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Assessing the Integration of ICT Resources in Teaching and Learning in Selected

Senior Secondary Schools in Cape Coast Metropolis

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Abstract

Despite the effort Government and other stakeholders are making to support Ghanaian senior high schools in information and communication technology (ICT), most of the schools are teaching ICT as an isolated subject rather than integrating the ICT resources into the educational curriculum to improve teaching and learning. The objective of the study was to assess the integration of ICT resources in teaching and learning in senior secondary schools in the Cape Coast metropolis. A total of 270 respondents took part in the survey. Five senior secondary schools were selected. This comprised of teachers and students. Random sampling was used to select the respondents and questionnaires were the instruments used for the survey. The Data were analyzed using SPSS version 21.0 software to produce frequencies and percentages. Result of the analysis indicated that teachers who had background knowledge in ICT were the ones who used it in their lesson delivery, also students were interested in using ICT in their learning but could not so due to lack of access to the facility in their various schools. This was as a result of inadequacy, or absence of the technology. The study recommended to Government and other stake holders to come to the aid of Senior Secondary Schools to provide ICT infrastructure for these schools, and make them available to students. It was also recommended that ICT training should be organized for teachers to facilitate the smooth integration of ICT into the school curriculum.

Background to the Study

Information and communication technology (ICT) has become an important part of most organizations and businesses (Zhang & Aikman, 2007). Natale and Lubniewski (2018) were of the view that technologies have the potential to support education across the curriculum and provide opportunities for effective communication between teachers and students. It has been argued by Kozma (2015), that ICT is a principal driver of effective teaching delivery, economic development and social change worldwide.

In many countries like Singapore, Malaysia, Thailand and Indonesia, the need for economic and social development is used to justify investments in educational reforms and in educational ICT (Tullao, Borromeo & Cabuay, 2015). Another argument to this effect is by Roztocki, Soja and Weistroffer (2019), who commented that ICT plays a major role in all aspects of national life, such as in politics, in economics, as well as in social and cultural development. They further argued that ICT is transforming the way people do business, access information and services communicate with each other and even entertain themselves.

The role of technology in teaching and learning is rapidly becoming one of the most important and widely discussed issues in contemporary education policy (Thierer, 2014). Most experts in the field of education agree that, when properly used, information and communication technology hold great promise to improve

teaching and learning in addition to shaping workforce opportunities (Robbins, 2008; Teye, 2012).

In Africa, concerted efforts have been made by many governments to initiate Internet connectivity and technology training programmes (Carlson & Firpo, 2011). Such programmes link schools around the world in order to improve education in this global era. The developments and exploitation of ICT in schools in Ghana has had an operational history that is just over a decade old (Dankwa, 2007). Although at the beginning, there had been several efforts at developing ICT in schools, there had not been any defined policy direction for ICT in education as to what specifically was needed to be achieved and the strategy for it (Teye, 2012). In the process, several initiatives on ICT in education were started by different interest groups to meet different needs (Dankwa, 2007).

As at now, the use of ICT is becoming more persuasive in Ghana and the number of computers for educational purposes in our institutions is growing. It is on these premises that the Government of Ghana is committed to the transformation of the economy in addition to the agro based economy of Ghana into an information-rich and knowledge-based economy and society using the tools of ICT.

The Government of Ghana has acknowledged the need for ICT training and education in the schools, colleges and universities and the improvement of the education system as a whole. The development of ICT in education will result in the creation of new possibilities for learners and teachers (Teye, 2012). ICT will also enhance access to education and improve the quality of education delivery on

equitable basis. Hence, the Government's commitment to a comprehensive programme of rapid development and utilization of ICT within the education sector to transform the education system. It is the desire of Ghana Government that, through the development of ICT, the traditional-based learning will be transformed to education that stimulates thinking and creativity (Teye, 2012).

In a statement on the government's policy on ICT (Ministerial ICT Policy Statement 2005), the Minister for Communication acknowledged that the information and technology age has provided opportunities for Ghana to mitigate the problems of decade-long stagnation and poor economic performance. He explained further that the Ghanaian Ministry of Education, Science and Sports has teamed up with the Ministry of Communication and the Intel World Ahead Programme to set up the local Ghanaian version of the Intel worldwide digital education content platform (currently operating in South Africa and Nigeria). The objective of this initiative is to provide an integrated platform for science and mathematics education.

