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# Effort at Implementing ICT Policy in Basic Schools in Ghana: An Assessment of Available Facilities and Resources for Successful ICT Education within the Atwima Nwabiagya District in Ashanti Region

***ABSTRACT:*** *ICT (Information and Communication Technology) has potential to make educational resources accessible entirely. Therefore, knowledge is not limited to a geographical area and instrumental in offering options for information sharing, archiving, and retrieving. Thus, governments have to prioritize ICT education by supporting schools with materials for teaching and learning. The study aimed to document resources and materials available for teaching and learning of ICT in Atwima Nwabiagya District in Ghana. The study adopted case study design and a mixed method of data collection. In all, a total of 512 were recruited to be part of the study. The study found that the government of Ghana has failed to support schools with the needed resources for teaching and learning of ICT. Schools lack ICT labs, internet connection, and other resources needed to make teaching a success. The current resources available in schools will not make it possible for the country to achieve its objective with making ICT education possible for all children in basic schools in Ghana. Therefore, it is high time the government put in much resource in effort to make this policy a reality.*
***KEY WORD:*** *Information and Communication Technology; Education; Students and Teachers; Resources Support; Implementation of Policy.*

***RESUME****: "Upaya Pengimplementasian Kebijakan TIK (Teknologi Informasi dan Komunikasi) di Sekolah-sekolah Dasar di Ghana: Sebuah Penilaian terhadap Ketersediaan Fasilitas dan Sumber Daya untuk Keberhasilan Pendidikan TIK di Kabupaten Atwima Nwabiagya di Daerah Ashanti". TIK memiliki potensi untuk membuat sumber daya pendidikan dapat diakses sepenuhnya. Karena itu, pengetahuan tidak terbatas pada wilayah geografis dan secara instrumental menawarkan pilihan untuk berbagi, mengarsipkan, dan mengunduh informasi. Jadi, pemerintah harus memprioritaskan pendidikan TIK dengan mendukung sekolah menyediakan bahan-bahan untuk mengajar dan belajar. Penelitian ini bertujuan untuk mendokumentasikan sumber daya dan bahan yang tersedia untuk mengajar dan belajar TIK di Kabupaten Atwima Nwabiagya di Ghana. Studi ini mengadopsi desain studi kasus dan metode campuran dalam pengumpulan data. Semuanya, sebanyak 512 orang direkrut untuk menjadi bagian dari penelitian ini. Studi menunjukan bahwa pemerintah Ghana gagal dalam mendukung sekolah dengan sumber daya yang dibutuhkan untuk mengajar dan belajar TIK. Sekolah kekurangan laboratorium TIK, koneksi internet, dan sumber daya lainnya yang dibutuhkan untuk membuat pengajaran sukses. Ketersediaan sumber daya saat ini di sekolah tidak memungkinkan bagi negara mencapai tujuannya untuk menjadikan pendidikan TIK memungkinkan bagi semua anak di sekolah-sekolah dasar di Ghana. Karena itu, sudah saatnya pemerintah memasukan banyak sumber daya dalam upaya menjadikan kebijakan ini menjadi kenyataan.*
***KATA KUNCI****: Teknologi Informasi dan Komunikasi; Pendidikan; Murid dan Guru; Sumber Dukungan; Implementasi Kebijakan.*

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## INTRODUCTION

Education has proven to be for life and a key agent of socio-economic development. For instance, U NICEF (United Nations International Children Emergency Fund), in 2012, stated that education provides the ticket to a better quality of life, including good jobs that pay decent wages and offer opportunities for advancement (UNICEF, 2012). In addition, J. Uriah & A. Wosu (2012) mentioned that education provides the means to develop ones talent and abilities to utilize their full potential (Uriah & Wosu, 2012).

