UNIVERSITY OF CAPE COAST

TRAINING AND DEVELOPMENT NEEDS OF PUBLIC SENIOR HIGH SCHOOL INFORMATION COMMUNICATION TECHNOLOGY TEACHERS IN THE ACCRA METROPOLITAN AREA

BY

SETH NII GORDON

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Dissertation submitted to the Institute of Development Studies, Faculty of Social

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DECLARATION

Candidate's Declaration

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

Candidate's name: Seth Nii Gordon

Candidate's Signature: …………………………   Date: …………………

Supervisor's Declaration

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

Supervisor's name: Professor Francis Eric Amuquandoh

Supervisor's Signature: …………………..……   Date……..……………..

ABSTRACT

A major identifiable challenge facing the development of the full potential of ICT for education, research and development in Ghana has been the brain drain syndrome and inadequate ICT professionals. This study therefore sought to assess the training and development needs of the public senior high school ICT teachers in the Accra Metropolis.

The study employed a cross sectional design. Questionnaires were used to acquire data. There were 19 public SHS in the Accra Metropolis with an ICT teacher population of 60 at the time of the study. This number in addition to the nineteen heads of the institutions as well as the ICT coordinator gave a total of 80 who formed the population for the study.

The results indicated an inadequate and imbalance distribution of ICT teachers. Sixty teachers had to teach 26,789 students giving a ratio of 1 teacher to 446 students. Resources for teaching the subject were also woefully inadequate. The results also indicted that very few public SHS ICT teachers in Accra Metro could effectively express their knowledge and skills in ICT. Many of them (71.7%) exhibited average knowledge and skills in the subject.

The study concluded that there was inadequate human resource to effectively handle the subject. Also, a gap existed between the knowledge and skills of ICT teachers in Public SHS in the Accra Metropolis and the knowledge and skills required to perform their job. It is thus recommended that the public SHS in the Accra Metropolis be provided the necessary resources whiles regular ICT training should be organized for the teachers.

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AIDS   –   Acquired Immune Deficiency Syndrome

ASPnet   –   Associated Schools Project Network

BECE   –   Basic Education Certificate Examination

FTP   –   Fiankoma Teacher Programme

GECSI   –   Global E-Schools and Communities Initiative

GES   –   Ghana Education Service

GIMPA   –   Ghana Institute Of Management and Public Administration

HP   –   Hewlett Packard

HRD   –   Human Resource Development

ICT   –   Information Communication Technology

ICTs   –   Information Communication Technologies

IICD   –   International Institute for Communication and Development

ISO   –   International Standards Organization

KNUST   –   Kwame Nkrumah University of Science and Technology

LAN   –   Local Area Network

NEPAD   –   New Partnership for Africa's Development

PSI   –   Presidential Special Initiative

REN   –   Research and Educational Network

SHS   –   Senior High School

SIDA   –   Swedish International Development Corporation Agency

SPSS   –   Statistical Package for Service Solutions

UCC   –   University of Cape Coast

UEW   –   University of Education, Winneba

UNESCO   –   United Nations Educational, Scientific and Cultural
            Organization

CHAPTER ONE

INTRODUCTION

Background to the study

One of the many challenges facing developing countries today is preparing their societies and governments for globalization and the information and communication revolution. Information and Communication Technology (ICT) is simply a technology that arose from scientific and technological progress in computer sciences, electronics, and telecommunication which enables us to process, store, retrieve, and disseminate valuable information in text, sound, and video form. Worldwide, nations have come to identify the developmental opportunities and the challenges of the emerging information age characterized by information and communication technologies (ICTs).

These technologies are propelling national development efforts worldwide and a number of developing and developed countries are exploring ways of facilitating their development process through the deployment and development of ICT. Most developing countries have either restructured or are in the process of restructuring their telecommunication systems in order to make ICT a central element of their economic growth. This is in conformity with worldwide trends in which information and communication are crucial for economic activity. Thus, the quality and range of telecommunication services available in a country have become critical elements for a country's competitiveness in the global economy.

Ghana is not left out in this quest and this has led to the introduction of ICT as a course of study from the basic schools to the tertiary institutions. The

first African Development Forum (ADF) organized by the Economic Commission for Africa (ECA) in 1999 based on the theme *"Challenges of Globalization and the Information Age"* examined and proposed a number of actions to be taken at the national and continental levels to improve ICT in Africa including Ghana. On Thursday, August 22, 2002 the National ICT Policy and Plan Development Committee was inaugurated in an effort to improve ICTs in Ghana. Related to this, the Finance Minister of Ghana announced in the 2010 Budget that government would develop a comprehensive and reliable electronic database to facilitate crime investigations and policing research. Ghana also started the implementation of the e-Government project to link all district capitals to the national high speed broadband.

The Ghana ICT for Accelerated Development (ICT4AD) Policy represents the Vision for Ghana in the information age. It is based on the Policy Framework Document: 'An Integrated ICT led Socio-economic Development Policy and Plan Development Framework for Ghana' released in March 2003. Among the priority focus areas of the policy is the Accelerated Human Resource Development through the promotion of ICTs in Education (The Ghana ICT4AD Policy, 2003). Education is therefore, one of the key drivers of the policy. As a result, the study of ICT was introduced as a subject in the basic school as well as the senior high school in Ghana from the year 2007. Currently, all schools in Ghana have ICT as part of their curriculum. In this light, the human resource base of ICT teachers is very important in making the Ghanaian ICT goal a reality. Teacher training colleges and other tertiary institutions are training people to fill the vacancies that

exist for ICT instructors. Meanwhile, teachers already at post are also taking up the teaching of ICT even though they might not be trained ICT instructors.

On the issues of deployment and use of ICT in the country, the Ghanaian tertiary education sector is the most advanced. All the country's major universities have their own separate ICT policies, which include an ICT levy for students. This enables students to have 24 hours access to computer laboratories with broadband connection. However, not all tertiary institutions in the country are equally endowed and there are instances where the computer facilities are run by the private sector as cyber cafes on campuses (Osei, Aggor, & Badu, 2007).

In the basic and secondary education sector, a project to set up computer laboratories in all science schools in the country has led to a significant increase in the number of computer laboratories across the country. The government of Ghana has also initiated a free laptop per SHS student project as a way of solving some of the challenges facing the development of the full potential of ICT for education. A computer levy of GH¢ 3.20 is allowed to be charged as ICT fees in most senior high schools (Osei, Aggor, & Badu, 2007). The ICT initiatives and projects in educational institutions are summarized in Table 1.

Table 1: ICT initiatives and projects in Ghanaian schools

Activity	Description	Organization	Funding source
Global E-Schools and Communities Initiative (GECSI)	Expand the deployment of ICTs in schools in Ghana and to promote the effective use of ICT to achieve Ghana's educational and community development objectives.	Ministry of Education, Youth and Sports	SIDA and the Irish Government

Table 1 continued

NEPAD E-Schools	Supporting six schools in six regions with ICT infrastructure.	Ministry of Education	HP, Microsoft, Oracle, and Cisco
Intel-Elearning Centre (Accra Girls)	Pilot project to establish Africa's first WiMAX connected school, to be located in Ghana, West Africa.	Accra Girls Secondary School	Intel
P.S.I. on Distance Learning	TV show on Mathematics, Science and English broadcast nationwide and sold on CDs.	Ministry of Education	Government of Ghana
HP Digital Community Centre (KNUST)	High-speed ICT infrastructure at KNUST and for community learning and technology centers.	KNUST	HP
Research and Educational Network (REN)	Facilitate the interaction and collaboration between researchers in institutions and the world.	University of Ghana	World Bank/infodev
GIMPA Distance Learning Centre	Connecting members of central government's policy and decision makers, managers, academics, politicians, professionals, development partners and donors, etc. to a global knowledge exchange.	GIMPA	World Bank
Associated Schools Project Network (ASPnet)	Ghana's ASPnet has twinned with many schools abroad, including schools in Denmark, Great Britain, Mexico and the USA. The network has facilitated exchanges among teachers and students.		UNESCO
Microsoft - Partners in learning program	Supporting schools with technology and training.	Ministry of Education	Microsoft/Government of Ghana

Table 1 continued

Global Teenager Project	Using the Internet and especially e-mail to catalyse structured exchanges among schools and teachers.	Rescue Mission Ghana	School Net Africa and International Institute for Com. and Deve. (IICD)
Innovative Best Teacher Award	Awarding teachers who excel in using ICT in education.	Ghana Education Service	Government of Ghana
Catch IT	Fostering the development of ICT clubs throughout Ghana helps to prepare the youth for ICT related jobs	AYF/OVF	
Expanding Education Networking	Involves a total of 50 schools in Accra, Kumasi, Cape Coast, Tema and other areas	iEARN /SchoolNet Ghana	
e-Education package for schools	Offer affordable financing at competitive rates for qualifying educational institutions towards Broadband Internet access via VSAT anywhere in Ghana.	Accelon, Standard Trust Bank, ICT Education Support Africa Foundation	Accelon
The Fiankoma Teacher Programme (FTP)	Uses the Internet and other digital media as tools to promote development awareness by linking together networks of teachers in Ghana and the UK.		

Source: ICT4Africa/Country Report, Ghana

The Education Reforms launched in June 2007 called for the introduction of Information and Communication Technologies (ICTs) at the Second Cycle Institutions through the introduction of ICT as a core subject as well as an elective subject, the integration of ICTs as a teaching tool for all subject areas and the integration of ICTs to support educational management and administrative functions. The effective integration of ICTs into the educational system is a

complex, multifaceted process that involves not just technology but also curriculum and pedagogy, institutional readiness, teacher competencies, among others.

Statement of the problem

For effective introduction of Ghanaian pupils and students to ICT, the knowledge and skills set of ICT teachers must be comparable to what exists in the developed world. This therefore requires the availability of ICT teachers, in terms of both quantity and quality, in all Ghanaian schools. Unfortunately, studies including Dadebo, Asamoah-Duodu, Clarke, Essien and Twinomugisha (2009) indicate gross lack of ICT teachers in most Ghanaian schools. The report on e-Readiness in 2009 indicates that about 56 percent of Ghanaian teachers (17,953) lack basic skills in ICT and that the majority of teachers teaching ICT in most of the schools in Ghana were not trained originally as teachers of ICT. They either learnt it on their own or they learnt it as a liberal course while at school. Like most parts of the country, ICT teachers in the Accra Metropolis are inadequate. Due to the shortage of professional ICT teachers, some ICT teachers were selected to help, based on their interest and or their background.

Within the Accra Metropolis just like most parts of the country, there is also a great disparity between public and private schools in their access to ICTs and teachers. In schools where facilities for ICT exist, a number of teachers are using the internet for personal research or there are inadequate personnel to handle the subject (Opoku, 2004). The few available ICT teachers preferred to teach in schools where the resources for teaching the subject were available and it

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is apparent that the private schools are more resourced than the public schools. Some ICT teachers teaching in the Accra Metropolis are untrained ICT personnel because in the teacher training institutions, the ICT course was introduced just about the same time the course was introduced in the basic and secondary schools. However, with close to ten years since the introduction of ICT in second cycle institutions in Ghana, no study has so far been conducted to evaluate the training and development needs of ICT teachers in the country. It is against this background that this study was conducted to evaluate the training and development needs of teachers in the Accra Metropolitan Area of the Greater Accra Region of Ghana.

Objectives of the study

The main objective of the study was to assess the training and development needs of ICT teachers in the Accra Metropolitan Area. Specifically, the study sought to:

1. Identify the training needs of the ICT teachers;

2. Determine the knowledge, skills and abilities needed by public SHS ICT teachers in the Accra Metropolis;

3. Assess the current state of skills, knowledge, and abilities of the public SHS ICT teachers in the Accra Metropolis;

4. Ascertain ICT resource capacity of the Senior High Schools in Accra metropolis; and

5. Make recommendations towards the training and development of public SHS ICT teachers in the Accra Metropolis.

Research questions

The following research questions were formulated to guide the study.