The integrated platform also aids students with curriculum-focused multimedia learning, offering open-ended learning tools to help them explore wider concepts and providing valuable exam-focused resources for their preparation for state examinations (eLearning Africa News portal, 2009). The Computers for Africa Schools Project has equipped schools in Ghana with networked laboratories containing a total of 50 refurbished desktop computers and Internet connectivity. The facility has enabled students to learn basic computer hardware and software technologies, keyboarding, Internet and e-mail usage.

Today, computers perform a host of functions in teaching and learning as many nations are adding computer literacy, reading and writing literacy as skills students will need for succeeding in a technologically driven world (Thomas & Kobayashi, 2014). At the instructional level, ICT tools are used by students to learn reading, mathematics, social studies, art, music, simulation and health practices. All over the world, almost all governments strive to develop a general strategy for ICT and also produce strategies for teaching and learning. Today, ICT has, however, assumed a very important role in education and society at large. ICT use in education has constantly been reviewed in countless researches with most recommendations from such researches encouraging its use as well as further researches into specific areas of education (Ahiatrogah & Barfi, 2016).

However, going round most secondary schools in Cape Coast have revealed that there are not enough training opportunities for teachers in the use of ICT in the classroom environment. In the Cape Coast Metropolis, where the study is set, ICT equipment needed to enhance quality teaching and learning delivery pose another challenge; laptops, desktop computers, projectors, scanners, among others, are still expensive even though prices keep on reducing on the global computer-device market. Students are the worst hit victims in this area.

In spite of the various strategies and policies put in place by the Government of Ghana, one ought to give a serious consideration to factors capable of militating against the integration of ICT resources in teaching and learning in the senior high schools. This call for concern and the need to probe further through research, especially now that ICT has been made a core subject at

the senior high school (SHS) level (MoE, 2015). Therefore, this research seeks to find out the level of integration of ICT resources in teaching and learning in five selected senior high schools (SHSs) in the Cape Coast Metropolis.

More specifically, the main objectives of the research are to:

i. Determine ICT resources available for use by students and teachers in the teaching and learning environment at Cape Coast Metropolis.

ii. Determine the attitudes of senior high school teachers and students when technology is used in lessons at Cape Coast Metropolis.

iii. Identify the key effects of ICT use on teaching and learning at Cape Coast Metropolis.

iv. Examine the major obstacles militating against the use of ICT in teaching and learning at Cape Coast Metropolis.

The following hypotheses were formulated to be tested:

H_0: There is no statistically significant association between the availability and usage of ICT resources both teachers and students.

H_0: There is no statistically significant association between senior high school teachers' attitudes towards the use of ICT resources.

H_0: There is no statistically significant association between senior high school students' attitude towards the use of ICT and the usage of ICT resources in learning.

Theoretical Framework

The study is underpinned by Kelmans' (1961) Compliance Theory, which states that an individual accepts influence from another person or group because

he or she hopes to achieve a favourable reaction from them. The characteristics of compliance is that opinions are only expressed when the person's attitude is observable by the influencing agent who has the means-control and who is seen as limiting the choice of behaviour. The subject is concerned with the attitude of teachers and students towards technology use in teaching and learning.

ICT Resources available for Teaching and Learning

ICT resources are tools that can be used to support teaching and learning. In this study, the types of tools that support the teaching and learning of ICT in various schools was considered. The use of ICT resources in teaching encourages students to learn.

According to Ghavifek, Kunjappan, Ramasamy and Anthony (2016), ICT resources in education mean teaching and learning using ICT tools. Educational ICT tools or resources are divided into three categories namely: input resources, output devices and others. Input sources include such things as personal computers (PCs), tablets, applications software, student response systems, visualizer or document camera. Output resources/devices refer to such devices as projector, interactive boards, monitors, display, and television. Others include digital camera, digital recorders, switchers and other technologies. The use of ICT tools can lead to improved student learning and better teaching methods with better resources. The resources include laboratories in schools, internet, computer facilities for teachers.

Davis and Tearle (2008) argue that ICT resources enhance learning when they engage students in active, interactive and collaborative learning. Lavonen

(2008) stresses that ICT resources provide teachers with wider choices of resources that facilitate planning and evaluating activities, as well as offer choice of tasks for students in the learning environment. He further adds that when this is done, it helps students feel close to peers.