Similarly, K. Akyeampong (2010) posited that the most important exit route out of poverty is access to formal education, especially where it improves the quality of labor market (Akyeampong, 2010). Therefore, all children must have the opportunity to fulfill their rights to quality education in schools or alternative programs of whatever level that fosters their well-being (Sekyi, 2012; and Tamakloe, 2014).

Due to the relevance of education, countries around the globe have institutionalized strategies to help make their educational system efficient in order to achieve desired outcome (Kotnik & Hagsten, 2013; and Victor, 2013). One area which has attracted the attention of educationists is integration of ICT (Information and Communication Technology) into education to facilitate teaching and learning (Butcher, 2010). In this context, Saverinus Kaka (2008) said as follows:

> [...] being aware of the significant role of ICT in our life, especially in the educational activities, education authorities should be wise enough in implementing the strategies to empower ICT in supporting the teaching and learning process in the classroom (Kaka, 2008).

Therefore, ICT (Information and Communication Technology) results in an improvement and ensuring an effective educational process. N. Butcher (2010) again supported this assertion by stating that ICT makes education accessible anywhere, anytime, and anyhow. ICT has potential to make educational resources accessible and improving quality knowledge sharing and management of the education system entirely (Butcher, 2010). Therefore, knowledge is not limited to a geographical area and instrumental in offering options for information sharing, archiving, and retrieving (*cf* Butcher, 2010; and Prasadh, 2013).

Computer illiteracy and lack of access to ICT are widely recognized as an increasingly powerful obstacle to the economic, civic, and political development for Africa. Some donor agencies, such as USAID (United States Agency for International Development); AISI (African Information Society and Initiative); CC (Carnegie Corporation); and ITU (International Telecommunication Unions) have taken it up to support African countries in this regard (Hennessy *et al.*, 2010; and Sekyi, 2012).

S. Hennessy *et al*. (2010) noted that the proliferation of ICT is due to electronic boost in East Africa coupled with haphazard use of ICT, which resulted in governments and donor agencies formulating policies to streamline its use in schools (Hennessy *et al*., 2010). For instance, in 2000, G-8 (Eight Governments) Heads of states pledged to support ICT initiatives in developing counties, which research has shown could contribute to sustainable economic development, enhance public welfare as well as play a role in fostering international peace and stability (D'Souza *et al*., 2013; and Victor, 2013).

The group put in place measures to develop human resources by encouraging countries to invest much ICT literacy (Sekyi, 2012; and Prasad, Lalitha & Srikar, 2015). Similarly, OECD (Organization for Economic Cooperation and Development), UN (United Nations), and WB (World Bank) also supported the formulation of initiatives to develop ICT in poor countries (Kozma, 2008).

There are new developments happening in Africa in relations to the use of ICT in education. The speed with which ICT is developing and its impact on socio-economic activities cannot be overemphasized (Sekyi, 2012; and Kotnik & Hagsten, 2013). In 2003, report by World Bank noted that ICT is capable of improving effective delivery of resources to the vulnerable and pivotal in



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transferring the needed knowledge, which could help achieve MDGs (Millennium Development Goals). As a result, between 1996 to 2006, most poor nations developed ICT plans, particularly in 2000, 13 countries had national information and communication infrastructure policies, while 10 were in the process of implementing (cited in Opoku, 2004).

National policies and programmes can be an important tool for the realization of ICTs (Information and Communication Technologies). Ghana has made significant strides putting in place measures to foster the usage of ICT in the education sector. Ghana was the first country to open-up its telecommunication sector, which has resulted in tremendous development in distribution of ICT infrastructure. The current polices of ICT usage in education instituted by the government of Ghana centered on using ICT to make enormous contribution into the economy (*cf* Akyeampong, 2010; Sekyi, 2012; and Tamakloe, 2014).

However, studies have demonstrated that the integration of ICT into basic schools faces numerous fundamental challenges, despite the recognition of the value of ICT in education. These challenges have, therefore, seen few educational facilities to integrate ICT education. These challenges have been categorized differently by different writers. Example of such writers is D. D'Souza *et al*. (2013), who categorized the challenges to ICT education into extrinsic and intrinsic barriers (D'Souza *et al*., 2013).

