have adopted ICT as an enabler. Those nations, according to the respondent, have leapfrogged in terms of socio-economic and political developments. It behooves Ghana to infuse ICT in its schools to build a solid foundation for manpower and future growth. The respondent remarked:

You can think of countries like China, Finland, Singapore, Malaysia, UK and USA. All these countries have taken advantage of ICT as a contributing factor to their success stories. Even African countries like Rwanda, Namibia, Botswana and South Africa have out in place viable ICT in education policies to provide a basis for harnessing human resource for national development. So, I believe that these are some other things that influence some of us as policymakers to vouch for an ICT in education policy. If we do not move on, and stay where we are, we
will be left out of the system and we will not be competitive at all, our products will not be able to compete with anyone. (Personal communication, January 24, 2011)

It is worth noting that the two dominant political parties’ manifestoes also played a major role by stating the need for ICT in education policy and subsequent implementation in Ghanaian schools. Professor Dominic Fobih, the former NPP minister of education, indicated that introduction of ICT in education was part of their political agenda hence when they came to power in the year 2000, they deemed it fit to design and implement the policy. Fobih argued:

The whole thing originated from the total policy of the government towards the development of Ghana. I mean the government came to power and we were moving Ghana into a medium-income country. That means that we need to overhaul all the structures in the system and education is necessarily a tool for change for improving knowledge, manpower skills also for bringing about development. So our focus was to use ICT for human resource development.

(Personal communication, January 17, 2011)

Professor Fobih’s assertion corroborated the NPP manifesto on ICT in education. However, the policy statement fell short of how ICT will be integrated in Ghanaian schools. The only statement made in relation to ICT in education was “ICT as a subject shall be strongly emphasized in the curricula of basic education” (NPP Manifesto, 2008, p. 42). The NPP manifesto (2008) states:

Our objective is to use information, knowledge and technology as a platform for rapid economic growth. Recent developments in the ICT industry provide an
opportunity for Ghana to lead West Africa in bridging the digital divide. Our policy will focus on the total overhaul and enhancement of our ICT infrastructure through regulation and by providing incentives to attract investment in the various components of the sector…. ICT as a subject shall be strongly emphasized in the curricula of basic education. (p. 42)

Even though the NDC former Minister for Education did not make reference to the NDC political manifesto, critical analysis of the NDC’s Manifesto for a Better Ghana (2008) contends: “Make information technology an examinable subject at SSS level” (p. 7). The NDC’s manifesto, like that of NPP, failed to elaborate on how the party intends to integrate ICT into education. However, Mr. Alex Tettey-Enyo, the NDC former Minister for Education, highlighted the importance of ICT in education. He views ICT as an enabler for national and development, and feels it is important to introduce it within the education sector. He contested:

We see ICT as the vehicle through which all the development processes of this country, be it in education itself, health and agriculture, will lead to facilitate learning, acquisition of knowledge, in the context of the quickest means of letting information through and acquisition of knowledge on every discipline, every subject of development that the country can think of. Therefore it is necessary that ICT should become a tool, device methodology within the school system so that the student can be exposed not only in terms of ICT literacy but also as a tool for acquisition of knowledge and dissemination of information. (Personal communication, January 17, 2011)
The Anamuah-Mensah committee’s report also stressed the need for ICT in education. The report states: “The increasing importance of Information and Communication Technology (ICT) in the creation of wealth and the transformation of the economies of nations cannot be ignored in the educational development of Ghana” (Government of Ghana 2002, p. 71).

Based on the respondents’ assertions, it was evident that there is the need to introduce ICTE in Ghanaian schools. The respondents indicated the potentials of ICTE. They also proved that other developed and developing countries were benefiting from ICTE. The two dominant political parties (NDC and NPP) also indicated how they intend to introduce ICT in their political manifestoes.

**Early ICT in Education Initiatives**

It was evident from the responses in the study that before the official introduction of Ghana ICTE Policy, there was a series of *ad-hoc* ICT in education initiatives introduced by those at the helm of the implementation process at both MOE and GES. NGOs, Parent Teacher Association (PTA), and private computer vendors were included among others. A classical example of such initiative was the establishment of the Science Resource Centers (SRCs) by MOE and GES. The centers were renamed Science and ICT Resource Centers.

The Ghana Education Service (2004) asserts that in 1995, MOE, in collaboration with GES, set up 110 SRCs throughout the nation. Each of these centers was expected to serve a group of SSS within a 40-kilometer radius. The centers were equipped with modern science and ICT equipment, and these resources were used to teach science and ICT.
Rev. Emmanuel Dadebo, ICTE coordinator at MOE, informed the researcher that: “From 1995, the first major government intervention was to put in place science and technology resource centers to facilitate the integration of science and ICT in the educational system” (Personal communication, January 16, 2011).

Another initiative was the Science Technology and Mathematics Education (STEME) Workshop initiated by Professor Jerome Djangmah, who as the director-general of GES, had this to say:

When I was the Director–General of Education I started the science, technology and mathematics education for girls. This was a program that was organized every year during the long vacation period to whip girls’ interest in science, technology and mathematics. The initiative later included boys and was renamed the National Science, Technology and Mathematics (STEM) workshop (Personal communication, January 27, 2011).

Rev. Emmanuel Dadebo, the current ICT in education coordinator at MOE corroborated the above assertion. He remarked:

I want to mention that science, technology, mathematics education program which was previously called the Girls’ Science, Technology, Mathematics Education program clinic for girls and later became something for both boys and girls. It was also introduced as a component of training and an exposure that was given to the students in the basic and senior high school. (Personal communication, January 16, 2011)

Rev. Dadebo further cited private and NGO interventions to integrate ICT in school.

According to him:
Apart from science and technology initiatives introduced by MOE and GES, there were other private initiatives on the ground. We had the World Link for Development (Worldlinks) Project, the Global Teenager Project (GTP), the Global Learning and Observation to Benefit the Environment (GLOBE) Project and other initiatives that were introduced in some junior and senior high schools. Private computer vendors also got involved, they provided some computers and computer literacy to some teachers to enable them to teach computer literacy in schools. (Personal communication, January 16, 2011)

In April 2002, the then President John Agyekum Kuffuor initiated an ICT project known as the Presidential Special Initiative on Distance Learning (PSI-DL). The main focus of PSI-DL was to provide digitized course content for JHS and SHS students. Initially, television was used as the main delivery medium because of the low level of computer literacy, limited access to computers and Internet and to ensure cost effectiveness. Course materials on English language, mathematics and core science were developed and produced on Video Compact Discs (VCDs). Later on, radio programs were introduced for English language only.

Despite the original initiatives there were other numerous problems associated with some of the initiatives to integrate ICTE. For example, only a few schools from the urban areas benefited from the initiatives. Most schools in the rural areas were left out because most of them lacked ICT infrastructure especially electricity (Malcalm & Godwyll, 2008). The Government of Ghana (2002) cited the following challenges of ICT initiatives in education: “absence of a unified course content, lack of computer laboratories in most of the schools and lack of teachers trained to teach ICT as a subject”
The situations have led to schools with well-endowed ICT facilities far ahead with those without the ICT facilities. ICTE in schools are being implemented on ad-hoc basis.

The Ghana Education Service (2004) emphasized that during the process of computerization, only few schools were involved. Most of these schools were privately owned. In addition, there was a lack of teachers trained with the requisite ICT knowledge and skills. The uncoordinated ICT initiatives had resulted in proliferation of obsolete computers and unregulated ICT curricula in schools. The status quo also led to exploitation of schools by private computer vendors. There were problems of ownership and coordinating some initiatives. A classical example was the PSI-DL initiative. The coordinating office was located at the Ministry of Information and Presidential Initiatives, though MOE officials felt they were supposed to be in charge of the initiative. Dr. Ato Essuman, the former Chief Director of MOE, recalled that:

About who controls the PSI-DL initiative, as the chief director MOE I talked about it to other colleagues at the Ministry of Information. Since it is an educational program for both JHS and SHS, MOE should be the coordination body. But my colleagues at the presidency thought otherwise. (Personal communication, January 10, 2011)

The Ministry of Education (2008) enumerated challenges faced by some ICT in education initiatives such as inability of the project managers to consult with MOE/GES before selecting the schools to take part in the initiatives; hence this leads to duplication of projects in some schools. Furthermore, over-dependence on donor agencies resulted in termination of projects after donor agencies withdrew their support. Lack of ownership of
projects by respective schools also accounts for the unsustainability of the projects. Finally, most of these projects were located in urban schools to the detriment of rural schools.

**Ghana’s ICT in Education Policy Initiation Process**

Mangesi (2007) and Du Vivier (2010) indicate that attempts to develop ICT in education for Ghana has been on the drawing board for a long period. The efforts to develop the policy document predate the launching of Ghana’s ICT4D policy in 2003. Rev. Emmanuel Dadebo, one of the respondents who was instrumental in the development of the ICTE Policy narrated how the policy came to being had this to say:

> The desire was just to teach basic computer literacy skills in the schools. But because there was no clear-cut policy on the use of technology in teaching and learning, everybody was just doing their own thing. So in 2002, efforts were made to develop a kind of policy framework. In the course of the year 2002, an ICT in education policy framework was developed. Thereafter, we followed up with the development of a real ICTE Policy, which was based on the ICT4AD policy. In 2006, the draft policy was completed. After that the cabinet adopted the draft policy, the substantive ICTE Policy was ushered in and implemented alongside the education reforms in 2007. (Personal communication, January 16, 2011)

As indicated in chapter four, the development of an ICTE Policy evolved when President John Kufuor commissioned a 30-member committee, under the chairmanship of Professor Jophus Anamuah-Mensah, to review Ghana’s Education Policy in 2002.

The Government of Ghana (2002) notes that after formal inauguration of the Anamuah–Mensah committee on January 17, 2002, the committee embarked on
nationwide consultations which took them to schools, colleges and higher educational institutions, districts, municipal and regional capitals. Individual and professional bodies also submitted memoranda to the committee. There were phone-in radio programs, and press briefings that contributed to the committee’s work. The committee completed its work in 2002 and submitted its report, *Meeting the Challenges of the Twenty-First Century Report of the President's Committee on Reviews of Education Reforms in Ghana* to the Office of the President and the cabinet. The National Patriotic Party (NPP) government, then in offices issued a white paper on the report in 2004. The reform commenced in all educational institutions in Ghana during the 2007/2008 academic year.

Professor Jophus Anamuah-Mensah, who served as the chairman of the 2007 education reform committee, remarked:

Soon after launching of the committee, the members embarked on a nation tour to ascertain situations, problems and solicit opinions, views and recommendations from the general public. I want to reiterate that for the first time in the process of reforming our educational system, the committee had extensive consultation with stakeholders, professional bodies and the general public on the way to integrate an ICT in educational system. (Personal communication, January 24, 2011)

The Anamuah-Mensah committee’s presented a 10-point recommendations list regarding ICT in education. The Government of Ghana (2002) listed them as:

1. Government should equip all basic and secondary schools, training colleges, technical and vocational institutes with computers;
2. ICT should be introduced as practical hands-on activity at the basic level to stimulate the interest of children. Where there is no
electricity, small generators should be provided;

3. At the secondary level, ICT should be introduced, both as a co-curricula activity for all students and as an elective subject for those who plan to pursue further studies in ICT or IC-based courses. UCC and UCEW should therefore be supported to expand their facilities to enable them to train ICT teachers for SSS and other levels;

4. Tertiary institutions should be adequately resourced to enable all students to be introduced to ICT;

5. Tertiary institutions and schools in the pre-tertiary sector should encourage private participation in the provision of ICT infrastructure and programs;

6. A competently staffed Information and Communication Technology Directorate should be created within the GES to be responsible for the implementation and management of ICT education programs in pre-tertiary schools;

7. Computer Science and ICT Departments in public tertiary institutions should be adequately resourced to enable them produce skilled human capital to meet the requirements of industry;

8. In the short term, all ICT graduates from the Universities and other tertiary institutions doing national service should be assigned and motivated to teach in secondary schools to help implement the ICT program;

9. The implementation of the ICT program at the pre-tertiary level
should be done in phases. It should start with schools with adequate computer laboratories and teachers. This should gradually be expanded to other schools as and when ICT equipment and teachers become available;

10. ICT Clinics should be organized annually by the GES along the lines of the Science, Technology and Mathematics Education (STME) Clinics to create awareness and generate interest in ICT. (pp. 58-59)

For the first time in education reform of Ghana, the Anamuah-Mensah’s committee officially proposed introduction of ICT applications in the school system. The committee initiated concrete framework for introduction of ICTE in Ghanaian schools, colleges and universities. The recommendations indicated how ICTE should implementations should be carried out.

The committee also scrutinized and proposed restructuring of library and information services to boost teaching and learning in schools. The committee outlined the following as achievable ICT in education objectives:

1. Make all students/pupils computer literate at all levels of educational system;
2. Produce a critical manpower pool of highly skilled ICT professionals, engineers, scientists, technicians and software developers to support a vibrant ICT industry;
3. Provide career opportunities for talented Ghanaians and others to participate in ICT knowledge generation;
4. Improve the administration and management of educational institutions
through the effective use of ICT tools in their day-to-day operations

In terms of strategy, the committee recommended that ICT should be introduced in
curriculum and as both compulsory (core) and as an elective subject for those who will
opt for ICT as their majors (elective) in all senior high schools. The Ministry of
Education (2002) states: “At the secondary level, ICT should be introduced both as a co-
curricula activity for all students and as an elective subject” (p. 277). It is worth noting
that the “missing link” within the proposed strategy was how ICT would be used in
pedagogy. Based on critical analysis of the listed strategies, ICT was expected to be
taught as a subject in schools, which raised concern and debate about whether ICT was
seen as an end in itself or as a means (tool) to an end. The issue was later addressed in the

**Ghana’s 2008 ICT in Education Policy Document**

Mangesi (2007) avers that the development of the ICTE Policy document was
through tremendous technical assistance from Global e-Schools and Communities
Initiative (GeSCI) and other various partners in education. According to the Ministry of
Education (2008), the development of Ghana’s ICTE Policy represents a major stride in
streamlining efforts towards infusing ICT into educational systems. MoES put together a
committee to draft ICTE Policy document.

During the researcher’s interview process with Rev. Emmanuel Dadebo the ICT
in Education Coordinator, indicated Mr. Gabriel Canacoo, an ICT consultant at the
Ghana Institute of Management and Public Administration (GIMPA), served on the draft
committee of ICTE policy document. The other members of the committee were
Professor Clement Somuah, Chairman of Special Technical Committee on ICT in Education, Ministry of Education and Sports (MOES), and the interviewee, Rev. Emmanuel Dadebo, Co-ordinator of ICT in Education Programs at MOES. According to Rev. Dadebo, the draft committee received technical support from Khalid Bomba and Denise Clarke of GeSCI. There was also input from other stakeholders in ICT in education. In preparing the draft document, the committee consulted ICTE Policies from Namibia, South Africa and Bangladesh. According to the Ministry of Education (2008), the development of the policy process included the following steps:

1. The initial workshop of sector stakeholders convened under the consultative process for *The Ghana ICT for Accelerated Development (ICT4AD) Policy* in 2001;

2. The development of the *Introduction of Information and Communications Technology in Education: A Policy Framework* (2002) as a part of the initiatives of the Ghana Education (GES) to streamline implementation of ICT programs in pre-tertiary institutions;

3. The workshop on the Integration of ICT in Education for Policy Makers (2002);

4. The development of the Education Strategic Plan (2003-2015) which addressed policies, targets and strategies including the need for ICT in Education;

5. A survey of the education platform that provided a situational analysis of the sector and presented in the Ghana e-Schools Initiative High Level Business Plan (August 2003);
6. The development of the actual draft policy document for the sector including a number of sector stakeholder consultations from January–December 2006. (p. 3)

The 38-page policy document enshrined how ICT was expected to be deployed in educational institutions in Ghana. The then Minister of Education, Mr. Alex Tettey-Enyo, one of the respondents in this study, explicitly stated in the Foreword of the policy document:

The government has acknowledged the need for ICT training and education in the schools, colleges and universities and the improvement of the education system as a whole. The deployment of ICTE will result in the creation of new possibilities for learners and teachers to engage in new ways of information acquisition and analysis. ICT will enhance access to education and improve the quality of education delivery on an equitable basis. The government is therefore committed to a comprehensive program of rapid deployment and utilization of ICT within the education sector to transform the education system and thereby improve the lives of our people. (Ministry of Education, 2008. p. 4)

According to the Ministry of Education (2008), the policy document defined and outlined seven thematic areas as guiding principles, objectives and strategies for the policy document. These are:

1. Education Management – Ministry/Agencies and Educational Institutions
2. Capacity Building
3. Infrastructure, E-readiness and Equitable Access
4. Incorporating ICTs into the Curriculum
In relation to the Fiedler’s Theory of Contingency of Leadership, the policymakers provided clear visions, goals and objectives of the ICTE policy document. In other words, the policy document provided adequate guidelines on how to introduce ICTE in Ghanaian schools. The policy document also recommended for an ICT implementation plan for comprehensive implementation of the policy in the schools,

**Implementation of ICT in Education Policy in Senior High Schools in Ghana.**

Against the background of the ad-hoc and uncoordinated nature of how ICT is being deployed in Ghanaian schools, MOE came out with the draft ICTE Policy document in 2006 during the NPP regime. With the change in government in 2008, the NDC government moved to complete the policy and officially published it in January, 2009. According to the Ministry of Education (2008), to enhance fruitful results and sustainability of ICT in education projects in schools, the policy document should be “implemented not necessarily to increase the number of computers, but should instead be based on supporting discrete educational objectives” (p. 12). The policy document also drew lessons from earlier ICT in education initiatives and sought to ensure proper coordination and management of implementing the policy.

In terms of implementation, it is a mandate for ICT to be taught in all high schools. The CRDD revised the SHS curriculum and distributed it to all Ghanaian schools. Ms. Dzigbodi Ama Banini, assistant director of CRDD, remarked:
When the MOE came out with the draft ICT in education policy, our division CRDD brought together selected subject teachers, teachers from training colleges, lecturers from the universities and other stakeholders to revise various SHS curricula and syllabi. Copies of curricular and syllabi were later distributed to all schools nationwide. (Personal communication, January 9, 2011)

The MOE assisted schools for ensuring that education materials were distributed to schools and science and resource centers. Rev. Emmanuel Dadebo, the ICT Coordinator at MOE had this to say:

The very first major attempt by the government to formally introduce ICTs in education was from the perspective of introducing computer literacy in schools, thus, introducing ICT as a course of study in school curricular in all basic schools. That is being done in schools’ computer labs. In terms of using ICT as a tool for teaching and learning, it was indicated in the policy that ICT should be seen as a means to an end. So the ministry had supplied resources to science resource centers to be used in teaching and learning. A lot of these materials are digitized and are on CD ROMs, where educational resources have been captured and these were supplied to the science resource center schools to be used also by the satellite schools, because each science resource center had about five satellite schools, and so they made use of these facilities. (Personal communication, January 16, 2011)

Rev. Emmanuel Dadebo, the ICT in Education Coordinator also hinted that to equip high schools with ICT infrastructure, the MOE in collaboration with Ghana Investment Fund for Electronic Communication (GIFEC) and Ministry of Local Government (MLG) are
working under the school connectivity project to provide high schools, especially those in rural areas and underserved areas, with computers, scanners, printers, projectors and servers linking them with Internet access.