One can use tools like simulations and 3D virtual worlds in immersive learning environments, to construct scenarios that mimic realistic situations, and allow individuals to train and practice their skills. Ofsted (2011) observes that learning analytics with the aim of improving student retention and providing high quality, personalized experience for learners can be achieved with the help of ICT resources.

The use of ICT resources in teaching can also support students with special needs. Demkanin (2008) indicates that the use of ICT resources enables students with special needs or difficulties to understand concepts of science subjects. Students also assume responsibilities when they use ICT to organize their work through digital portfolios or projects.

ICT resources for learning offer the possibility of acquiring knowledge, and understanding better procedures during the teaching and learning process. ICT resources offer various forms of work with content and activities work during the teaching and learning process. Eady and Lockyer (2010) argued that an integrated design of learning resources using ICT is an important part of the instructional process that helps achieve expected learning outcomes. Some ICT learning resources are repositories of educational resources, interactive tutorials, and web 2.0 tools.

Repositories of educational ICT resources offer a variety of teaching materials for learning (Eady & Lockyer, 2013). These can be repositories of learning objects composed of content units with activities and evaluation tests in helping students to understand contents in a subject area. Interactive lessons using ICT allow teachers to process guided presentations using text, graphics and audio (Eady & Lockyer, 2013).

Research Methods

The study seeks to look into assessing the integration of ICT resources in teaching and learning in selected Senior High Schools in Cape Coast Metropolis. Since the study entails a survey of teachers and students' views on the issues, the descriptive survey design was deemed the most appropriate research design. Descriptive research design involves systematic gathering of data about individuals in order to answer research questions (Ary, Jacobs, Razavieh & Sorensen, 2006). An advantage of a descriptive design is that it helps the researcher to collect data to enable him draw the relationship between variables in the study and analyze the data collected. It also helps to describe and document aspects of a situation as it naturally occurs in research (Ary et al., 2006).

However, the use of descriptive design in research is laborious and time-consuming method. It is susceptible to, or easily influenced by distortions through the introduction of biases in the measuring instruments, and so on. It is sometimes regarded as focusing too much on the individual level, neglecting the network of relations and institutions of societies.

Sampling per say is not a technique or procedure for getting information but it ensured that any technique used helped in getting information from a smaller group accurately represented the entire group (Teye, 2012). The sample for the research was chosen from senior high schools in Cape Coast Metropolis. The sampling procedure employed for the study was purposive sampling. Purposive sampling, according to Teddie and Tashaskkori (2003), involves selecting certain units or cases based on specific purposes rather than randomly. They further argued that purposive sampling is used in studies to gather in-depth information of participants to represent the target population.

In the view of Teddie and Tashaskkori (2003), purposive sampling is used to gather in-depth information of the participants to represent the target population. The researcher purposively selected St. Augustine College, Holy Child Senior High School, University Practice Senior High School, Christ the King Senior High School and Ghana National College. Moreover, 40 students and 20 teachers were purposively selected from each school. In all, 200 students and 100 teachers were purposively selected for the study.

Questionnaire was used as research instrument to collect data for the study. The questionnaire was self-made by the researchers. Sarantakos (2012) confirm the usefulness of questionnaires in terms of their simplicity, time used and easiness for a researcher to administer.

The reliability coefficient (Cronbach's alpha) informed the researchers as to whether the instrument is reliable or not. According to Kinash (2010), reliability coefficient of the instrument (questionnaire), measured in Cronbach's

alpha value, provides basis to measure the internal consistency and trustworthiness of the items on the instrument. The Cronbach's alpha test was run to determine their reliability of the questionnaire which gave figure of 0.79, which was a reliable value. The descriptive nature of the study made the researchers use descriptive statistical tools for the analysis of the data. Statistical tools like frequency distribution, percentages and cross tabulation were also be used to describe the variables. The analyzed data were interpreted in relation to the research questions.

Results and Discussion

Demographic Characteristics of Respondents

The demographic characteristics of the respondents helped in determining the extent to which the responses they provided could be depended upon. Out of 100 teachers and 200 students sampled for the study, 88 (88.0%) and 179 (89.5%) valid questionnaire was retrieved.