1. What are the training needs of public SHS ICT teachers in the Accra metropolis?

2. What are the desired knowledge, skills, and abilities of public second cycle ICT teachers?

3. What is the current state of knowledge, skills, and abilities of public SHS ICT teachers in the Accra metropolis?

4. What is the ICT resource capacity in public SHS in the Accra metropolis?

Justification of the study

It was envisaged that the study would provide the Ministry of Education and other policy and decision makers with training needs information that would help in the planning and implementation of the right training for ICT instructors to achieve the goal of the 2007 Educational Reforms. Information from this research could help in decision making so as to train ICT teachers with the relevant knowledge and skills. The ICT students stand to lose if they are not taught the accurate knowledge in ICT.

Again, the results of the study would be useful to all stakeholders of education including teachers, parents, and government in re-appraising ICT facilities to improve standard of education by providing the necessary facilities to the less endowed schools.

It was envisaged to provide inputs for developing and restructuring ICT curricula for all levels of educational systems. It was anticipated that the results of the study would be of immense value to the ICT teachers, since the finding would bring to bare the potential training areas for the ICT teachers so they could seek the necessary training.

Organisation of the study

This dissertation is divided into five chapters. Chapter One focuses on introduction which present the background to the study, statement of the problem, objectives, research questions, justification of the study and the organisation of the study.

Chapter Two is the review of relevant literature. This focuses on the context of needs assessment as component of human resource development, causes of needs assessment, methods for conducting needs assessment, ICT needs assessment, and the conceptual framework.

Chapter Three describes the procedure for conducting the study. It explains the various research methods used to generate and analyze the data relating to the study. Issues covered include: the study area, study design, target population, sample size and selection, data collection method, ethical issues, field work/challenges, as well as data management and analysis.

The fourth chapter deals with the results and discussion. It presents the analysis of the data and the discussion of the findings in relation to the objectives of the study, while the final chapter focuses on summary, conclusions and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

This chapter reviews relevant literature related to training and development needs assessment. It covers issues such as; needs assessment as component of human resource development; causes of needs assessment: methods for conducting needs assessment and ICT needs assessment. Finally, a conceptual framework was drawn based on the literature reviewed.

Needs assessment as component of human resource development

Several scholars (Gilley & Eggland, 1989; Desimone, Werner, & Harris, 2002; Angote, 2009) define Human Resource Development (HRD) as the organized activities arranged within an organization in order to improve performance and/or personal growth for the purpose of improving the job, the individual, and/or the organization. Angote (2009) indicates that the HRD practice includes training and development; career development; and organization development. Human Resource Development therefore combines the use of all developmental practices in order to accomplish higher levels of performance than would otherwise be possible. Specifically, HRD is the integrated use of training and development, organization development, and career development to improve individual performance, and organizational effectiveness (Desimone et al. 2002; Tao, Yeh & Sun, 2006; Abdullah, 2010).

Literature also indicates that the first stage in the systematic HRD process is needs assessment and analysis, and this assessment is also considered as the

"why" of HRD (Leigh, Watkins, Platt, & Kaufman, 2000; Angote, 2009). Leigh, Watkins, Platt, and Kaufman (2000) stressed the importance of assessing and analyzing needs because this stage builds the foundation by identifying the kinds of HRD intervention needed for an effective effort. Desimone et al, (2002) suggest that in analyzing HRD needs, four levels of needs have to be analyzed. They include assessing the needs of the organization, individual employees' skills, knowledge and attitudes, and their functional responsibilities as well as departments' needs (Wilson, 1999; Harrison, 2000).

According to Tao, Yeh and Sun (2006), training resources, like other resources in the organization are limited. To utilize training resources to the best advantage, companies must therefore put a fair amount of effort in training needs assessment. In spite of this, Kerr and McDougall (1999) cited in Abdullah, 2010 have found that "most companies do not analyze all the four levels, but rather emphasized on individual employees' needs" (p. 12).

Training Needs Assessment

Gilley and Eggland (1989) defined need as "a gap between a current set of circumstances and some changed or desirable set of circumstances", and needs assessment as the process of "measuring (as scientifically as possible) or appraising that gap" (p. 302.) The word "circumstance" in this definition can be substituted with words such as "proficiency" (knowledge, skills, and attitudes), "performance" or "situation" (Tao, Yeh & Sun, 2006). The results of a needs assessment can be used to 'help curriculum planning, diagnose individual problems, assess student learning, demonstrate accountability, improve practice

and safety, or offer individual feedback and educational intervention' (Grant, 2002) as cited in (Tao, Yeh & Sun, 2006, p. 24). The most widely accepted application of needs assessment is to ground training and development efforts to specific organizational objectives. Without a clear understanding of needs, organizations' training efforts may completely miss the mark resulting in a total waste of valuable resources.

According to Angote (2009, p.1) "needs assessment is a systematic exploration of the way things are and the way they should be". He noted that there are three levels of HRD needs, and these are;

   i. *Organizational Level Needs* – changes in mandate of state agency, expectations of customers/citizens through surveys may reveal a need for organizations to change behaviour of service providers of retooling them.

   ii. *Task Analysis Needs* (job analysis) – skill requirements to perform a given task could help determine needs of the current holders of jobs.

   iii. *Person Analysis Needs* – the competencies of current job holders could also be assessed to determine their suitability for the jobs they currently hold.

Since this study sought to determine the skill required to perform a given task as SHS ICT teachers and the competencies of the current job holders, this study focused on task analysis needs and person analysis needs. The study, thus, employed the suitable methods for conducting task analysis and person analysis. As stated earlier, a training needs assessment is the process of separating the job tasks into those for which training is needed and those for it is not, and then

developing an individual training plan for accomplishing the needed training. Never the less, this study focused on determining the training needs of the set target. This does not merely mean selecting those knowledge, skills or abilities, which are critical to the job performance, but also means determining what the capabilities of the current job incumbents (target population) are. Many training programmes fail because those programmes try to train people on things they already know or are capable of doing. In this light, it is imperative to determine the causes for which need assessment may be necessary. This would help determine the appropriate assessment and intervention.

Causes of Needs Assessment

Angote (2009) states that Human Resource Development interventions may be necessary due to changes taking place as a result of legislation or policy changes, lack of basic skills, poor performance, new technology, customer requests, new products/services, higher performance standards, new jobs, and career progression requirements.

Legislation or policy changes and lack of basic skills were the main reasons identified as the cause for this needs assessment. The Educational Reform of 2007 which introduced a new policy of ICT in various schools along with the teachers' low level of basic ICT skills identified by Dadebo et al. (2009) give cause for a task and person analysis.

Methods for conducting needs assessment

There are numerous reported 'methods' for assessing needs in the literature. Researchers such as Tao, Yeh and Sun (2006) and Gilley and Eggland

(1989) believed that the ways, strategies, and schemes which are normally referred to collectively as "methods" may aggregate to a total of 20 or 30. Contrarily, Grant (2002) outlined 46 formal and informal methods of self assessment which includes critical incident techniques, gap analysis, objective knowledge and skills tests, observation, revalidation, self assessment, video assessment, and peer review. Gilley and Eggland (1989) also pointed out the six most useful methods in HR development including interviews, questionnaires, tests, group problem analyses, records and report studies, and job analysis and performance reviews.

Although literature generally reports only the more formal methods of needs assessment, HRD practitioners use a wide range of formal or informal ways to identify training needs as part of their ordinary practice. Depending on the method used, the needs related data collected can be categorized as "felt needs (what people say they need), expressed needs (expressed in action), normative needs (defined by experts), and comparative needs (group comparison)" (Grant, 2002, p.157). Traditionally, the "felt-needs" methodology, which usually asks employees to simply list or rank desired training courses, has often been used to assess needs of large numbers of employees. However, this approach is also most criticized for not being able to gauge true needs because employees usually do not know what the organizational objectives are and often report "wants" instead of "needs" (Tao, Yeh & Sun, 2006). This study therefore collected data that could be classified under normative needs.

Rouda and Kusy (1995) mentioned four steps for conducting a need assessment. The first step is to perform a "gap" analysis. The second is to identify priorities and importance. The third is identifying causes of performance problems and/or opportunities. The final step is to identify possible solutions and growth opportunities. The first step in need assessment is to check the actual performance of the organization and its employees against existing standards, or to set new standards. They further observed that this step is what produces a large list of needs for training and development, career development, organization development, and/or other interventions.

It is noteworthy that gap analysis, though not commonly practiced in assessing training needs, is actually a widely used tool for assessing discrepancies between "what is" in reality and "what was intended to be" in many fields (Kochhar, Suri, & Hether, 1991; Khan & Hafiz, 1999). Gap analysis is a formal method to quantify discrepancies and has the added advantage of prioritizing assessed items to expedite action planning. When used in assessing competency-based training needs, Grant (2002, p.157) opines that gap analysis "involves comparing performance with stated intended competencies by self assessment, peer assessment, or objective testing". Data collection for gap analysis is usually administered via a survey-type questionnaire to the employee, the employee's manager, or other intended personnel (Tao, Yeh & Sun, 2006).

The WBI (2007) notes that task analysis explains the processes and inputs that are being used at a time to accomplish results. As a consequence, a task analysis defines what individuals and teams are both doing and should be doing in

order to contribute to current results. In completing a needs assessment the task analysis is a vital tool for mutually informing the diagnosis of needs as well as the detection of potential remedies for improving performance (Rouda & Kusy, 1995; WBI, 2007). Literature including Tao, Yeh and Sun (2006) asserts that in many ways, a task analysis process parallels the performance analysis process, although the former begins with the results currently being achieved, while the latter begins with the desired results that should be accomplished in the future. Sometimes these starting places are one and the same. Yet, from their unique vantage points, the two processes parallel each other as they identify the tasks, processes, procedures, tools, and resources that are used to achieve results (Rouda & Kusy, 1995; Tao, Yeh & Sun, 2006; WBI, 2007).

According to the WBI (2007), through a task analysis one can attain a clear definition of what resources, processes, and results are related to current tasks that are (or will be) related to a programme or project. A task analysis will help identify both what is working well and what is not working well within the current organization.

Borich (1980) in Garton and Chung (1997) described an approach to conducting educational needs based upon a discrepancy model. This model utilized survey methodology in which respondents provided data that could be weighted and ranked in order of priority. Borich (1980) stated that "... the needs assessment model is essentially a self-evaluative procedure which relies on teachers' judgments about their own performances. The assumption underlying the needs model is that the performer (teacher) can best judge his or her own

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performance and, when explicitly asked to do so, can make an objective judgment" (p. 42). In addition to Borich, others have defined approaches to assessing educational needs (Garton & Chung, 1997).

A quadrant analysis model was used by Gable, Pecheone and Gillung (1981) to establish priorities for training teachers and other school personnel. In the quadrant analysis model, a two by two matrix is used with one dimension represented teachers' self desired competencies and the second dimension represented ratings by experts on the importance of those competencies. Witkin (1984) concluded that the quadrant analysis model provided a method to use importance as a qualifying factor in deriving priorities and avoided the fallacy of basing priority decisions on simple discrepancies (Garton & Chung, 1997).

On the contrary, concerning the methods used in the identification of needs within organizations, Abdullah (2010) citing Wilson (1999) suggests the conventional and simpler methods such as interviews, questionnaires, observations, and focus groups for gathering information for HRD needs analysis. Yet, Gilley et al, (2003) as cited in (Abdullah, 2010), suggested the more analytical method such as is/should analysis, critical analysis and root-cause analysis methods to gather information. However, Reid and Barrington (1994) argued that methods of identification depend on the focus of investigation, and have proposed referencing to strategic planning documents relating to marketing, production, and staffing; analyzing minutes of management meetings, and analyzing operational and personal records.

Wilson (1999) agreed that it is important to include the HR plan and the organization's strategic plan in needs analysis. It was suggested by several theorists that there are various methods of identifying needs, from the simpler methods suggested by Wilson (1999) to the more technical and complicated method by Gilley et al. (2003). However, some researchers have argued that organizations would rather much preferred methods such as performance appraisals, informal feedback from line managers and individual employees. Particularly, in organizations adopting the ISO Policy, Vinten (2000) as cited in Abdullah (2010), claimed that employees' training needs through line managers' requests are highly associated with 'non-conformance' that is identified upon completion of the ISO auditing procedure. For this study, the heads of department in the schools will serve as the line managers.