In addition, the MOE, in collaboration with Multi Choice, a private Digital Cable Network, also provided free digital television programs to 35 SHS nationwide. The program was under the Multi Choice’s Resource Centre Initiative, which was launched in 2004. Under the program, each school was given a television set, a video recorder with discs and the necessary satellite dish, and a free subscription to digital television education facilities.

MOE, in partnership with the New Partnership for African Development (NEPAD) e-Commission secretariat, also launched an NEPAD e-school project in six selected SHS in Ghana. The project was an initiative to pilot e-learning in Ghanaian schools. The schools were supplied with computers with Internet, television sets, projectors, printers and scanners to be used in teaching and learning.

CENDLOS one of the new agencies of MOE, took over from PSI-DL and reproduced digital course content materials for both JHS and SHS and distributed them to all schools. The director of CENDLOS remarked:

Under my direction, CENDLOS reproduced lesson materials on Video Compact Disc (VCD) and distributed them to all JHS and SHS in the country. Some of these lessons are also telecast on Ghana Television (GTV). The lessons produced so far were: English Language and Mathematics for JHS 1, 2 & 3 and English Language and Mathematics for SHS 1, 2 & 3. Others are Physics, Chemistry, Biology and Integrated Science for SHS 1 & 2, Catering I, Block-Laying and
Concreting for SHS 1 & 2. (Mr. Joshua Mallet. Personal communication. January 17, 2011)

On May 29, 2008, MOE in collaboration with Intel Corporation launched an educational portal with the link: www.skool.com.gh. The portal was designed purposely to enhance teaching of science and mathematics at JHS and SHS. The course contents were based on the current curricula and syllabi for JHS and SHS.

To enhance capacity of educators to enable them diffuse ICT in education, MOE, in collaboration with Microsoft’s Partners in Learning (PIL) project, organized workshops on computer literacy and the use of ICT to teach in classrooms for over 300 teachers. These cohorts of teachers were designated “ICT teachers”, with teachers in charge of various computer laboratories. Similar training workshops were organized for ICT teachers in all the 38 teacher-training colleges to enable them to teach in-service teachers. Apart from teaching computer literacy in high schools, MOE in collaboration with GES organized STEME workshops for selected students during the long vacations.

Challenges Facing the Implementation of the Policy and their Implications

It was evident from the interviews with the policymakers that the ICT in education policy implementation faced by six major bottlenecks. Notable including lack of capacity building or professional development for teachers, financial constraints, lack of ICT sector implementation plan, the duration of senior schools, ban of cell phones in senior high schools and lack of effective research, monitoring and evaluation of ICTE implementation process,
Lack of capacity building (professional development programs) for teachers

The inability of MOE and GES to build capacity of the teachers to integrate ICT in education was a major problem. The critics of the policy pointed out that there was no national training program for teachers to introduce them to ICT integration in school. Instead, only a few teachers were trained as prior to the official introduction of the Policy during the 2007/2008 academic year. MOE officials complained they lacked financial resources to conduct nationwide training for teachers.

The ICT in Education Coordinator responded that:

The ICTE Policy document is a good one. But I think the implementation of the policy is problematic. There was no massive training for teachers nationwide. Due to financial constraints, MOE in collaboration with Microsoft’s PIL project was able to train some selected teachers nationwide to lead the crusade (Rev. Emmanuel Dadebo, ICT in Education Coordinator at MOE. (Personal communication)

Dr. Ato Essuman, the former director of MOE, remarked:

The government wanted to launch the policy officially during the 2007/2008 year, the government. However, at the same time the government was faced with financial challenges. At the same time there was support from some development partners such as Microsoft and Intel, who were willing to help us conduct training for our teachers. The Microsoft’s PIL trained some selected number of teachers before the launching of the policy. The ministry, therefore, decided to conduct nationwide training for teachers with assistance from Intel as soon as the
implementation of the policy kick started in the schools. (Personal communication, January 10, 2011)

It was evident that there was lack of national training programs for teachers to enable them integrate ICTE in schools. Intel and Microsoft sponsored the initial pilot training programs conducted by MOE for only few selected teachers.

**Financial constraints**

It was evident from the assertions of the two MOE officials that a financial constraint was one of the obstacles that hindered early implementation of the policy. It is also noteworthy that dependence on development partners or foreign assistance still persists since Microsoft and Intel are still dominant corporate entities supporting the ICTE implementation process. To buttress this assertion, during an open ceremony of “Ghana’s National ICT for Education Strategy and Program” held in Accra, Ghana, on May 27, 2008, the then Minister for Education, Science and Sports, Professor Dominic Fobih, who is also one the respondents for this study, admitted that, the technical and financial support provided by external development partners. He asserted:

> The Ghana Ministry of Education, Science & Sports has developed a new ICT in Education Policy (2006) with financial and technical support from the Global e-Schools and Communities Initiative (GeSCI). Microsoft supported the printing of the first three thousand copies of the policy document. (Fobih. 2008, p. 3)

It was obvious that MOE was saddled with financial constraints; hence MOE had to fall on a development partner for technical and financial support for the development and printing of the policy document. Lack of financial resources also affected initial implementation of the policy in the schools.
Lack of an ICT sector implementation plan

Another setback for the implementation of the policy is that as of writing this study report, MOE and GES have not come out with an ICT sector implementation plan as called for in the Ghana ICT in Education Policy (2008) document. Boateng (2007) made a similar assertion by stating: “The integration of computer technology in the education curriculum at the senior secondary level in Ghana has been delayed due to the absence of an orchestrated plan for implementation” (p. 155).

The Ministry of Education (2008) states: “Additionally, the Ministry intends to focus on specific strategies in implementing the policy. This will be further defined in ICT sector Implementation Plan” (p. 3). In an attempt to find out if the implementation plan had been published, Rev. Emmanuel Dadebo, the ICTE Coordinator, remarked: “The ICT sector implementation plan is in draft form, and is being analyzed by officials at the MOE.” (Personal communication, January 16, 2011). The lack of implementation of the ICT plan could result in situations in which schools will continue to implement the policy on an ad hoc basis, since there are no clear cut plans or achievable results.

The duration of senior high schools

Another contentious issue that stymies the implementation of the policy is the duration of SHS. Policy analysts and political commentators criticized the two dominant political parties- NDC and NPP-for politicizing the duration of SHS. It is noteworthy that the 1987 Anfom educational reform ushered in by then NDC government slatted the duration of SHS for three years. However, its white paper on the Anamuah-Mensah Educational Reform of 2007 the NPP government decided to extend the SHS duration to four years. NDC, then in opposition, vehemently opposed the decision. During the 2008
Presidential and Parliamentary election, the NDC issued a political manifesto stating that when elected to power, the party would revert the SHS back to three years. After the party won the election the government convened a national education forum to discuss rationale for converting to the three-year period.

Soon after the NDC government came to power, the MOE inaugurated a 12-member committee, chaired by Dr. Stephen Ayidiya of the University of Ghana, to convene a national education forum to deliberate reverting the duration SHS from four years back to three years. There were divergent views on the issue at the forum. The Conference of Head of Assisted Secondary Schools (CHASS) favored of the three-years duration, arguing that the performances of most JHS students at the previous Basic Education Certificate Examination (BECE) were poor. In addition, those who qualified for SHS standards were not the best. For that matter, the four-year duration at SHS would be ideal to prepare the students to achieve higher performances.

CHASS also argued that the three-year duration would not give students sufficient time to select their majors. According to CHASS, of the nine terms of the three-year span, only six terms were used for meaningful academic work. The explanation was that while first-year students utilize the first term to settle down in school, during the second term of the third year, there was little or no meaningful teaching, since during the final year students normally write their mock examinations. CHASS concluded that by the third term of the third year students prepare for their West Africa Senior School Certificate Examination (WASSCE).

The National Graduate Teachers Association (NAGRAT), on the other hand favored the three-years duration, arguing that four years was a waste of financial
resources of parents and the government. They further argued that rather than using resources to construct extra facilities for the students during the fourth year, infrastructure and teaching facilities at JHS and improved conditions of teachers at all levels could be provided. It is noteworthy that even though there was no consensus at the forum on SHS duration, the government reverted to three years.

In an attempt to explore the rationale behind the decisions of the two political parties and policymakers’ decisions, Professor Dominic Fobih, the former NPP Minister of Education concluded that:

Our justification was simple and based on historical tradition. NPP was just following our earlier argument raised as some of challenges faced by 1987. The popular demand by then was that it should be a four-year program because the teachers in the schools, the senior high schools, were complaining that they did not have enough time to complete the syllabi and the examination results coming from the schools were mass failures. (Personal communication, January 17, 2011)

Mr. Alex Tettey-Enyo, the former MOE during whose tenure in office the duration was rescinded from four to three years indicated that the NDC government based the decision on recommendation of Dr. Stephen Ayidiya’s commission. The former MOE also argued that it was not the additional one year added to SHS that mattered, but rather the body of knowledge the students acquired within the entire educational system. Mr. Alex Tettey-Enyo remarked:

Well it is not a matter of time being spent in school, but what body of knowledge you would acquire within the entire sector of the educational structure. The structure provides the framework within which knowledge could be acquired or
skills could be acquired and therefore if there is a structure that can adequately serve the needs and vision of the country, it is better to adopt that efficient load of education within the structure, than merely talk about the length of time people could spend at primary level, at JHS level, at senior high school level. It is within the purview of that kind of concept that the country appointed a commission to look into the content and structure of education in this country. The commission came out after analyzing public views on the structure content with the recommendation that the SHS should revert to the three-year period, instead of the existing four-year period. (Personal communication, January 17, 2011)

Mr. Alex Tettey-Enyo debunked the argument that the conditions under which they argued for the four-year extension of the SHS system were longer in existence. According to him, prior conditions such as lack of teachers, lack of course syllabi, and inability of teachers to complete curricula were things of the past. He also argued that the additional year added by the previous government exerted undue financial pressure on parents and the government. He attested that:

The additional year added by the NPP government was not necessary. In addition, the conditions that existed at the time when people were thinking of an extension of the three-year course to four years no longer exist. They were thinking of lack of teachers, lack of the standard curriculum for which reason the teachers were not able to complete the syllabus. These conditions, according to the committee, were no more tenable. There was no justification for the extension. The extension of the four-year period is imposing extra cost on both the government and parents.
The Commission therefore strongly recommended that the four-year should be reverse three-year period (Personal communication, January 17, 2011).

Two of the respondents interviewed indicated that the arguments raised by the Ayidiya Commission and enumerated by the former NDC minister of education still persist. According to the respondents, there were inadequate teaching materials and textbooks for teaching and learning, no computers or other ICT tools in the schools, insufficient training for teachers to integrate ICT in education, head of schools were trained to implement the ICTE Policy in the schools. Professor Dominic Fobih, the NPP former Minister of Education contended:

There were inadequate facilities at both the JHSs and SHSs levels. For example, some schools do not have science and ICT laboratories, even computer and science equipment were unavailable. Therefore, NPP feels that all these things need to be addressed, so we introduced some technical skills, ICT and other things into the new educational system to broaden the horizon and skills of the students. Our government also introduced technical education, vocation and technical education as recommended by Anamuah-Mensah’s committee. The NPP government made these technical and vocational institutes attractive to JHS pupils, so that every child who goes to a technical school, vocational technical school, will follow the same syllabus as the senior high schools. We also introduced the core subjects (English, mathematics and Science) as compulsory at all levels at SHS, technical and vocational institutes. So whether you go to Wesley Girls SHS, Achimota School or technical institutes and so on, you study the same core subjects and the same syllabus. The only difference is the fourth
year when the students will select their electives subjects. So the first year, is for deepening the core background; English, science, and math, which we acknowledged to be the causes of mass failures of most students. So we are deepening it by one year making sure that technical students also follow the same course. Whether you attend technical institute or SHS, and as you move to the second and third years, you will move into your elective subjects and your technical or vocational subjects become your elective subjects while the elective subjects may be arts, business, technical or science and so on. So to NPP, we made the technical education as an elective course. (Personal communication, January 17, 2011)

The Chairman of the 2007 educational reform committee, Professor Anamuah-Mensah who, recommended a three-year duration for SHS based on certain caveats, argued:

I am for the three years with certain conditions. The conditions were that you know for us to be able to implement the three years, we need to strengthen the early childhood education. Thus, we have to introduce early childhood that is kindergarten, as part of the basic education and then also strengthen primary and junior secondary with resources. All kinds of resources are needed to improve conditions at basic schools. It could be building the capacity of teachers so that they can in turn improve the performance of the pupils and students at primary and JHS. There is also the need to improve facilities at both primary and JHS levels. Currently, if you take primary three to six pupils, less than one third of them obtain proficiency at grade three; thus, primary three in English language and less than 20% obtain proficiency in mathematics at primary three. When you
come to grade six, thus, primary six only about 10% achieve proficiency in mathematics. So, when we sent the educational reform report to the government, the cabinet decided to go in for four years. (Personal communication, January 24, 2011)

Professor Jerome Djangmah, former director general of GES and former chairman of WAEC, argued in favor for a four-year period. He explained that the poor performances of students at SHS show that the three-year duration is too short to prepare students for their final examinations. He had this to say:

Critical analyses of WAEC results of both JHS and SHS show that standards of education in our schools are appalling. For that matter, I opted for a four-year SHS duration. The four-year period will adequately give a sound academic foundation to the students. During my tenure ship as WAEC board chairman, I have made a critical analysis of the past results. It is interesting to note that there are small numbers of high performing schools that Ghana depends on. These schools are the so-called Ghanaian Ivory schools. Some of these schools are the Achimotas, St. Augutines, Mfantsipims, Wesley Girls and few others. In the year 2006, out of 109,285 candidates presented by 429 schools, only 15,375 (14.1%) qualified for tertiary education. Let me ask you this question. Is it acceptable that such a huge gap should exist between schools, which are publicly funded? In the years 2007, 2008 and 2009, exam candidates who qualified for tertiary education were about 13%, 18%, and 17% respectively. So you can see clearly that the students are not passing well enough to be admitted in the tertiary institutions.
That is why I think the four-year period will adequately prepare our students for future academic laurels. (Personal communication, January 27, 2011)

The consequences of adopting a three-year period is that come 2013, there will two batches of SHS graduates. Three years and four-year groups will graduate and the situation will have serious implications for students who have to compete for admissions to overburdened public tertiary institutions. In addition, there will be pressure on academic facilities in the schools since schools have to provide extra amenities such as computer and other ICT tools to care for the two groups of SHS graduates. Another logistical implication is that the four-year syllabi, learning aids and textbooks have to be changed to three-year needs. Adoption of the four-year period will put undue financial pressure on MOE, since the sector is already having challenges of providing ICT facilities to the schools.

**Ban on cell phones usage in senior high schools**

Another dysfunctional directive from GES was the ban on cell phone use in SHS. In 2006, GES issued a directive to all heads of SHS to seize cell phones from any student. According to the then-acting director-general of GES, Mr. Michael Nsowah, the use of cell phones distracts from academic work in schools (Tawiah, 2006). The ban resulted in students riots in one SHS in northern parts of the country. According to Zoure (2010), the school authorities alleged that some WASSCE results of final year students were cancelled due to cell phone examination malpractices, hence the management of the school decided to retrieve cell phones from students.
When the respondents were asked about the rationale behind the ban and its subsequent consequences on teaching and learning in schools, it was evident that there were mixed reactions among them. Here are some of those reactions:

Dr. Ato Essuman, the former chief director of MOE contended:

I knew that students were not supposed to use mobile phone. But it was more of a GES directive. It never came up at the ministry as a policy. It was a GES issue, however, I didn’t have any problem with the ban. In the sense that if boys and girls use mobile phones, they are just used for communication, sending emails and phone calls. We talked about capacity and knowledge. The teacher must know what mobile phones can be used for, and how he/she can access information and so on. You know, we need to get to that point where everyone appreciates the other use of mobile phone so once we are on that same wavelength we can look at the directive again. I mean, we have not prepared ourselves to take advantage of the mobile learning. We are only talking about 10% of usage of mobile phone as a learning tool. Once we get there, then we can look at the directives again.

(Personal communication, January 10, 2011)

The Chairman of the Anamuah-Mensah committee was not in favor of the ban. His thought was that instead of imposing ban on mobile phones use in schools, the GES officials should rather introduce educational contents to be used on mobile phones. He had this to say:

Well, before the directive came into operation, I was interviewed and I told them that, they would be isolating Ghana from the rest of the world if they ban the use of mobile phones because we have not utilized the benefit of this equipment. If
we want the students not to use it to call their girlfriends and their boyfriends
to do all those kind of things, then we have to put in contents. All that they need
are contents. If we have contents on mobile phone, that will engage them, then
they have no other reason but to work on the assignment given to them on the
mobile phones. They will spend very little time chatting with friends and doing all
those kinds of things. That is what I said. But they don’t understand it. Those in
favor of banning the use of mobile phones in schools don’t even understand what
contents are. So, it is like the whole management system needs education in that
direction. (Personal communication, January 24, 2011)

Mr. Alex Tettey-Enyo, the former NDC minister of education argued for and against the
directive. He elaborated the reasons why cell phones were banned in SHS. He remarked:

We are aware of the benefits to be derived in making knowledge accessible
where-ever you are and that it is sometimes through the M-learning that we may
acquire that facilitate making use of information in education, but every tool can
be misused or abused. Therefore this very controversial thing, the abolition of the
use cell phones in the school system, particular by the senior secondary school
level, arose out of misuse of these cell phones. First of all, some students use
mobile phones to disrupt examinations by communicating to teachers and friends
outside the exam hall to solicit help on examination questions. Secondly, some
students use phones in classrooms to disturb or interrupt class sessions, which was
making things difficult for lessons to be held in a normal atmosphere. In other
areas, some of the ICT experts who have come to help us with ICT policy are
even advocated that that policy would not succeed. Hence, it is high time we plan
to offset the abuses and then make headway with the use cell phones so that is where we are now. We are considering the best way of handling the issues of abuse in the use of these mobiles then we will come back with a new and more concrete content. (Personal communication, January 17, 2011)

The consequences of cell phone ban in SHS are enormous. Rogers and Price (2007) underscores the importance of the cell phone use in schools. They contend that cell phone usage in schools could give students access to educational resources through the Internet. Students could use cell phones to create new knowledge and to collaborate and exchange educational information with their counterparts throughout the world.