Table 1: Gender of respondents

Gender	Number of Teachers	Percent (%)	Number of Students	Percent (%)
Male	59	67.0	114	63.7
Female	29	33.0	65	36.3
Total	88	100.0	179	100.0

Out of 88 teachers selected for the study, 59 were males (67.0%) and 29 were females (33.0%). This indicates that most teachers who took part in the survey were males. Also out of 179 students who took part in the study, 114 were

males (63.7%) while 65 were females (36.3%). Therefore, majority of the students who took part in the survey were males.

Table 2: Age group of Students

Ages	Frequency	Percentage (%)
11 -15 years	21	11.7
16 -19 years	158	88.3
Total	179	100.0

The age group of students shown in Table 2 indicates that majority of the 179 students (88.3%) were in the 16-19-year group and just 11.7% of them aged between 11 and 15 years.

Table 3: Age group of teachers

Ages	Frequency	Percentage (%)
Under 25	1	1.1
26 -30	23	26.1
31-35	23	26.1
36-40	18	20.5
41-45	13	14.8
46-50	7	8.0
51-55	3	3.4
Total	88	100.0

Table 3 shows that the age groups of teachers who took part in the survey. Table 3 indicates that majority of the teachers were in the ages of 26 to 40 years.

Only one person aged below 25 years and 23 of them were above 40 years with just 3 in the 51-55-year group.

Table 4: Highest level of Education attained by teachers

Academic Qualification	Frequency	Percent
First Degree	60	68.2
Masters	28	31.8
Total	88	100.0

From Table 4, 60 (68.2%) teachers had first degrees as their highest level of education and 28 (31.8%) had masters degrees as their highest level of education. This therefore indicates that most teachers who took part in the survey were first-degree holders.

Table 5: Number of year's teachers had been teaching

Years	Frequency	Percentage (%)
1-5	19	21.6
6-10	40	45.5
11-15	14	15.9
Above 15	15	17.0
Total	88	100.0

From Table 5, most teachers (40) captured in the survey had been teaching for 6-10 years making up 45.5 %. Twenty-nine (32.9%) of them had at least 11 years of teaching experience while 21.9% had taught for one to five years. Thus,

majority of the teachers used in the study were experienced teaching their subjects.

Table 6: Level at which teachers studied ICT

Institution	Frequency	Percentage (%)
Training College	37	42.0
Polytechnic	4	4.5
University	39	44.3
None	8	9.1
Total	88	100.0

Table 6 presents the intuitions teachers attended. Most teachers, who took part in the survey, studied ICT at the university (44.3%) and training college (42.0%). Four studied ICT at the Polytechnic whereas the other (8) studied ICT studied the subject elsewhere.

Table 7: Class of students

Class	Frequency	Percentage (%)
SHS 3	96	53.6
SHS 2	83	46.4
Total	179	100.0

Table 7 presents the class of students used in this study. As shown in Table 7, out of the 179 students who took part in the survey, 96 were in SHS 3 comprising 53.6% whiles 83 (46.4%) were in SHS 2. Table 7 indicates that majority of the respondents were SHS 3 students.

Description of Main Results

Objective 1: Determine ICT resources available for use by students and teachers in the teaching-learning environment.

Table 8: Availability of ICT resources for use in teaching and learning

	Availability		Usage	
	Yes	No	Yes	No
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Personal Desktop/Laptop Computers	145 (81.0)	34 (19.0)	133 (74.3)	46 (25.7)
School Internet	116 (64.8)	63 (35.2)	71 (39.7)	108 (60.3)
Printer	137 (76.5)	42 (23.5)	54 (30.2)	125 (69.8)
Digital cameras	56 (31.3)	123 (68.7)	21 (11.7)	158 (88.3)
Technical support	95 (53.1)	84 (46.9)	77 (43.0)	102 (57.0)
Digital projectors	165 (92.2)	14 (7.8)	145 (81.0)	34 (19.0)
Adequate Classroom computers for students' use	48 (26.8)	131 (73.2)	43 (24.0)	136 (76.0)
Computers for students' use elsewhere (E.g. Computer lab)	136 (76.0)	43 (24.0)	129 (72.1)	50 (27.9)

Table 8 shows the ICT resources available for use in teaching and learning in the five selected senior high schools in the Cape Coast Metropolis. The analysis revealed that 81% and 74.3% of respondents, respectively, confirmed the availability and usage of personal computers (desktop and laptops). However, while 64.8% of respondents confirmed the availability of Internet in their schools,

60.3% claimed they did not use the Internet provided at school. Also, 76.5% indicated the availability of a printer, but only 69.8% claimed it is not available for use. As high as 76% of the students indicated that they rather used computers elsewhere, such places as computer laboratories, other than those provided in the classroom. This implies that there are ICT resources available in the SHSs for teaching and learning.

