

Full Length Research Paper

Challenges facing information and communication technology implementation at the primary schools

Mark Valentine Aikins¹ and Emmanuel Arthur-Nyarko^{2*}

¹Department of Mathematics and ICT, Bia Lamplighter College of Education, Sefwi Debiso, Ghana.

²Department of Mathematics and Science, College of Distance Education, University of Cape Coast, Ghana.

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The importance of information and communication technology (ICT) in education in the 21st century cannot be overemphasized. A number of initiatives have been put in place in Ghana to ensure that information and communication technology is extensively used and taught at all levels of our education. The study utilized a descriptive survey design and employed cluster and simple random sampling technique to collect data from 525 pupils in 34 schools in the Cape Coast Metropolis, Ghana. The cluster was made up of six communities in the Metropolis, namely, Aboom, Bakaano, Cape Coast, Efutu, Ola, and Pedu/Abura. The sample was chosen on the basis of Cohen et al. recommendation for choosing representative samples. These two sampling techniques helped to arrive at a sample that was fairly representative of the population. The study addressed four research questions: (1) How available are the ICT facilities to pupils and teachers in Cape Coast Metropolis primary schools? (2) How does the use of ICT equipment affect the implementation of ICT programmes in primary schools in the Cape Coast Metropolis? (3) How does the attitude of primary school pupils affect the implementation of ICT in Cape Coast Metropolis? and (4) How does the attitude of teachers teaching ICT in the primary schools affect the implementation of ICT in the Cape Coast Metropolis? The analyses of responses from questionnaires revealed the unavailability of ICT equipment and pupils' lack of access to ICT infrastructure. The study recommends that Ghana Education Service (GES) should institute technology and technical support units in the various schools to handle technology integration challenges.

Key words: Information and communication technology (ICT) challenges, access to ICT, implementation, primary school.

INTRODUCTION

In the last two decades information and communication technologies (ICT) has changed and transformed the way things are done. ICT has become one of the basic

building blocks of the current information-driven society. Digital skills and computer literacy are now regarded basic requirements for employment and part of the core

*Corresponding author. E-mail: earthur-nyarko@ucc.edu.gh.

of education, alongside reading, writing and numeracy in many countries.

Understanding about the critical role ICTs play in our every life continues to increase and this is not only found in business, industries or economics but in teaching and learning (Barak and Rafaeli, 2004; Dori et al., 2003). Education as the bedrock for acquisition of knowledge have embraced emerging technologies in a bid to increase knowledge. Digital and advanced technologies are now part of the teaching and learning process in classrooms. These technologies, according to Barak et al. (2006) have the capability of becoming a significant component of today's education, as well as to change the manner class interactions and information flows.

In spite of the increasing advancement in ICT facilities in western and Asian countries, African countries remain stagnated in ICT implementation, and that continues to further widen the digital and knowledge divides. According to Kiptalam and Rodrigues (2010), the major challenge confronting most African countries has been the lack of access to ICT facilities, with a ratio of one computer to 150 pupils compared to the ratio of 1:15 pupils in the developed countries. The Ghanaian educational system appears to lag behind despite the positive results indicating that ICT has penetrated many sectors including banking, transportation, communications, and medical services. Additionally, the National Council for Science and Technology (2010) recently reported that computer use in Ghanaian classrooms is still in its infancy, and concluded that the perceptions and experiences of teachers and administrators do play a critical role in the use of computers in Ghanaian classrooms.

It is generally acknowledged that for Ghana to make any appreciable progress in its socio-economic development efforts, substantial resources will need to be directed at improving educational delivery. The key role that Information and Communication Technologies (ICTs) can play in widening access to education to a wider section of the population and literacy education for facilitating educational delivery and training at all levels has been recognized as a key priority area under the current Education Reforms of 2007.