In the Ghanaian senior high school context, teachers and students are missing the great opportunities available for cell phone use in classrooms. As indicated by some of the respondents, education officials putting in place prudent educational contents could trigger M-learning in the schools. The ban on cell phones per se would not necessarily solve examination malpractices in the schools, whereas banning cell phone would rather widen the gap between schools in developed nations and those of Ghana in terms of the use of technology in education. School authorities could institute measures to regulate cell phone use during normal class hours and during examination periods.

Due to inadequate computers and unreliable access to Internet services, cell phones provide affordable alternative Internet access to teachers and students. Gutterman et al, (2009) contend:

Mobile devices extend desktop-based online learning into the mobile and wireless environment, allowing students with personal mobile phones to access educational materials from anywhere at anytime. Mobile technology also gives
teachers a new means of education delivery, and allows them to connect with their students at anytime. (p. 16)

**Lack of effective research, monitoring and evaluation of the ICT in education implementation process**

Apart from an E-readiness study conducted by MOE in 2009, no national study has been carried out on the state of ICTE in SHS. When the Director of EMIS was interviewed to determine if his office has been collecting data on the state of ICT implementation in the schools, he indicated that ICT indicators are yet to be added to existing EMIS indicators. He commented:

To be frank, since the introduction of ICT as core and elective subjects in SHSs, my outfit is yet to add indicators to ascertain the state of the ICT infrastructure in the schools, the number of students benefiting from the course, the number of ICT teachers in the schools, teachers using ICT to teach in classrooms and many other indicators. As of now, those indicators are not part of annual census data we collect from schools (Personal communication, January 16, 2010).

It was evident from the EMIS director that there was no close working relationship between EMIS, the ICT in Education unit and the Monitoring and Evaluation (M&E) Directorate. This assertion was corroborated by the 2009 and 2010 versions of the Education Sector Performance Report (ESPR). A lack of effective M&E in the ICTE implementation process led the Republic of Ghana (2009) to recommend: “Integrate the collection of ICT in the EMIS process to support improved efforts in planning, implementation and Monitoring and Evaluation” (p. 37).
The Republic of Ghana (2010) cites lack of financial funds as one of the main reasons why M&E activities have not been conducted in the schools. The report states:

Most of the Monitoring and Evaluation (M&E) activities earmarked for the implementation of the 2007 Education Reform to enhance efficiency and cost-effectiveness did not take place because of lack of funds. (p. 76)

It was obvious from the assertion of the Director of EMIS and from the ESPR reports that, there are no effective supervision, monitoring and evaluation process put in place to assess the impact of ICTE in the schools.

**Ghana’s policymakers and Fiedler’s Contingency Theory of Leadership**

With regards to the first research question: *What are the experiences of Ghana’s policymakers in policy creation and implementation in education in Ghana?* It was evident that each of the Ghanaian policymakers interviewed had contributed immensely to the ICTE Policy and implementation process. It is worth noting that even though the ICTE Policy implementation is in its nascent stages, the role-played by Ghanaian policymakers during pre-policy development and initial implementation cannot be over-emphasized.

The role played by MOEYS officials as early as 2002 for developing an ICTE Policy framework for pre-tertiary institutions, the ICT4AD policy developers and the work of Anamuah-Mensah’s education reform committee members have all demonstrated some form of leadership style. Based on analysis of ICTE Policy document and the interviews conducted with policymakers, it was obvious based on Fiedler’s Contingency Theory Leadership Theory, that makers of Ghana’s ICTE Policy clearly stated the vision, mission, policy goals and objectives in the policy document. According
to Fiedler (1967), having clear policy goals, objectives and scope are crucial to policy implementers and beneficiaries to comprehend the elements of the policy.

However, after the policy document was put in place, its makers failed to establish strong relationships with policy implementers at GES and at the school level. It was evident from the study that MOE and GES failed to guide and provide support to schools’ administrators and teachers at OSHS to implement the ICTE Policy. A classical example was the lack of training of teachers on how to integrate ICTE at OSHS. Lack of an ICT infrastructure and lack of a monitoring and evaluation process at OSHS were some challenges to implementing the Policy. Some of the challenges faced by OSHS can be found in chapter six of the study.

The Republic of Ghana (2009) corroborates some of the lack of leadership and managerial skills. The report states:

There are also problems with leadership and managerial skills in the Education enterprise. Waste, inefficiencies and lack in managerial practices also compound the problem. (p. 70)

Fiedler (1967) postulates that to build a strong team, a leader must have a strong relationship with his or her followers, because such a relationship is a necessary ingredient for leadership. Fiedler further reveals that without a strong relationship the leader cannot control the team or influence them. Based on critical analysis of Fiedler’s Contingency Theory Leadership Theory on the leadership style of policymakers, it was obvious that the theory assisted in exposing leadership deficiency on the part of Ghana’s educational policymakers in terms of not establishing strong relationship with the policy implementers at the school level. The lesson for policymakers is to ensure effective
leadership by building capacity of policy implementers (school administrators and teachers), consistent supervision, monitoring and evaluation at the schools.
Chapter 6: Experiences of Head of School, Teachers, and Students in the use of ICT in Teaching and Learning at Odorgonno Senior High School

Introduction

Chapter six presents the results of the study, the discussions and possible policy implications of the results of the interviews conducted with 21 respondents from OSHS. The chapter also includes the researcher’s observations at OSHS and documents reviewed in relation to the study. The analyses focus on narratives and experiences of Ghana’s ICT in education policymakers, assistant headmaster, teachers and students at OSHS. Observations, documents and photographs were used to triangulate some of the issues raised by respondents.

The researcher used the UNESCO’s *Continuum of Approaches to ICT Development Model* to explain how ICT policy is being implemented at OSHS. The use of UNESCO’s *Continuum of Approaches to ICT Development Model* was to ascertain the implementation stage of ICT in education at OSHS. The model was used as a theoretical framework in this study to help explain ICTE policy implementation process at OSHS.

With regards to the second research question: *What are the experiences of heads of schools, teachers, and students in the use of ICT in teaching and learning at Odorgonno senior high school?* Responses were solicited from an assistant headmaster, 10 teachers and 10 students from OSHS. To strike a gender balance, of 10 students, five of them were female and the other five were male. Likewise, five female and five male teachers were interviewed.
The main focus of the second research question is to enable the respondents to narrate their own stories and experiences of ICT use in OSHS. In all, 11 participants were purposively selected from the school. The assistant headmaster in charge of academic affairs was selected, due to the fact that he is in charge of how ICT is being integrated in the school. Five male teachers and five female teachers were selected from various subjects.

**Background of Respondents**

For the purposes of anonymity, I refer to OSHS respondents with code names or pseudonyms. The assistant headmaster Kweku Mensah, was transferred from another school in the metropolis to OSHS in 2000. He is in charge of academic affairs. He holds bachelors degree in sociology from the University of Cape Coast (UCC). Before being promoted to the post of assistant headmaster, Mr. Mensah was a geography teacher. He assisted me in selecting teachers and students for the study. He used the students’ performances in the previous examination to select the best students with good academic standing to be interviewed.

**Teacher Respondents**

The assistant headmaster purposively selected the 10 teachers for interviews across various disciplines in the school. The following females teachers were selected:

- Adwoa Asante- Home Economics Teacher
- Anita Wiredu- English Language Teacher
- Ama Kukah- Economics Teacher
- Mabel Aniwa- Biology Teacher
- Yawa Anku- Geography
Adwoa Asante has been teaching home economics at OSHS for about four years. She holds a bachelor degree in home economics from the University of Ghana (UG), Legon. Adwoa is married, with two children.

Anita Wriedu has been English language teacher at OSHS since five years. She is a product of UCC, from which, she holds a master’s degree in English language. She is unmarried.

Ama Kukah has taught economics at OSHS for the past two years. She attended Kwame Nkrumah University of Science and Technology (KNUST), Kumasi and holds a bachelor degree in economics and sociology combined. She is married, with three children.

Mabel Aniwa has been teaching biology at OSHS since eight. She holds a bachelor’s degree in human biology from UG, Legon. She is unmarried.

Yawa Anku is a Geography teacher at OSHS for the past four years. She holds a master’s degree in geography and human resource from UG, Legon. Yawa is married with one child.

The following male teachers were selected for the study:

Eric Owusu- ICT Teacher

Jacob Nettey- Mathematics Teacher

Paul Anagre- Chemistry Teacher

Samuel Essah- Physics Teacher

Johnson Odum- Agricultural Science

Eric Owusu is an ICT teacher at OSHS and one of the teachers who benefitted from PIL’s training workshop organized jointly by MOE and GES. He holds a bachelor’s
degree in education from UCC. He is currently undertaking postgraduate course in educational technology at UCC. He teaches computer literacy at the school for the past five years. Eric is married, with one child.

Jacob Nettey teaches mathematics at OSHS. He holds bachelor degree in mathematics from UG, Legon. He is unmarried. He has been teaching in the school the past three years.

Paul Anagre holds a master’s degree in chemistry from KNUST. He teaches integrated science and elective chemistry at OSHS, where he has been teaching for the past seven years. He is married, with four children.

Samuel Essah has taught physics at OSHS for the past nine years. He holds a bachelor’s degree in physics from KNUST. Samuel is married with, three children.

Johnson Odum holds a bachelor’s degree in agricultural economics from UG. He has been teaching agricultural science at OSHS for the past four years. He is married with, two children.

**Student Respondents**

The assistant headmaster assisted in selecting 10 OSHS student across the various course and grade levels. Five male students and five female were selected. This is to ensure equal representation between males and female students. To ensure anonymity of the students were also given code names. The female students are: Ama, Adwoa, Ekua, Abena and Efia. The male students are: Kwame, Kodwo, Kweku, Kwabena and Kofi.

Ama is an 18-years-old first year student. She lives with her parents at Awoshie, which is about four miles from the school. She is the oldest daughter with three other younger siblings. Ama is in a liberal arts class. According to Ama her parents are
supportive of her pursuit of academic work. Her father is a civil servant and her mother is a small-scale trader. Ama’s parents bought her a personal computer to be used at home. However, the computer is not hooked up to the Internet.

Adwoa is a 19-year-old second year science student. She lives with her aunt at Gbawe, a suburb of Awoshie where OSHS is located. She strives hard to maintain herself in school by helping her aunt in the market whenever she returns from school. She does not have personal a computer at home.

Ekua is a 20-year-old and in her third year in the home economics class. She lives with her parents at MacCathy Hill in Accra. Her mother is a teacher and her father is commercial transport driver. Ekua has two brothers who are undergraduate students at UCC and UG respectively. The brother at UG is studying computer science. Ekua says the brothers help her in computer literacy skills any time they are on holidays. She is an ardent user of computers and other ICT tools such as camcorders, digital cameras and computer games.

Abena is 21-year-old fourth year general arts student who lives with her parents in the Kwashieman suburb. Her mother operates a restaurant at their house. Abena has two older siblings. Her father is a hard-working private electrical contractor, who supports Abena in her education pursuit. He paid for her to attend extra classes and a computer literacy class. Abena owns a laptop that is hooked up to the Internet.

Afia is an 18-years-old who lives with her elder sister at Awoshie. She is a first-year business student. Afia has difficulty paying her school fees on time and is often prevented from attending classes till she pays them. She does not have access to a computer at home.
One of the male respondents, Kwame is a 19-year-old second-year science student. He lives in the Santa Maria suburb with his parents. Kwame is the youngest son of the family with four other siblings. He indicated his parents support his pursuit of academic studies. His mother is a well-to-do small-scale trader who provides for his academic needs. His parents bought him a laptop hooked up to the Internet.

Kodwo is an 18-year-old second year student in general arts. He lives with his father and stepmother in the Sowutuom suburb. He has an elder sister who supports his financial needs. Kodwo has neither laptop nor personal computer at home.

Kweku is a 21-year-old fourth-year business student living with his parents in Awoshie, some few miles from the school. Kweku’s father is head teacher at one of the private JHS in Accra metropolis. His mother is a midwife who operates a private clinic at Awoshie. Kweku has a personal computer at home but it is not connected to Internet.

Kwabena is also a 21-year-old fourth-year general arts student. He lives with his parents in the Kwashieman suburb. According to Kwabena, his parents are not well-to-do and struggle to provide for his education needs. He has neither laptop nor personal computer at home.

Kofi is 19-year-old second-year visual arts student. His father lives in the USA with his younger sister. Kofi lives with his mother in Weija suburb. Kofi occasionally visits the father in the USA during summer vacation. He has been exposed to computer games and other ICT tools.
Assistant Headmaster’s, Teachers’ and Students’ Knowledge and Understanding of ICT in Education Policy

The researcher’s interactions with the assistant headmaster, teachers and students solicited varied understanding of ICT in education. All the 21 respondents interviewed indicated they were aware of Ghana’s ICT in Education Policy document. However, only the Assistant headmaster had indicated he possessed a copy. When asked if any of them had read the Policy document, once again, only the assistant headmaster said he had read the contents of the Policy. The remaining 10 teachers and 10 students had not.

While the assistant headmaster and a couple of teachers had a clear-cut understanding of the question: What is your understanding of ICT in education?, there were mixed explanations given by the teachers and students. Seven out of 10 teachers thought that only computers and the Internet could be used to enhance teaching and learning in classrooms. Eight out of 10 students were not certain about what was entailed in ICT in education as specified by Ghana’s ICT in Education Policy.

The question: What is your understanding of ICT in education?, elicited responses regarding the use of computers and the Internet to teach in schools, are the use of computers to improve teaching and computer literacy in schools. Three out of 10 teacher respondents mentioned the use of ICT tools such as radio, television, the Internet, cell phones, calculators, and computers with accessories to promote teaching and learning. Only two out of the 10 student respondents expressed sufficient understanding of ICT in education. Here are some of the responses given with regards to respondents’ understanding of ICTE: Mr. Kweku Mensah, the assistant headmaster asserted:
The use of ICT tools like computers, the Internet, radio, television, digital cameras and others to enhance teaching and learning in the school. For example, some teachers here in OSHS have started using their laptops in classrooms. Likewise some students also carry their laptops to classrooms. (Personal communication, January 10, 2011)

When the researcher probed further to ascertain what the assistant headmaster meant by some teachers having started using their laptops in the classroom and students carrying their laptops to classrooms, explained that some of the science and mathematics teachers have been using Intel’s software to teach their in classes. He also indicated that students who have laptops use them in class to explore what the teacher teaches them.

When the researcher asked the teachers about their understanding of ICT education, some of the responses received were:

Mr Eric Owusu, an ICT teacher, stated:

My understanding is that it is not only the use of computers in teaching, but also, the use of other equipment like technological equipment that can enhance teaching and learning in schools. For example, students were using calculators before we got to know of computers so I can say we have been using technology of some sort before the integration of computers into our educational system.

(Personal communication, January 12, 2011)

Mrs. Adwoa Asante, the home science teacher contended:

The use of ICT in education is how technology can facilitate learning as well. Teachers also need more skills to teach technology in order to encourage students
to research on their own information in their various fields of endeavor.

(Personal communication, January 12, 2011)

When the students were asked the same question with regards to their understanding of ICT in education, the following are some of the responses:

Kwame, a second year science student remarked:

ICT gadgets help us students in calculating figures in mathematics class. At times, too, we watch and learn from science and mathematics quizzed on television. Some of our SHS courses are also delivered through radio and television. (Personal communication, January 11, 2011)

Abena, a third-year general arts student said:

When you talk about ICT in education it is all about using modern technology to make learning easier and faster and also learning about things outside your country or outside your reach. (Personal communication, January 11, 2011)

The students’ knowledge about ICT tools was focused on the computer and its accessories. It is noteworthy that only two out of 10 students could explain ICT integration in the curricula. However, eight of them mentioned computers connected to the Internet, calculators, printers, and computer games as ICT tools. Three out of the total number of teachers had a fair idea about ICT tools. Some of the teachers’ responses about ICT tools were: computers, printers, the Internet, cell phones and digital cameras. The following are some of the responses the teachers and students gave.

It was evident that even though the students were aware of the introduction of ICT in school curriculum, eight of them did not know what ICTE encompasses. Three of the teachers interviewed were aware of what is entailed by ICT in the curriculum. The
understanding of the majority of teachers about ICT tools focused on the computer and its accessories, cell phones and the Internet. Unlike the policymakers and the assistant headmaster who indicated that ICTE implied the application of ICT tools in curricula or to enhance teaching and learning, the teachers and students see ICTE as computer literacy.

The implication is that the government policy on ICT in education is not well understood by the beneficiaries. The resultant effect might lead to a situation in which other ICT tools like television, projectors, VCD players, CD ROMS and radio, among others, could be neglected or might not be used in teaching and learning. In addition, even though the teachers and students were aware of the introduction of Ghana’s ICT in Education Policy, none of them had read the contents of the Policy document. There is the need for MOE and GES to make copies of the policy document available to teachers and students. Since teachers and students could read and understand the elements of ICTE policy issues and the mode of integrating it in teaching and learning.

**ICT use at Odorgonno Senior High School**

**Introduction of computers and other ICT tools to OSHS.**

OSHS was among the schools that introduced the use of computers in learning in the late 1990’s. According to the assistant headmaster, Mr. Kweku Mensah, the first batch of computers was brought to the school in 1998. They were used ones and about 20 in number. A former student who was living in the USA donated the computers. Some of them were used in the school’s administrative office. The rest were sent to the science laboratory, where they were left unused, since there was no computer tutor to teach the students computer literacy. The assistant headmaster indicated:
It is pathetic to say that even though the first batch of computers was brought in to the school, there was no teacher to teach the students, so the computers were lying in the science laboratory covered. It was three years, before a National Service Personnel (NSP) with computer science background was posted to the school to teach students how to use the computers. (Personal communication, January 10, 2011)

It was evident that, apart from computers, no other ICT tools were introduced in the school at the time the computers were. When the assistant headmaster was quizzed about any other ICT tools that were introduced into the school, he replied: “Apart from the computers, I cannot remember if there were other ICT gadgets introduced as of the time computers were introduced in to the school” (Personal communication, January 10, 2011).