A study by W.J. Pelgrum (2001) also presented the barriers to successful ICT education into two circumstances characterized by material and non-material condition (Pelgrum, 2001). Material condition pertain the availability of materials like computers and important software; whereas non-material challenges include the knowledge, skills, and time of the teachers to facilitate the teaching process (*cf* Pelgrum, 2001; Bingimlas, 2009; D'Souza *et al*., 2013; and Victor, 2013).

Other studies by Acquah B.Y.S. Sekyi (2012) and A. Tamakloe (2014) categorization of the challenges was based on content characteristics, user characteristics, technological considerations, and organizational capacity (Sekyi, 2012; and Tamakloe, 2014). According to A. Balanskat, R. Blamire & S. Kefala (2006), the challenges could be categorized base on teacher-level, school-level, and system-level (Balanskat, Blamire & Kefala, 2006).

The teacher level factors consider the knowledge and skills of the ICT teachers. The school level also considers the available infrastructure to be used and the ICT equipment available. The system level factors consider the educational system and assessment (*cf* Balanskat, Blamire & Kefala, 2006; Akyeampong, 2010; Sekyi, 2012; and D'Souza *et al*., 2013). This study would follow the perspective of the teacher level, school level, and the system level.

Successive governments in Ghana has recognized the importance of ICT education, which led to the formulation of policies and programmes geared towards making ICT education accessible to all students, especially at the basic level (Sekyi, 2012). However, these efforts have proven futile as access to ICT in both teaching and learning in basic schools has been elusive. The lack of access to this equipment might hamper the drive towards achieving socio-economic development associated with ICT education and denying students the chance to be part of this technological age.

Interestingly, researchers in the field of ICT education in Ghana and virtually most developing countries tend to pay attention to only the challenges without focusing much on the resources that has been provided for teaching in the various schools. Therefore, this study will provide information on this phenomenon by throwing more light efforts at enhancing ICT education in Atwima Nwabiagya District of Ashanti region. In addition, the study will serve as a reference point for policy makers and other organization involve in making ICT accessible to students.

## MATERIALS AND METHODS

***Study Design and Type.*** This study employed case study design to examine


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ICT (Information and Communication Technology) policy, implementation, and outcomes within Atwima Nwabiagya District in Ghana. The primary purpose of a case study is to understand something that is unique to an identified case (Yin, 2009; and Creswell, 2013). The study employed both quantitative and qualitative methods of data collections.

Case study design enabled the researchers chance to study a phenomenon in details and provide objectivity within the limited time frame. This is in line with the view of E.C. Osuala (2005) that a case study will enable the researcher to collect data from and within a geographical boundary to produce an understanding of the study subject (Osuala, 2005). Therefore, case study provides an opportunity to study a phenomenon within a geographical boundary and the chances are that; there are other similar cases elsewhere, but the researchers limit the study to a specified place for the purpose of the study.

***Study Area and Population.*** Atwima Nwabiagya is among the 27 districts in the Ashanti region of Ghana. It is one of the biggest districts in the region and it shares boundary to South with Kumasi Metropolis, West to Ahafo Ano South, and Offinso Municipal to the North. The Atwima Nwabiagya has been chosen for the study, because it was logically convenient to conduct the study within the district due to proximity.

Also, the researchers were very familiar with the terrain in the district, which made it much easier to access than other destinations. Therefore, since the research study was expected to be completed within a specific time frame, limiting the study to the Atwima Nwabiagya district was appropriate. Also, the target population would consist of teachers and students in the selected schools within the district.