Even though the importance of analyzing needs has been discussed by theorists and researchers, it was realized that many companies do not regard HRD needs analysis as a main concern and this trend is particularly obvious in small firms (Kerr & McDougall, 1999; Hill & Stewart, 2000; Sadler-Smith, & Lean, 2004). This is also true with ICT training needs in the Ghana Education Service. Indeed, there are various reasons scholars give as to why needs assessment is not conducted. It is described as being a difficult process, time consuming and there is lack of resources in carrying out the analysis (Hill & Stewart, 2000; Hansen, 2003). In contrast, Desimone et al (2002) argued that incorrect assumptions are usually made about needs analysis being unnecessary because the available information already specifies what an organization's needs are. Furthermore, it

was contested by researchers (Reid & Barrington, 1994; Wilson, 1999; McGoldrick, Stewart & Watson, 2002), that there is a lack of support for needs assessments as HRD professionals are unable to convince top management of its necessity.

ICT training needs for teachers

Boakye and Banini (2008) opine that if teachers possess little knowledge of ICT as is the case of many Ghanaian teachers, then, the integration of ICT into pedagogical practices is seriously compromised. They cite other literature including Maclure (1997) to support their view that, in most countries, innovation is thought about, introduced into educational practices, and imposed on teachers without warning or preparation. Contrarily, to make innovations and reforms meaningful in schools, those who will be most directly affected, – teachers, students, parents and administrators – need to be part of the conception and planning process (Samoff, Sebatane & Dembélé, 2003; Weva, 2003) as cited in (Boakye & Banini, 2008). Yet, the 2007 Educational Reform that introduced ICT into the educational curriculum ill prepared teachers to handle the subject. Again, even though some teachers have now been trained to handle the subject, those who held the fort and are still handling the subject, need some further training.

The role of teachers for integrating ICT cannot be downplayed. As such, OFSTED (2002) in Boakye and Banini (2008) opines that, where training has not yet started or has failed to meet the needs of teachers, the use of ICT is usually underdeveloped. This is congruent to the situation in Ghana. Some Ghanaian teachers were inquired about their skills as regards ICT and its use in their

pedagogical practice. Seventy one percent of the teachers including some ICT teachers responded that they never used the computer in class (i.e. using a computer during class time or taking students to the computer laboratory). Only ten percent said they always used it for their classroom activities (Boakye & Banini, 2008). This was because they did not have the knowledge, skills and abilities to use the computers effectively.

A need assessment conducted in Jamaica by JCSEF (2005) indicated that there was a significant gap in the output levels of ICT training institutions, where only 6 percent of annual outputs from training were at the professional or specialist level and only 26 percent were at the advanced level. Also, a study in Nigeria according to Jegede (2009) concluded that the training in ICT that teacher educators received had similar contents irrespective of the training provider, the trainings had not impacted on classroom practices as mere word and data processing skills had been the emphases. A more focused and teacher-targeted ICT training content freely delivered was what was recommended (Jegede, 2009). In Ghana, a similar national study conducted by Dadebo et al, (2009), indicated that there was a very low ICT competency level in the Ghanaian educational sector.

Some training needs in technological resources in general identified by Gastaldo, Almerich, Díaz, Bo and Suárez (2005) include; handling and use of the computer; word processor; spreadsheet; design and management databases; multimedia presentations; documentary bases; audiovisual media; educational software; author languages and systems for design of multimedia applications.

Others include the internet: resource and information source (browser); internet communication media (mail, lists of distribution, forums, chats, amongst others.); design of web pages: editors, and advanced design of web pages, author languages and programming.

Again, the study conducted in Ghana by Dadebo et al (2009), identified some skill sets as being critical at the school level to support (a) integration (b) the teaching of ICT – either as a core or elective subject and (c) providing technical support. These skill sets were clustered as:

- Basic Skills: basic knowledge in application software such as word processing, spreadsheet, internet and a presentation application;

- Advanced Skills: advanced practical knowledge and skills in application software, plus a basic knowledge or programming and/or networking

- Trouble shooting skills: practical knowledge and skills to fix basic problems with computers and therefore could provide a first line of support

- Networking skills: practical knowledge and skills needed to set up and maintain a basic Local Area Network (LAN)

- Content development skills: practical knowledge and skills needed to develop digital content resources that could be used for integration and teaching of other subject areas.

The skill sets identified by Gastaldo, Almerich, Díaz, Bo and Suárez (2005) as well as that of Dadebo et al (2009), informed the themes under which the analysis was conducted. There were summarized as: programming, hardware

maintenance, designing, spreadsheet, networking, database, software development, word processing, file management and ICT concepts.

Conceptual framework for the ICT training needs assessment

Since this study sought to identify the gap that needed to be filled with regards to the teaching of ICT, the Gap Analysis model was adopted to guide the study. The gap analysis model also sometimes referred to as need gap or need assessment model is a process in which the current or actual state of an organization is compared to the desired or ideal state. The difference between the two stages is known as a "gap," which includes problems that need to be corrected and aligned with organizational goals. Also, it could be a narrative document detailing the linkages between gaps, barriers, and resources. Gap analysis allows for the gaps to be highlighted and makes recommendations on how to address those gaps (Barling & Simpson, 2009)

A needs analysis and gap assessment can also uncover and address issues in employee performance, procedural efficiency and even overall organizational effectiveness. Gap analysis also applies to the comparison of employee competencies with a competency model for a target occupation, level or title series. Therefore, a gap analysis identifies situations in which the number of personnel or competencies in the current work force will not meet future needs, as well as situations in which current work force personnel or competencies exceed the needs of the future. Gap analysis, according to Grant (2002, p. 157) "involves comparing performance with stated intended competencies by self assessment, peer assessment, or objective testing".

Put simply, gap analysis consists of (1) listing the characteristic factors (such as attributes, competencies, performance levels) of the present situation – ("what is"), (2) cross listing the factors required to achieve future objectives – ("what should be"), and then (3) highlighting the gaps that exist and need to be filled. The conceptual framework for the ICT training and development needs assessment is illustrated in Figure 1.

1

IDEAL SITUATION
A detailed description of the situation as it should be or the required standard

3

THE GAP

Areas where training could be offered

2

CURRENT SITUATION
A detailed description of the situation as it presently stands.
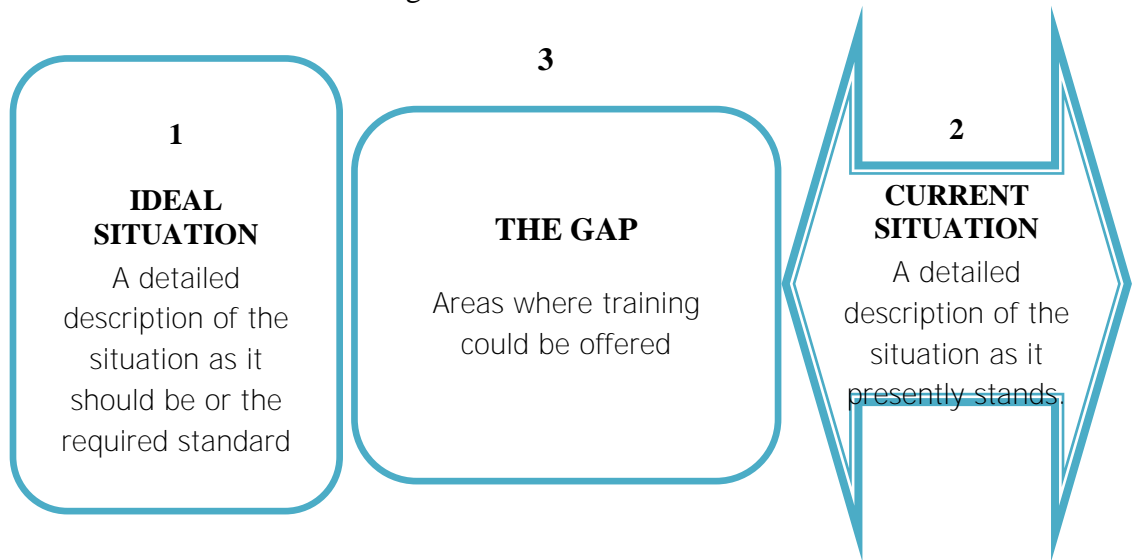
Figure 1: Conceptual framework for the study

From the framework illustrated above, the first (1) thing will be to determine the ideal knowledge and skills status required of SHS ICT teachers. Then, through data analysis, (2) examine the current knowledge and skills status of the ICT teachers. Comparing the present knowledge and skills of the ICT teachers in Accra Metro to the ideal knowledge and skills will bring out (3) the gap that exists in order to determine potential training areas.

Gap analysis model was chosen because it is useful as a strategic-planning tool in that by looking at current performance, targeted performance and the difference thereof, plans can be determined and or ruled out. Also it is a technique

for determining the steps to be taken in moving from a current state to a desired future-state. Much more, gap analysis gives an understanding of the differences between current practices and best practice, as well as providing an assessment of the barriers that need to be addressed before successful implementation of best practices.

By this framework, the required knowledge and skills of SHS ICT teachers were determined with the description of the intended benchmark, result, or outcome (Ideal Situation). The analysis was then run after collecting the data, as such, identifying and describing the situation as it presently stood (Current Situation). Data collection for gap analysis is usually administered via a survey-type questionnaire to the employee, the employee's manager, or other intended personnel (Tao, Yeh & Sun, 2006). A comparison of the two situations was then undertaken to determine the gap for the training needs.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter describes the procedure for conducting the study. It explains the various research methods used to generate and analyze the data relating to the study. Issues covered include: the study area, study design, target population, sample size and selection, data collection method, ethical issues, field work/challenges, as well as data management and analysis.

Study area

The study area is the Accra Metropolitan Area (AMA) in the Greater Accra Region of Ghana. The study area is a part of a larger metropolitan area called the Greater Accra Metropolitan Area (GAMA), including eight districts - Accra Metropolis (study area), Tema Metropolis, Ga East Municipal, Ga West Municipal, Ga South Municipal, Ledzokuku-Krowor Municipal, Ashaiman Municipal and Adenta Municipal. Lying on the coordinates 5°33N 0°12W, the study area is the largest city of Ghana, with the population estimated at 2,291,352 as of 2012.