The assistant headmaster admitted that in 2003 the school experienced a critical mass of infusion of ICT tools. During that year, the school’s Parent Teacher Association (PTA) bought new sets of personal computers, laptops, printers, television and projectors among other ICT tools for the school. It was during that era that the assistant headmaster started to learn to use basic word processing, spreadsheet and digital presentation tools. He said, he can now use a laptop to prepare students’ admission records and grades and to analyze students’ general academic records. He remarked:

My brother, I must admit that it was somewhere around the year 2003 that I started learning basic computer skills. During that year the school’s PTA bought brand new computers, laptops, printers, televisions and other accessories for school. It was then that I was given a laptop to learn computer software. It was
game change era for me. I quite remembered one of our national service personnel was my personal trainer. Today, I am happy to say that I can use my laptop to write memos to all teachers. I have my own email accounts, which I use to communicate with my teachers and students. I also use spreadsheet to analyze students’ admission records and academic performances. Thanks to ICT.

(Personal communication, January 10, 2011)

When quizzed if he was invited by either MOE or GES to participate in any professional development programs, the assistant headmaster indicated there was no training program for heads of schools in relation to either ICT integration in education or ICT the policy implementation process. He indicated:

One of the major lapses of ICT policy implementation was that the powers that be, thus MOE and GES, failed to conduct training programs for the administrators or the implementers of the policy in the schools. For that matter, the policy could not take off smoothly in some schools, especially in rural and hard-to-reach schools. Less-endowed schools also faced tremendous infrastructural problems.

(Personal communication, January 10, 2011)

The above stated assertion made by the assistant headmaster exposed one major deficiency on the part of policymakers at MOE and GES. His assertion showed that there was no formal training for policy implementers on how to go about an ICT policy implementation process in the schools. As indicated earlier on, inadequate ICT infrastructure in most schools, especially in rural ones, was one of the challenges of implementing ICTE Policy.
According to the assistant headmaster, the school’s administration explored other sources to secure extra ICT tools for the school. Among the efforts was the alumni association (former students of OSHS) that donated some computers. The administration also now levies each student GHS 30 ($20) per term as a computer fee. Part of the levy is used to buy extra computers and accessories for the school to cater for the total student population. Some of the funds of the computer levy are being used to maintain malfunctioned computers.

The school also benefitted from a model school initiative launched by the NPP government during the 2003/2004 academic year. As indicated in chapter three, the school benefited from massive infrastructure development, among which was the building of a computer laboratory and a supply of computers. Intel Corporation also launched a pilot ICT in education project in the school. Mr. Kweku Mensah, the assistant headmaster, informed me that:

As a model school we have our computer laboratory with about 40 computers and then, fortunately, my school was luckily selected for a pilot project being run by Intel Corporation. Intel donated 50 laptops known as “classmate laptops” for the pilot project. All these laptops are being used teachers and students to teach and learn. When you talk about ICT equipment I think OSHS has some equipment. But I might admit that looking at the current total student population, the equipment are not sufficient. (Personal communication, January 10, 2011)

Based on the assistant headmaster’s assertion, the computers and other ICT facilities at the school were not adequate to cater for the large number of the students’ population.
The researcher’s observation of ICT facilities attested the assistant headmaster’s assertion.

**Researcher’s observations of ICT facilities at Odorgonno senior high school**

For the researcher to acquaint himself with ICT facilities at the school, he went round the premises to observe what was available. The first visit was to the administration block. The administration block; two new story buildings the school had built under the model school initiative. There were three computers and one printer at the general office. The general office is where all visitors are expected to report when seeking any information or looking for students or staff of the school. At the time of my visit, secretaries were using two of the computers. One uses the computer for a database for all incoming and outgoing mail. The second computer is for general administrative purposes, where all outgoing letters and other correspondence or vital information is composed and printed to be sent out.

The assistant headmaster in charge of administration had one laptop and a printer on his desk. The assistant headmaster in charge of academic affairs had one laptop, a scanner, and personal computer with a printer. He uses the laptop for general correspondence, to record students’ grades, and for general records of staff and students’ records. The computer and the scanner, according to the assistant headmasters were used to compose examination questions and other confidential documents of the administration. Apart from a television set at the headmistress’s office, no other ICT tools were found.

In the staff common room, a 36-inch television was mounted on the wall. During my visit the teachers were watching a panel discussion on a political issues. The school’s
computer laboratories are located near the soccer field, and labeled Computer Laboratory ‘A’ and Computer Laboratory ‘B’. Laboratory ‘A’ had 40 computers and Laboratory ‘B’ had 40 laptops known as “PC Classmates” donated by Intel Computer Incorporated for Intel Computer program training purposes.

![Figure 11. Computer laboratory ‘B’ without the laptops](source: Fieldwork, 2011)

Laboratory “A” was well networked and hooked up to an Internet facility sponsored by the school’s PTA. The computer laboratories were fitted with burglarproof iron bars to ensure maximum security. However, the teacher in charge of the laboratories revealed that since there was no night watchman or security office the laptops from Computer Laboratory ‘B’ are stored in the computer laboratory server room and brought out during computer class sessions. Each computer laboratory had a computer server, to which the computers and laptops were connected. The ICT teacher set up a secured
wireless Local Area Network (LAN) that provides Internet access to staff and students with laptops. However, the Internet access speed was very slow due to a slow bandwidth connection provided by Internet Service Provider (ISP). Laboratory “A” serves as an Internet gateway. It was linked up to a Very Small Aperture System (VSAT) mask from the ISP. There is a 36-inch television set and a video camera recorder player in Laboratory “A”. All the broken-down and malfunctioning computer monitors and system units were packed at the back of Laboratory “B”. There were no ICT tools at the classrooms.

The ICT teacher, Mr. Eric Owusu, serves as technology coordinator and an NSP with a computer science background serves as laboratories administrator. My observations showed that the two computer laboratories were covered with dust from the nearby soccer pitch. According to Mr. Eric Owusu, the dust in the laboratories was the major cause of rampant breakdown of the computers. To add insult to injury, the two laboratories have no curtains or window blinds to prevent dust coming from the soccer pitch. The computers in Laboratory ‘A’ had no protective dust covers, the situation allowing for further dust problems.

The Internet speed at the laboratory was not the best. The school subscribed for 512/mps speed per month from the Internet Service Provider (ISP) known as Africa on Line (AOL). The school administration was responsible for the payment till the inception of Intel’s ICT project in the school. At the time of this study, Intel had taken over the payment of the Internet subscription bills. The 512/mps gateway connection is shared by the school’s administration block, the computer laboratories and a wireless hotspot created by the computer laboratory system administrator.
Teachers’ ICT use at Odorgonno Senior High School

When the assistant headmaster was quizzed about how ICT are being used by teachers at the school, he said the majority of teachers are not interested in using ICT in their classrooms. He said even though he tries to impress the teachers to utilize the facilities and tools available online to enhance their teaching, most of them favor a didactic mode of teaching, even though they have enormous resources online. He also hinted that most of the teachers lack ICT knowledge and skills. Mr. Kweku Mensah elaborated:

My brother, even though I have tried my possible best to educate my teachers to use the available ICT facilities in the school and educational resources to teach, only a few of them are doing that. The majority of them still use the old lesson
notes in teaching. Most of them are also deficient in ICT knowledge and skills. (Personal communication, January 10, 2011)

When I explored what efforts were put in place to build the capacity of teachers to acquire the knowledge and skills to enable them use the necessary ICT facilities and resources, Mr. Kweku Mensah stressed that the administration had offered free computer literacy tuition for teachers after-school sessions, but surprisingly, most teachers showed no interest. He said the teachers prefer to organize “extra classes” for students to earn an additional income. Mr. Kweku Mensah remarked:

The administration made frantic efforts to provide free computer literacy for teachers after-school sessions. But, instead most of these teachers prefer to organize extra classes to earn extra income at the expense of building their own capacity. (Personal communication, January 10, 2011)

Based on the assertion of the assistant headmaster, it was obvious that most teachers in the school are not integrating ICT in teaching at OSHS. To assess teaching at the school, the researcher observed class sessions of three of the 10 teachers interviewed. The decision to select the three teachers’ class was based on information received from the assistant headmaster indicating that the teachers were among the few who integrate ICT in their teachings. The other seven teachers were interviewed to ascertain their teaching experiences with ICT.

Researcher’s observations of teaching at Odorgonno Senior High School

The first class lesson observed was that of Mr. Eric Owusu’s core ICT class. Mr. Owusu teaches both core and elective ICT at all levels in the school, from form one to form four. As part of the ICTE Policy, core ICT was introduced as a compulsory subject
for all students from the first year up to the fourth year. I observed the first year virtual arts class. There were 40 students of 25 males and 15 females. The class was held in Computer Laboratory ‘A’.

The class started at 8:30 a.m with 30 students. The ICT teacher introduced me to the class and explained my intention to observe the lesson for research purposes. He introduced the topic for the day as “Introduction to Word Processing”. He used an LCD projector and Microsoft PowerPoint to outline the objectives of the lesson: “by the end of the class session students will be able to create a new document and save it, open an existing document, inserting of text and graphics and how to edit them, paging, paper and page setup, previewing and printing of documents, how to create, edit and use tables, creating of templates amongst others” (copied from the ICT teacher’s Power Point presentation).

After taking the students through the lecture notes on Microsoft Word, the teacher had the students switch on the computers for the practical aspect of the class. The researcher observed that five students entered the laboratory during his PowerPoint presentation and after it the remaining five entered. The researcher also observed that each of the 20 computers being used by two students, with only one of them performing the task given by the teacher. The remaining students were looking on. The ICT teacher took the students through a hands-on exercise. The researcher noticed that about half of the computers were very slow and noted that the previous users of the computers have saved documents and files on the desktop and that might have been one of the reasons why the computers were slow.
The ICT teacher later brought in Intel’s (PC Classmates) laptops to be used by students whose computers were working slowly. During the hands-on exercise, the students were given ample time to practice what they learned. The teacher helped the students who were having problems with the tasks. He finally gave out the assignment for the week. He asked the students to create a document with tables and present it during the next class session. The class lasted for almost 45 minutes. At the end of the class, since most students do not have USB jump drives, they, too, saved their completed tasks on the computer desktops.

After the class session, the researcher interviewed the teacher on his computer use in teaching at OSHS. According to Mr. Eric Owusu, he was in charge of teaching both compulsory (core) and elective ICT. When I explored the rationale behind the core ICT syllabus, Mr. Owusu, reading from a piece of paper, remarked:

The core ICT syllabus is designed to provide basic skills in ICT for SHS students. It is expected that the knowledge and skills gained in this course will help students to use ICT in almost all their courses at school. The syllabus covers selected basic topics in ICT which offers hands-on activities to help students acquire the required ICT skills (Personal communication, January 25, 2011).

When pressed to specify the main aims of the syllabus, Mr. Owusu: outlined the specific aims as:

The syllabus intends to allow the students to acquire basic ICT literacy, develop their interest and use ICT for learning in other subjects. The syllabus also intends to enable students to acquire the knowledge for application of ICT in education and business, to enable them use the Internet to communicate effectively to access
Mr. Owusu added that by the end of the first year, the students are expected to cover the following topics: Typing, Introduction to ICT, Word Processing, Internet and Spreadsheet. According to him, the core ICT lessons are allocated two periods of 35-minutes per week for first-year students and two periods of 40 minutes per week for second-year students. Third-year students taking ICT as elective subjects have more periods allocated for them. Mr. Owusu revealed that the school failed to put a technology plan in place to ensure integration of ICT in learning and teaching. When quizzed how other subject teachers use the facilities to teach their students, Mr. Owusu answered:

Apart from integrated science and maths teachers, who occasionally bring their students to use the science and maths software provided by Intel, I cannot remember any teacher using the facilities in the laboratory to teach their students.

(Personal communication, January 25, 2011)

It was evident based on discussions with Mr. Owusu and the laboratory logbook showing who had used the facility that, apart from the ICT teacher, the integrated science and maths teacher no other teachers at OSHS use the ICT facilities available at the laboratory. My observation and available records show, only few teachers visit the laboratory, to check their emails. The situation reaffirmed the earlier assertion by the assistant headmaster that the teachers do not use ICT in their teaching pedagogy in the school. The implication is that the intended purposes of ICT in education are not being implemented in a model school like OSHS. There is therefore, a gap between the policy and its
implementation activities at the school. OSHS has no technology plan to make it a policy for all teachers to use ICT in classrooms.

When asked to state some of the challenges facing his teaching of ICT as a course in the school, Mr. Owusu contended:

Most of the computers are not working well. I hope you saw it yourself during the class lesson. We have about six out of 40 that are working well. Three of our good computers were moved to school administration for administrative purposes. How can over 1,000 students use 40 computers? Most of our computers have hard disk or memory problems. We have broken-down computers that can be repaired. We have sent a budget to administration to upgrade and repair the broken computers, but after about a year now nothing has been heard. When I send requests to buy new facilities for the laboratory, they always tell me to wait, because there is no money. The students do not have pen drives or external hard drives to save their projects or assignments. Because of that, the students have to save their ongoing projects on the computer. That also accounts for the slow nature of the computers. We also don’t have reliable anti-virus software. We only use trial versions that expire within a short period. Internet access at the laboratory is not reliable. At times some teachers do visit the lab to use the Internet to teach their students, but due to the fact that we do not pay our Internet bills on time, the provider disconnects our service. As a model school, you may think all is well with us but I hope you have seen it all. (Personal communication, January 25, 2011)

Mr. Owusu indicated that the ICT levies have not been channelled to either buying new equipment or repairing the broken-down computers. He lamented that instead of the ICT
levies being used to refurnish the computer laboratories the funds, according to the school authority, were being used to support students’ food costs at the boarding house. When asked if there is a technology plan for the school, Mr. Owusu said there was no such document. According to him, it was the responsibility for MOE and GES to provide guidelines for such documents. The discussion with Mr. Owusu also revealed that he relied on an ICT supplementary textbook known as “Aki-Ola” that has not been officially approved by CRDD to teach students. He explained that the official book ascribed by CRDD was not ready to be used.

When asked for the syllabus being used to teach the students, he produced two separate syllabi, one for Core ICT produced by Ministry of Education, Science and Sports (2007a) and second one being Elective ICT (from SHS 2- SHS 4) Ministry of Education, Science and Sports (2008a). The 16-page Core ICT syllabus is meant for all students from first to third year at SHS. The syllabus covers specific areas such as rationale for teaching and learning ICT, general aims, and scope of contents, pre-requisite skills, and organization of the syllabus. Specific topics to be covered are: Basic ICT concept, hardware and software, typing speed development, word processing applications and Internet. The rest are spreadsheet applications and project work. Six 35 minutes per week have been allocated for each class. (Ministry of Education, Science and Sports, 2007a)

The Elective ICT is meant for students (from SHS 2- SHS 4) who will select ICT as their majors. The 51-page syllabus covers the rationale for teaching and learning elective ICT, the scope of contents. The 12 themes that have to be covered are:

- Advanced Information and Communications Technology (Advanced ICT)
• Advanced Word Processing
• Desktop Publishing Software and its functionality
• Advanced Spreadsheet
• Advanced Hardware
• Introduction to software development
• PC Hardware Maintenance and Software Installation
• Data Communications
• Basic Networking
• Introduction to Data Processing Systems
• Introduction to Programming

The researcher also observed the geography class session of Mrs. Yawa Anku. Her class took place in the General Arts 3 classroom. The class started at 12:35 pm with 35 students in the class. The teacher introduced me to the class and explained my intention to observe the class lesson for my research purposes. She asked one of the students to recap the gist of the previous lesson. The student recapped the lesson by summarizing the formation of rocks. He outlined the characteristics, formation and examples of the three types of rocks, namely: igneous, sedimentary and metamorphic rocks.

The teacher later introduced the day’s topic by writing “Volcanic landforms” on the blackboard. Mrs. Anku listed the definition, the characteristics, the formation and examples of volcanic landforms. She took time to explain the various landforms. She also drew the various landforms and labeled the features of each. Mrs. Anku also gave
examples of where some of these landforms can be found in the world. The students
took turns drawing the landforms as shown on the blackboard. The class session lasted
for almost an hour. I observed that throughout the class session, no aspects of ICT were
used. Even though, the teaching activity for the topic emphatically stated “Students find
out from different sources including the Internet, CD ROMs and documentaries on how
vulcanicity occurs and discuss in class” (Ministry of Education, Science and Sports,
2008b, p. 24), the teacher failed to adopt the teaching methodology. Rather, Mrs. Anku
resorted to the traditional didactic methodology of teaching in which the teacher basically
used chalk, blackboard and her class notes.

One may think that the teacher might have given the students an assignment to
explore digital contents and the Internet on the topic before coming to class. In other
words, with the enormous resources available for the 21st century classroom, the teacher
might have adopted some of these resources by arranging to take students to the computer
laboratory to download simulation programs, or see on the Internet examples of volcanic
landforms and how they are formed.

After the class, the researcher interviewed Mrs. Anku about her experiences with
teaching with ICT. She indicated she had basic knowledge of computers and the Internet
and occasionally uses the Internet to check her email. She admitted she is not an ardent
user of technology. When asked how she learned how to use the basic computer skills
and the Internet, she recalled:

I learned basic computer skills at UG, when I was in the final year of my
undergraduate course. I gave my final project work to a lady who was secretary to
our head of department as she typed for me. At the close of work each day, I
normally sat with this lady to type my work. I always observed her when she was using the word processor. I have decided to learn and do the necessary editorial work on the project. So she took me through the basic word processing skills. Sometimes, I helped her with the editing aspect of the work. She also helped me by taking me through how to surf the Internet. During my graduate studies, computer study was part of our program. It was there that I improved upon my skills. (Personal communication, January 26, 2011)

When asked whether she uses ICT tools to teach her students, she answered:

In fact, I have tried by going to the computer lab on a number of occasions to use the Internet to download resources for my class, but I was told the Internet was down. The ICT facilities in the school are not conducive for teaching. Can you imagine taking my students to the lab and the Internet is not working?

The Internet is absolutely, 100% good for finding or searching for information and teaching students. But if such a tool is not available, nothing can be done.

(Personal communication, January 26, 2011)

When asked if she could use the facilities at an Internet café outside the school premises, where resources can be downloaded onto CD or external drives to teach her students, Mrs. Anku replied that the school is expected to provide facilities for teaching and learning in the school. She also raised the issue of ICT levies being collected by the school’s administration. According to her, such funds were expected to be used to furnish the computer lab and pay for improved and reliable Internet services. She lamented the deplorable state of teaching resources in the school. Mrs. Anku also blamed GES for not providing adequate teaching materials for teaching in the school and not providing
professional development for teachers. When asked about the initiative of the assistant headmaster to provide free computer literacy for teachers in the school, she indicated that, the time scheduled for the class was not convenient for most teachers, since most of her colleagues teach private students for extra income.