In Ghana, various governments continue to place a strong emphasis on the role of ICT in transforming the country's economy. These are captured in the country's medium-term development plans including the Ghana Poverty Reduction Strategy Paper (GPRS I&II) and the Education Strategic Plan 2003-2015 that recognise the use of ICT as a vehicle for reaching out to the poor in Ghana (Government of Ghana, 2003). The Ghanaian Parliament, in 2004, legislated the Ghana's ICT for Accelerated Development (ICT4AD) policy into law, and is now at various implementation stages. The Ministry of Education, in 2007, produced an ICT in education policy for Ghana to integrate ICTs in schools. An effort at developing a policy for the education sector precedes the

national ICT policy. "The objectives of the policy were to:

- (1) Ensure that pupils have ICT literacy skills before coming out at each level of education
- (2) Provide guidelines for integrating ICT tools at all levels of education
- (3) Provide means of standardizing ICT resources for all schools
- (4) Facilitate training of teachers and pupils in ICT
- (5) Determine the type and level of ICT needed by schools for teaching and administrative purposes.
- (6) Promote ICT as a learning tool in the school curriculum at all levels" (Government of Ghana, 2005).

It not enough to ask whether technology can improve education because it is similar to asking whether experiments can improve science education. As Noss (2003) declares, it all hinges on what kind of technology is introduced, how it is used, its design and how teachers are supported to use it. For this reason, Ghana has put in place an ICT policy that aims to improve the livelihood of Ghanaian by ensuring the availability of accessible, efficient, reliable and affordable ICT services. The sections the national policy addresses include Broadcasting, Telecommunications and Postal Services and Information Technology. However, it is the section on information technology that spells out the aims and strategies regarding ICT and education.

In spite of the initiatives, it appears there are some challenges. This is supported by research findings on barriers to ICT application in other levels of education. Some of the findings of these studies are enumerated subsequently. For instance, lack of teacher's confidence and teacher's computer anxiety has been the foremost challenge (BECTA, 2004). This is followed by the lack of teacher's competency as a result of lack of time for training, lack of pedagogical training, lack of skills training, and lack of ICTs focus in initial teacher training (BECTA, 2004; Yusuf, 2005). Lack of access to resources in terms of lack of hardware, poor organization of resources, poor quality hardware, inappropriate software, and lack of personal access for teachers are placed third. Fourth, is lack of time to use ICTs due to school time table (BECTA, 2004). The fifth relates to technical problems which comprise lack of technical support, lack of telecommunication, fear of things going wrong and other infrastructure, and erratic of electricity supply (BECTA, 2004). Others include lack of clear vision, lack of or ineffective technological leadership in schools, lack of incentives for teachers, lack of teachers' involvement in planning for ICT integration (Spodark, 2003).

Purpose of the study

The purpose of the study was to investigate the

challenges facing ICT implementation, the primary schools in the Cape Coast Metropolis. In this regard, the study addressed the following research questions:

- (1) How available are the ICT facilities to pupils and teachers in Cape Coast Metropolis primary schools?
- (2) How does the use of ICT equipment affect the implementation of ICT programmes in primary schools in the Cape Coast Metropolis?
- (3) How does the attitude of primary school pupils affect the implementation of ICT in Cape Coast Metropolis?
- (4) How does the attitude of teachers teaching ICT in the primary schools affect the implementation of ICT in the Cape Coast Metropolis?

LITERATURE REVIEW

Importance of ICTs to everyday life

Literature reviewed show that information and communication technologies (ICT) have become indispensable tools in today's information age, making a dramatic impact on the lives of people globally. This effect is most significant in education. Computer has become a motivating tool for teaching and learning in schools (Mossom, 1986; World Bank, 1999). Internet allows cost-effective information delivery services, collaborative and distance education, more than has ever been imagined (Clyde, 1995; Mbeki, 1996; Todd, 1997).

ICT can help provide equal opportunities for the neglected groups and communities. However, the irony of the matter is that for those marginalised groups that are behind the digital divide, ICT is yet another means to further widen the gap. Education is therefore expected to play a major role in solving this problem. Thus, unless ICT becomes part of both the delivery and content of education, the disadvantage will intensify and progress will suffer.

In today's information age, ICTs and emerging technologies have become vital tools, having a significant impact on people's lives globally. This effect is not only mostly felt in business, industry, and economics but also significantly impacting on education. The computer has become a motivating tool for teaching and learning in schools (Mossom, 1986; World Bank, 1999). For instance, the Internet permits cost-effective information delivery services, collaborative and distance education, individualized learning and more than has ever been imagined (Clyde, 1995; Mbeki, 1996; Todd, 1997).