***Data Collection Sources.*** Data for this study was obtained from primary and secondary sources. Data was sought from these sources as and when the researchers deem it prudent. Primary data for this study was gathered from the responses that were obtained from participants of the study. Secondary data was derived from published and unpublished reports, books, and relevant articles. They were obtained from libraries of KNUST (Kwame Nkrumah University of Science and Technology), Ministry of Education, journals, the internet, and other sources.

***Sampling and Sampling Technique.*** In conducting research, it is at times not possible or too costly to collect data from all potential respondents. Hence, a smaller number of units (sample) are chosen to represent the whole population. This study employed different sampling methods, due to the multi-level participants. First, a purposive sampling was used to select schools within the district. With regard to purposive sampling, the researchers employed own expert judgment about who to include in the sample frame, which is based on appropriate characteristics required from sample member (Babbie, 2013).

In addition, M. David & C.D. Sutton (2004) added that the units are selected according to the researchers own knowledge and opinion about which ones they think will be appropriate to the topic area (David & Sutton, 2004). Therefore, the researchers selected the sample on the basis of their suitability and purpose of the study. In line with this, teachers and headmasters within the selected schools in the district were enrolled in the study.

Also, the study used simple random sampling to recruit students within selected schools in the district to be part of the study. A simple random sampling is a technique that gives individuals in the population an independent and equal chance of being selected from the sampling frame in the study population (Onwuegbuzie & Collins, 2007). This would ensure that all prospective participants have equal chance of being selected to enroll in this study. In all, a total of 32 teachers and headmasters (eight each were selected from four schools in each town) as well as 480 students (30 from each of the four selected schools; thus, 120 students were selected from each town). Therefore, a total of 512 participants were recruited for the study.



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***Data Collection Techniques and Tools.*** The study adopted both qualitative and quantitative method of data collection. Hence, both semi-structured interviews and structured questionnaires were used in the data collections (Creswell, 2013). Teachers and headmasters were interviewed, which were recorded with their permission.

The administration of the instruments was based on variables under the objective of the study. This allowed them to share their opinion and knowledge about the ICT (Information and Communication Technology) policy being practiced in order for them to give thorough assessment about the policy. It allowed participants to share their views on the ICT policy, the performance of students as well as the resources available for them to use to teach in their respective schools. In the same way, students were guided to fill out questionnaires given to those selected to be part of the study.

***Data Management and Analysis.*** All field data were kept confidential. Therefore, the filled questionnaires were kept under locked by the researchers at each day of data collection. Only the researchers had access to the data. Again, the researchers checked all forms to ensure completeness and consistency prior to submission for data entry. Double data entries and analysis was done using SPSS (Statistical Package for Social Sciences) Software 20, which made the data entry quick than manual process and reduced human errors.

Result of the analysis was generated using descriptive and analytical statistics. Data were summarized in the form of frequency and percentage for categorical variables. Means, minimum, maximum, and standard deviation were also used to summarize variables.

The recorded data were transcribed verbatim by the researchers, since the participants spoke mainly in English language. The researchers read through the final transcripts to make sense of the data. During the readings, concepts and statements that are related to the objectives of the study were marked out and labeled using alphabets. Similar concepts and statements were given the same alphabetical codes. Based on the codes, concepts and statements that are similar were put together to form the main themes. These themes formed the main sections of the final report.

***Ethical Consideration.*** The researchers observed ethical issues while at the field, by moving with a letter of introduction to avoid suspicions, built relationships with the interviewees, and dressed to suit the nature of participants. The researchers also respected the cultural values of the participants throughout the research process. The volunteers at the various schools were pleased, because the researchers addressed them politely and explained the need for them to be part of the study.

## FINDINGS

***Characteristics of Participants.*** Both teachers and students from selected schools in the district participated in the study. Table 1 and table 2 summarized the demographic characteristics of study participants. Participants of the study, that is ICT (Information and Communication Technology) teachers and headmasters, were recruited equally (25% each) from four schools in four towns within the district. In each of the towns, four basic schools were selected and two participants each, headmasters (50%) and ICT teachers (50%) were recruited to be part of the study. Also, over 60% of participants were males.