Accra is one of the most populated and fastest-growing cities in Africa, with an annual growth rate of 3.36%. Accra is a major centre for education, manufacturing, marketing, finance, insurance, transportation and tourism. The metropolis houses about thirty-three senior high schools of which nineteen are public schools. The transition rate between junior high and senior high school in the metropolis is said to have increased from 30 percent in 1990 to 50 percent in

2001. The senior high schools in the district have an average enrolment of 979.84 students. Accra Metropolitan Area has the highest senior high school enrolment rate in the region. The net secondary enrolment rate in the region is 54.9 per cent, which is substantially lower than the primary school enrolment rate. The regional average is almost one and a half times the national average.
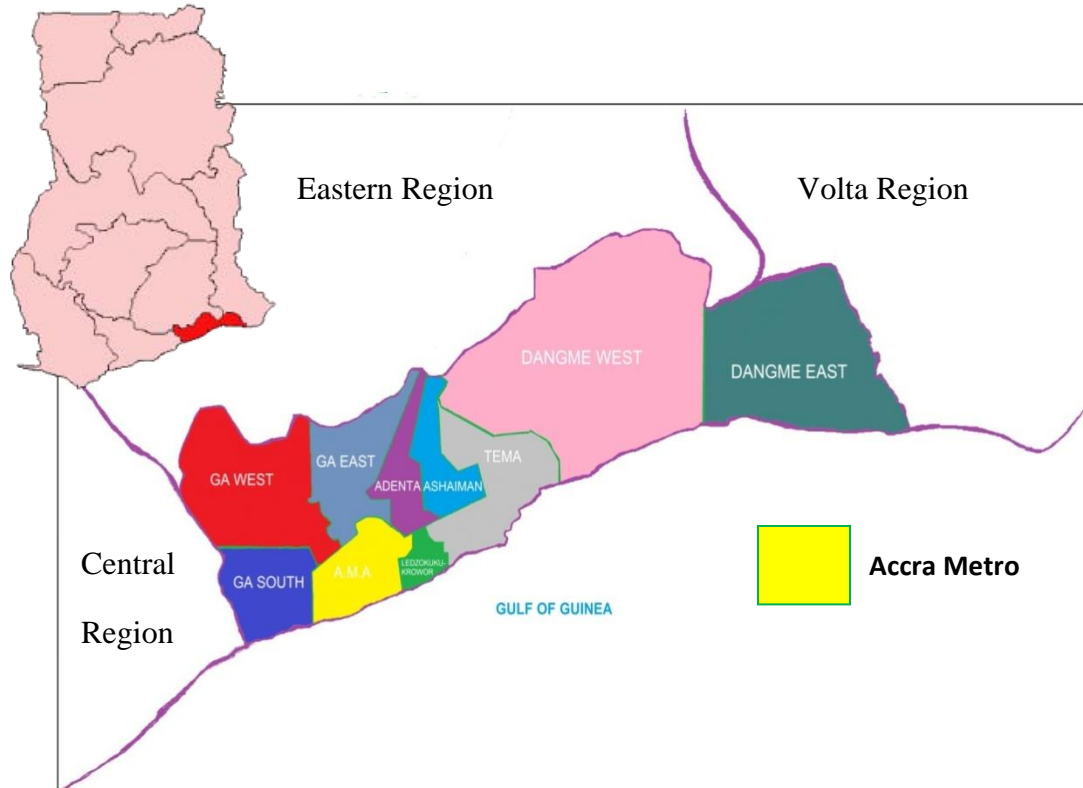
Figure 2: Map of the Study Area

Source: Adopted from Wikipedia; Greater Accra Districts

Study design

This study employed the cross sectional design. Lavrakas (2011), states that cross-sectional survey collects data to make inferences about a population of interest (universe) at one point in time. According to Olsen and St. George (2004), in this type of research study, either the entire population or a subset thereof is

selected, and from these individuals, data are collected to help answer research questions of interest.

The cross-sectional survey was appropriate for the study because primarily, it is used to determine prevalence which is the number of cases in a population at a given point in time that display a particular phenomenon with all measurements on each person made. The data for this study was thus collected at one time (June, 2011) rather than over a period of time. Again, this design was used since it was cost effective for large areas, minimized bias, and promoted accurate answers which were needed for this study.

Target Population

The study population comprised of all ICT teachers of public senior high schools in the Accra Metropolitan area as well as all heads of the various schools in the study area and the ICT coordinator for the district during June 2011.

There were nineteen senior high schools in the Accra Metropolitan area. Some schools had two ICT instructors, others had more. The ICT teacher population of Accra Metro at the time of the study was sixty. This number in addition to the nineteen heads of the institutions plus the ICT district coordinator gave a total of eighty. Table 2 shows the number and distribution of ICT teachers of public SHS under the Accra Metro Education directorate.

Table 2: Public Senior High Schools in the Accra Metro

S/N	Name of School	Location	Number of ICT teachers	Number of Heads
1	Accra High School	North Ridge	4	1
2	Armed Force Secondary /Technical	Burma Camp	4	1
3	Christian Methodist Senior High	Circle	2	1
4	Ebenezer Secondary	Dansoman	3	1
5	Wesley Grammar Senior High	Dansoman	3	1
6	St. Margaret Mary Sec./ Tech.	Dansoman	3	1
7	Labone Senior High School	Labone	2	1
8	Presbyterian Senior High School	Osu	6	1
9	O'Reilly Senior High School	Adabraka	2	1
10	St. Mary's Senior High	Korle-Bu	5	1
11	St. Thomas Aquinas Senior High	Cantonments	5	1
12	Accra Academy	Kaneshie	5	1
13	Kaneshie Secondary Technical	Kaneshie	1	1
14	Accra Wesley Girls Senior High	Kaneshie	1	1
15	Holy Trinity Cathedral Secondary	High Street	2	1
16	Kinbu Secondary /Technical	Tudu	2	1
17	Achimota Senior High School	Achimota	5	1
18	Accra Girls Senior High School	Maamobi	2	1
19	La Presbyterian Senior High	La	3	1
	Total		60	19

Source: Accra Metro Education Directorate (2010/2011)

Sample size and sampling technique

In all, 80 people consisting of sixty ICT teachers, nineteen heads and one ICT district coordinator participated in the study. Due to the small size of the population, all the senior high schools in the area formed the study unit. One headmaster/headmistress or head of department for each of the nineteen

institutions as well as the ICT coordinator for the district were purposefully selected for the study. That resulted in total targeted respondents of 80.

Data and sources

Data needed to achieve the study objectives included; requisite knowledge, skills and abilities of ICT teachers, performance appraisal, in-service training information and training needs of ICT teachers.

Data were obtained from two main sources namely primary and secondary. The primary data were obtained through a survey. The secondary data were collected through a content analysis of existing official ICT documents, the SHS ICT Teaching Syllabus and existing records of performance appraisals in the various schools.

Research Instruments

Two major instruments were used to collect data from the participants of the study – a questionnaire and an interview guide. The interview guide was a semi-structured instrument, which had five major open-ended questions that were intended to elicit the views of the heads and the coordinator on some questions raised for the study. For the teachers, a questionnaire was designed as the instrument for data collection. Based on the objectives of the study, the questions in the questionnaire were grouped into five parts lettered I to V. The instrument covered issues such as; ICT teacher educational background and competencies; in-service training information; status of knowledge, skills, and abilities of ICT teachers and prospective training needs of ICT teachers.

The whole instrument was made up mainly of close-ended items or items with predetermined answers. Part I had seven major items that sought to elicit respondents' personal data including gender, age, mode of employment, educational qualification and number of years as ICT teacher. Part II sought to answer the third research question. It sought the knowledge of ICT teachers based on the 2010 ICT teaching syllabus for Senior High Schools. Also, there was ten (10) Likert scale kind of questions which sought the respondents' rating their knowledge in ICT on the scale of 1 to 5 being "very good" to "very poor". Part III tested the teachers' skills in ICT and also included ten (10) Likert scale questions based on the points 1 to 5 being "strongly agree" to "strongly disagree". Part IV of the questionnaire sought information on the teachers' abilities in performing some ICT tasks while the final part (Part V) focused on the potential training areas for the ICT teachers. For each of the items, participants were to choose the answer category that they agreed with or best reflected their views.

Pre-testing

The reliability of the questionnaire was tested in two Senior High Schools in the Ga South District of Greater Accra. Based on the feedback from the participants, some of the ambiguous questions were rephrased for better understanding. The pre-test was carried out by the researcher a month before the actual study was conducted in June, 2011.

Ethical Issues

First, an introductory letter was acquired from UCC, and then permission was sought from the place of study precisely the Accra Metro office of the Ghana

Education Service. Permission was also sought from the heads of the various schools. Finally, the participants were rightly informed about the study, taking into consideration their right to informed consent, anonymity, and confidentiality.

Actual fieldwork

The administration of the instruments were conducted by the researcher personally since that was anticipated to promote cooperation, at least, better than commissioning others to assist in the collection. The questionnaires were distributed to all the SHS ICT teachers available at the time of the study in Accra Metro. The Headmistresses, Headmasters or their assistants who were available or responsible for administration were also briefly interviewed as well as the ICT coordinator for Accra Metro. In each of the school, the researcher personally gave out the questionnaires to the respondents, briefly explained them and collected them back after a couple of hours or immediately the questionnaires were completed. The collection of the data spanned about four weeks within the months of June and July, 2011.

Methods of data analysis

The statistical package for service solutions (SPSS 17.0) was used to analyze the data. The variables in the instrument were coded or input into the analysis software. After inputting the data, they were checked for errors and accuracy. The data that had to be transformed were transformed into their respective categories.

The Likert scale response categories were subjected to univariate analysis. The analysis therefore focused generally on frequency tables, highlighting the percentage in reporting the findings of the study. Knowledge and skill test scores were calculated for the other closed ended questions which tested knowledge and skills. Frequencies of these scores were then analyzed using descriptive statistics in the SPSS.

To measure the variable of the study – knowledge and skills of ICT – an operational procedure that specify how the measurement was done was made in line with the operational definition of the variable (Fisher, Laing, Stoeckel & Townsend, 1998). 'ICT knowledge' in this instance referred to the number of correct answers a respondent gave to 15 ICT questions. The scores were then categorized into high knowledge, average knowledge and low knowledge. Also, 'ICT Skills' in this instance referred to the number of correct answers a respondent gave to 12 ICT skill domain test. The scores were then categorized into high skill, average skill and low skill.

The data gathered through the interview guide was analysed qualitatively. Since it only elicited the opinions of the respondents, it was also present briefly in the report qualitatively as statements from the respondents.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents findings of the study. Issues covered include; socio-demographic characteristics of respondents, ICT capacity of the public senior high schools in Accra Metro, the actual knowledge, skill, and abilities ICT teachers in Accra Metro, potential training areas for ICT teachers and knowledge, skill, and abilities required of ICT teachers as regards the Ministry of Education-(Ghana Education Service) SHS ICT teaching syllabus.

Socio-demographic characteristics of respondents

At the time of the study, the number of ICT teachers in Accra Metro was 60. Of this number, forty-six representing 76.7 percent participated in the survey. Out of the 46 teachers who responded, 67.4 percent representing 31 teachers were males where as 32.6 percent representing 15 teachers were females.

The study showed that most ICT teachers in Accra Metro were young. Over 66 percent of the respondents were between 26 and 35 years. Of this 34.1 percent fell in the range of 26 and 30 years whiles 31.7 percent were between 31 and 35 years. About 14.6 percent were between 36 and 40 years and 12.2 percent between 41 and 45 years. Only 7.3 percent of them were 25 years and below. The maximum age obtained was 44 years. The details of these socio-demographic characteristics of respondents are shown in Table 3.

Table 3: Respondents' Socio-demographic Characteristics

Profile	Frequency	Percentage
Sex		
Male	31	67.4
Female	15	32.6
Age		
25 and below	3	7.4
26-30	14	34.1
31-35	13	31.7
36-40	6	14.6
41-45	5	12.2
Non response	5	
Level of Education		
Secondary	1	2.2
Post-secondary	1	2.2
Tertiary	44	95.7
ICT Training		
Trained	37	84.1
Untrained	7	15.9
Non response	2	

Source: Fieldwork 2011   N = 46

Regarding the educational background of the respondents, it emerged from the study that the majority (95.7%) of the respondents had acquired their degrees. Only one respondent (2.2%) had postsecondary education and another one (2.2%) possessed secondary education. There was no respondent who had not obtained secondary education, yet 4.4 percent had obtained only a maximum of post secondary education which was below the qualification to teach in a senior high school.

The survey also indicated that 84.1 percent of the respondents had received some form of ICT training whiles 15.9 percent had received no form of ICT training, but they were teaching the subject. As Boakye & Banini, (2008) earlier indicated, to make innovations and reforms meaningful, those who will be most directly affected, in this situation the teachers, need to be part of the conception and planning process but it is obvious this was lacking.

ICT Capacity of the Public Senior High Schools in Accra Metro

This section appraises the ICT resources including teachers, personal computers, printers, projectors in relation to students' population in public senior high schools in the Accra Metro. Table 4 shows the total number of ICT teacher in Accra Metro as 60. There was no school without an ICT teacher. The number of teachers in the schools ranged from 1 to 6. However, it was noted that some of the teachers were Mathematics and other subject teachers who were filling the vacancy. In four schools, Mathematics teachers were supporting in teaching the subject while in two schools, the ICT teachers were solely Mathematics teachers holding the fort.