Pupils' and teachers' access to ICT facilities

Availability of ICT infrastructure is another vital variable of ICT integration in schools. Ottesen (2006), in his doctoral dissertation revealed that lack of computer infrastructure

is one major problem facing ICT integration in schools today. Relatedly, Norris et al. (2003) revealed that appropriate access to technology infrastructure is another key factor in the effective technology integration process. The study revealed substantive correlation between technology access and use. In another study, Yildirim (2007) revealed that teachers agreed that access to ICT infrastructure is one of the effective means to integrate ICT in classrooms.

Teachers' pedagogical skills in teaching ICT in primary school

Most research on teachers' use of information and communication technology (ICT) in their teaching describes low levels of usage and minimal pedagogical change and Mishra and Koehler (2006) suggest that it is of a necessity that teachers develop all-encompassing knowledge of teaching, content, and technology, called Technology Pedagogy and Content Knowledge (TPACK). In the 21st century, TPACK is becoming a required area of expertise for teachers in new technology-led learning environments. Schmidt et al. (2009) state that TPACK is a theoretical framework for describing the interaction and integration of technology, pedagogy, and content knowledge needed to successfully integrate technology use into teaching. As far back as, Shulman (1986), first asserted that teachers needed content knowledge (CK), pedagogy knowledge (PK), and pedagogical content knowledge (PCK). His work was extended by Mishra and Koehler's (2006) work who added technological knowledge (TK) and came up with the term TPACK. In addition, Mishra and Koehler (2006) stated that the TPACK framework consists of seven domains: CK, PK, TK, PCK, technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPCK). Other researchers argue that TPACK emphasizes the dynamic interaction and integration of knowledge with the use of technology for teachers based on the three main knowledge categories (that is, content, pedagogy, and technology) (Schmidt et al., 2009; Thompson and Mishra, 2007). TPACK, therefore, describes the use of technology as an instructional technique and the use of technology to support particular pedagogies within a specific content coverage. In a nutshell, TPACK describes how technology is used to help teachers improve student learning (Schmidt et al., 2009; Thompson and Mishra, 2007).

As an instructional technique, it is also critical to know teachers' specific ICT skills and how these skills translate to classroom teaching and learning. ICT skills are the core skills needed to use generic ICT tools (e.g. Word, Excel, Outlook, PowerPoint) to function in the information society and in working life. According to Owston (2006), in the past 15 years, research work has indicated the

significant influence of teacher competence and ICT skills on student achievement. Teachers are therefore required to have the necessary knowledge and competence to incorporate ICT in their everyday teaching and learning. This will maximize their ability to help improve student's digital competence. The relationship between teacher's digital competence and their utilisation of ICT in the classroom is well established in literature. In as much as training teachers how to use specific ICT equipment, the internet and general utilisation are important, it is also worth knowing that without feeling competent in how to integrate ICT into teaching appropriately, both from the pedagogical perspective as well as the specific viewpoint of the subject being taught, teachers are less likely to use ICT in the classroom for teaching and learning. There is therefore the need for more professional development opportunities on the pedagogical use of ICT and particularly subject-specific training on learning applications, by fewer teachers. Consequently, participation in professional development activities can significantly influence teachers' ICT use (Fredriksson et al., 2008; Valiente, 2010).

In the light of the aforementioned issues, it is worth knowing that teachers do not merely use technology for its use sake but their acceptance of technology in teaching is based on a critical analysis of the benefits technology allure to teaching and learning. In order to encourage teachers to use new technology in practice, it is necessary to provide them a suitable infrastructure/system, to enable them to use technology easily without any problem. This can be done by providing technology that meets subjects' content and learners' characteristics.

Pupils' readiness to learn ICT

Pupils in our schools today are all excited about using technology and ICT tools in learning and exploring their world. This excitement and other behaviour change exhibited by pupils in technology enabled lessons in classroom go a long way to influence their readiness to integrated ICT in their learning process or otherwise. According to previous studies (Dabholkar, 1994; Mick and Fournier, 1998; Parasuraman, 2000; Parasuraman and Colby, 2001), a mixture of positive and negative beliefs about technology is responsible for the domain of technology readiness. For instance, both Dabholkar (1994) and Mick and Fournier (1998) asserted that information technology/information system (IT/IS) consumers with more positive beliefs are more receptive and ready to use the various new technologies. In addition, Dabholkar (1994) found that individuals simultaneously harbour positive (favorable) and negative (unfavorable) beliefs about technology. The positive beliefs propel individuals towards new technologies, while negative beliefs may hold them back. Parasuraman and