Hypothesis 1

H_0: There is no statistically significant association between the availability and usage of ICT resources for both teachers and students

Table 9: Chi-Square Test for Availability and Usage of ICT resources for both teachers and students

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	205.177	1	0.000
Number of Valid Cases	267		

Table 9 shows the Chi-Square test performed to ascertain the association between availability and usage of ICT resources for both teachers and students. The analysis showed that the value of the test statistic (Pearson Chi-Square) is 205.177 and the corresponding p-value of the test statistic is 0.000 (p = 0.000). Since the p-value is less than alpha level ($\alpha = 0.05$), the null hypothesis was rejected that there is no statistically significant association of the availability and usage of ICT resources for both teachers and students. This indicates that the usage of ICT resources depends on their availability. According to Apagu and Wakili (2015), inadequate availability of ICT resources in secondary schools

leads to a low level of exposure to the use of ICT resources. Therefore, to encourage the use of ICT facilities for teaching-learning activities, these facilities should be made available for both teachers and students to use.

Objective 2: Determine the attitude of senior high school teachers towards the use of ICT resources in teaching and learning

Table 10: SHS teachers' attitude towards ICT use in teaching and learning

	Yes Freq. (%)	No Freq. (%)
I am comfortable using ICT resources in the teaching-learning process	71 (80.7)	17 (19.3)
I enjoy using educational technology	77 (87.5)	11 (12.5)
Learning about educational technology and using them is a waste of time	19 (21.6)	69 (78.4)
I use ICT resources while teaching	73 (83.0)	15 (17.0)
I won't have anything to do with ICT	15 (17.0)	73 (83.0)
I think class time is too limited for educational technology use	9 (10.2)	79 (89.8)
Educational technology use suits my students' learning preferences and their level of educational technology knowledge	79 (89.8)	9 (10.2)
The state of ICT facilities discourages me from using ICT	70 (79.5)	18 (20.5)

In psychology, Hogg and Vaughan (2005) have argued that an attitude is a belief and behavioral tendencies towards an events. In Table 10, the attitudes of teachers towards the use of ICT resources in teaching are presented. Seventy one (80.7%) of teachers felt comfortable using ICT resources in teaching and learning process. Sixty nine (78.4%) maintained that learning about educational technology and using it is not a waste of time. This may be due to their experience with the use of computers as Kafyulilo, Fisser and Voogt (2016) has indicated that teachers' level of experience with computers is one of the factors that enhance teachers' usage of ICT. Only 17% of teachers said they didn't use ICT resources in teaching and that they wouldn't have anything to do with ICT. Similarly, 10.2% of the teachers were of the view that class time was too limited for educational technology use, whiles majority of them 89.8% were of the view that educational technology use suited their students learning preferences. The state of ICT facilities discouraged 79.5% of the teachers from using ICT; thus, there is a positive relationship between the state of ICT and its use.

Hypothesis 2

H_0: There is no statistically significant association between SHS teachers' attitudes towards the use of ICT resources.

Table 11: Chi-Square Tests on SHS teachers' attitude towards the use of ICT resources in teaching

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.879	3	0.031
N of Valid Cases	88		

Table 11 shows the Chi-square test performed to determine the association between SHS teachers attitude towards the use of ICT resources. The value of the test statistic (Pearson Chi-Square) is 8.879 and the corresponding p-value of the test statistic is 0.031 (p = 0.031). Since the p-value is lesser than alpha level (α = 0.05), the null hypothesis was rejected. Therefore, there is a statistical significant association between SHS teachers' attitude and the use of ICT resources.