The results in Table 4 indicated an imbalance in the distribution of ICT teachers. Specifically, 60 teachers were involved in handling 26,789 students. That is, a ratio of one teacher to four hundred and forty-seven students (1:447). Interviews with the heads of institutions indicated they had to employ the services of the Mathematics teachers to support in teaching of the subject, making the Mathematics teachers overloaded and overworked. The observed high ICT teacher – student ratio supports the findings of Dadebo et al. (2009) that there is a

gross lack of ICT teachers in most Ghanaian schools. It could therefore be inferred that the ICT lessons are not effectively delivered since the human resources to do that are not readily available for use.

Table 4: ICT Resource Capacity of Public Senior High Schools in Accra Metro

Name of School	Student Population	Teachers	ICT	PC	Printer	Projector
Accra High School	1817	4	Elective	48	1	0
Armed Force Sec. /Technical	1070	4	Core	3	0	1
Christian Methodist Sen. High	1046	2	Core	3	0	0
Ebenezer Secondary	1596	3	Core	20	1	0
Wesley Grammar Senior High	1984	3	Core	48	1	1
St. Margaret Mary Sec./ Tech.	1198	3	Core	20	0	0
Labone Senior High School	2250	2	Core	5	0	1
Presbyterian Sen. High, Osu	1492	6	Core	28	1	1
O'Reilly Senior High School	924	2	Core	20	1	0
St. Mary's Senior High	1040	5	Core	40	1	1
St. Thomas Aquinas	1744	5	Elective	23	1	0
Accra Academy	2161	5	Core	10	1	1
Kaneshie Sen. High Technical	1064	1	Core	30	0	0
Accra Wesley Girls Sen. High	323	1	Core	20	0	0
Holy Trinity Cathedral Sec.	1020	2	Core	0	0	0
Kinbu Secondary /Technical	1506	2	Core	30	1	1
Achimota Senior High School	2034	5	Core	40	1	1
Accra Girls Sen. High School	1462	2	Core	20	1	1
La Presbyterian Senior High	1058	3	Core	5	0	0
Total	26,789	60	2/17	413	11	9

Source: Field Work, 2011

Due to the inadequacy of professionally trained ICT teachers, out of the nineteen schools, two schools (10.53%) offered ICT as an elective subject, whilst 17 schools were offering ICT only as a core subject since it was a requirement from the Ghana Education Service. Most students were therefore not getting the opportunity to study elective ICT to prepare them for higher education in ICT or any related course.

The resources for teaching the subject were also woefully inadequate. The number of computers available for teaching the subject ranged from 3 to 48. On the average, each school had about 20 computers. But there were schools that had to use only 3 or 5 computers to teach a class of about 50 students. Some students therefore did not fully benefit from such lessons. The student PC ratios were Labone SHS (450:1), Armed Forces (357:1), Christian Methodist (349:1), Accra Academy (216:1) and La Presec (212:1). The ratio for some of the computer endowed schools were Kaneshie Secondary Technical (35:1), St. Mary's (26:1) and Accra Wesley Girls (16:1).

Often, LCD projectors are usually used to complement the inadequacy of computers but at the time of the study, out of the 19 schools only 9 or 47.3% had a projector. The majority did not own a projector. In addition, only 11 schools had a printer each. Even with the schools which had printers and projectors, the ratio of student to the printer was that of the school's population to one. It emerged from the study that La Presbyterian Senior High, Holy Trinity Cathedral Secondary., Accra Wesley Girls Senior High, Kaneshie Sen. High Technical, St. Margaret Mary Secondary / Technical and Christian Methodist Senior High did

not own a printer or LCD projector. Other ICTs such as scanners, photocopiers, and digital cameras which are now vital to education were mostly unavailable. The details of student accessibility are shown in Table 5.

Table 5: ICT Capacity and student numbers

Name of SHS	Teachers	Student Population	Number of PC's	Student PC Ratio	Printer	Projector
Accra High SHS	4	1817	48	38:1	1	0
Armed Forces SHS	4	1070	3	357:1	0	1
Christian Methodist	2	1046	3	349:1	0	0
Ebenezer SHS	3	1596	20	80:1	1	0
Wesley Grammar	3	1984	48	41:1	1	1
St. Magaret Mary	3	1198	20	60:1	0	0
Labone SHS	2	2250	5	450:1	0	1
Presec Osu SHS	6	1492	28	53:1	1	1
O'Reilly SHS	2	924	20	46:1	1	0
St. Mary's SHS	5	1040	40	26:1	1	1
Aquinas SHS	5	1744	23	76:1	1	0
Accra Academy	5	2161	10	216:1	1	1
Kaneshie Sec Tec	1	1064	30	35:1	0	0
Accra Wesley Girls	1	323	20	16:1	0	0
Holy Trinity SHS	2	1020	-	1020:0	0	0
Kinbu Sec Tec	2	1506	30	50:1	1	1
Achimota SHS	5	2034	40	51:1	1	1
Accra Girls SHS	2	1462	20	73:1	1	1
La Presec SHS	3	1058	5	212:1	0	0
Total	60	26,789	413	65:1	11	9

Source: Fieldwork 2011

The internet is very necessary for effective teaching of the ICT course as outlined in the syllabus. Yet, a substantial number of schools did not have access

to this service. Of the 19 schools, 7 or 36.8% did not have access to the internet. These unavailable resources were all indications that the ICT lessons were not effectively delivered.

Knowledge on ICT by Socio-demographic Characteristics

Table 6: Knowledge on ICT by Respondents' Socio-demographic Characteristics

Profile			Knowledge		
		High (%)	Average (%)	Low (%)	Totals
Sex:	Male	6.5	52.2	8.7	
	Female	0.0	19.6	13.0	
Total		6.5	71.8	21.7	100
Age:	25 and below	2.4	4.9	0.0	
	26-30	2.4	22.0	9.8	
	31-35	0.0	26.8	4.9	
	36-40	2.4	9.8	2.4	
	41-45	0.0	9.8	2.4	
Total		7.2	73.7	19.5	100
Level of Education:					
Secondary		0.0	2.2	0.0	
Post-secondary		0.0	2.2	0.0	
Tertiary		6.5	67.4	21.7	100
ICT Training:					
Trained		6.8	63.6	13.6	
Untrained		0.0	9.1	6.8	100

Source: Fieldwork 2011   N = 46

By matching the socio-demographic characteristics of the respondents with their knowledge, the study showed that out of the 31 male respondents, 77.4 percent displayed average knowledge of ICT, while 12.9 percent exhibited low knowledge and 9.6 percent had high knowledge of the subject. As regards the 15 female respondents, 19.6 percent had average knowledge; while 13 percent

39

displayed low knowledge in ICT. There was no female who displayed high knowledge in the subject. Generally, it was revealed that most of the respondents lacked advance knowledge in the subject.

In analyzing the ICT knowledge for all the age groups, it is worth noting that none of those 25 years and below displayed low knowledge in the subject, rather out of 3 respondents within this age bracket, 2 respondents or 4.9 percent had average knowledge and 2.4 percent displayed high knowledge. It could be inferred from this results then that, the target age group for training in ICT should be those above 25 years especially those within 31and 35 years as well as 41 and 45 years since none of them displayed high knowledge in ICT.

Knowledge, skill and abilities of ICT teachers in Accra Metro

The results showed that the majority 80.4% of the public SHS ICT teachers in Accra Metro had average knowledge of the subject matter. Another 17.4 percent were noted to have low knowledge of the subject whiles 2.2 percent could be described to have high knowledge. It is inferred from the result that there exist a gap between the knowledge the teachers have and that which is required to teach the ICT subject effectively.

The study also explored the skills competencies of the public SHS ICT teachers in Accra Metro. These skills competencies refer to the teachers' ability to demonstrate capabilities in performing some task with the computer. A substantial number of the teachers were not skilful in ICT. Table 7 shows that 52.2 percent of the public SHS ICT teachers in Accra Metro had average skills in ICT. Only 8.7

percent of the respondents demonstrated high skills in ICT where as 39.1 percent exhibited low skill level in the subject. This result is congruent with that of Dadebo et al. (2009) whose report on E-Readiness in Ghana indicated that, more than half (55.9%) of teachers studied did not have the basic ICT skills, while the majority (85.6%) of them lacked advanced ICT skills. The students will therefore not benefit from such lessons since most of the teachers are not be capable of imparting the requisite skills and knowledge which they do not have to the students.

Table 7: Knowledge and Skills Score of Respondents

Profile	Frequency	Percentage
Knowledge		
Low	8	17.4
Average	37	80.4
High	1	2.2
Total	46	100.0
Skills		
Low	18	39.1
Average	24	52.2
High	4	8.7
Total	46	100.0

Source: Fieldwork 2011   N = 46

In a further analysis, 15 questions were employed to gauge the knowledge of the public SHS ICT teachers about the subject. In this instance, majority of the respondents displayed adequate knowledge in some aspects of ICT. Regarding their knowledge of processing devices, 84.8 percent had it right, 91.3 percent for components of the system unit, 73.9 percent, for PowerPoint presentation, and on

classification of computers 71.7 percent had them right. On the contrary, less than 50 percent had the right answers to questions on themes such as the central memory 47.8 percent, web search engines 39.1 percent, the internet and World Wide Web, excel functions, programming statements, internet connectivity, and listing with numbers in HTML. As low as 19.6 percent correct responses were recorded for Ms Word window features and identifying *types* of computers 17.4 percent respectively. The domains tested and their corresponding results are presented in Table 8.

Table 8: Knowledge of ICT Teachers

No.	ICT knowledge areas	Number with right answer	Percentage with right answer
1	Processing devices	39	84.8
2	Components of the system unit	42	91.3
3	Type of computers	8	17.4
4	Classification of computers	33	71.7
5	Central memory	22	47.8
6	Web search engines	18	39.1
7	The internet and world wide web	9	19.6
8	Excel functions	8	17.4
9	Ms word window features	9	19.6
10	Programming statements	12	26.1
11	Formatting features on word	26	56.5
12	Internet connectivity	15	32.6
13	Listing with numbers in html	10	21.7
14	Formatting in excel	30	65.2
15	PowerPoint presentation	34	73.9

Source: Fieldwork 2011   N=46

This result indicated that respondents' knowledge in identifying components of the computer, PowerPoint presentation, and classification of computers was good, yet themes related to the internet, programming, and some feature of MS Word window as well as excel functions posed problems to majority of the teachers. These themes are thus potential training areas. Dadebo et al (2009) identified a number of skill sets as being critical at the school level. The inability of teachers to display these skills would have adverse effect on student learning.

Using the self assessment tool, teachers were asked to rank their knowledge on various ICT themes using a Likert scale of 1 to 5 ('1' being very good to '5' very poor). In presenting the results, the scale was collapsed into three that is, 'good', 'average', and 'poor'.

Table 9: Self Rating of ICT Knowledge (Percent)

Self Rating of ICT Knowledge Themes	Good	Average	Poor	Total
Self rating on features of a browser window	86.3	13.6	0.0	100.0
Self rating on importance of word processing	97.7	2.3	0.0	100.0
Self rating on open source and proprietary software	90.9	6.8	2.3	100.0
Self rating on object oriented programming	45.5	20.5	34.0	100.0
Self rating on top-down programming	40.9	22.7	36.4	100.0
Self rating on identifying application software	95.4	4.5	0.0	100.0
Self rating on internet concepts and terminologies	97.7	2.3	0.0	100.0
Self rating on algorithms in programming	52.3	25.0	22.8	100.0
Self rating on identity of vital parts of system unit	97.7	2.3	0.0	100.0
Self rating knowledge of ICT concepts and terms	93.2	6.8	0.0	100.0

Source: Fieldwork 2011

The result of the survey showed that most of the teachers (97.7%), rated themselves good with regard to their knowledge of importance of word processing, knowledge of internet concepts and terminologies, and identifying the vital components of the system unit. On themes like identifying application software (95.4%), open source and proprietary software (90.9%), knowledge of ICT concepts and terminologies, the majority (93.2%) ranked themselves good. On the contrary, less than 50 percent ranked themselves good in themes such as 40.9 percent for top-down programming, and 45.5 percent for object oriented programming. Also, as many as 34.0 percent for object oriented programming and 36.4 percent for top-down programming, rated their knowledge as poor. On algorithms in programming 52.3 percent said they had good knowledge, 25.0 percent being neutral and 22.8 percent saying they had knowledge poor. Table 9 presents the results of the self rating.