Colby (2001) defined technology readiness as people's predisposition to accept and use new technologies at home and at the workplace. This suggests that pupils should develop more positive ICT integration to indicate their readiness to use and explore the benefits technology stands to provide their learning process in classroom. Hence, curriculum developers, designers and institutional providers must carefully consider the needs and value of learners, and to ensure that ICT and emerging technologies effectively fit the needs and demands of today's learners in classroom. In this regard, to encourage pupils to continue with ICT lessons, the teachers of subject matter need to ensure that ICT lessons are very flexible, easy to use and useful to improve students' academic performance. Specifically, the 'skeptics' and 'paranoids' must be convinced of the importance of using technology-driven classroom environment.

In classroom learning environment, implementation of ICT in schools cannot be successful without active involvement of the students. Technology acceptance greatly depends on personal attitude of students, as personal attitudes are major factors that affect individual ICT usage. Hence, to develop an appropriate technology-enabled environment, it is necessary to understand students' attitude towards ICT usage (Sánchez-Franco et al., 2009). In that regard, the technology acceptance model (TAM) is used as based model to explore the students' readiness towards learning of ICT. In the Information Systems Research, Technology Acceptance Model (TAM) has been extensively used to collect user reactions to information systems. The TAM model basically examines users' views of Usage, Usefulness, and Ease of Use. As some researchers opine, TAM is one of the most extensively used models to investigate adoption of a new technology or the intentions to adopt a new technology as it is seen as a powerful theory by the IS community (Lucas and Spittler, 1999; Venkatesh and Davis, 2000). However, the main weakness of TAM pointed out by researchers is its inability to explain the external variables affecting users' perceived usefulness and perceived ease of use (Legris et al., 2003). Although different researchers have studied student readiness with respect to learning ICT (Cheon et al., 2012; Hussin et al., 2012; Mahat et al., 2012), but the concept of student readiness towards technology is still evolving. Review of literature on ICT in education indicates an absence of a concise and well-established survey instruments to assess student readiness towards learning ICT (Khadage and Knezek, 2013). Pupils' readiness to learn ICT in school has the power to power to reduce the digital gap. Learning ICT encourages independent and collaborative learning, improves self-confidence and self-respect of the learner, enhances numerical skills, "promotes education in informal settings, and engages learners for longer periods" (Attewell, 2005).

METHODOLOGY

Research design

The current study utilized the descriptive survey design. While a survey research is appropriate when a researcher attempts to study some aspect of a population by using unbiased sample of a population who are asked to complete a set of instruments to solicit for vital information to be used in the research work, descriptive study is primarily concerned with finding out “what is” and provide a clear picture of existing phenomena. This design allowed the research to collect large amount of data in a short time to address the research questions.

Participants

The current study was carried out in the Cape Coast Metropolis, of the Central Region of Ghana. The participants comprised 525 students selected from 34 schools, with a population of 15964. This was done through cluster and simple random sampling techniques. The cluster was made up of six communities in the Metropolis, namely, Aboom, Bakaano, Cape Coast, Efutu, Ola, and Pedu/ Abura. The sample as chosen on the basis of Cohen et al. (2007)'s recommendation for choosing representative samples, these two sampling techniques helped to arrive at a sample that was fairly representative of the population. In addition, 34 teachers were also selected randomly from the six communities in the Metropolis.

Procedure

Two questionnaires were used for this study; one for pupils and the other questionnaire for teachers. These questionnaires were adapted from the work of Adebisi-Caesar (2012). Each instrument had four main sections: A to D. While section A elicited data on respondents' demographic information, sections B, C and D gathered data on availability of ICT facilities, pupils' readiness to learn ICT, knowledge of competencies of ICT teachers, and the pedagogical skills of ICT teachers in the municipality, respectively. Most of the questions were five-point Likert scale items with responses ranging from strongly agree to strongly disagree.

The instruments were pilot-tested to determine their reliability vis-à-vis the suitability for this study. Using the internal consistency method, the instrument for teachers yielded a Cronbach alpha of 0.79 while the instrument for the pupils yielded 0.85 of Cronbach alpha which were considered satisfactory. The data collection process took place at one time.