Objective 2: Determine the attitudes of senior high school students towards the use of ICT resources in teaching and learning

Table 12: Attitudes of students towards the integration of ICT on teaching and learning

	Yes	No
	Freq. (%)	Freq. (%)
I enjoy using the computer	167 (93.3)	12 (6.7)
I think it takes a long time when I use a computer	43 (24.0)	136 (76.0)
I focus much on the computer when I use one	166 (92.7)	13 (7.3)
I know computers give me the chance to learn many new things	171 (95.5)	8 (4.5)
The state of facilities discourages me from using ICT	165 (92.2)	14 (7.8)

From Table 12, 93.3% of the students enjoyed using computers, whiles 6.7% of them did not. Again, 92.7% of the students testified that they focused

much on the computer when they use it. This finding is in agreement with Meerza and Beauchamp (2017), who reported that students have positive attitudes towards the use of ICT in their learning.

Majority of the students (95.5%) indicated that the computer offered them the opportunity to learn new things. The state of ICT facilities also discouraged students (92.2%) from using computers. Students indicated that, broken down computers and slow Internet among other things discouraged them from using ICT facilities in learning.

Hypothesis 3

H_0: There is no statistically significant association between SHS students' attitude towards the use of ICT and the usage of ICT resources in learning.

Table 13: Chi-Square Tests on SHS students' attitude towards the use of ICT resources in learning

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.449[a]	1	0.020
Number of Valid Cases	179		

Table 13 shows the Chi-Square test performed to determine the association between SHS students' attitude towards the use of ICT resources in learning. The value of the test statistic (Pearson Chi-Square) was 5.449 and the corresponding p-value of the test statistic was 0.020 (p = 0.020). Since the p-value was less than alpha level (α = 0.05), the null hypothesis was therefore rejected. This indicated that there was statistically significant (p < 0.05) association

between SHS students' attitude towards the use of ICT resources in their learning and usage of these facilities in learning. Hence, a positive attitude towards usage of ICT in learning promotes the use of ICT facilities in learning. This finding supports the assertions by Ghavifekr and Rosdy (2015) that students have positive attitudes towards the use of ICT in their learning activities. Sanga, Makwinya, Kitindi, Kibirige and Bara (2015) have argued that students' positive attitude towards ICT is due to the fact that the use of ICT improves the quality of learning process.

Objective 3: Identification of the key effects of ICT use on teaching and learning

Table 14: Effects of ICT use in teaching and learning

	SA Freq. (%)	A Freq. (%)	D Freq. (%)	SD Freq. (%)
Students feel more involved in the lesson	33 (37.5)	43(48.9)	7 (8.0)	5 (5.7)
Educational technology motivates students to do more study	31 (35.2)	45(51.1)	7 (8.0)	5 (5.7)
Promotes students' learning and improves students' performance	33 (44.3)	37(42.0)	5 (5.7)	7 (8.0)
It makes the subject matter more interesting	36 (40.9)	38(43.2)	6 (6.8)	8 (9.1)
Provision of a better learning experience	46 (52.3)	36(40.9)	4 (4.5)	2 (2.3)
It makes the lesson more real and practical rather than abstract	30 (34.1)	45(51.1)	7 (8.0)	6 (6.8)
It helps teachers in their lesson notes preparation	43 (48.9)	39(44.3)	4 (4.5)	2 (2.3)
It helps in faster access to information	41 (46.6)	42(47.7)	4 (4.5)	1 (1.1)

In Table 14, 37.5% and 48.9% of teachers strongly agreed and agreed, respectively, that students felt more involved in the lesson when ICT was used in the teaching and learning process. Only 13.7% disagreed or strongly disagreed. Similarly, 86.3% of the students strongly agreed or agreed that the use of ICT in teaching and learning improves their performance. Papaioannou and Charalambous (2011) have argued that when ICT is integrated into classroom, students are able to access more information faster in an efficient manner, which enhances their understanding and, consequently, improves their performance.