Gap analysis, according to Grant (2002, p.157) "involves comparing performance with stated intended competencies by self assessment, peer assessment, or objective testing". The self assessment of the teachers on these themes indicated the gab in their knowledge and training in these areas are required so they could perform their job effectively.

It could be deduced from the results that the respondents were knowledgeable when themes such as word processing, basic ICT concepts and terminologies, hardware and presentation were considered. In contrast, knowledge gaps existed and this was apparent on themes such as programming, internet, excel functions, and identification of some features on the MS Word window.

To assess the skills of public SHS ICT teachers in Accra metro, twelve (12) skill domains were tested and this is shown in Table 10.

Table 10: Skills of ICT Teachers

No.	ICT Skill areas surveyed	Number with Right answer	Percentage with Right answer
1	Using html for making a check box	19	43.2
2	Effects of double and triple clicking	12	27.3
3	Order of priority for html style sheets	10	22.7
4	Shortcut key for checking spelling	32	72.7
5	Identity of the edit menu	9	20.5
6	Identity of icon for coping text	20	45.5
7	Applying bold and italics to text	15	34.1
8	Renaming a work sheet in excel	30	68.2
9	Shortcut key to start slide show	15	34.1
10	Fixing cell to text with double arrow	14	31.8
11	Shortcut for toggling between web screen	29	65.9
12	Feature for blind coping a message	29	65.9

Source: Fieldwork 2011   N = 46

On the whole, many themes saw less than 50 percent correct score. Apparently, the teachers displayed less than average skills in the subject. It is evident from Table 10 that a substantial number of the respondents did not display adequate skills in the subject. Less than forty percent of them could display the right skills on tasks such as identifying the edit menu (20.5%), (22.7%) could arrange in order of priority for html style sheets, and (27.3%) was able to indicate the effects of double and triple clicking. Regarding fixing cell to text with double arrow, only 31.8% could do that, whiles 34.1% could use the shortcut key to start slide show and 34.1% could apply bold and italics to text. Also, a majority of the respondents had average or "medium" skills in performing the various ICT tasks.

Nevertheless, there were few areas where most of the respondents displayed the right skills. As many as 72.7 percent could use the shortcut key for spell check, 68.2 percent renamed a work sheet in excel whiles 65.9 percent were able to use the shortcut key to toggle between web windows and another 65.9 percent could use the feature for blind coping a message. The majority who displayed the right skills in the few skill areas were on the average about 65 percent. This indicated that there were still a substantial number (35%) who displayed the wrong skills. All these 35 percent also taught students for which they required accurate skills in order to perform efficiently and effectively. Training in these skills areas are therefore essential.

It must be noted though that those who displayed adequate skills were not as many as those who displayed high knowledge in the various ICT themes. This showed that many of the respondents possessed more theoretical knowledge of the subject than the practical skill in the subject.

Again, as regards skills of respondents, other manipulative domains were tested and the results show that most of the teachers were good as regards their skills in sending and accessing e-mail (97.8%), navigating between existing folders (80.0%), doing complex search for files and folders (91.1%), saving files in selected folder (82.3%), and developing functions common to arithmetic applications (88.9%). It was also noted that there were few who were poor in these same skill areas, 15.5 percent 6.7 percent, 2.2 percent, and 2.2 percent respectively with the exception of sending and accessing e-mails. The results and their corresponding scores which were graded are presented in Table 11.

Table 11: ICT Skill Score of Respondents (Percent)

Themes on Testing ICT Skill	Good	Average	Poor	Total
Using special application software like Corel	48.9	28.9	22.2	100.0
Navigating into a network	68.9	15.6	15.5	100.0
Performing computer diagnostics	62.2	28.9	8.9	100.0
Saving files in selected folder	82.2	15.6	2.2	100.0
Navigating between existing folders	80.0	15.6	4.4	100.0
Zipping and unzipping files	72.1	17.8	11.1	100.0
Using URL and search engines	55.5	22.2	20.0	100.0
Developing functions common to arithmetic apps.	88.9	8.9	2.2	100.0
Complex file and folder search	91.1	2.2	6.7	100.0
Sending and accessing e-mail	97.8	2.2	0.0	100.0

Source: Fieldwork 2011

Contrarily, only half (55.5%) of the respondents displayed good skills in using the URL and search engines. Also, 22.2 percent had average skill in performing the task, while 20.0 percent displayed poor skills in this same task. Again, as low as 48.9 percent displayed good skills in using special application software like Corel with 28.9 percent displaying average skills and 22.2 percent exhibiting poor skills. Much more, on themes such as zipping and unzipping files (11.1%), navigating into a network (15.5%), performing computer diagnostics (8.9%), and doing complex file and folder search (6.7%), the respondents indicated poor skills. This informs areas for which training could be organized for the respondents (teachers).

Further ICT task themes were outlined for the respondents to agree or disagree whether they could perform those tasks effectively. The degree to which

they could perform the various tasks indicated their felt needs and also it goes to inform the areas for which training could be organized for the respondents.

The results indicated that quite a substantial number of the respondents were undecided as to their effective performance of certain tasks. The Table shows that quite a substantial number of the respondents were undecided as to how effective they could perform tasks such as creating and working with macros (44.2%), analyzing worksheet using pivot tables or crosstabs (41.9%), formatting text using html (32.6%) and designing web pages using html (30.2%). This high rate of indecision clearly indicates a lack of confidence in handling those themes. It is inferred from this that they lacked adequate skills in these areas. There were other undecided ones ranging from 18.6% on themes such computer diagnostics and maintenance, constructing flow charts, down through to (2.3%) in constructing formula in spreadsheet. The results are displayed in the Table 12.

Table 12: Self Rating on Effective Application of ICT Skills (Percent)

Self Rating	Agree	Neutral	Disagree	Total
Constructing formula in spreadsheet	97.6	2.4	0.0	100.0
Creating database using forms and tables	88.4	4.6	7.0	100.0
Create and work with macros	46.5	44.2	9.3	100.0
Formatting text using html	41.8	32.6	25.6	100.0
Constructing flow charts	74.4	18.6	7.0	100.0
Computer diagnostics and maintenance	65.1	18.6	16.3	100.0
Design web pages using html	48.8	30.2	18.7	100.0
Analyze worksheet using pivot tables/ crosstabs	51.2	41.9	7.0	100.0
Edit and save word document using editing tools	90.7	7.0	2.3	100.0
Apply animation effects to slides	90.7	7.0	2.3	100.0

Source: Fieldwork 2011

Notwithstanding, most of the teachers (97.6%) agreed that they were effective in performing tasks such as constructing formula in spreadsheet, 90.7 percent agreed on editing and saving word document using editing tools and another 90.7 percent agreed on being effective at applying animation effects to slides. As many as (88.4%) agreed they were effective for creating database using forms and tables. Also, for constructing flow charts, 74.4 percent agreed they were effective. On the contrary, a number below average agreed to effectively perform tasks such as designing web pages using html (48.8%), formatting text using html (41.8%), creating and work with macros (46.5%).

Conversely, some respondents disagreeing to their effective performance of some themes such as formatting text using html (25.6%), designing web pages using html (18.7%) and Computer diagnostics and maintenance (16.3%). With the exception of constructing formula in spreadsheet, there were some respondents who disagreed to their effective performance of each outlined theme.

It could be inferred from Table 12 that the majority of the respondents were not skilful when it came to tasks such as performing computer diagnostics and maintenance, creating and working with macros, formatting text using html, designing web pages using html and analyzing worksheet using pivot tables or crosstabs. Yet, some were skilful when it came to skills such as constructing formula in spreadsheet, editing and saving word document using editing tools and applying animation effects to slides. The degree to which they could effectively perform the various tasks goes to inform the areas for which training could be organized for the respondents. On the whole, it was evident that there was a

correlation between the knowledge level and skill of the respondents. The average knowledge of the subject was revealed in their average manipulative skills in ICT.

Potential training areas for ICT teachers

Using the "felt-needs" methodology, which usually asks employees to simply list or rank desired training courses (Holton et al, 2000), the respondents (teachers) made their own choices of five areas they required training.

Table 13: Pressing Areas Requiring ICT Training

Areas Requiring ICT Training	Frequency	Percentage %
Programming	30	65.2
Networking	22	47.8
Database	16	34.8
Software Development	13	28.3
Hardware maintenance	12	26.1
Designing (Corel etc.)	12	26.1
Spreadsheet	4	8.7
Word processing	1	2.2
File management / ICT concepts	1	2.2

Source: Fieldwork 2011   N = 46

Most of the respondents indicated they needed training in programming. In Table 13 the result indicates that majority of the respondents (teachers) would require training in Programming with 65.2 percent. It was followed by 47.8 percent requiring training in Networking, 34.8 percent for Database; 28.3 percent Software Development, 26.1 percent in Hardware maintenance, and another 26.1 percent requiring training in Designing (Corel etc.). Themes such as Spreadsheet (8.7%), word processing (2.2%) and file management and ICT concepts (2.2%) were sparingly stated as areas requiring training.

This trend in choice was consistent with all the test scores of the knowledge and skills of the respondents. The respondents displayed 'low' to 'average' knowledge and skills in the areas that topped the chart on areas requiring training. In contrast, they displayed high knowledge and skills in the themes that were sparingly indicated as requiring training.

Nonetheless, before concluding on the potential training areas, further enquiry was made in order to determine more accurately the gap requiring training. The respondents identified the ICT areas for which they had received training and indicate how effective the training received was. Software development was identified as one area of training which many of the respondents required training. Only 40.9 percent of the respondents had received such training. Of this number, 50.0 percent agreed the training was effective, where as 34.4 percent disagreed that the training was effective. Also, 45.5 percent had not been trained in basic networking as well as 41.9 percent untrained in software and hardware maintenance.

In contrast, most of the respondents had had training in all the other areas with 90.9 percent trained in word processing and spreadsheet, 90.7 percent in presentation and 81.8 percent in file management and ICT concepts. Although Programming (65.9%) and Database (74.4%) saw a substantial number of trained respondents, the untrained respondents in these areas were also considerable, numbering 34.1 percent and 25.6 percent respectively. Table 14 presents the result of that survey.

Table 14: ICT Professional Development

ICT Professional Development areas	Percentage that have received training	Percentage that consider training to be effective
File management and ICT concepts	81.8	85.7
Basic Networking	54.5	68.8
Hardware and Software Maintenance	58.1	73.3
Software Development	40.9	50.0
Database	74.4	75.0
Presentation	90.7	88.9
Spreadsheet	90.9	94.6
Programming	65.9	44.4
Word Processing	90.9	94.8

Source: Fieldwork 2011   N=46

It was apparent from the results that most of the respondents (94.8%) agreed that their training in word processing was effective. Other themes had more respondents agree their training was effective, with 85.7 percent agreeing for themes such as file management and 94.6 percent for ICT concepts, spreadsheet and presentation had 88.9 percent agreeing to the effectiveness of such training.

On the contrary, only a few respondents agreed that training on themes such as software development (50.0%), programming (44.4%), and basic networking (68.8%) were effective. Besides those who agreed, substantial numbers disagreed that such trainings were effective. Thus, 25.0 percent disagreed on programming, as well as basic networking, 20.0 percent in hardware and software maintenance with 19.4 percent disagreeing in database. These

responses make it apparent that themes such as programming, networking, software development, software / hardware maintenance, and databases were potential training areas for the respondents.

From the foregone analysis and discussion, the potential ICT training areas for the respondents in order of respondents preference are; programming, networking, software development, software / hardware maintenance, designing and databases. There are few areas in word processing (macros, etc), and spreadsheet (creating formulas), that is, advance word processing and advance spreadsheet, for which the respondents need to be trained.