RESULTS

The data collected through the questionnaires were analysed using descriptive statistics. The analysis was carried out in accordance with the research questions. The results were presented in the following.

Research Question 1: How available are the ICT facilities to pupils and teachers in Cape Coast Metropolis primary schools?

The data that addressed the research question 1 are

shown in Table 1.

Data in Table 1 shows that out of the 525 respondents, majority disagreed (n=311, 59.2%) that each pupil has access to computers at school while a few (n=173, 33.0%) indicated that they had computers to practice with during ICT lessons. Again, a few agreed that they had computers laboratories for practical ICT lessons while majority disagreed they had computer laboratories. It also shows from the Table 1 that majority disagreed to the availability of ICT equipment such as scanners, digital cameras, microphones, etc. Equipment like printers and projectors were available in just a handful of schools.

Research Question 2: How does the use of ICT equipment affect the implementation of ICT programmes in primary schools in the Cape Coast Metropolis?

The second research question sought to find out the effect of the use of ICT equipment on the implementation of ICT programmes in primary schools in Cape Coast Metropolis. The data is shown in Table 2.

Results in Table 2 indicate that majority (n=273, 52.0%) of the respondents disagreed that they are given regular access to computers while the rest disagreed. Also, majority of the respondents disagreed that ICT equipment are used for only ICT lessons, pupils benefit from ICT training and the fact that pupils make use of email facility. However, majority (n=272, 52.0%) agreed that pupils are able to access information on the internet when they are given assignments, and that pupils use computers for other purposes (Games, Social Networks) other than ICT lessons. It can be concluded that although pupils benefit from ICT equipment, they are not used to support ICT lessons.

Research Question 3: How does the attitude of primary school pupils affect the implementation of ICT in Cape Coast Metropolis?

The third research question aimed to find out how the attitude of primary school pupils affects the implementation of ICT in Cape Coast Metropolis. The results are as shown in Table 3.

Results in Table 3 show that majority (n=410, 78.4%) agreed that they like ICT lesson and visit Internet Cafes to use their services after school hours (n=254, 48.5%). Also, a majority (n=331, 63.7%) indicated that additional time should be added to ICT period on the timetable and that they find ICT lessons interesting and insightful (n=405, 77.9%). However, more than half of the respondent (n=298, 57.2%) disagreed that they had personal computers at home. From this analysis, it can be concluded that primary school pupils in Cape Coast had

Table 1. Availability of ICT facilities to pupils and teachers.

Statement	Responses/frequency					Total
	SD	D	I	A	SA	
Students' response						
Each pupil has a computer to practice during ICT lessons	171	140	39	75	98	523
We use the computer laboratory for other subject lessons	247	123	43	40	65	518
We have other ICT equipment like camera, scanners, microphones, speakers etc.	179	96	63	70	115	523
We have projector in our computer laboratory	183	93	66	68	107	517
Teachers' response						
Computers in the laboratory are network	13	9	0	4	7	33
We have Internet access at school and pupils use it	16	5	1	6	5	33
We have an ICT technician to manage school computer laboratory	15	8	1	5	5	34
We have printer at the school computer laboratory	15	7	0	5	7	34
We have scanner at the school computer laboratory	25	6	2	1	0	34
There is projector installed to aid teaching and learning of ICT lessons	22	4	0	2	6	34

Table 2. Uses of ICT equipment for the implementation of ICT programmes in Primary Schools in the Cape Coast Metropolis.

Statement	Responses/frequency					Total
	SD	D	SD	A	SA	
Students' response						
We are given regular access to the computers	174	99	55	70	125	523
Technical problems hinder ICT teaching and learning	181	90	77	77	94	519
ICT equipment/facilities are used for only ICT lessons	138	78	71	79	157	523
Pupils benefit from more ICT training	43	34	28	113	305	523
The use of ICT enhances teaching and learning in other subject areas	90	74	87	111	161	523
Pupils are able to access information on the internet when given assignments	99	60	40	116	208	523
Teachers' response						
Pupils make use of E-mail	11	8	2	10	3	34
Pupils are taught how to use printers with Computers	13	9	0	9	3	34
Pupils are taught how to use scanners with Computers	15	13	2	4	0	34
Pupils use computers for other purposes (games, social network, etc.) either than ICT lessons	3	2	4	14	11	34

positive attitude toward ICT and is affecting ICT implementation positively in Cape Coast Metropolis.