Objective 4: Determination of the major obstacles militating against the use of ICT in teaching and learning

Table 15: Major obstacles to the use of ICT tools in teaching and learning

	Frequency	Percentage (%)
Lack of computers and Internet connection	65	73.9
Broken down computers	12	13.6
Lack of ICT teachers	5	5.7
Power connection (Poor state or lack of power supply)	5	5.7
Lack of institutional support for ICT	1	1.1
Total	88	100.0

From Table 15, out of the 88 teachers who took part in the survey, 73.9% indicated that lack of computers and Internet connection affected teaching and learning. This finding confirms Ghavifekr, Kunjappan, Ramasamy and Anthony

(2016) report that lack of access to resources, including access to computers in classrooms, is one of the complex challenges that prevents teachers from integrating ICT into lesson delivery. Also 13.6% agreed that broken down computers was also a major obstacle, while 5.7% asserted that lack of ICT teachers militated against the use of ICT resources in teaching and learning. Power connection and availability was also indicated by some teachers (5.7%) as a major problem that stood against the proper use ICT facilities in teaching and learning. One of the teachers also indicated that lack of institutional support for ICT was one of the major obstacles of ICT use in teaching and learning.

Conclusions

The integration of ICT in senior secondary schools especially in the Cape Coast Metropolis is very crucial in the development of education in the region. However the current educational system is clouded with challenges such as: Lack of computers, poor internet connectivity and lack of a working framework on ICT policy for SHSs.

The integration of ICT in second cycle schools in Ghana demonstrates positive result for the future life of student in participating schools. The message coming from teachers and students from Cape Coast Metropolis is that for ICT to be effectively used in teaching and learning there should be adequate ICT facilities and equipment available to students, frequent workshops for teachers to polish their skills and update their knowledge in ICT use, to enable them to properly use it in their lesson delivery.

Recommendation

1. Based on the results of the findings that ICT facilities are inadequate or not available in senior secondary schools in the Cape Coast Metropolis, it is recommended that Government and other stakeholders should help to furnish senior high schools with adequate ICT facilities.

2. In-service training for teachers is very crucial. There should be regular ICT training of such programmes to update knowledge and skills of teachers in their lesson delivery.

3. Furthermore, second cycle schools should be networked so that necessary information could easily be shared among schools for students to personalize learning in and out of their schools.

4. Finally Institutions should insist and make it mandatory for teachers to use ICT in their lessen delivery. This can however be sustained by adequate financial and staff support if teachers are to use technology appropriately to promote learning for all students in their classrooms.

REFERENCES

Ahiatrogah, P. D., & Barfi, K. A. (2016). The attitude and competence level of basic school teachers in the teaching of ICT in Cape Coast Metropolis. *Proceedings of INCEDI 2016 Conference*, August 29-31, 2016, Accra – Ghana, 446 – 454.

Apagu, V. V., & Wakili B. A. (2015). Availability and utilization of ICT facilities for teaching and learning of vocational and technical education in Yobe State Technical Colleges. *American Journal of Engineering Research*, *4*(2), 113-118.

Ary, D., Jacobs, L. C., Razavieh, A., & Sorensen C. (2006). *Introduction to research in education* (7th ed.). Thomson Wadsworth, Australia.

Carlson, S., & Firpo, J. (2011). *Integrating computers into teaching: Findings from a three year programme in twenty developing countries*. New York: Mary Ann Liebbert.

Dankwa, K. A. (2007). SchoolNet: *A catalyst for transforming education in Ghana*, Sika Publishing Company.

Davis, M., & Tearle, P. (2008). Would-Be teacher's competence in applying ICT: Exposition and preconditions for development. *Informatics in education - An International Journal*, *6*(2), 397 – 410.

Demkanin, P. (2008). One small, but significant step in science education in Slovakia. In P. Demkanin, B. Kibble, J. Lavonen, J. G. Mas, & J. Turlo (Eds.), *Effective use of ICT in science education* (pp. 120-140). Edinburgh: University of Edinburgh, School of Education.

Eady, M. J., & Lockyer, L. (2013). *Tools for learning: technology and teaching strategies, learning to teach in the primary school*. Master's thesis submitted to Queensland University of Technology, Australia.

eLearning Africa News Portal (2009). What do football and mathematics have in common? Available at:

http://www.elearningafrica.com/newsportal/english/news141.php.

(Assessed 10 May 2019).

Ghavifek, S., Kunjappan, T., Ramasamy, L., & Anthony, A. (2016). Teaching and learning with ICT tools: Issues and challenges from teachers' perceptions, *Malaysian Online Journal of Educational Technology*, *4*(2), 38 – 50.

Ghavifekr, S., & Rosdy,W. A. W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 1(2), 175-191.