When asked to further enumerate some of the challenges facing her inability to integrate ICT in pedagogy, Mrs. Anku contended:

To further add to my earlier challenges enumerated, I also think GES failed by not organizing in-service training for geography teachers to empower us to integrate ICT in our teaching. Prior to the inception of the launching of the ICT policy, we were thinking GES would run training workshops for us to know how to use the new mode of teaching. But no training was organized for us. In addition, we don’t have the tools to work with. Personally I don’t have a laptop and access to the Internet to enable me to research and provide updated information for my students. There is no motivation to encourage us to go the extra mile in our efforts to use ICT in the classroom. (Personal communication, January 26, 2011)

It was evident from the discussions with Mrs. Anku that some of her responses corroborated Mr. Owusu’s assertions in terms of inadequate ICT facilities and the inability of the school’s administration to release funds for reliable Internet contact or purchase ICT equipment for the computer laboratory.

The teacher last class to be observed was Mr. Paul Anagre’s integrated science class. Integrated science is one of the subjects compulsory for all SHS students. The Ministry of Education, Science and Sports (2007b) states the rationale for integrated science as:
The integrated science syllabus is a conscious effort to raise the level of scientific literacy of all students and equip them with the relevant basic scientific knowledge needed for their own living and secondly, needed for making valuable contributions to production in the country. Education in science also provides excellent opportunities for the development of positive attitudes and values in our youth. (p. ii)

During the researcher’s interview with Mr. Anagre to find out the scope of the integration, he stressed:

The content of the integrated science syllabus encompasses the basic sciences that cover topics in agriculture, health and Industry. The course has been designed to provide an adequate foundation for the study of other subjects and for those who want to pursue further studies and training in science-related areas. (Personal communication, January 31, 2011)

The class lesson took place in a second year business classroom with 30 students in attendance. Mr. Anagre introduced me and my expected mission to the class. The class commenced at 8:30 a.m. However, before the class started, the teacher took head attendance and noted those students absent. Mr. Anagre’s topic for the class was the “Hydrological Cycle.” He took his time to explain the cycle by expounding on the various stages such as evaporation, condensation, precipitation, ground water and snowfall. Mr. Anagre illustrated each stage by drawing a diagram on the blackboard and labeled it. The class ended at 10:10 a.m.

The researcher observed that while the teacher was explaining the processes of cycle, almost half of the students were busy drawing the diagrams. The researcher also
saw that, Mr. Anagre’s approach of instruction was didactic. He was the only one who spoke throughout the class. The students were passive listeners. He did not use any ICT tools during the class. After the class, the researcher interviewed Mr. Anagre about his approach towards teaching integrated science. When asked why Intel’s resources on the computer were not used, he answered:

The Intel’s science and math resources are meant for teaching elective science and math. I have been using the resources for those pursuing elective chemistry. Some of these chemistry resources are on CDs and on the Intel’s portal. I normally take my elective chemistry students through some of these resources. But when you are ready to use the laptops supplied by Intel to teach, at the same time students learning computer literacy are using the laptops and you cannot go and ask them to leave the lab for my students to use them. (Personal communication, January 31, 2011)

Mr. Anagre corroborated the earlier assertion by Mr. Owusu, the ICT teacher, that due to the poor condition of the computers in the laboratory, the Intel laptops (PC Classmates) were being used to supplement the teaching of students on computer literacy, instead of the purported reasons. Mr. Anagre complained that the situation was hampering the teaching of science and math in the school. When asked if other science and math teachers were facing the same problem, he indicated the situation was not limited to him alone, since his colleagues always complain about their inability to use the laboratory facilities to teach.

When asked if he had the necessary skills to use Intel’s science and math software, he replied:
When the project was introduced to the school, Intel officials took all science and math teachers in the school through how to use the resources. The training exposed us to the modern way of using ICT to demystify science and math education. Personally, I have learned a lot. (Personal communication, January 31, 2011)

Mr. Anagre indicated that if ICT facilities were made available to the laboratories, students would benefit from new ways of learning and teaching. He also echoed earlier challenges enumerated by the teachers interviewed that GES failed to conduct professional development training for science teachers and was unable to provide teaching materials for the school.

The remaining seven teachers were interviewed in their respective classrooms after class sessions. All seven indicated they do not integrate ICT in their teachings. Four of the seven do not know how to use computer software applications. When asked why they could not take advantage of the opportunities offered by the assistant headmaster to become computer literate, Adwoa Asante, the home economics teacher replied:

The time scheduled for the computer class was not ideal for me. I am a nursing mother and I have to go home after classes to take care of my baby. I have suggested to the assistant headmaster to reschedule the time, but my suggestion was not taken into consideration, hence I could not take part in the class.

(Personal communication, February 1, 2011)

Johnson Odum, agricultural science teacher remarked:
“I have extra classes to teach at the same time the computer class is scheduled. Due to that, I am not being able to make it for the computer class” (Personal communication, February 1, 2011).

Anita Wiredu, the English language teacher recalled:

I was able to make it to the computer class on two occasions, but none of my colleagues were able to make it, so the class could not take off. Since then I decided not to go and waste my time. (Personal communication, February 1, 2011)

It was evident that the teachers missed the opportunity to learn computer literacy. Even though, the assistant headmaster afforded teachers the opportunity to learn computer literacy to enable them to integrate the knowledge and skills in their teachings, the teachers seem to think otherwise. When asked if they perceived that computer literacy could help them improve their teaching, almost all of them agreed that computer literacy could enhance their teachings. Jacob Nettey, math teacher, remarked:

I think computer literacy can improve my teachings of math I also think other ICT tools can help my students to explore new ways of demystifying math in the classroom. (Personal communication, February 1, 2011)

Ama Kukah, the economics teacher contended:

I know there are a lot of advantages to mastering the use of computer applications. There are resources one can pull out from the Internet to assist in teaching the students. (Personal communication, February 1, 2011).

From the above assertions by the teachers, it was evident that even though they were aware of the potentials of computer literacy, they did make it a priority to learn how to
use the computer applications. From a policy point of view, the ICTE Policy implementation at OSHS is being saddled with the problem where teachers who were supposed to be championing the implementation process of the policy were, themselves, not computer literate.

When the teachers were asked if they were aware of PSI-DL whereby some SHS subjects like English, math, sciences and social studies were broadcast on national radio and TV, almost all indicated that they were aware of the programs. However, when asked why some of these resources were not used in teaching their students, the teachers indicated they lacked the resources to enable them to record and use the programs in classrooms. When asked if they had received any of these resources from CENDLOS, at the time of the interview, the teachers said the materials had not been received.

Summary of the Assistant Headmaster’s and Teachers’ use of ICT at OSHS and Policy Implications

The assistant headmaster, through his own efforts, was able to learn computer software applications for administration purposes. Under his supervision, the computers in the administration block were used to record and track student records and grades. The computer in the assistant headmaster’s office was used to compose and print examination question papers for students during examination periods. In the acquisition of ICT infrastructure for the school, the school’s PTA played a pivotal role by donating assorted ICT facilities to the school. Under the model school initiative introduced by the NPP government during the 2003/2004 academic year the school also benefitted from some ICT facilities. Intel Corporation donated laptops to the school for the teaching of science and math.
In general, six out of ten teachers indicated they know how to use computer software applications. However, only one out of ten uses ICT tools in teaching. Apart from the ICT teacher who teaches ICT as core and elective subjects, the teachers interviewed do not integrate ICT in their classrooms. Even though some teachers, especially, those who teach science and math courses, indicated they have capabilities to use computers and other ICT tools in their teaching they were unable to do so, because the laptops in the computer laboratory meant for teaching of science and math were diverted to teach computer literacy.

It was evident from observation and discussions with the teachers that the main ICT tool being used at OSHS was a computer. The computers in the laboratory were inadequate and only a few were in good condition. Most of them had broken-down and the maintenance culture at the school was not the best. The Internet connection for the computer laboratories was slow and unreliable. Some teachers said the situation prevents them from using the facilities in the computer laboratory to teach. Even though attempts were made by the assistant headmaster to provide professional development computer literacy training for teachers, they failed to participate. Instead, these teachers tended to organize extra classes for students for extra income.

The teachers blamed MOE and GES for not providing training programs to enable them to diffuse ICT into their classrooms. MOE and GES were also blamed for not providing teaching materials. The teachers blamed the school authorities for not providing ICT infrastructure for the computer laboratories, even though the school authorities collect an ICT levy from the students each term.
According to the assistant headmaster, one major problem confronting the implementation of the ICT policy at OSHS was lack of time on the part of policymakers to prepare for the introduction of the policy, hence the teachers’ lack of adequate knowledge about ICT integration in the school. The Upper East Regional Secretary of GNAT supported this assertion. As quoted in the *Ghanaian Chronicle* (2007), “the Upper East Regional Secretary of GNAT, Mr. Linus Attey Cofie, stated that the official visits conducted by the Association in most schools in the region have revealed that teachers do not have fertile knowledge as far as the yet to be implemented reforms were concerned” (para. 3). It was evident that after four years of implementing the policy in the schools, the initial problems conceded by GNAT still persists.

None of the teachers used TV, radio or other ICT tools, even though the PSI for ICT programs in English language, the sciences and social studies were among being aired on national radio and TV stations. Despite being aware of some of these programs, the teachers indicated they did not have the resources to record the programs for use in teachings students. The state of teacher ICT use at OSHS has demonstrated another gap between ICT policy and its implementation process. The situation at the school was in line with MOE’s E-readiness report. The Ministry of Education (2009) states that lack of professional development on the part of teachers; poor ICT infrastructural facilities, inadequate ICT facilities, ineffective supervision and monitoring in schools among others are problems facing ICTE implementation in schools.

It is noteworthy that despite new educational reforms and the introduction of ICTE Policy that requires integration of ICT in teaching and learning at SHS in Ghana, there are major challenges confronting the implementation of the policy at OSHS.
ICT Use Among Students at Odorgonno Senior High School.

To ascertain the respondents’ knowledge about the ICTE Policy, they were asked if they had heard about the introduction of the policy in the school. Almost all of them said they were aware of the policy. All of them were able to explain the difference between core ICT and elective ICT. However, only one-third of the respondents understood what was entailed ICT integration in education. Two-thirds of them understood ICT integration in education as ICT literacy.

Based on the interviews with the students, it was obvious that the major ICT tools used were computers and the Internet. About two-thirds of the students used computers in their learning process. Only one-third of the total number of respondents used the Internet. Two respondents indicated they use game consoles to play video games. Since the ban of cell phone use was in effect in the school, none of the respondents made reference to the cell phone as a learning tool.

Ama, a first year student said she used the computer more often than any other ICT tools:

I used the computer more than any other ICT tool. I have a computer at home and I have been using Mavis Beacon to learn how to type. I have a digital camera, but I hardly use it for learning. (Personal communication, February 2, 2011)

Kodwo, a second-year general arts student, was one of the students who played video games. He stated:

As for me, when I am learning and I become bored, I just go and take my game console and connect it to the television and start playing games. The kinds of
When the students were asked how they were using ICT tools to enhance their learning, they gave varied responses. The remaining five of the respondents, especially the first-year students, indicated they were learning computer literacy to apply to other courses being studied. Three of the remaining half indicated they used ICT tools, especially the computer and Internet, to research for academic purposes, especially to help them solve their assignments. The remaining two students used computers to play video games and learn how to type. The students offered these insights:

Kweku, a fourth-year general arts student remarked:

I used the computer and Internet for research work. When we are given any assignment in school, when I go home, I log on to the Internet and type in the topic or question and download the information. (Personal communication, February 2, 2011)

Ekua, a third-year student responded:

I used the computer and Internet at a cyber cafe to search for answers for assignments given by my teachers. I realized that the information gathered on the Internet is much more detailed than what my teachers provide. I also used the computer to play games. (Personal communication, February 2, 2011)

Kwabena, a fourth-year student had this to say:

Actually, when any teacher makes mention of any scientific term that I don’t understand anything taught in class, when I go home, I do go to the Internet café
and type in the term. I do get the answers. (Personal communication, February 2, 2011)

Based on my observations and interactions with the respondents, I deduced that the students seldom used computers and Internet services at the school’s computer laboratories after school hours. When asked if they have been using ICT facilities in the school’s computer laboratories to learn, Kofi, a second-year visual arts student responded:

We are not permitted to go to the computer laboratories to use the computers, unless it our turn to have a computer class period. Apart from that if you go there, you will see other students taking their computer lessons. (Personal communication, February 2, 2011)

Abena, a fourth-year student remarked:

The ICT teacher does not allow us to use the computers at the laboratories. He always tells us the computer laboratories are booked to be used for computer class. The laboratories were also locked up after classes. The situation made it difficult for us to practice whatever we have learned. (Personal communication, February 2, 2011)

Almost all the students corroborated the teachers’ assertions that ICT tools were not used in teaching in the school. The students indicated that apart from core ICT and elective subjects, none of the teachers used ICT in their teachings. The respondents were expecting the teachers to take the initiative to integrate ICT in teaching in classrooms. Abena, a fourth-year general arts student relayed that:
Apart from elective ICT, we have not experienced any situation where other teachers use ICT tools such as computers, TV or video in their teaching. Personally, I was thinking that since ICT had been introduced in the school system, I expected teachers to use the tools in their teachings. (Personal communication, February 2, 2011)

Kwame, a second year science student remarked:

Apart from the ICT teacher who teaches us core ICT, I have not seen my teachers using ICT to teach in any of my subjects. The teachers will just come to class and teach or dictate their lesson notes (Personal communication, February 2, 2011).

UNESCO’s Continuum of Approaches to ICT Development Model and ICT Use at OSHS

Based on the results of the interviews, observations and documents analyzed, it was obvious that ICT use at OSHS was at the *Emerging Approach Level*. The state of ICT use at OSHS portrayed characteristics of *Emerging Approach Level* as stipulated by UNESCO’s *Continuum of Approaches to ICT Development Model*. UNESCO (2002) contends that schools at the *Emerging Approach Level* or schools at nascent stages of ICT development show the characteristics of those schools that begin to buy computers and other accessories. The school bought some computers and some were donated by the alumni association and the PTA. The state of ICT use at OSHS showed that the school authorities and teachers still use traditional and teacher-centered methods of instruction. The ICT facilities were not effectively used in teaching and learning in the school. However, there were some elements of basic ICT knowledge and skills among school authorities, students and teachers.
UNESCO (2002) states: “Schools at this emerging phase are still firmly grounded in traditional, teacher-centered practice. The curriculum reflects an increase in basic skills but there is an awareness of the uses of ICT” (p. 15). This was the case at the school as evidenced by observations interviews and documents analyzed.

**Summary of Students ICT Use at OSHS and Policy Implications**

The students’ assertions, coupled with lesson notes and my observations, further proved that there was no meaningful ICT integration-taking place in the school. Only a few students have taken initiatives to visit Internet cafes to conduct their research and improve their learning. It was evident that there is a missed opportunity for teachers and students at OSHS to use ICT to enhance teaching and learning. OSHS as a model school deserves a better ICT policy implementation process. However, the state of ICT use at the school was not different from the findings of MOE’s report on E-readiness (Ministry of Education, 2009). Apart from students taking core and elective ICT classes as courses in computer literacy, there is no meaningful ICT integration in the school. It is noteworthy that other ICT tools such as TV, radio, VCD players and cell phones, among others, were not used in teaching and learning.

The main ICT tool used in the school was a computer with occasionally Internet services. The Internet connectivity in the school was not reliable, thus limited the access to digital materials that could enhance teachers’ and students’ teaching and learning in the school. The school’s authorities’ inability to pay Internet bills on time resulted in disruption of Internet services, so the teachers and students were unable to use the services at the computer laboratory.
The students and teachers were not given ample time to use ICT facilities in the school computer laboratories. There was no technology plan for the school; no standardized measure mechanism to ensure teachers were complying with standards and norms of the ICTE Policy; and no proper supervision, monitoring or evaluation process. ICT use at the school was thus being implemented on an *ad-hoc* basis. Obsolete computers and rampant breakdown of computers in the laboratories, coupled with a poor maintenance culture have aggravated the state of the ICT situation in the school. Even though students pay computer levy fees, rather than using to refurbish some of the broken computers and restock the laboratories with new ones, the school administration diverted the funds to cater to other school needs.

The policy implication is that the ICTE Policy implementation process at OSHS was fraught with many operational problems. Students and teachers were not benefiting from the introduction the policy. It is noteworthy that the state of ICT use at OSHS is reminiscent of the pre-ICTE Policy era, when ICT in education initiatives were implemented in a haphazard manner. The situation, therefore, calls for re-examination of conditions at the school and the need for pragmatic decisions on the part of the powers that be, such as the school authorities, PTA, GES and MOE to address the problems.

**Post-Interview Analysis**

After analyzing of the study data of respondents, it is imperative to provide feedback to policymakers on the outcome of the results of the state of ICTE implementation at OSHS. The purpose is to triangulate the results findings and the need to inform the policymakers on how the policy is being implemented to enable possible
policy review or the necessary actions to be taken. Five policy makers were interviewed by phone. Four out of five policymakers took part in the earlier interview.

On the lack of ICT infrastructure in the school, the ICTE Coordinator corroborated the result by indicating that the situation at OSHS is no different from most schools in the country. He mentioned the lack of resources on the part of MOE and GES to deploy ICT infrastructure in all schools. However, he indicated that the MOE in collaboration with the Ministry of Communication (MOC) and a Ghanaian private ICT firm rLg Communication has started a project known as ‘One Laptop Per Child’ (OLPC) with 60,000 child-friendly computers being distributed to students in basic schools in Ghana.

With hindsight, the project received criticism from sections of NGOs’ working in the education sector and some members of academia. The argument raised by those who opposed the project was that, the project is not viable since most of the basic schools in the country had no classrooms, libraries, teachers, electricity, Internet on proper materials for teaching and learning. The opponents to the project suggested the government might better channel the resources to provide classrooms, teachers teaching materials, textbooks and electricity among other needs, to the schools.

According to Vibe Ghana (2011), Dr. Kwadwo Adjei Tutu, a senior lecturer at the University of Ghana accused the government of wasting resources of the nation. Vibe Ghana (2011) states:

He also charged the Government for misplaced emphasis on ICT education when many pupils remain poor at reading and writing. According to Dr. Adjei Tutu, Government could be charged for causing financial loss to the state with the
distribution of 6,000 laptops to pupil’s, when the same resources could be used to provide libraries, books and proper supervision for pupils. (para. 2-3)

In similar vein, CitifmOnline (2011) reports that Mr. Steven Agbenyo, the Executive Director of a Tamale-based NGO, criticized the government’s OLPC project.