Research Question 4: How does the attitude of teachers teaching ICT in the primary schools affect the implementation of ICT in the cape Coast Metropolis?

The forth aim of the study was to investigate how the attitude of ICT teachers in the primary schools affects the implementation of ICT in the Cape Coast Metropolis. The data is shown in Table 4.

Results in Table 4 show that the teachers responded in

affirmative to all the questions. For instance, all the 31 (91.2%) out of 34 teachers agreed to the statement that they like teaching ICT lessons and 29 (85.3%) out of 34 also agreed that they will opt for advance training in ICT to improve subject competence. This suggests that the primary school ICT teachers in the Cape Coast Metropolis hold positive attitude that affect ICT implementation positively.

DISCUSSION

The importance of information and communication technology (ICT) in the 21st century cannot be

Table 3. Primary school pupils' attitude that affect the implementation of ICT in Cape Coast Metropolis?

Statement	Students responses/frequency					Total
	SD	D	I	A	SA	T
I like ICT lessons	36	50	27	131	279	523
I visit Internet Café to use their service after school hours	144	86	40	83	171	524
Additional time should be added to ICT time table period	70	58	60	122	209	519
I would like other teachers to use computers to teach their subjects	137	82	55	83	163	520
I have a personal computer at home	208	89	27	60	137	521
I have my personal ICT textbook apart from school textbook	156	90	23	76	176	521
I find ICT lessons boring	185	88	51	79	119	522
I find ICT lessons interesting and insightful	47	30	38	107	298	520

Table 4. Attitude of ICT teachers in the primary school that ICT implementation in the Cape Coast Metropolis.

Statement	Teachers responses/frequency					Total
	SD	D	I	A	SA	T
I like teaching ICT lessons	0	1	2	20	11	34
I use Applications such as Word Processing, Spreadsheet, etc., in teaching	3	6	5	14	6	34
I use Visual aids to reinforce pupils understanding of ICT lessons	2	6	0	20	6	34
I help other teachers to use computer in teaching their subject	5	6	2	11	10	34
I will opt for advance training in ICT to improve subject competence	1	0	3	9	20	33

overemphasized. The use of ICT in education continues to redefine teaching and learning processes. However, the implementation of these tools is faced with challenges that sometimes hinder their significance. The aim of this study was to assess the challenges facing the implementation of ICT programmes in the Cape Coast Metropolis. The results revealed that a majority of pupil had no access to computers individually at school while a few indicated that they had computers to practice with during ICT lessons. Again, it was found that basic schools in the Metropolis lack computer laboratories for practical ICT lessons. This suggests that ICT lessons have not been as effective as expected. These findings concur with Ottesen (2006) who revealed that one fundamental problem facing ICT integration in schools is the lack of computer infrastructure. In a related study, Norris et al. (2003) revealed that appropriate access to technology infrastructure is another key factor in the effective technology integration process.

The rippling effect of the unavailability of computers and other ICT resources in the Basic Schools in the Cape Coast Metropolis was evident in this study. The study revealed that pupils in the Metropolis lack regular access to ICT equipment which hinders effective use of computers. Pupils indicated that they do not have access to the internet when needed for assignments thereby having a negative effect on ICT programme implementation. Access to ICT is as critical as its

availability; hence, there is the need to ensure it is available and accessible when needed. Soomro et al. (2018) state that not everyone has equal access to ICT. They intimated that the consequence of limited access to ICT is the lack of effective participation in society. Limited access has the tendency of denying students from taking control of their learning.

One key factor that militates the adoption of ICT in teaching and learning has been attitude towards technology. While positive attitude encourages the use of ICT, negative towards ICT impedes its adoption and usage. The results from the current study showed that pupils held positive attitude towards ICT in spite of unavailability and access to digital technologies. The results are consistent with Papaioannou and Charalambous (2011). Berteau (2009) declares that favourable attitude shows a greater possibility that learners will accept and use technology. This study also recorded positive attitude on the part of the ICT teachers in the Cape Coast Metropolis. This is also positive for ICT implementation in the metropolis.