Knowledge, skill, and abilities required of ICT teachers

By the gab analysis framework, the required knowledge and skills of SHS ICT teachers had to be determined. This section thus reports on the content analysis of ICT teaching syllabus of September 2010 released by the Ministry of Education through the Curriculum Research and Development Division (CRDD). It seeks to answer the question 'What are the knowledge, skills, and abilities needed by second cycle ICT teachers?' The rationale for teaching SHS ICT especially the elective, according to the September 2010 Teaching Syllabus for ICT is to provide advanced skills in ICT for Senior High School students. It was expected that the knowledge and skills gained in the course would prepare students to pursue ICT courses in years ahead and provide them with the basic skills needed for the ICT job market. The ICT elective syllabus was planned at a higher content level than the ICT content at the core ICT level.

The SHS ICT course is supposed to cover these themes; information and communications technology, hardware, introduction to software development, PC hardware maintenance and software installation, desktop publishing software and its functionality, word processing, and spreadsheet. Others include introduction to data processing systems, introduction to programming, basic networking, data communications and introduction to educational technology. These twelve themes are to be covered in years 1, 2 and 3 of senior high school education (MoE, 2010). These themes clearly indicated the knowledge and skills required of teachers in order to teach the SHS ICT course effectively. Teachers need to be able to explain the basic concepts of all the themes outline as well as perform various tasks in these areas of ICT.

It is worth mentioning that as at the time of the study, some of the schools had little or no knowledge of the September 2010 Syllabus. Two Assistant Headmasters interviewed were even not aware of the elective ICT. They were still making reference to the computer science course which was an aspect of the Integrated Science subject which was reviewed in 2009. Six teachers also indicated they had not heard anything from the West African Examination Council as to the elective ICT course being examinable, as such, they were not teaching the elective ICT.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents the summary of the study, draws conclusions based on the findings and makes recommendations to various stakeholders as to how the finding can of benefit to them.

Summary

The main objective of the study was to assess the training and development needs of public SHS ICT teachers in the Accra Metropolitan Area. Specifically, it sought to determine the knowledge, skills and abilities needed by public SHS ICT teachers in the Accra Metropolis; evaluate the current state of skills, knowledge, and abilities of the public SHS ICT teachers in Accra metropolis; and also assess ICT resource capacity of the Senior High Schools in Accra metropolis.

The study therefore employed the cross sectional design since cross-sectional surveys are used to determine prevalence which is the number of cases in a population at a given point in time that display a particular phenomenon with all measurements on each person made.

The study population comprised of all ICT teachers of public Senior High Schools in the Accra Metropolis 60, as well as all heads of the various schools in the study area 19 and the ICT Coordinator for the district during June, 2011. This gave a total of 80. Of the 60 teachers, 46 responded to the survey.

Two major instruments were used to collect data from the participants of the study – a questionnaire and an interview guide. For the teachers, a questionnaire was designed as the instrument for data collection. Based on the objectives of the study, the questions in the questionnaire were grouped into five parts. The interview guide on the other hand was a semi-structured instrument, which had five major open-ended questions that were intended to elicit the views of the heads and the coordinator on some questions raised for the study.

The Statistical Package for the Service Solutions (SPSS 17.0) was used to analyze the data. The variables in the instrument were coded or input into the analysis software, and then checked for errors and accuracy. The data that had to be transformed were transformed into their respective categories. The analysis focused generally on frequency tables, highlighting the percentage in reporting the findings of the study. Frequencies of the scores were analyzed using descriptive statistics in the SPSS. To measure the variable of the study – knowledge and skills of ICT – an operational procedure that specify how the measurement will be done was made in line with the operational definition of the variable. The scores were then categorized into high, average and low.

Main findings of the study

Firstly, considering the availability of teachers, the results indicated that the number of ICT teachers was inadequate since 60 teachers had to teach 26,789 students. This gives a ratio of 1 teacher to 447 students. Also, there was a misbalance in the distribution of ICT teachers.

Again, the resources for teaching the subject were inadequate. The student PC ratios ranged between 450 students: 1 computer to the least of 16 students per computer. Furthermore, out of the 19 schools surveyed, only 9 had projectors and only 11 schools had a printer each.

Other ICTs such as scanners, photocopiers, and digital cameras were mostly unavailable. These were all indications that the ICT lessons were not effectively delivered since the resources to do that were not readily available for use. The students therefore did not fully benefit from such lessons.

The SHS ICT course is made up of a core ICT subject and an elective ICT course. The subject is supposed to cover themes such as; information and communications technology, hardware, introduction to software development, PC hardware maintenance and software installation, desktop publishing software and its functionality, word processing, and spreadsheet. Others include; introduction to data processing systems, introduction to programming, basic networking, data communications and introduction to educational technology. Thus, the ICT teachers need to be able to explain the basic concepts of all the themes outlined as well as perform various tasks in these areas of ICT.

As regards the knowledge and skills, the result indicted that there were few public SHS ICT teachers in Accra Metro (6.5%) who could effectively express their knowledge and skills in ICT, since many of them (71.7%) exhibited average knowledge and skills in the subject. There was also a substantial number (21.7%) who exhibited low knowledge and skills in the subject.

Of the 31 male respondents, 77.4 percent displayed average knowledge of ICT, whiles 12.9 percent exhibited low knowledge and 9.6 percent had high knowledge of the subject.

As regards the 15 female respondents, 19.6 percent had average knowledge; whiles 13 percent displayed low knowledge in ICT. There was no female who displayed high knowledge in the subject.

The results indicated that the respondents displayed high knowledge in themes such as word processing, basic ICT concepts and terminologies, identifying hardware and features of presentation. Contrarily, majority of the respondents were not skilful when it came to tasks such as performing computer diagnostics and maintenance, creating and working with macros, formatting text using html, designing web pages using html and analyzing worksheet using pivot tables or crosstabs.

Concerning the respondents' felt needs, more than half of the respondents required training in programming. Some 47.8 percent required training in networking, while less than half the number required training for database, software development, hardware maintenance, and designing (Corel etc.). Themes such as spreadsheet, word processing, file management and ICT concepts were sparingly stated as areas requiring training with a total of 13.1 percent.

Conclusions

Based on the findings of the study, the following conclusions are drawn;

- The public SHS in Accra Metro were inadequately resourced to effectively teach the ICT course. This was because the student PC ratios ranged between 450 students: 1 computer to the least of 16 students per computer. Also, only 9 schools had projectors and only 11 schools had a printer each, out of the 19 schools surveyed. Other ICTs such as scanners, photocopiers, and digital cameras were mostly unavailable.

- There was inadequate human resource to effectively handle the subject. Sixty ICT teachers taught 26,789 students. That is, a ratio of one teacher to four hundred and forty-seven students (1:447). The situation is worsened with a misbalance in the distribution of ICT teachers, so while some schools had four or more teachers, others had just one teacher though they might have the same class size.

- Most public SHS ICT teachers in Accra Metro had limited ICT knowledge required to teach the subject. Their knowledge covered basic issues such as word processing, basic ICT concepts and terminologies, identifying hardware, basic spreadsheet and features of presentation. Therefore, a gap existed between the desired knowledge and skills of ICT teachers in public SHS in Accra Metro and the actual knowledge and skills of ICT teachers in public SHS in Accra Metro.

- The actual ICT training areas for the respondents in order of priority were programming, networking, software development, software / hardware maintenance, designing and databases.

Recommendations

On the basis of the findings and conclusions drawn, it is recommended that:

- The Ministry of Education and GES should provide the public SHS in Accra Metro with the necessary ICT resources so that the subject would be taught effectively in order for the nation to achieve her ICT development goal.

- The Ministry of Education and GES should train more ICT teachers to handle the subject rather than using other subject teachers as substitutes.

- Regular in-service training on ICT should be organized by the Ministry of Education and GES for the ICT teachers to upgrade their knowledge and skills in the subject.

- In organizing any in-service training for the ICT teachers, the Ministry of Education and GES should consider as crucial themes as programming, advance word processing, advance spreadsheet, software development, networking, designing, and hardware and software maintenance.

- The Ministry of Education and GES in posting ICT teachers to public SHS in the Accra Metropolis should consider the disparity in distribution of teachers to public SHS in the area so as to rectify the discrepancy in the distribution of the ICT teachers.

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APPENDIX A

QUESTIONNAIRE FOR EVALUATING THE HUMAN RESOURCE
DEVELOPMENT NEEDS OF ICT TEACHERS IN THE ACCRA
METROPOLIS

This is a training needs assessment questionnaire for ICT teacher in second cycle institutions in the Accra Metropolitan Area. It seeks to identify the discrepancies between the knowledge, skills and abilities of the ICT teachers and the knowledge, skills and abilities required to performance their jobs in order to identify potential training areas for the teachers.

You have been chosen for this study. You are therefore assured of your anonymity and that the findings of this study will be used for educational purposes only. Please find some few minutes to complete this questionnaire.

PART I: Background

Q1. What is your gender?   Male [   ]₁   Female [   ]₂

Q2. How old are you?
_____

Q3. What is your mode of employment?   Full-time [   ]₁   Part-time [   ]₂

Q4. What is your level of education?   Basic [   ]₁   Secondary [   ]₂
                                Post-secondary [   ]₃   Tertiary [   ]₄

                              Other, specify _____

Q5. Which tertiary institution did you attend? _____

Q6. How many years have you been teaching ICT in a senior high school in

Ghana? _____

Q7. What is your school's ICT capacity? Please indicate which of the ICT resources listed below are available for your use at school. Tick all that which apply and provide appropriate number available.

	Available	Number available
Desktop/laptop computer for personal use	[ ]₁	_____
Personal email account	[ ]₁	_____
School intranet	[ ]₁	_____
Internet	[ ]₁	_____
Printer	[ ]₁	_____
Digital cameras	[ ]₁	_____
Software applications (CRD, Creative Suite, etc)	[ ]₁	_____
Technical support	[ ]₁	_____
Digital projectors/interactive whiteboards	[ ]₁	_____
Desktop computers for student use in your computer lab	[ ]₁	_____
Scanners	[ ]₁	_____
Photocopier	[ ]₁	_____
Fax machine	[ ]₁	_____

PART II: Knowledge Needed by ICT Teachers

Q8. Is your school offering ICT as an elective subject?   YES [ ]₁   NO [ ]₂

If NO, why? ………………………………………………

Q9. Are there any of the topics in the syllabus for which you may need some

training in order to teach?   YES [   ]₁   NO [   ]₂

Q10. Did you ever receive any kind of ICT training? YES [   ]₁   NO [   ]₂

If yes, please specify …………….....…………………….

Q11. By ticking the appropriate box marked (A-Agree, D-Disagree) answer the

following questions;

Processing devices includes all the following; CPU Such as Celeron, Pentiums,

AMD, and MC68040.   A   D

[   ]₁   [   ]₂

Power switch light indicators, floppy and CD ROM drive, USB ports, Serial ports,

power socket, motherboard, CPU, power supply, memory, hard disk are all vital

component of the Systems Unit   [   ]₁   [   ]₂

In categorizing computers by "TYPE" there are; Micro Computers, Mini

Computers, Mainframe Computers and Super Computers   [   ]₁   [   ]₂

Computer programs or software packages can be classified into three main types

according to the functions that they perform. These are System software,

Application software and Programming Languages   [   ]₁   [   ]₂

The Central memory is used to hold programs and data temporarily while they are

being used. This central memory is referred to as Read Only Memory (ROM).