CitifmOnline (2011) contents:

According to the Savannah Signatures Executive Director, there are schools in the heart of the Tamale metropolis (names withheld) that cannot boast of a single computer and its accessories. He added that the region lacked teachers to handle the ICT subject in many schools that do not have access to electricity.

On the way forward, Mr. Steven Agbenyo advised the Ministry of Education to put on hold the initiative of making the ICT subject examinable at the Junior High School level and ensure the fair distribution of ICT logistics to all schools nationwide. (para. 8-10)

On the problem of lack of training for teachers to integrate ICT in pedagogy, an assistant director at CRDD indicated that the situation is now changing since the CRDD has started a nationwide training for heads of schools and teachers on ICTE knowledge and skills. The training is also being used to orient the participants on ICTE issues.

On the issue of ban of cell phones usage in schools, Mr. Stephen Adu, the deputy director of GES disagreed with the policy directive. According to him, the ban of cell phones in school will not deter the students to either use the cell phones in examination malpractices or use them to watch pornographic features on the Internet. He rather argued that school authorities should put in place mechanisms to check the use of cell phones in schools. He also suggested that teachers should be taught how to help students to use cell phones to enhance learning in schools. He indicated MOE is looking into several
memoranda presented by civil society organizations and IT experts on the ban of cell phones in schools. One ICTE Policy maker hinted that the entire problems facing ICTE could not be solved within the shortest possible time. He indicated the government is doing its level best to equip the schools with reliable Internet and electricity, among other facilities.

**How Does the Ghana ICT4AD Policy and Other Documents Support the ICT in Education Policy?**

**Introduction**

The last research question is *How does Ghana ICT4AD and other policy documents support ICT integration in senior high schools?* Attempts to find policy documents that provide the basis for the ICT policy and its implementations processes at SHS have led to the discovery of certain vital documents. It was obvious from my document analysis that there were some international conference declarations and national policies and documents that informed Ghana’s ICT policymakers in the quest for developing ICT in Education Policy.

According to the Ministry of Education (2008), the ICT in Education Policy document was influenced by various international and national policy documents, declarations, charters, papers and plans. The notable ones include:

- World Summit on Information Society (2005)
• ICT in Education Policy Framework: which highlights key issues and expected benefits of ICTs in Education (2002)

• The Ghana ICT for Accelerated Development (ICT4AD) Policy (2003) that recognizes education as a crosscutting issue within the national framework was crucial to the support of the thirteen other national pillars.


In addition to the above-named stated documents, the researcher reviewed other related documents that provided a basis for the ICTE policy. This segment of the report takes a critical look at the contents of these international and national documents and how they relate to Ghana’s ICTE policy.


According to the United Nations (2010), Ghana was among the 189 nations meeting in United Nations Headquarters’ at New York in the year 2000 that signed the final declaration known as Millennium Development Goals (MDGs). MDG provide clear-cut targets for solving severe poverty throughout the world. The eight goals seek to address poverty alleviation and to promote international development and member nations are expected to achieve their respective targets by 2015.

Two of the eight goals relate directly to education. Thus, goal two focuses on universal primary education and goal three seeks to promote gender equality and empowerment of women. Education has been identified as an enabler for manpower development and has a positive impact on the achievement of the other MDGs. The
MDGs provide a framework for member countries of the United Nations to work together towards poverty alleviation and international development.

Under the goal two of the MDGs, the United Nations (2010) states: “Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling” (p. 16). In the Ghanaian context, the focus of goal two is to ensure equal access to education to all Ghanaian pupils and students. Ghana’s ICTE policymakers made reference to the MDGs, because Ghana was a signatory to the declaration and must comply with the tenets of the document. The ICTE policy intends to provide equal access to ICT education for all pupils and students.


Ghana was signatory to another international conference known as the World Education Forum, held in 2000 in Dakar, the capital of Senegal. The outcome of the forum became known as *The Dakar Framework of Action*. The World Education forum came out with six education targets intended to promote, FCUBE, equal access to education, increased adult literacy programs and eradication of gender disparities. It is worth noting that Ghana’s FCUBE program launched in 1995 by MOE took its cue from the Dakar education forum. According to UNESCO (2000), to achieve the Dakar education goals the various governments have pledged to “harness new information and communication technologies to help achieve EFA goals” (p. 9).

The World Education Forum is a benchmark for assessing the impact of education policies in Ghana. The Ministry of Education (2008) states: “Together with the MDGs, the Dakar Education Goals constitute an internationally agreed framework against which the success of Ghana’s education policies, reforms, strategies and programs can be
measured and evaluated” (p. 9). Ghana’s ICTE policymakers made reference to the Dakar Education Goals in the policy document.

**World Summit on Information Society (2005)**

Ghana endorsed both the Geneva and Tunis Plan of Actions for the World Summit for Information Society (WSIS). The two declarations called for pragmatic approach on Information Society and promotion of ICT programs to achieve international development goals as enshrined in the MDGs. By 2015, the WSIS Plan of Actions expected to connect all levels of education, public libraries, health centers, hospitals, and local and central government agencies with ICT. The Plan of Actions also called for the formulation of school curricula to meet the challenges of the Information Society. The Plan of Actions made reference to equal access to ICT facilities by all segments of the global society. The United Nations (2005b) states:

- *building ICT capacity* for all and confidence in the use of ICTs by all - including youth, older persons, women, indigenous peoples, people with disabilities, and remote and rural communities - through the improvement and delivery of relevant education and training programs and systems including lifelong and distance learning.

- *implementing effective training and education*, particularly in ICT science and technology, that motivates and promotes participation and active involvement of girls and women in the decision-making process of building the Information Society.
• paying special attention to the formulation of universal design concepts and the use of assistive technologies that promote access for all persons, including those with disabilities (p. 14).

The ICTE Policy document of 2008 made reference to the provision of equal access to ICT education to both girls and boys including people with disabilities as enshrined in the World Summit on Information Society declaration.


Ghana Vision 2020 (1996) states:

To achieve the GHANA-VISION 2020 goal, Ghana will have to embrace science and technology as the medium within which to operate. This is the technological era; Technology is what drives productivity, makes possible private initiative and creativity, and bestows competitive advantage to the production of goods and services in an open and liberal economy. In the 21st century, the country that fails to recognize the essential role of science and technology (S&T) in the socio-economic transformation of the nation cannot escape the clutches of poverty
Consequently, GHANA-VISION 2020 will be founded an adequate S&T base in spear-heading development in agriculture, industry health, education, housing, transport, communications and environmental sustainability. Indeed, this is the only way to achieve integrated rural development, a major priority plank in the long-term goal. (p. 28)


**ICT in Education Policy Framework: which highlights key issues and expected benefits of ICTs in Education (2002)**

On the national level, a number of documents have highlighted the relevance of integrating ICT into the education sector. The ICT in Education Policy document of 2008 drew a lot of policy framework from the Introducing Information and Communication Technology in Pre-Tertiary Institution’s Report prepared by MOEYS in 2002. The 17-member committee was chaired by Mr. A.A. Akuoko, then the acting director of the Secondary Education Unit (SEU) of GES. The policy framework focused on the type of computer literacy needed in pre-tertiary schools, the structure of the management and running of ICT laboratories, the maintenance plan for ICT equipment, the integration ICT in school curricular plans and funding of ICT laboratories. The policy framework also covered ICT education from primary school up to teacher-training college levels. It is
noteworthy that the policy framework document paved the way for the development of the ICT in Education Policy of 2008.


The Anamuah-Mensah educational reform committee’s report of 2002 highlights ICT as a vital crosscutting issue in the education sector. The report elaborated on the ICT policy framework of 2002 developed by MOEYS. According to the Ministry of Education (2008), Anamuah-Mensah’s report put forward several strategies including:

- Equipping all educational institutions with computer equipment and ICT tools in a prioritized manner; implementing ICT programs at the pre-tertiary level in a phased approach, starting with schools already possessing adequate laboratories and teachers; gradually expanding to other schools as and when ICT equipment and teachers become available; and adequately resourcing computer science and IT departments in public tertiary institutions to enable them to produce skilled human capital to meet the requirements of the industry. Within these reforms, it is also expected that the introduction of ICT into schools should cover teaching of ICT skills to all students, preparing students for the ICT professions and enhancing teaching and learning through ICTs. (p. 11)


The Ghana’s ICT4AD Policy document of 2003 has shown the Government of Ghana’s commitment to ensuring the building of a formidable information based society. The national ICT policy also sought to provide a general policy framework towards an economy driven by a knowledge-based technology. The 95-page policy document outlines 14 sectorial policy frameworks and strategies on how ICT could be deployed to enhance national development. The Republic of Ghana (2003) states the overall policy objective as:

To engineer an ICT-led socio economic development process with the potential to transform Ghana into middle income, information-rich, knowledge-based and technology-driven economy and society. (p. 17)

ICT in education is highlighted as first among the 14 pillars of the national policy document. The Ministry of Education (2008) states:

The National Policy outlines fourteen (14) pillars, of which education is highlighted, as both a critical pillar as well as a key socio-economic enabler. Towards this end, a number of key strategies have been identified, including: promoting the deployment and exploitation of information, knowledge and technology within the economy and society as key drivers for socio-economic development; modernizing Ghana’s educational system using ICTs to improve and expand access to education, training and research resources and facilities, as well as to improve the quality of education and training and make the educational system responsive to the needs and requirements of the economy and society with specific reference to the development of information and knowledge-based
economy and society; and improving the human resource development capacity and the Research and Development (R&D) capacity of Ghana to meet the demands and requirements for developing the nation’s information and knowledge-based economy and society. (p. 10)

The ICT4AD policy document also outlined an initiative to achieve specific objective goals of ICT in education. The ICTE Policy document utilized the proposed policy framework and initiatives in outlining the broad-based document for the education sector.


The *Ghana Education Strategic Plan (ESP) 2003 – 2015: Volumes II (2003)* document provides general strategic objectives, targets and indicators for the overall education policy. The 25 pages of volume I of the ESP cover an overview of 13-year education sector policies, strategies and targets. The duration of the ESP (2003-2015) conforms to the EFA deadline, where targets set by various member countries who ratified the declaration would be evaluated. Volume II of the ESP is made of work plans with specific objectives, activities, outcomes timelines and institutional responsibilities. MOE has general responsibility for policy development, direction, monitoring and evaluation. GES, on the other hand, has general responsibility for implementation of the policies and plans at the various regional and district levels.

The Government of Ghana (2003c) highlights policy goal number six to focus on ICT and science education. Policy goal six states: “Promote and extend the provision of science and technology education and training” (p. 8). In Volume I of the ESP document, “lack of effective use of ICT as a tool for teaching and learning” (p. 10), has been identified as one of the major weaknesses of the ICTE implementation process. The
Government of Ghana (2003c) lists the following as strategies for the implementation of policy goal number six:

- Finalize national policy on ICTE including syllabi;
- Provide necessary infrastructure to support ICTE programs at SSS level;
- Train a core team in ICT as TOTs;
- Provide appropriate ICT training opportunities at all levels, utilizing Science Resource Centers (SRCs);
- Develop a cadre of trained persons to support the delivery of ICT in schools and institutions (pre-service and in-service);
- Provide access to the Internet and establish a networking system as a basic part of the instructional environment in selected primary, secondary and tertiary institutions;
- Construct/rehabilitate computer laboratories in schools and institutions. (p. 33)

Critical analysis of the strategies based on the backdrop of interviews held with the policymakers, the assistant headmaster, teachers and students of OSHS have shown that most of the items listed have not yielded much in the way of results. Provision of ICT infrastructure, teacher professional development, trained core personnel to support ICTE in schools and provision of the Internet have not been implemented. The policymakers have only four more years to ensure that the above listed targets are met.


The 2004 NPP government’s white paper issued following the Anamuah-Mensah Education Reform Committee’s report also informed Ghana’s ICT in Education Policy.
According to the Government of Ghana (2004) the government put a premium on ICT education at all levels of education in the country. At the SHS level, ICT was intended to be diffused to provide second-cycle students with compulsory ICT literacy. ICT was expected to be used as a tool for teaching and learning, and to be used as a management system in school administration. The government white paper extended FCUBE to include two years of kindergarten and created a more inclusive second-cycle educational system. The white paper also recommended a four-year duration of SHS. However, the NDC led-government changed the four-year duration to three in the 2008/2009 academic year.


Under the 2008 Education Act, MOE still wields the power of development of education policy and coordination. In addition, it has been given the power to enforce “educational standards, development of books and other education materials and promote quality teacher training” (p. 6). Under the act, 13 satellite agencies report to the Ministry of Education. GES is responsible for the implementation of all education policies related to the pre-tertiary education system.

Wereko and Dordunno (2010) states:
The Act gives a new focus to decentralized management of education services at the district level and strengthens the role of parents and District Assemblies in the implementation of the FCUBE policy. District Assemblies (the main local government structure, which are partly elected and partly appointed) are enabled to build and maintain schools, establish district directorates of education and appoint district education oversight committees (pp. 5-6).

According to Wereko and Dordunno (2010), the act has to be implemented in conjunction with the Local Government Service Act of 2003, which delegates powers to various district directors:

- to assign responsibility for implementing decisions of each District Assembly on education in the district to the head of a district education directorate, who supervises and controls schools and is answerable to the district chief executive through the district coordinating director (p. 6).

**Summary**

The various documents analyzed above provided theoretical and contextualized framework for the *Ghana ICT in Education Policy (2008)*. The international documents helped by contextualizing ICT based on global perspectives, whiles the national documents aided by providing a theoretical framework. The Ghana Education Act (2008) provided legal backing to the ICTE policy document. However, based on critical analysis of the documents and interviews held with the respondents a gap was evident between the ICTE policy and the actual implementation process at OSHS. For example, most of the strategic targets set in the ESP documents in connection of ICTE have yet to yield the intended results.
Chapter 7: Summary of Findings, Recommendations, and Conclusions

Introduction

The purpose of the study was to explore the experiences of Ghana’s ICT policy-makers and their impact on ICT education at OSHS in Ghana. Specifically, the study targets how the ICTE Policy impacted the OSHS in Ga South District in the Greater Accra region of Ghana. Consequently, the research sought to address how integration of ICT in a particular Ghanaian school is supporting teaching and learning.

The purpose of the inquiry is to understand the experiences of Ghana’s ICT policy in education in terms of policy initiation and the use of ICT policies in teaching and learning. Chapter seven provides a summary of findings, conclusions and recommendations of the study.

Summary of Findings

Ghana’s ICT policymakers knowledge and understanding of ICT in education

The researcher’s interaction and interview processes with the nine respondents have shown their in-depth knowledge of ICT in education issues. My question: What is your understanding of ICT in education?, elicited responses such as the use of ICT tools to enhance effective teaching, learning and school management. The respondents further mentioned the use of ICT tools such as the Internet, television, computers and their accessories, mobile phones and radio among others as a means of delivering teaching and learning in classrooms and managing students’ records. It was evident that there were no ambiguities in terms of the policymakers understanding of ICT in education. Their
responses conformed with Ministry of Education’s definition of ICT in education that states:

ICTs are basically information handling tools – a varied set of goods, applications and services that are used to produce, store, and process, distribute and exchange information. They include “old” ICTs of radio, television and telephone, and the “new” ICT of computers, satellite and wireless technology and the Internet with their attendant tools. (Ministry of Education, 2008. p. 7)

**The need for an ICT in education policy and early initiatives**

With regards to the question why the government needed to introduce ICT in schools in Ghana, the policymakers gave varied reasons. Most of them opined that since the term “ICT” is now a household word, it was imperative that the government place a premium on introducing ICT in schools. Some of the respondents argued that, since Ghana is part of that global village and most of the members of the village were benefiting from the adoption of ICTE, the time had come for the nation to adopt such a policy.

Policymakers were in consensus that ICTE could provide a human resource base for the nation. Others opined that ICT in education could revolutionize that resource base. Though the two main political parties, the NPP and NDC, made reference to introducing ICTE in their manifestos, they fell short of detailing how ICT could be integrated in the schools. Anamuah-Mensah’s Education Reform Committee report (2002) indicated ICTE could transform the economy of the nation by creating wealth.
Early ICT in education initiatives

It was evident from the responses elicited from the policymakers that before the official introduction of the Ghana ICTE policy (2008), a series of *ad-hoc* ICTE initiatives was introduced by those in charge of the implementation the process both at MOE and at GES, NGOs, PTAs and private computer vendors among others. Some of the initiatives were the Science Resource Center (SRC) by MOE and GES, STME workshops, a World Links for Development project, a Global Teenager Project, the PSI-DL program and other school-based ICTE initiatives. Despite these initiatives to integrate ICTE, most of the initiatives were short-lived and riddled with problems. For example, only a few schools in urban areas benefited from the initiatives due to the lack of Internet connectivity in most schools.

Ghana’s ICT in education policy initiation process

Mangesi (2007) and Du Vivier (2010) indicated that an attempt to develop ICTE policy for Ghana has been on the drawing board for a long period of time. Efforts to develop the policy document predate the launching of Ghana’s ICT4AD policy in 2003. In addition to the ICT4AD Policy document, there was ICTE Policy framework launched in 2002 was used as a guide by the policymakers in drafting the Ghana ICT in Education Policy (2008). The Anamuah-Mensah Committee’s report (2002) officially proposed for the first time in the history of Ghana’s education reform, introduction of an ICTE policy in the Ghanaian educational school system. The committee also scrutinized and proposed the restructuring of library and information services to boost teaching and learning in schools.
In terms of strategy, the committee recommended that ICT should be introduced in curricula and be compulsory in the first year and be an elective subject in all senior high schools. The Ministry of Education (2002) states: “At the secondary level, ICT should be introduced both as a co-curricula activity for all students and as an elective subject” (p. 277). It is worth noting that the “missing link” within the proposed strategy was how ICT would be use in pedagogy. Based on critical analysis of the listed strategies, ICT is expected to be taught in schools as a subject. This issue raises concern and debate of whether ICT is seen as an end in itself or as a means (tool) to an end. The issue was later addressed in the ICTE Policy (2008).

Ghana’s 2008 ICT in education policy document

The development of the ICTE Policy document came about through tremendous technical assistance from GeSCI and various other stakeholders in education. According to the Ministry of Education (2008), the development of Ghana’s ICT in education policy represents a major stride in streamlining efforts towards infusing ICT into the educational system. MoES put together a committee to draft an ICTE Policy document. The Ministry of Education (2008) stressed that the policy document defined and outlined seven thematic areas as guiding principles, objectives and strategized for the policy document. These are:

1. Education Management – Ministry/Agencies and Educational Institutions
2. Capacity Building
3. Infrastructure, E-readiness and Equitable Access
4. Incorporating ICTs into the Curriculum
5. Content Development
6. Technical Support, Maintenance and Sustainability

7. Monitoring and Evaluation. (p. 6)

The seven thematic areas formed the basis for the ICTE policy document. Each of the seven thematic areas provided clear-cut guidelines, objectives and strategies of integrating ICTE.