CONCLUSION AND RECOMMENDATION

The purpose of this study was to investigate the challenges militating against the implementation ICT programmes in primary schools in the Cape Coast

Metropolis. On the basis of the findings, this study concludes that challenges of ICT programmes implementation in Cape Coast Metropolis emanate from lack of ICT equipment both at home and schools. ICT equipment such as computers, printers, scanners, projectors, digital cameras, and the internet are not available in most schools in the metropolis. This has also created limited access to these devices. Pupils do not have access to ICT laboratories where basic ICT skills could be practiced to enhance knowledge in ICT and improve the implementation of ICT programmes. In spite of these challenges, teachers and pupils hold positive attitude towards ICT programmes and lessons which are sometimes thought theoretically. On that score, the study recommends that the government, through the Ghana Education Service should institute technology and technical support unit in the various schools to handle technology integration challenges and provide rapid responses to teachers' technological needs. The provision of this unit will go a long way to combat such challenges as accessibility to hardware, technical infrastructure, and software availability, adequate computer in laboratories and internet access and regularity.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Adebi-Caesar TE (2012). Assessment of I.C.T situation in Senior High Schools, A case study in Lower Manya Krobo District. Unpublished MBA Thesis. Institute of Distance Learning, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.
- Attewell J (2005). From research and development to mobile learning: Tools for education and training providers and their learners. Paper presented at the 4th World Conference on m-learning Cape Town, South Africa. Retrieved from <http://www.mlearn.org.za/CD/papers/Attewell.pdf>
- Barak M, Rafaeli S (2004). Online question-posing and peer-assessment as means for Web-based knowledge sharing. *International Journal of Human-Computer Studies* 61(1):84-103.
- Barak M, Lipson A, Lerman S (2006). Wireless laptops as means for promoting active learning in large lecture halls. *Journal of Research on Technology in Education* 38(3):245-263.
- BECTA (2004). A Review of the Research Literature on Barriers to the Uptake of ICT by Teachers [Online], accessed from http://partners.becta.org.uk/page_documents/research/barriers.pdf.
- Bertea P (2009). Measuring students' attitude toward e-Learning. A case study. The international Scientific Conference eLearning and Software for Education. In Retrieved May 10, 2009, from <http://adlunap.ro/else2009/papers/979.1>. Bertea. pdf.
- Cheon J, Lee S, Crooks S M, Song J (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers and Education* 59(3):1054-1064.
- Clyde A (1995). Computers in school libraries: The Internet and Australian schools. Access 9(2):26-28.
- Cohen L, Manion L, Morrison K (2007). *Research Methods in Education* (6th ed.). London: Routledge.
- Dabholkar PA (1994). Incorporating Choice into an Attitudinal Framework: Analyzing Model of Mental Comparison Process. *Journal of Consumer Research* 21:100-118.
- Dori YJ, Barak M, Adir N (2003). A Web-based chemistry course as a means to foster freshmen learning. *Journal of Chemical Education* 80(9):1084.
- Fredriksson U, Jedeskog G, Tjeerd P (2008). Innovative use of ICT in schools based on the findings in ELFE project. *Education and Information Technologies* 13(2):83-101.
- Government of Ghana (2003). The Ghana ICT for Accelerated Development (ICT4AD) Policy. Retrieved from www.moc.gov.gh/moc/PDFs/Ghana ICT4AD_Policy.pdf
- Government of Ghana (2005) Government of Ghana Ministerial ICT Policy Statement: Accra: NBS Multimedia
- Hussin S, Manap M R, Amir Z, Krish P (2012). Mobile learning readiness among Malaysian students at higher learning institutes. *Asian Social Science* 8(12):276-283.
- Khaddage F, Knezek G (2013). Introducing a mobile learning attitude scale for higher education. In WCCE 2013: Learning while we are connected: Proceedings of the IFIP Computers in Education 2013 World Conference. Nicolaus Copernicus University Press, Torun, Italy pp. 226-235.
- Kiptalam GK, Rodrigues AJ (2010). Accessibility and utilization of icts among secondary school teachers in Kenya. Retrieved from <http://www.ictworks.org/2011/09/12/12-challenges-facing-computer-education-kenyan-schools/>
- Legris P, Ingham J, Collette P (2003). Why do people use information technology? A critical review of the technology acceptance model. *Information and Management* 40(3):191-204.
- Lucas HC, Spittler VK (1999). Technology use and performance: A field study of broker workstations. *Decision Sciences* 30(2):291-311.
- Mahat J, Ayub AFM, Luan S (2012). An assessment of students' mobile self-efficacy, readiness and personal innovativeness towards mobile learning in higher education in Malaysia. *Procedia-Social and Behavioral Sciences* 64:284-290.
- Mbeki T (1996). The information community and the developing world. A Perspective of South Africa. Unpublished
- Mick DG, Fournier S (1998). Paradoxes of Technology: Consumer Cognizance, Emotions and Coping Strategies. *Journal of Consumer Research* 25(2):123-143.
- Mishra P, Koehler MJ (2006). Technological pedagogical content knowledge: A Framework for integrating technology in teacher knowledge. *Teachers College Record*, 108(6):1017-1054.
- Mossom M (1986). Status of computer education in Natal Schools. University Lecture, delivered at the University of Natal, Pietermaritzburg, October 1 1986.
- Noss R (2003). What can digital technologies take from and bring to research in mathematics education? *Second international handbook of mathematics education*. Springer Netherlands pp. 323-349.
- Norris C, Sullivan T, Poirot J, Soloway E (2003). No access, no use, no impact: snapshot surveys of educational technology in K#12. *Journal of Research on Technology in Education* 36(1):15-27.
- Ottesen E (2006). Learning to teach with technology: authoring practiced identities. *Technology, Pedagogy and Education* 15(3):275-290.
- Owston R (2006). Teachers can make a difference: Professional development as a policy option for improving student learning with ICT. Paper prepared for the CEIRIS-Keris international Expert meeting on ICT and Educational Performance, South Korea, October 16-17, 2007.
- Parasuraman A (2000). Technology Readiness Index (TRI): A Multiple-Item Scale to Measure Readiness to Embrace New Technologies. *Journal of Service Research* 2(4):307-320.
- Parasuraman A, Colby CL (2001). *Techno-Ready Marketing: How and Why Your Customers Adopt Technology*: The Free Press.
- 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 Research* 10:349-369.
- Sánchez-Franco MJ, Martínez-López FJ, Martín-Velicia FA (2009). Exploring the impact of individualism and uncertainty avoidance in