On age, it was found that most participants were between 26-30 years compared to less than 10% who were between 46-50 years. The mean age of participants was 32.2 years. In terms of rank, most participants were ranked as Principal Superintendents (40.6%) based on Ghana Education Service ranking system; while 21.9% were Senior Superintendent II.

On working experience, half of the participants had worked between 1-5 years compared to 12.5% who had worked between 6-10 years. In relations to qualification, over 50% of participants have Diploma degree; while less than 20% had obtained their Master's degree.


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**Table 1:**
Characteristics of Teachers' Participants

| Category | Number of Participants | Percentage (%) |
|---|---|---|
| ***Study Area:*** | | |
| Abuakwa | 8 | 25 |
| Asoromanso | 8 | 25 |
| Nkawie | 8 | 25 |
| Sepaase | 8 | 25 |
| **Total** | **32** | **100** |
| ***Rank:*** | | |
| Assistant Director | 9 | 28.1 |
| Principal Superintendent | 13 | 40.6 |
| Senior Superintendent I | 3 | 9.4 |
| Senior Superintendent II | 7 | 21.9 |
| **Total** | **32** | **100** |
| ***Age:*** | | |
| 21 – 25 | **7** | **21.9** |
| 26 – 30 | **10** | **31.3** |
| 31 – 35 | **6** | **18.8** |
| 36 – 40 | **2** | **6.3** |
| 41 – 45 | **4** | **12.5** |
| 46 – 50 | **3** | **9.4** |
| **Mean age** | **32.3** | |
| **Total** | **32** | **100** |
| ***Qualification:*** | | |
| Master's Degree | 5 | 15.6 |
| Bachelor Degree | 10 | 31.3 |
| Diploma | 17 | 53.1 |
| **Total** | **32** | **100** |
| ***Sex:*** | | |
| Male | 20 | 62.5 |
| Female | 12 | 37.5 |
| **Total** | **32** | **100** |
| ***Years of Teaching:*** | | |
| 1 – 5 | 16 | 50 |
| 6 – 10 | 4 | 12.5 |
| 11 – 15 | 12 | 37.5 |
| **Total** | **32** | **100** |

***Source:*** Field Data (2015).

Table 2 presents the background information of students enrolled in the study. It is important to mention that the students were selected equally from their respective schools and towns. For instance, in all four towns in the district, 120 (25%), that is 30 students were selected from each of the schools. Out of the 480 students sampled, 69.2% were between 14 – 16 years; while 5.4% were above 16 years. The average age was 14 years.

On sex, 54% were males compared to 46% who were females. At least, one third of the students came from various class: JHS (Junior High School) 1, JHS 2, and JHS 3. On the average, the students had approximately 6 years knowledge on ICT (Information and Communication Technology) through coursework. However, most students had learned it for 7 years and more. See table 2.

***Teachers' Perspective on Resources.*** This section discusses resources available for the teaching of ICT (Information and Communication Technology) in schools. The participants conceptualize that there are limited resources and materials for teaching



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**Table 2:**
Percentage Distribution of Background Characteristics of Students

| Variable | Frequency | Percentage |
|---|---|---|
| ***Students from Each Area*:** | | |
| Abuakwa | 120 | 25 |
| Asoromanso | 120 | 25 |
| Nkwawie | 120 | 25 |
| Sepaase | 120 | 25 |
| **Total** | **480** | **100** |
| ***Age:*** | | |
| 11 – 13 | 122 | 25.4 |
| 14 – 16 | 332 | 69.2 |
| 17 - 19 | 26 | 5.4 |
| **Total** | **480** | **100** |
| **Mean (SD); Min/Max** | **14.40 (1.11); 11/19** | |
| ***Sex:*** | | |
| Male | 259 | 54 |
| Female | 221 | 46 |
| **Total** | **480** | **100** |
| ***Class Level:*** | | |
| JHS (Junior High School) 1 | 172 | 35.8 |
| JHS (Junior High School) 2 | 143 | 29.8 |
| JHS (Junior High School) 3 | 165 | 34.4 |
| **Total** | **480** | **100** |
| ***Years of Learning ICT course*:** | | |
| 1 – 3 | 116 | 24.2 |
| 4 – 6 | 105 | 21.8 |
| 7 – 9 | 259 | 54.0 |
| **Total** | **480** | **100** |
| **Mean (SD); Min/Max** | **5.9 (2.41); 1/9** | |