**Implementation of the ICT in Education Policy in Senior High Schools in Ghana.**

Behind the *ad-hoc* and uncoordinated nature of how ICT is being deployed in Ghanaian schools, MOE came out with the draft ICTE policy document in 2006, during NPP regime. With the change in government in 2008, the NDC government moved to complete the policy and officially published it in January 2009. According to the Ministry of Education (2008), to enhance fruitful results and the sustainability of ICTE projects in schools, the policy document needed “implemented not necessarily to increase the number of computers, but should instead be based on supporting discrete educational objectives” (p. 12). The document also drew lessons from earlier ICT in education initiatives and sought to ensure proper coordination and management in implementing the policy.

Even though MOE and GES put a lot of effort into providing logistical support for the smooth implementation of the policy, the implementation process was bedeviled with operational and political problems. Notable among them were:

**Lack of capacity building for teachers**

One of the major problems was the inability of MOE and GES to build capacity of the teachers to integrate ICTE. The critics of the policy pointed out that there was no national training program for teachers to introduce them to ICT integration into schools.
Instead, only a few teachers were trained prior to the official introduction of the policy during 2007/2008 academic year. The officials at MOE complained of the lack of financial resources to conduct a nationwide training for teachers.

**Financial constraints**

It was evident from the interviews conducted with policymakers and from documents analyzed that financial constraints was one of the obstacles that hindered the early implementation of the policy. It is also noteworthy that over-dependence on international development partners or foreign assistance still persists. Since Microsoft and Intel were the two main corporate entities supporting the ICT in education implementation process. Both Microsoft and Intel sponsored the initial training of teachers.

**Lack of ICT sector implementation plan**

Another major setback for the ICT Policy implementation was the lack of ICT Sector Implementation Plan. As at the time of this study, MOE and GES have not come out with the ICT sector implementation plan as called for in the ICTE Policy document. The Ministry of Education (2008) states: “Additionally, the Ministry intends to focus on specific strategies in implementing the policy. This will be further defined in ICT sector Implementation Plan” (p. 3). Lack of an ICT implementation plan could result in a situation where schools will continue to implement the policy on an *ad hoc* basis, since there is no clear cut plan on achievable results.

**The duration in senior high schools**

Another contentious issue that saddles the implementation of the policy is its duration in SHS. Policy analysts and political commentators criticized the two dominant
political parties; NDC and NPP, for politicizing the duration of SHS. Whiles the NPP
government increased the duration of SHS from three-year to a four-year period in the
2007/2008 academic year, the NDC government after winning power in 2008, reduced
the time back to a three-year period. The situation has aggravated logistical problems in
the schools, since syllabi have to be redrawn, extra ICT facilities have to be provided and
extra classrooms have to be provided for those students now in the fourth year.

Another consequence of reverting to a three-years period is that come 2013, there
will be two batches of SHS graduates. Both a three-year group and a four-year group will
graduate and the situation will have serious implications for students who must have to
compete for admission to overburden public tertiary institutions.

**The ban on cell phones usage in senior high schools**

Another dysfunctional directive from GES was the ban on cell phone use in SHS. In 2006, GES issued a directive to all heads of SHSs to seize cell phones from any
students. According to the then acting-director-general of GES, Mr. Michael Nsowah, the
cell phones distract from academic work in schools (Tawiah, 2006). The ban resulted
student riots in one SHS in the northern part of the country. According to Zoure (2010)
the school authorities alleged that some WASSCE results of final-year students had be to
be disqualified due to cell phone malpractices during examinations. As a result, the
management of the school decided to confiscate cell phones from students.

The consequences of cell phone ban in SHS are enormous. Teachers and students
alike missing great opportunities available with the use of cell phones in classrooms. As
indicated by some of the respondents, if education officials put prudent educational
content in place, that could trigger m-learning (mobile learning) in the schools. The ban
of cell phones per se will not necessarily eliminate examination malpractices in the schools. School authorities could regulate cell phone use during normal class hours and enforce stricter rules during examination periods. A complete ban of cell phones would widen the gap between schools in developed nations and those of Ghana in terms of the use of technology in education.

**Lack of effective research, monitoring and evaluation of the ICT in education implementation process**

Apart from the E-Readiness study conducted by MOE in 2009, no other national study was conducted on the state of ICT in education in Ghanaian SHS. Since the introduction of the ICTE Policy, the EMIS unit of MOE has not included ICT in education indicators in the annual census database. It was evident from the information gathered from the EMIS director that there was no closed relationship with EMIS, the ICT in Education unit and the Monitoring and Evaluation (M&E) Directorate. This assertion was corroborated by the 2009 and 2010 Education Sector Performance Reports (ESPRs).

The Republic of Ghana (2010) cites lack of funds as one of the main reasons M&E activities have not been conducted in the schools. The report states:

Most of the Monitoring and Evaluation (M&E) activities earmarked for the implementation of the 2007 Education Reform to enhance efficiency and cost-effectiveness did not take place because of lack of funds. (p. 76)
What are the experiences of heads of school, teachers, and students in the use of ICT in teaching and learning at Odorgonno Senior High School?

With regards to the second research question: What are the experiences of head of school, teachers, and students in the use of ICT in teaching and learning at Odorgonno Senior High School? The main focus was to enable the respondents to narrate their own stories and experiences of ICT use at the school. In all, there were 21 participants were purposively selected from the school. The summary of findings were:

Assistant headmaster’s, teachers’ and students’ knowledge and understanding of ICT in education

The researcher’s interactions with the assistant headmaster, teachers and students elicited varied understanding of ICT in education. While the assistant headmaster had a clear-cut understanding of ICT in education, there were mixed explanations by teachers. Most teachers and students thought only computers and the Internet could be used in enhancing teaching and learning in classrooms. The question: What is your understanding of ICT in education?, solicited responses such as the use of computers and the Internet to teach in schools, the use of computers to improve teaching and computer literacy in schools.

The implication is that the government policy on ICT in education is not well understood by the beneficiaries. The resultant effect might lead to a situation in which other ICT tools like television, projectors, VCD players, CD ROMS and radio, among others, could be neglected or might not be used in teaching and learning.
ICT use at Odorgonno senior high school

OSHS was among the schools that introduced the use of computers in learning in the late 1990s. The 20 or so computers brought to the school in 1998 were used ones. Some were sent to the school’s administrative office and the rest sent to the science laboratory. Even though the computers were installed at the science laboratory, they were not used, because there was no one to teach computer literacy.

It was evident that, apart from computers, no other ICT tools were introduced in the school. In 2003, the school experienced a critical mass ICT tools infusion. During that year, the PTA bought new personal computers, laptops, printers, television and projectors for the school. The school also benefited from “Model School” status during the 2003/2004 academic year, when it received computers and assorted ICT equipment. Intel Corporation donated laptops to the school for the teaching of science and mathematics.

Observations of ICT infrastructure at Odorgonno senior high school

The researcher’s observations of ICT facilities have shown that the main ICT tool being used in the school the computer. Almost half of the equipment in the computer laboratories was not in good shape. Most were broken down and the rest were obsolete. The Intel laptops donated to be used for teaching mathematics and sciences were being used to support the teaching of Core and Elective ICT at the school.

Assistant headmaster’s and teachers’ use of ICT at Odorgonno senior high school and the policy implications

The assistant headmaster through, his own effort and with the help of an NSP posted to the school, was able to learn computer software applications for administration purposes. Under his supervision, the computers’ in the administration block were used to
record and track students records and grades. The computer in the assistant headmaster’s office was used to compose and print examination question papers for students.

In general, six in ten teachers indicated they know how to use computer software applications. However, only in of ten uses ICT tools. Apart from the ICT teacher who has the ICT as Core and Elective subjects, teachers interviewed do not integrate ICT in their teachings. Even though some teachers especially those who teach science and math courses indicated that they are capable of using computers and other ICT tools in their teaching. They because the laptops in the computer laboratory meant for the teaching of science and math, were diverted to teach students computer literacy.

It was evident from the observations and discussions with the teachers that the main ICT tool in use at OSHS was the computer, even though the computers in the laboratory were inadequate and only few were in good condition. Most of the computers were also broken down and the maintenance culture at the school was not the best. The Internet connection in computer laboratories was slow and unreliable. The situation, according to some teachers, prevents them from using the facilities at computer laboratory for teaching purposes.

The teachers blamed MOE and GES for not providing professional development training programs to enable them integrate ICT into classrooms. MOE and GES were also blamed for not providing adequate teaching materials. The teachers blamed the school authorities for not providing an ICT infrastructure for the computer laboratories, even though the school authorities collect an ICT levy from the students each term.
One major problem confronting the implementation of an ICT policy at OSHS was the lack of ample time for policymakers to prepare for the introduction of the policy, hence the teachers’ lack of adequate knowledge on ICT integration in the school.

None of the teachers used TV, radio and other ICT tools in their teaching, even though PSI for ICT programs in English language, the sciences and social studies among were being aired on national radio and TV stations. Through the teachers being aware of some of these programs, they sold they had neither time nor resources to record the programs. The teachers’ non-use of ICT at OSHS has demonstrated another gap between ICT policy and its actual implementation. The state of affairs at the school was in line with MOE’s E-readiness report. The Ministry of Education (2009) underscores the lack of professional development on the part of teachers and poor ICT infrastructural facilities as some of the major challenges of ICTE.

There was no technology plan for the school, lesson notes of the teachers do not show ICT use in teaching, there is no standardized measuring mechanism to ensure teachers are complying with the standards and norms of the ICTE Policy, and no proper supervision, monitoring or evaluation process. Hence, ICT use at the school was being implemented on *ad-hoc* basis.

It is noteworthy that, despite the new educational reforms and the introduction of the ICTE Policy that requires for integration of ICT in teaching and learning at senior high schools in Ghana, there were still major challenges confronting the implementation of the policy at OSHS.
**Students’ use of ICT at Odorgonno senior high school**

Based on interviews held with the students, observations and documents analyzed, it was obvious that the major ICT tools in use were computers and the Internet. To ascertain the respondents’ knowledge about the ICTE Policy, they were asked if they were aware of its introduction. Almost all of them indicated they were aware of the policy. All of the respondents were able to explain the difference between the Core ICT and Elective ICT. However, only one-third of the respondents understood what was ICT integration in education entailed. Two-thirds of the respondents understood ICT integration in education to be ICT literacy.

All the respondents were benefiting from compulsory Core ICT classes at the school. About two-thirds of the students use computers in their learning process, but only one-third of the total number of respondents used the Internet. Two of the respondents indicated they play video games. Since the cell phone ban because effective in the school, none of the respondents made reference to the cell phone as a tool for learning.

The respondents complained of not having ample time to use ICT facilities in the school computer laboratories. Even though students pay ICT levy fees, instead of the funds having used to repair the broken computers and buy new ones, the funds were diverted to cater for other school needs.

The policy implication is that the ICT in Education Policy implementation process at OSHS was fraught with many operational problems. Students and teachers were not benefiting from the Policy. It is noteworthy that the state of ICT use at OSHS is reminiscent of the pre-ICT in Education Policy era, when ICTE initiatives were
implemented in a haphazard manner. The state of respondents’ ICT use at OSHS was no different from the E-readiness report (Ministry of Education, 2009).

**How Does the Ghana ICT4AD Policy and other Documents support the ICT in Education Policy?**

The last research question: *How does the Ghana ICT4AD and other policy documents support the ICT integration at senior high schools?*, prompted the researcher to find policy documents that provide a basis for an ICT policy and its implementation processes at SHS. The effort has led to discovery of certain vital international and national documents. It was obvious from my document analysis that some international conference declarations and national policy and documents informed Ghana’s ICT policymakers in the quest to develop the Ghana ICT in Education Policy (2008).

Following is a summary of the documents analyzed:

**Millennium development goals (2000)**

Ghana was a signatory to MDGs, which provides clear-cut targets for solving severe poverty throughout the world. The eight MDGs seek to address poverty alleviation and to promote international development and, by 2015, member nations are expected to achieve their respective targets. Two of the eight MDGs relate directly to education. Goal two of the MDGs focus on universal primary education and goal three seeks to promote gender equality and empowerment of women.

Education has been identified as enabler for manpower development and has a have positive impact on the achievement of the other MDGs. In the Ghanaian context, the focus of goal two is to ensure equal access to education to all Ghanaian pupils and students. The ICTE policy was intended to provide equal access to ICT education for all
pupils and students. The MOE’s ESP (2003-2015) was developed to meet the MDG deadline (the year 2015).


Ghana was a signatory to the *Dakar Framework of Action*, also known as *Education for All (EFA)*. The World Education Forum is a benchmark for assessing the impact of education policies in Ghana. The Ministry of Education (2008) states: “Together with the MGDs, the Dakar Education Goals constitute an internationally agreed framework against which the success of Ghana’s education policies, reforms, strategies and programs can be measured and evaluated” (p. 9). Ghana’s ICTE policymakers made referred to the Dakar Education Goals in the policy document.

**World summit on information society (2005)**

Ghana endorsed both Geneva and Tunis Plan of Actions for World Summit for Information Society (WSIS). The two declarations called for a pragmatic approach an Information Society and promotion of ICT programs to achieve international development goals as enshrined in the MDGs. By 2015, the WSIS Plan of Actions is expected to connect all levels of education, public libraries, health centers, hospitals, and local and central government agencies with ICT.

The Plan of Actions called for the formulation of school curricula to meet the challenges of the Information Society. The plan made reference to equal access to ICT facilities to all segments of the global society. The ICTE Policy document of 2008 referred to provision of equal access to ICT education for both girls, boys and people with disabilities, as enshrined in the World Summit on Information Society declaration.


Ghana’s ICT in Education Policy, 2008 drew a lot of its policy framework from the Introducing Information and Communication Technology in Pre-Tertiary Institution’s report prepared by MOEYS in 2002. The policy framework focused on the type of computer literacy needed in pre-tertiary schools, the structure for the management and running of ICT laboratories, the maintenance plan for ICT equipment, the integration the ICT in School curricular plan and funding of ICT laboratories. The policy framework also covered ICT education from primary school up to teacher training college levels. It is noteworthy that the policy paved the way for the development of Ghana’s ICT in Education Policy, 2008.


The Anamuah-Mensah Educational Reform Committee’s report of 2002 highlights ICT as a vital cross cutting issue in the education sector. The report elaborated


The Ghana’s ICT4AD Policy document of 2003 has shown the Government of Ghana’s commitment to ensuring the building of a formidable information-based society. The national ICT Policy also sought to provide a general policy framework for a knowledge-based technology driven economy. The 95-page policy document outlines 14 sectorial policy frameworks and strategies on how ICT could be deployed to enhance national development. The ICT4AD document also outlined initiatives to achieve specific objective goals of ICT in education. The ICTE Policy document utilized the proposed policy framework and initiatives in outlining the broad-based document for the education sector.


The Ghana Education Strategic Plan (ESP) 2003 – 2015: Volumes I and II (2003) documents provide general strategic objectives, targets and indicators for the overall education policy. The 25-pages of volume I of the ESP cover an overview of 13-year education sector policies, strategies and targets. Volume II of the ESP is made of work plans with specific objectives, activities, outcomes, timelines and institutional responsibilities. MOE has general responsibility for policy development, direction, monitoring and evaluation. GES, on the other hand, has general responsibility for implementation of the policies and plans at the various regional and district levels.
White paper on the report of the education reform review committee (2004)

The white paper of the then government of NPP issued in the Anamuah-Mensah Education Reform Committee report’s also informed the Ghana’s ICTE Policy. According to the Government of Ghana (2004), it put a premium on ICT education at all levels of education in the country. At the SHS level, ICT was intended to be deployed to provide second-cycle students with compulsory ICT literacy. ICT was to be used as a tool for teaching and learning, and as a management system in schools.

The 2008 Education Act

The 2008 Education Act passed by Ghana’s Parliament provided legal backing to the ICT in Education Policy. Wereko and Dordunoo (2010) indicate that the act was passed to give legal backing to a new framework for education that aimed to improve education service delivery in the country. The 2008 Education Act replaced the 1961 Education Act passed during the regime the late Dr. Kwame Nkrumah.

Under the 2008 Education Act, MOE still wields the power of development of an education policy and its coordination. In addition, MOE has been given the power to enforce “educational standards, development of books and other education materials and promote quality teacher training” (p. 6). Under the Act, 13 satellite agencies report to the Ministry of Education. GES is responsible for the implementation of all education policies related to pre-tertiary education system.
Recommendations

To address the numerous challenges facing Ghana ICT in Education Policy, 2008 implementation in the schools, there is need for policymakers to put in place several directives. Some suggested policy recommendations are:

**The need for comprehensive programs on awareness and education on Ghana ICT in Education and implementation issues**

To address the paucity of information about ICTE Policy and its implementation issues, comprehensive public education activities are needed to create awareness and educate the populace about ICTE Policy issues. MOE and GES have partnered with the National Commission on Civic Education (NCCE), CHASS, GNAT, NAGRAT, NGOs working with the education sector and other stakeholders to launch educational programs on ICT in Education issues and needs.

**The need for a national ICT in education implementation plan**

As stated earlier, there was no ICT in Education implementation plan. The Ministry of Education (2008) states: “Additionally, the Ministry intends to focus on specific strategies in implementing the policy. This will be further defined in ICT sector Implementation Plan” (p. 3). MOE and GES need to put in place a proposed ICT sector comprehensive implementation plan with clear-cut timetables and deliverables. The plan will assist in regulating the ICT in Education implementation process in the schools to avoid haphazard implementation of the policy.

**The need for government-private partnership**

There is the need for government-private partnership to support schools to have access to ICT facilities. Government-private partnership will also afford opportunities for
school administrators, teachers and students to have access to uninterrupted Internet services, since some of these private entities can partner with government to cater of Internet cost of the schools.

**Teacher professional development and teacher training programs**

There is the need for comprehensive professional development programs for teachers, to enable them to integrate ICT in their pedagogy. The professional development should focus on ICT literacy and ICT integration in curricula. MOE and GES should review pre-service teacher training colleges and teacher training universities curricula by integrating ICT in education in training colleges. This will go a long way toward solving the lack of ICT teachers and the lack of knowledge of how to integrate ICT in pedagogy.