- web-based electronic learning: An empirical analysis in European higher education. *Computers and Education* 52(3):588-598.
- Schmidt DA, Baran E, Thompson AD, Mishra P, Koehler MJ, Shin TS (2009). Technological pedagogical content knowledge (TPACK): The Development and validation of an assessment instrument for preservice teachers. *Journal of Research on Technology in Education* 42(2):123-149.
- Shulman LS (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher* 15(2):4-14.
- Soomro KA, Kale U, Curtis R, Akcaoglu M, Bernstein M (2018). Development of an instrument to measure Faculty's information and communication technology access (FICTA). *Education and information technologies* 23(1):253-269.
- Spodark E (2003). Five Obstacles to Technology Integration at a Small Liberal Arts University. *The Journal* 30(8).
- Thompson AD, Mishra P (2007). Breaking news: TPCK becomes TPACK!. *Journal of Computing in Teacher Education* 24(2):38.
- Todd R (1997). Information Technology and learning: a never-ending beginning. *ACCESS* 11(1):11-14.
- Valiente O (2010). 1-1 in Education: Current Practice, International Comparative Research Evidence and Policy Implications. OECD Education Working Papers, No. 44, OECD Publishing. <http://dx.doi.org/10.1787/5kmjzwl9vr2-en>
- Venkatesh V, Davis FD (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science* 46(2):186-204.
- World Bank (1999). *Education in the Middle East and North Africa: A strategy towards learning for development*, (Washington, DC: The World Bank).
- Yildirim S (2007). Current Utilization of ICT in Turkish Basic Education Schools: A Review of Teacher's ICT Use and Barriers to Integration. *International Journal of Instructional Media* 34(2):171-86
- Yusuf MO (2005). An investigation into teachers' self-efficiency in the implementation of computer education in Nigerian Secondary Schools. *Meridian: A Middle School Computer Technologies Journal*. Retrieved from www.ncsu.edu/meridian/sum2005/index.html