***Source***: Field Data (2015).

ICT in the various school. Participants again mentioned the source of computers used for teaching.

According to the teachers, the computers for teaching ICT do not come from the government. However, the sources are through donor agencies and funds mobilized from students. The teachers related that the schools solicit funds and liaise with private computer providers to supply them with computers (interview with Teacher I, 28/1/2015; and interview with Teacher II, 5/2/2015).

The quotations below highlight how some headmasters and teacher commented on the available resources:

> *It's unfortunate that we've not received materials from the government as to the teaching of ICT, but the school has been able to liaise with other computer providers to establish a computer lab in the school. Most of the computers are not functioning well, because of lack of money to repair them. In fact, we teach them in the class, but we manage to use our laptops to help them understand the practical. It is unfortunate that we didn't receive some of the ICT laptop shared by the government* (interview with Headmaster III, 13/2/2015).

> *We mobilize resources from the students to purchase computers to help in the teaching of ICT. First, we informed the PTA the need to get computers to support the teaching. We, therefore, agreed on an amount to be paid by each student, particularly when the person is being admitted the first time into the school. Currently, our major challenge is how to get funds to repair the computers that are not working* (interview with Headmaster VI, 10/3/2015).

> *We have computers over here, but they were not provided by the government. The school solicited its own funds to buy the computers. It's not that appropriate, but we can't teach the students without the computers; so, the only option was to find ways of raising funds from students to make provisions for the computers* (interview with Teacher II, 5/2/2015).

Some of the participants further related that due to the limited computers for


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**Table 3:**
Percentage Distribution of Available Resources and Materials for Successful ICT Education Policy

| Variable | Frequency | Percentage |
|---|---|---|
| ***Currently having enough materials for ICT learning:*** | | |
| Yes. | 133 | 27.7 |
| No. | 347 | 72.3 |
| ***ICT materials lacked by the school:*** | | |
| Limited computers. | 229 | 47.7 |
| Limited software (Microsoft package, paint). | 53 | 11.0 |
| No internet access. | 116 | 24.2 |
| Computers without peripherals. | 82 | 17.1 |
| ***Person responsible for teaching ICT:*** | | |
| Classroom ICT teacher. | 439 | 91.5 |
| ICT lab instructor. | 9 | 1.9 |
| A teacher responsible for all courses. | 32 | 6.7 |
| ***Availability of ICT laboratory for practical after teaching:*** | | |
| Yes. | 17 | 3.9 |
| No. | 463 | 96.1 |
| ***Enough time to do practical after teaching:*** | | |
| Yes. | 72 | 17.2 |
| No. | 347 | 82.8 |
| ***Barrier in accessing the ICT laboratory:*** | | |
| Yes. | 400 | 83.3 |
| No. | 80 | 16.7 |
| ***Type of barrier faced when accessing laboratory:*** | | |
| Small laboratory size. | 45 | 9.3 |
| Limited computers at the laboratory. | 230 | 47.9 |
| Limited time allocated to class. | 79 | 16.5 |
| Other. | 126 | 26.25 |

***Source***: Field Data (2015).

teaching students, they are compel to use their own laptop to do most of the practicals when teaching in the classroom. One of the participants narrated the teaching method used under this circumstance:

> *There are no computers, so sometimes I bring my laptop to classroom to teach the students. Particularly, I call them individually and give them my laptop to practice. I also group and give the laptop to them to use, when we are doing practicals* (interview with Teacher VII, 8/3/2015).