Hogg, M., & Vaughan, G. (2005). *Social psychology* (4ᵗʰ ed.)*. London: Prentice-Hall.

Kafyulilo, A., Fisser, P., & Voogt, J. (2016). Factors affecting teachers' continuation of technology use in teaching. *Education and Information Technologies,* 21, 1535-1554.

Kelman, H. C. (1961). Processes of opinion change. *Public Opinion Quarterly*, 25, 57-78

Kinash, S. (2010). Paradigms, methodology and methods. Available at: http://www.bond.edu.au/prod_ext/groups/public/@pubtlsgen/documents/genericwebdocument/bd3_012336.pdf. (Accessed 4 April 2019).

Kozma, R. (2015). Will media influence learning? Reframing the debate. Educational Technology research and Development, *42*(2), 7-19.

Lavonen, J. (2008). Finland in PISA 2006 Scientific Literacy Assessment. In J. Hautamäki, E. Harjunen, A. Hautamäki, T. Karjalainen, S. Kupiainen, J. Lavonen, E. Pehkonen, P. Rantanen & P. Scheinin (Eds.), PISA 2006: *Analysis, reflections, explanations*, pp. 65–113. Helsinki: Ministry of Education Publications: 44.

Meerza, A., & Beauchamp, G. (2017). Factors influencing undergraduates' attitudes towards ICT: An empirical study in Kheis. *The Turkish Online Journal of Educational Technology,* 16(2), 35-42.

Ministry of Education (2015). *Ministry of Education Youth and Sports*, Accra, Government of Ghana White Paper.

Ministerial ICT Policy Statement (2005). *Ministry of Education Youth and Sports*, Accra, Government of Ghana White Paper.

Natale, K., & Lubniewski, K. (2018). Use of communication and technology among educational professionals and families. *International Electronic Journal of Elementary Education*, *10*(3), 378-381.

Ofsted (2011). Removing barriers to literacy. Reading, writing and communication (literacy): distance learning materials for inspection within the new framework, 22.

Papaioannou, P., & Charalambous, K. (2011). Principals' attitudes towards ICT and their perceptions about the factors that facilitate or inhibit ICT

integration in primary schools of Cyprus. *Journal of Information Technology Education, 10*, 349-369.

Robbins, V. (2008). The development of information technology skills in trainee teachers for further education sector. *Research in Post-Compulsory Education, 3*(2), 240-251.

Roztocki, N., Soja, P., & Weistroffer, H. R. (2019). The role of information and communication technologies in socioeconomic development: towards a multi-dimensional framework, *Information Technology for Development, 25*(2), 171-183.

Sanga, C., Makwinya, N., Kitindi, E., Kibirige, G., & Bara, A. (2015). Exploring students' skills and attitudes on effective use of ICTs: Case study of selected Tanzanian public Secondary Schools. *Universal Journal of Educational Research*, 2, 11-20.

Sarantakos, S. (2012). *Social Research* (4th ed.). Palgrave Macmillan, London.

Teddlie, C., & Tashakkori, A. (2003). Major issues and controversies in the use of mixed methods in the social and behavioral sciences. *Handbook of mixed methods in social & behavioral research*, Thousand Oaks: Sage.

Teye, A. E. (2012). *Assessment of ICT situation in Senior High Schools*: *A case study in Manya Krobo district*. Unpublished thesis submitted to institute of distance learning, in partial fulfillment for the degree of Commonwealth Executive Master of Business Administration: Kwame Nkrumah University of Science and Technology.

Thierer, A. D. (2014). The Internet of things and wearable technology: Addressing privacy and security concerns without derailing innovation, *Richmond Journal of Law and Technology*, *21*(2), 1 – 119.

Thomas, R. M., & Kobayashi, V. N. (Eds.) (2014). *Educational technology: its creation, development and cross-cultural transfer*, Oxford: Pergamon Press, 25-34.

Tullao, T. S., Borromeo, M. R., & Cabuay, C. J. (2015). Framing the ASEAN Socio-Cultural Community (ASCC) Post 2015: Quality and Equity Issues in Investing in Basic Education in ASEAN. *ERIA Discussion Paper Series*, 1-100.

Zhang, P., & Aikman, S. (2007). Attitudes in ICT acceptance and use. *In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics),* 1, 4550, 1021-1030.