**Professional development programs for heads of schools and administrators**

To ensure effective leadership for implementation of ICT in education programs in the schools, there is the need for training programs for heads of schools and administrators on ICT in Education implementation issues, management, supervision and mentoring teachers.

**Affordable, cost-effective and reliable Internet connectivity for all schools**

MOE, in collaboration with the MOC has to put in place affordable, cost-effective and reliable Internet connectivity at all schools. These can be done in partnership with telecommunication companies, where concessions can be given to schools to pay low Internet subscription rates. Schools in rural areas where there are no electricity grids must also be provided with renewable energy like solar panels to power the computers and ICT tools.
**Development of local teaching materials and digital contents**

To avert the problem of over-reliance on foreign educational materials that does not align with national curricula. MOE and GES have to focus on development of indigenous or local educational content materials. Some of the materials can be in the form of print materials, audio, video and multimedia formats. In addition, open source resource materials and applications could be used to avoid using pirate propriety software. CRDD and CENDLOS could play important role in this sector.

**The need to lift the ban on cell phones use in schools**

There is a need to re-examine the ban on cell phone use in schools. Rather than an outright ban, strict guidelines and measures of student use of cell phones should be put in place. Mobile learning technology is in ascendancy. Ghanaian students will be missing a great opportunity if the ban is not lifted. SHS students pursuing an Elective ICT at the final year should be mentored to develop programs and software for cell phones.

**Teacher and student participation in collaborative programs**

One of the elements of the 21st century teaching and learning calls for teachers and students to take part in national and international collaborative programs. Online collaborative programs stimulate teachers’ and students’ thinking and analytical skills. Online collaborative programs also offer opportunity for students and teachers to build their ICT skills.

**Maintenance and technical support for the schools**

The maintenance culture at OSHS was not the best. As revealed by an E-readiness report (Ministry of Education, 2009), the maintenance situation in most Ghanaian schools is no different than that of OSHS. There is the need for maintenance and technical units
at schools to take care of broken-down ICT equipment. Students at technical and vocational institutes have to be trained to provide a human resource base for computer laboratories.

**Research, supervision, monitoring and evaluation plan**

MOE and GES have to put in place comprehensive research, supervision, monitoring and evaluation plans. There must be a close relationship among ICT in Education Unit, EMIS and M&E divisions at MOE and GES. EMIS must add ICT in Education indicators to the annual census indicators database to ensure effective tracking of the state of ICT in Education. There is the need also to conduct periodic research to ascertain the state of ICT situation for policy directives.

**Further Research Recommendations**

Due to the limited nature of this study, which covered only one school and a limited number of policymakers, extra studies are recommended to better understand the impact of the ICTE Policy in Ghanaian schools. Longitudinal studies are recommended to understand the nuances and impact of ICT in Education. There is further need to conduct comparative studies to determine ICT integration in rural and urban schools. I recommend that future studies cover a nationally representative sample size and scope.

**Conclusion**

The purpose of this study was to explore the experiences of Ghana’s ICT in Education policymakers and their impact on ICT education in Ghanaian Schools. The study used OSHS as a case study to ascertain how ICT is being implemented. Study findings have shown that as much as Ghana’s ICT Policy has contributed to the development of the policy document, implementation of the policy was fraught with
operational and policy problems. An ICTE implementation process at OSHS was bedeviled with problems such as teachers and students were not conversant with the contents of ICTE policy, inadequate ICT facilities, poor Internet connectivity, lack of capacity of teachers to integrate ICTE, students not given ample time to practice their skills and the inability of the school administration to provide ICT facilities to the computer laboratories. Most of the computers were broken and some were obsolete. It was evident from the findings that computers are the dominant ICT facilities used in the school.

The post-interviews conducted with some of the policymakers indicated that efforts are being made to address the problems facing ICTE Policy implementation. To conclude with, a lot of work still needs to be done by Ghana’s policymakers and school administrators to ensure ICT is effectively implemented in Ghanaian schools. The recommendations put forward will go a long way towards addressing some of the challenges enumerated in this study.
References


[www.elearning-africa.com/pdf/div/.../eLA08_Speech_Prof_Fobih_RTR.pdf](http://www.elearning-africa.com/pdf/div/.../eLA08_Speech_Prof_Fobih_RTR.pdf)


Lange, R. (2009). Africa Internet, broadband and digital media


Lange R. (2010). Africa Internet, broadband and digital media


from http://www.umsl.edu/services/govdocs/wofact2003/geos/gh.html


_The Dakar framework of action_. Paris: UNESCO


_Information and communication technology in education: A curriculum for schools and program of teacher development._ Paris: UNESCO.


United Nations.


United Nations News Centre, (2005) _Information technology must be used to promote development, Annan tells UN forum_. Retrieved on February 15, 2012 from


Yaghi, H. (1997). The role of the computer in the schools as perceived by computer-
using teachers and school administrators. *Journal of Educational Computing

Yidana I. (2007). Faculty perceptions of technology integration in teacher
education curriculum: A survey of two Ghanaian universities. Doctoral
Dissertation, Ohio University, USA.

Yildirim, S. (2007). Current utilization of ICT in Turkish basic education schools:
A review of teacher's ICT use and barriers to integration. *International Journal of
Instructional Media* v. 34(2) 171-186.

Sage Publication.

CA: Sage.

Young, A. & Norgard, C. (2006). Assessing the quality of online courses from the

Yusuf, M.O. (2005). Information and communication technology and education:
Analysing the Nigerian national policy for information technology. *International

and cultural influences on the development of teachers' craft knowledge, in: J.
Calderhead (Ed.) *Exploring teachers' thinking* (Eastbourne, Cassell), 1-2.

theory perspective. *Journal of Technology and Teacher Education* 9, 5–3
Appendix A: Interview Guide 1

INTERVIEW GUIDE FOR THE MINISTER FOR EDUCATION (NATIONAL DEMOCRATIC CONGRESS GOVERNMENT)

1. Can you briefly tell me about yourself?

2. Why does the National Democratic Congress government focus on ICT integration in teaching and learning in Ghanaian senior high schools as one of the major pillars in its political manifesto? (Probe)

3. How did your government decide on an ICT policy? (Probe)

4. In charting the course of ICT integration in schools, did your government look at any success stories from any country? If yes, can you share with me the success story of that country? (Probe)

5. What do you think might be some of the factors/conditions that contributed to that country’s success story?

7. Do you think we have those factors/conditions in Ghana?

8. Why did your government decide to settle on the three-year senior high school system instead of the four-year system forward by your predecessor government (probe).

9. Can you share with me some of the achievements of your governments in terms of ICT integration in teaching and learning in senior high schools? (Probe).

10. What are some of the challenges facing the implementation of ICT integration in schools policy?
11. What do you think are some of the measures to put in place to ensure success of ICT integration in senior high schools?
Appendix B: Interview Guide 2.

INTERVIEW GUIDE FOR THE FORMER MINISTER FOR EDUCATION
(NATIONAL PATRIOTIC PARTY/SHADOW MINISTER FOR EDUCATION)

1. Can you briefly tell me about yourself?

2. Can you share with me why the National Patriotic Party government focused on ICT integration in teaching and learning in Ghanaian senior high schools as one of its priority policy issues? (Probe)

3. How did your government decide on an ICT policy? (Probe)

4. In charting the course of ICT integration in schools, did your government look at any success story from any other country? If yes, can you share with the success story of that country? (Probe)

5. What do you think might be some of the factors/conditions that contributed to that country’s success story?

6. Do you think we have those factors/conditions in Ghana?

7. Why did your government decide to settle on the four-year senior high school system instead of the current three-year system? (probe)

8. Can you share with me some of the achievements of your governments in terms of ICT integration in teaching and learning in senior high schools? (Probe)

9. What are some of the challenges your government faced in the implementation of ICT integration in schools policy?

10. What do you think are some of the measures the current government has to put in place to ensure success of ICT integration in senior high schools?
Appendix C: Interview Guide 3.

INTERVIEW GUIDE FOR THE DIRECTOR OF ICT IN EDUCATION AT MINISTRY OF EDUCATION

1. Can you briefly narrate your autobiography?

2. What is the Ministry of Education’s working definition of ICT integration in teaching and learning in schools? (Probe)

3. Why did the Ministry of Education set up ICT model schools? (Probe)

4. From what I read in the ICT in Education Policy document, all senior high schools are expected to integrate ICT in schools. Can you share with me how the ICT is expected be used at all schools? (probe)

5. Can you share with me how ICT is being use in teaching and learning at Odorgonno Senior High School as a model ICT school?

6. Can you explain the current state of the ICT infrastructure at Odorgonno Senior High School? (Probe to find out how computers, Internet and other ICT Infrastructure are being use in the school).

7. How is the Ministry of Education ensuring ICT integration at the senior high schools in Ghana?

8. Can you share with me the types of training programs the Ministry of Education has in place to build the capacity of teachers to use ICT integration in teaching and learning in the schools?

9. What monitoring and evaluation processes does the Ministry of Education have in place to track progress of ICT integration in teaching and learning in the schools?
10. What are the relationships between your sector and other divisions within the Ministry of Education?

11. What are some of the problems schools are facing in integrating ICT in the curriculum?

12. What measures have been put forward by the Ministry of Education to address some of these problems?

13. What challenges are you facing as the sector ministry in terms of ICT integration in schools in Ghana.

INTERVIEW GUIDE FOR THE DIRECTOR OF CURRICULUM AND RESEARCH DIVISION OF THE MINISTRY OF EDUCATION

1. Can you briefly tell me about yourself?

2. What is the Curriculum Research and Development Division of Ministry of Education’s definition of ICT in education? (Probe)

3. Can you briefly describe how your division developed curricula and syllabi for schools? (Probe)

4. Can you briefly tell me how your division is implementing ICT in education in schools? (Probe)

5. Can you differentiate between the Ministry of Education’s syllabi and that of the West Africa Examination council? (Probe to find out how the two syllabi are being used in the schools?)

6. Can you briefly tell me how your division is working with other divisions within the Ministry of Education to provide professional development for teachers in schools? (Probe)

7. How does your division ensure implementation of National ICT assessments and standards in the schools? (Probe)

8. How are you equipping the schools with the necessary logistics when it comes to the distribution of curricula and syllabi? (Probe)

9. Can you brief me on some of the challenges confronting your division? (Probe)
10. What are some of the suggestions to ensure effective ICT integration in teaching and learning in schools. (Probe)
Appendix E: Interview Guide 5.

INTERVIEW GUIDE FOR THE DIRECTOR GENERAL OF GHANA EDUCATION SERVICE

1. Can you briefly tell me about yourself?

2. Can you let me know how many senior high schools there are in Ghana? (Probe)

3. What are the criteria for the selection of ICT model schools?

4. As the one in charge of implementing the Ministry of Education’s policies, what is the situation of ICT integration at the ICT model schools?

5. How about situation in other, non-ICT model schools?

6. What monitoring mechanism’s are in place to ensure teachers are effectively integrating ICT in the curricula?

7. What logistical supports are in place to ensure teachers effectively integrate ICT in the curricula? (Probe)

8. What type of human capacity is in place to ensure effective integration of ICT in the curricula?

9. Can you share with me some of the achievements of ICT integration in teaching and learning in senior high schools? (Probe)

10. What are some of the challenges being faced by schools in the implementation of the ICT integration in schools policy?

11. What do you think are some of the measures to be taken to ensure success of ICT integration in senior high schools?

INTERVIEW GUIDE FOR ASSISTANT HEADMASTER OF OSHS

1. Can you briefly tell me about yourself?

2. What is your understanding of ICT and its significance in education? (Probe)

3. Can you narrate how your school was selected as a model ICT school?

4. When did the first batch of computers and other ICT equipment arrive in the school? (Probe)

5. How many computers and ICT equipment are in the school lab and how were they acquired? (Probe)

6. Do you have any ICT training? If yes (probe to find out what type ICT training was received and how the training is helping him/her).

7. How do you ensure ICT is use in teaching and learning in your school? (Probe)

8. How are the various subject teachers using ICT in teaching in the school? (Probe to find out how you are applying technology to the curriculum).

9. What efforts are underway for all non-ICT teachers in the school to use ICT in the school? (Probe)

10. What could be done to increase participation and use of ICT at the school? (Probe)

11. What can be done to ensure sustainability of ICT use in the school? (Probe)

12. What problems do you face in using ICT in the school? (Probe)

13. What are the possible solutions to the problems? (Probe)
14. What training programs are in place to build capacity of teachers to use ICT in classrooms?

15. What types of support do you give to teachers integrating ICT in the schools? (Probe)

INTERVIEW GUIDE FOR TEACHERS

1. Can you briefly tell me about yourself? (Probe to find out his/her educational background, the subject being taught. etc)

2. What is your understanding of ICT integration in classroom teaching and learning?

3. How long have you been teaching in the school?

4. Do you use ICT in teaching your subject(s). If yes. What are your roles in using ICT in the school? (Probe)

5. What are you learning from using ICT in the school?

6. How many computers and ICT equipment are in the school lab and how were they acquired? (Probe and verify through observation at the computer lab)

7. Do you have any ICT training? If Yes. (Probe to find out what type ICT training was received and how the training is helping him/her) to integrate ICT. (Probe)

8. Do you receive any support in terms of using ICT in the school? If yes, probe to find out the types of support he/she receives to integrate the ICT in the schools?

9. Can you share with me how often officials from either the Ministry of Education or Ghana Education Service come to monitor your progress in ICT use in the classroom?

10. What do you think can be done to increase participation and use of ICT in the classroom?
11. What can be done to ensure sustainability of ICT use in the classroom?

12. What problems do you face in using ICT in the school? (Probe)

13. What are the possible solutions to the problems? (Probe)

INTERVIEW GUIDE FOR STUDENTS

1. Can you please briefly tell me about yourself? (Probe to find out his/her grade level, the course being taken, among others)

2. What is your understanding of ICT use in teaching and learning in the classroom? (Probe)

3. Can you tell me the types of ICT equipment you use in learning? (Probe)

4. How long have you been using this equipment? (Probe)

5. How are you using ICT in learning? (Probe)

6. How do your subject teachers use ICT to teach in the classroom?

7. Apart from School, where else do you learn how to use ICT?

8. What are the problems that you face in using ICT in the school? (Probe)

9. What are possible solutions to the problems? (Probe)

10. What support do you receive from your teachers in using ICT in learning? (Probe)

11. What do you think can be done to increase participation and use of ICT in the school? (Probe)

12. What are the challenges are you facing in terms of ensuring ICT are used to provide teaching and learning in the school? (Probe)

13. How do you feel these challenges can be addressed (Probe)

14. What do think can be done to ensure sustainability of ICT use in the school? (Probe)

INTEVIEW GUIDE FOR POLICYMAKERS

1. Can you briefly tell something about yourself?

2. What is your definition of ICT in Education?

3. Why ICT in Education?

4. What are some of the key elements of your committee’s recommendations towards educational reform? (Probe)

5. In charting the course of ICT integration in schools, did you look at any success story from any country? If yes can you share the success story of that country? (Probe)

6. What do you think might be some of the factors/conditions that contributed to that country’s success story?

7. Do you think we have those factors/conditions in Ghana?

8. Why do you think the NDC government decided to settle on the three-year senior high school system instead of the four-year system chosen by your predecessor government? (Probe)

9. Can you share with me your candid assessment of ICT integration in teaching and learning in senior high schools? (Probe)

10. What do you think are some of the challenges facing the policy of implementing of ICT integration in schools policy?

11. What do you think are some of the measures to put in place to ensure success of ICT integration in senior high schools?
Appendix G: Research Consent Form

Ohio University Consent Form
College of Education
Consent to Participate in a Research Study
Ebenezer Malcalm 740 591 1165 (USA) /0244 383725 (Ghana)
em283505@ohio.edu

Title of Research: Ghana’s Information and Technology Communication Policy Makers Impact of Education in Schools

Researcher: Ebenezer Malcalm

You are being asked to participate in research. For you to be able to decide whether you want to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to sign it. This will allow your participation in this study. You should receive a copy of this document to take with you.

Explanation of Study

The study explores the experiences of Ghana’s policy makers and their impact on Information and Communication Technologies (ICT) integration in senior high schools. Specifically, the study focuses on how ICT policies influence teaching and learning at Odogornno Senior High School, which is one of the Model ICT schools in Ghana. Consequently, this research seeks to address how integration of ICT in particular Ghanaian schools is supporting teaching and learning.


This study is being done because…
It is part of partial fulfillment of my doctoral degree in Instructional Technology program at Ohio University, USA.

If you agree to participate, you will be asked to..
Take part in an interview process at your office/classroom or location that deems fit to you

Your participation in the study will last…
For the length of the interview, each interview may take not more than one hour. The Interview will be conducted at the time and place of your convenience.
Risks and Discomforts
No risks or discomforts are anticipated

Benefits
This study is important to school/sector because your participation will help create awareness concerning ICT education in the two Ghanaian Schools.

Confidentiality and Records
Your study information will be kept confidential by the researcher. Please circle the following options:

1. For the sake of anonymity, do you want your real name to be used in the study report?
   (1). Yes. (2). No
2. Do you want to be audio taped? (1). Yes. (2). No

Additionally, while every effort will be made to keep your study-related information confidential, there may be circumstances where this information must be shared with:

* Federal agencies, for example the Office of Human Research Protections, whose responsibility is to protect human subjects in research;
* Representatives of Ohio University (OU), including the Institutional Review Board, a committee that oversees the research at OU;
* Ghana’s Ministry of Education and related bodies for policy review

Compensation
There are no incentives or payment for participating in this study.

Contact Information
If you have any questions regarding this study, please contact Ebenezer Malcalm (024 4383725 (Ghana) or Dr. Teresa Franklin (+1740 593 4561)
If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (+1740)593-0664.

By signing below, you are agreeing that:

• you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions and have them answered
• you have been informed of potential risks and they have been explained to your satisfaction.
• you understand Ohio University has no funds set aside for any injuries you might receive as a result of participating in this study
• you are 18 years of age or older
• your participation in this research is completely voluntary
• you may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you and you will not lose any benefits to which you are otherwise entitled.

Signature_________________________________________ Date________________

Printed Name_________________________________________

Version Date: [October, 17, 2010]
Appendix H: IRB Approval

The amendment, detailed below, and submitted for the following research study has been approved by the Institutional Review Board at Ohio University.

Project: Diffusion of Informational Communication Technology Education in Ghana: Critical Examination of Selected Schools

Amendment: Shift focus to policy issues, consent revised to reflect this.

Primary Investigator: Ebenezer Malcaim
Co-Investigator(s): 

Advisor: Teresa Franklin
(if applicable)

Department: Educational Studies (Instructional Technology)

Jo Ellen Sherow, MPA
Office of Research Compliance

Date: 12-15-10