[   ]₁   [   ]₂

The special software that may be used to search for information on the Internet is

called a search engine. An example of a search engine is Opera [   ]₁   [   ]₂

The Internet is that part of the World Wide Web that makes use of graphical

software known as web browsers.   [   ]₁   [   ]₂

Excel performs calculations in the following order: 1. Multiplication (*) and

Division (/) 2. Exponents (^) 3. Addition (+) and subtraction (-) [   ]₁   [   ]₂

To close MS Word completely, one can use the File Menu. [   ]₁   [   ]₂

Only the third option (iii) contains an executable statement

   i.   // var a = 0; // var b = 0;   ii. /* var a = 0; // var b = 0; */   iii. /* var a = 0;

         / var b = 0;   iv. // var a = 0; / var b = 0; */   [   ]₁   [   ]₂

Some features of formatting in MS Word are; insert, delete, undelete, find and

replace, cut and paste, copy, spell check and grammar check. [   ]₁   [   ]₂

Browsers and servers use Routers to connect to the Internet not TCP/IP

                                                     [   ]₁   [   ]₂

In HTML, the third option (iii) is used to make a list that lists the items with
numbers
      i. ‹list›   ii. ‹numbers›   iii. ‹ol›   iv. ‹ul›
                                                     [   ]₁   [   ]₂

You need not highlight a cell in spreadsheet since it is automatically selected on a
click
                                                     [   ]₁   [   ]₂

Views slides, slide sorter, outline, notes page and slide show are examples of

features in the View mode of power point   [   ]1   [   ]2

Q12. Rating yourself on the scale of 1 to 5, using (VG - Very Good, G-Good, A-Average, P-Poor, VP- Very Poor) describe your ability in performing the following tasks;

                                                      VG   G   A   P   VP
Explain the concept of ICT and its related terminologies
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Identify the vital component of the Systems Unit
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Explain the concept of Algorithms in programming
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Explain basic concepts, requirements and terminologies of internet
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Identify different types, examples and uses of Application software
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Explain the concept of 'Top Down' programming
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Explain the concept of Object Oriented programming
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Distinguish between Open Source and Proprietary Software
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
State the importance and use of Word Processing
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5
Identify the features of browser window
                                              [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

PART III: Skills of ICT Teachers

Q13. Are you responsible for hardware/software maintenance?
                                              YES [   ]1   NO [   ]2
If yes, give examples

…………………………………………………………………………………….

Q14. By ticking the appropriate box marked (A-Agree, D-Disagree) answer the

following questions   A   D

The correct HTML for making a checkbox is; ‹input type="checkbox"/ ›

[   ]₁   [   ]₂

Clicking the left plain side of a text document three times (triple click) selects a paragraph whiles a double click will select a line of text.   [   ]₁   [   ]₂

If multiple styles apply to an HTML element, the order of priority (highest to lowest) for the various types of style sheets will be: Internal style sheet > External style sheet > Browser default > In line style   [   ]₁   [   ]₂

The shortcut key to check spelling is F7   [   ]₁   [   ]₂
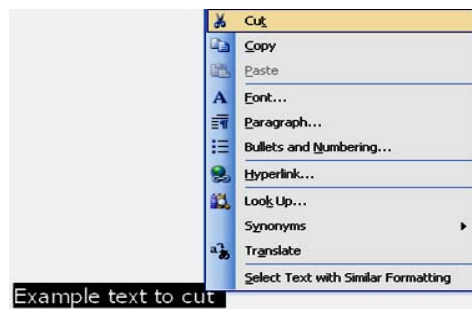
The illustration here indicates 'Cutting text using the edit menu.

[   ]₁   [   ]₂

Clicking on the circled icon shown below will copy a selected text.

[   ]₁   [   ]₂

To use the italics or bold features of MS Word, you can just click on the text, then the icon desired.   [   ]₁   [   ]₂

To rename a worksheet, you can place your mouse over the current name of the worksheet and double click then type in the new name.   [   ]₁   [   ]₂

To start a slide show you can use the slide show icon or the short cut key F8.   [   ]₁   [   ]₂

In Excel, to make a column bigger or smaller to fit a text, place the mouse pointer between the current cell and the next one. The pointer will then change to a double arrow, ←→ you can then double click.   [   ]1   [   ]2

In Internet Explorer, the F11 key will allow you to toggle back and forth between full screen view (all toolbars compressed into one thin line) and normal view.

                                        [   ]1   [   ]2

To copy your messages such that the person receiving the message is not aware of this, use the Bcc: feature.   [   ]1   [   ]2

Q15. Rating yourself on the scale of 1 to 5, using (SA- strongly Agree, A-Agree, N-Neutral, D-Disagree, SD- Strongly Disagree)   describe your ability in performing the following tasks;

Using the Computer, you can: SA   A   N   D   SD

Construct and insert simple formula in spreadsheet [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Create data base, working with Queries, forms and reports

                                        [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Create and work with macros   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Construct a flow chart   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Format text using HTML code   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Perform Computer Diagnostic and Maintenance   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Designing Website Using HTML   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Analyze data in a worksheet using pivot tables/dynamic crosstab

                                        [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Edit, and save Word document using editing tools [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Apply preset text, image animation effects to slides [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

PART IV: Abilities of ICT Teachers

Q16. Do you feel adequately trained to teach ICT?   YES [   ]1   NO [   ]2

If 'No' in which areas will you need more training?

…..………………………………...………………………………………………

…………………………………………………………………………………………

Q17. Rating yourself on the scale of 1 to 5, using (VG - Very Good, G-Good, A-Average, P-Poor, VP- Very Poor) describe your ability in performing the following tasks;

	VG	G	A	P	VP

Send and access e-mail messages with attachments [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Do complex searches for files and folders   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Use URL and Search Engines to access Information

                                                [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Develop functions common to arithmetic application

                                                [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Zip and unzip files   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Navigate between existing folders   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Save files in a selected folder   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Perform Computer Diagnostic   [   ]1 [   ]2 [   ]3 [   ]4 [   ]5

Navigate into a network   [   ]₁ [   ]₂ [   ]₃ [   ]₄ [   ]₅

Use special application software (Corel Draw, Creative Suit)

                                 [   ]₁ [   ]₂ [   ]₃ [   ]₄ [   ]₅

PART V: Potential Training Areas for the ICT Teachers

Q18. Indicate 5 pressing areas you will require ICT training. 1. …………….…..

2. …………………….…………….   3. …………….….…………………….…
4. …………………………………....   5. …………………………………………

Q19. Please indicate whether you have undertaken professional development in

any of the ICT areas listed below. If yes, please also indicate whether you found it

to be effective, using (SA- strongly Agree, A-Agree, N-Neutral, D-Disagree, SD-

Strongly Disagree)

Professional Development in ICT	Have you undertaken any in?	It was effective SA A N D SD
Programming	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
Word processing (e.g. MSWord)	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
Spreadsheets (e.g. Excel)	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
Presentation software (e.g. PowerPoint)	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
Databases (e.g. Access)	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
Software development	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
PC Hardware Maintenance and Software Installation	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
Basic Networking	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅
File management and basic ICT concepts	YES [ ]₁ NO [ ]₂	[ ]₁ [ ]₂ [ ]₃ [ ]₄ [ ]₅

Thank you for taking some time on this!

INTERVIEW GUIDE FOR HEADMASTERS/HEADMISTRESSES OF PUBLIC SHS

IN THE ACCRA METROPOLIS

Does your school offer ICT as an elective? If no, then why?

Are you teachers adequately trained to teach all the topics in the syllabus?

Does your school organize In-service Training on ICT for the teacher? What about GES?

In which areas does you ICT staff need training? Or what are the prospective training needs of your ICT teachers?

Do you have some performance appraisal reports that I can review briefly?

APPENDIX C

ACCRA METRO SHS ENROLMENT BY GRADE FOR 2010/ 2011

DISTRICT	LOCATION	NAME OF SCHOOL	SHS 1			SHS 2			SHS 3			SHS 4			SCHOOL TOTAL		
			BOY	GIRL	TOTAL	BOY	GIRL	TOTAL	BOY	GIRL	TOTAL	BOY	GIRL	TOTAL	BOY	GIRL	TOTAL
Accra Metro	KANESHIE	ACCRA ACADEMY	554		554	583		583	543		543	481		481	2,161	0	2161
Accra Metro	MAMOBI	ACCRA GIRLS SENIOR HIGH SCHOOL	0	388	388	0	423	423	0	333	333	0	318	318	0	1,462	1462
Accra Metro	DANSOMAN	EBENEZER SENIOR HIGH SCHOOL	221	186	407	253	176	429	208	162	370	222	168	390	904	692	1596
Accra Metro	KANESHIE	ST THOMAS AQUINAS SENIOR HIGH SCHOOL	423	0	423	479	0	479	411	0	411	431	0	431	1,744	0	1744
Accra Metro	KORLE GONNO	ST MARY SENIOR HIGH SCHOOL	0	274	274	0	257	257	0	251	251	0	258	258	0	1,040	1040
Accra Metro	TUDU	KINBU SECONDARY / TECHNICAL SCHOOL	259	118	377	357	160	517	269	111	380	158	74	232	1,043	463	1506
Accra Metro	BURMA CAMP	ARMED FORCES SECONDARY / TECHNICAL SCHOOL	135	91	226	154	94	248	196	103	299	204	93	297	689	381	1070
Accra Metro	OSU	PRESBYTERIAN SENIOR HIGH SCHOOL - OSU	182	177	359	242	256	498	193	161	354	146	135	281	763	729	1492
Accra Metro	DANSOMAN	WESLEY GRAMMAR SENIOR HIGH SCHOOL	230	203	433	273	243	516	281	242	523	268	244	512	1,052	932	1984
Accra Metro	LA EMMAUS	PRESBYTERIAN SENIOR HIGH SCHOOL - LA	169	158	327	170	159	329	95	123	218	86	98	184	520	538	1058
Accra Metro	DANSOMAN	ST. MARGARET MARY SECONDARY / TECHNICAL SCHOOL	123	181	304	136	169	305	133	161	294	122	173	295	514	684	1198
Accra Metro	NORTH RIDGE	ACCRA SENIOR HIGH SCHOOL	251	201	452	264	207	471	259	181	440	269	185	454	1,043	774	1817
Accra Metro	MATAHEKO	KANESHIE SENIOR HIGH TECHNICAL SCHOOL	178	108	286	184	115	299	180	87	267	138	74	212	680	384	1064
Accra Metro	CIRCLE	CHRISTIAN METH SENIOR HIGH SCHOOL	0	0	0	156	179	335	148	178	326	188	197	385	492	554	1046
Accra Metro	ACHIMOTA	ACHIMOTA SENIOR HIGH SCHOOL	256	238	494	271	242	513	276	241	517	269	241	510	1,072	962	2034
Accra Metro	LA EMMAUS	LABONE SENIOR HIGH SCHOOL	323	231	554	325	275	600	299	243	542	323	231	554	1,270	980	2250
Accra Metro	KANESHIE	ACCRA WESLEY GIRLS SENIOR HIGH SCHOOL		120	120		79	79		68	68		56	56	0	323	323
Accra Metro	ADABRAKA	O' REILLY SENIOR HIGH SCHOOL			0	175	174	349	134	167	301	132	142	274	441	483	924
Accra Metro	GA-MASHIE	HOLY TRINITY CATH. SENIOR SCHOOL	130	84	214	143	183	326	135	128	263	132	85	217	540	480	1020
		TOTALS	3,434	2,758	6,192	4,165	3,391	7,556	3,760	2,940	6,700	3,569	2,772	6,341	14,928	11,861	26,789

APPENDIX D

INTRODUCTORY LETTER

INSTITUTE FOR DEVELOPMENT STUDIES
FACULTY OF SOCIAL SCIENCES
UNIVERSITY OF CAPE COAST

Telephone: 03321-32983/35410/37105
Fax: 03321-32982
Website: www.cds-ucc.edu.gh

Post Office Box 01
University of Cape Coast
Cape Coast, Ghana.

Our Ref: IDS/40/Vol. 2/100

Date: May 31, 2011.

You r Ref:

TO WHOM IT MAY CONCERN

LETTER OF INTRODUCTION

We write to introduce to you **Seth Nii Gordon**, a student pursuing MA (Human Resource Development) Programme with Registration Number **SS/HRD/09/0039** at the Institute for Development Studies (IDS), University of Cape Coast.

He is writing his dissertation on the topic, **"EVALUATING HUMAN RESOURCE DEVELOPMENT NEEDS OF ICT TEACHERS IN ACCCRA METRO AREA".**

We shall be grateful if you can accord him all the necessary assistance that he requires for his dissertation.

Thank you for your cooperation.

Yours faithfully,

MR. P.K. MENSAH
(ASSISTANT REGISTRAR)
For: DIRECTOR

cc: The Director, IDS