The participants again commented that teaching of ICT (Information and Communication Technology) under circumstance, whereby there are no resources will not help in achieving a desired outcome. Therefore, something has to be done about the current state of resources in schools. These quotations summarize the views of participants:

> *I think that the country [Ghana] cannot achieve its ICT target, if measures are not taken to make provisions for ICT materials for teaching. This is because teaching without necessary materials, facilities, and infrastructure will obstruct the process. It is, therefore, important that the Government comes to our aid to make provisions* (interview with Headmaster I, 11/2/2015).

> *We have people to teach, but the facilities are not there. Here is not a village, but we don't have the facilities; so, what about those in remote places. I think Ghana is not prepared, in terms of personnel we are prepared, but in terms of infrastructure and resources we are not* (interview with Headmaster V, 11/3/2015).

With this, it will be difficult for teachers to pass on the needed knowledge and skills to students, due to the limited facilities available for them to use in teaching.

***Students' Perspective on Teaching and Learning Materials.*** The available resources and materials for successful ICT (Information and Communication Technology) teaching and learning were explored by students. As shown in table 3, majority of students (91.5%) indicated



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that persons responsible for teaching ICT were a general classroom teacher; while 1.9% mentioned having an ICT laboratory instructor. The study again found that most students were not currently having enough materials for ICT learning. Among the materials lacked by students were mostly limited computers and software, no internet access and computers without peripherals. See table 3.

On ICT (Information and Communication Technology) laboratory, majority of the students (96.1%) revealed the non-availability of laboratories for practicals after teaching; and 82.8% perceived that there is not enough time for them to do practicals after teaching. The students' further suggested that they indeed faced barriers when accessing the laboratories.

Example of such barriers faced by students were mostly limited computers at the laboratories (47.9%); limited time allocated to class (16.25%); and small laboratory size (9.3%). Other 35.7% of the students experienced barriers, including large class size and non-functioning computers. On the period allocated to ICT syllabus per week, the maximum periods were four whiles the lowest was one period. However, most (74.9%) students revealed they have two periods which last for 60 minutes.

The assertion by students confirm that it will be very challenging for them to learn under such condition, due to the numerous challenges they encounter in learning of ICT in their respective schools.

## DISCUSSION

The study examined resources and learning materials available in the selected schools for teaching of ICT (Information and Communication Technology). The study found that there are limited resources and materials for teaching ICT in the various schools. The study again found that most schools were not currently having enough materials for ICT learning. Among the materials lacked by students were mostly limited computers, no internet access, and computers without peripherals.

This finding implies that the schools might not have the necessary materials to support the effective ICT policy within the schools. The finding corroborates with previous study results, where limited materials were found as a major barrier to successful ICT education policy among students (Pelgrum, 2001; Bingimlas, 2009; Hennessy *et al*., 2010; and Sekyi, 2012).

The availability of computers with necessary peripherals is critical, when one wants to achieve a successful ICT education policy (MoE of Ghana, 2013; and Tamakloe, 2014). The finding implies that the lack of internet access might have a detrimental effect as the internet will further help students to get more insight into the concept of ICT. It was also realized that most computers for teaching ICT do not come from the government, but rather the schools solicit funds and liaise with private computer providers to supply them with computers.

Interestingly, due to the limited computers for teaching students, teachers are compelled to use their own laptops to do most of the practicals, when teaching in the classrooms. This finding corroborates with studies by S. Hennessy *et al*. (2010); E.J. Kipsoi, J.K. Chang'ach & H.C. Sang (2012); R.S. Prasadh (2013); and S.R. Victor (2013) posited that the lack of resources and materials for teaching hugely affect the ability of teachers to deliver or pass on the necessary skills for their respective students (Hennessy *et al*., 2010; Kipsoi, Chang'ach & Sang, 2012; Prasadh, 2013; and Victor, 2013). The study found that teaching of ICT under circumstance, whereby there are no resources will not help in achieving a desired outcome.

On ICT laboratory, the study revealed the non-availability of laboratories for practicals after teaching. The limited resources might be as a result of the government's inability to provide materials for teaching and learning ICT, despite the introduction of the policy. The limited resources were confirmed by teachers, when they commented on the source of their materials used for teaching (interview with Teacher I, 28/1/2015; and interview with Teacher II, 5/2/2015).

The study found that most schools have not received resources from the government


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to support the teaching and learning of ICT. This finding suggests that the government has failed to lead the frontier to provide resources to most schools in the district in order to achieve the targets of the ICT policy. These problems relating to limited resources and materials for teaching ICT was shared by the teachers and headmasters in their interview, when they expressed that this has not supported the policy to achieve its target (interview with Headmaster I, 11/2/2015; interview with Headmaster V, 11/3/2015; interview with Teacher I, 28/1/2015; and interview with Teacher II, 5/2/2015).

This finding agrees with studies by L. Almendarez (2011); G. Amanortsu, M.D. Dzandu & N.Y. Asabere (2013); J. O'Dowd (2013); and MoE of Ghana (2013). According to these studies, the lack of commitment from the government affects that ability of ICT policy to succeed in most countries (Almendarez, 2011; Amanortsu, Dzandu & Asabere, 2013; MoE of Ghana, 2013; and O'Dowd, 2013).

## CONCLUSION [1]

The study documented available resources and materials for teaching and learning of ICT (Information and Communication Technology) in basic schools in Atwima Nwabiagya District in Ashanti Region in Ghana. The findings reveal a worrisome situation for ICT policy implementation and outcome. It is evident from the findings that the access to computers and computer laboratories are limited for students. Other facilities like internet were not available in almost all schools.

Considering this factor, it is likely that most students are left out of practical after teaching. The findings established that the limited facilities were as a result of lack of commitment from government. There is the need for practical measures to be put in place to help arrest the situation to enable the policy achieve its goals.

Firstly, there is the need for governmental commitment towards the implementation of the policy, so as to achieve the objectives. Lack of political will manifested in the insufficient and lack of computers and laboratories in schools for practicals as revealed by the study. The study disclosed that the ICT materials lacked by the schools have a significant relationship with the difficulty of students understanding and following the ICT subject. Resources and materials availability for successful ICT education policy is difficult to come by as the government responsible for its provision has not been performing its role. Therefore, government should provide enough equipment needed by schools. Supplying of computers to schools should not be a one time show, but should be sustained. Moreover, government should consider building computer laboratories in schools and ensure that they are well furnished.

Secondly, it is important that corporate bodies take upon themselves in providing some of these resources to schools in order to augment the effort of government. The government is short-hand to some extent, so it will be ideal for multinational companies and private individuals to support schools with the needed ICT materials and resources.

Finally, also Ghana Education Service should perform their role as a major stakeholder of the policy implementation. In the first place, effective supervision of the programme is important in ensuring that teachers perform their role to satisfaction. They should coordinate with the government by sharing their experiences in terms of challenges teachers encounter in the teaching of ICT in schools. It is believed that should these policies be institutionalized, the teaching and learning of ICT in schools will be consolidated in the education system of Ghana.[2]

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[2]***Declaration:*** This is to certify that the manuscript is an original work by us based on our research. We have duly acknowledged the work(s) of others we used in writing this article/manuscript. We have duly cited all such work(s) in the text as well in the list of the References and that we have presented within quotes all the original sentences and phrases, etc. taken from the sources, which we have consulted in writing this article/manuscript. It does not breach, in any way, copyright; and if any study is cited within the text, it



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