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Research Paper

The place of information and communication technology (ICT) in early childhood education in the Winneba municipality of Ghana

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Abstract. This study examines the place of Information and Communication Technology (ICT) within the Ghanaian educational sector with specific reference to early childhood education. The study takes an inventory of ICT products at various early childhood centers within the Winneba municipality. The study serves as an audit of ICT products, their use, when used, and the background of who administers their usage. It looks at various ways by which ICT can be made more beneficial to early childhood educational development especially in a promising but deprived country like Ghana, and in a critical but delicate sector which is early childhood education. The researcher uses the mixed method approach consisting of questionnaire, field visits, and observations. This study is based on responses by 44 early childhood educators representing schools and centers involved in early childhood education who volunteered to participate in this study. Findings reveal a limited availability and accessibility of ICT products at early childhood centers, limited ICT background on the part of early childhood educators involved in ICT; and ICT taught as a specific subject, instead of an underlining concept across all subjects.

Keywords: Information and communication technology, early childhood education, Winneba, Ghana.

INTRODUCTION

There is unanimity in the field of research that when Information and Communication Technology (ICT) is introduced into teaching and learning, the results are positive (Lee et al., 2002; Lindsay, 2006). As a term, ICT is widely used in the field of research, policy, and educational practice. In most instances, it is erroneously used to replace computers (Edwards, 2001). However, in its entirety it is viewed to encompass computers; desktops, laptops, palmtops, digital cameras, and digital video cameras. In addition to computers, it consists of creativity and communication software and tools, the internet, telephone, fax machines, mobile and land phones, data projectors, electronic whiteboards, computer games, and stimulated environments among others. In fact, there is ample evidence to support that, experience by both developing and developed countries in the use of ICT have enormous potential for knowledge dissemination, its acquisition and most importantly teaching and learning (Higgs, 1997).

This study is premised on the assumption that ICT has a place in early childhood education (O'Hara, 2004; Lee & O'Rourke, 2006; Anderson, Rooney and Vincent, 2007), and that, there is abundant literature to support the positive benefits associated with ICT in the child's educational development (Siraj-Blatchford and Whitebeard, 2003; Downes, 2002; Robertson, 2003; O'Rourke and Harrison, 2004). Such benefits as the literature reveals can be seen within the spectrum of parental involvement in the child's education (Bain, 2000), children's literacy development with reference to speaking, reading, listening, and writing (Stephen and Plowman, 2003), as well as children's conceptual understanding of what is being taught especially when ICT is effectively utilized (Bolstad, 2004).

The above notwithstanding, there remains a lot of concerns on how developing countries such as Ghana can succeed in tapping into the abundant benefits associated with ICT especially at the early childhood level. Unfortunately, when it comes to ICT usage in Africa as a whole, there is the consensus that the "region is lagging behind in terms of adoption, use and innovation…" (Kipsoi et al., 2012:19). It is on this premise that this study looks at the place of an important tool, ICT in a critical but delicate sector; early childhood education, in an important but poor region; Ghana with the Winneba municipality as a case study.

ICT is seen as an important tool and a critical vehicle in every successful educational enterprise. It's relevance in every successful educational program cannot be under stated. Hence, this study specifically attempts to determine the extent to which ICT is made relevant to early childhood educational development in the Winneba municipality of the central region of Ghana, by taking an inventory of ICT products at early childhood centers in the municipality; that is, what is available in terms of ICT equipment, how they are used, the frequency of use and the background of early childhood educators in the field of ICT education?

Significantly, the findings of the study will provide insights into available ICT equipments at early childhood centers in the Winneba municipality, frequency of use by early childhood educators, competence of early childhood educators in ICT use and most importantly challenges associated with ICT use in early childhood education. Such findings will provide enough information for appropriate recommendations to address any shortfall that may be associated with ICT usage, especially at the early childhood level.

METHODOLOGY

Research questions

The research questions for this study were:

1. What is the state of information and communication technology in Early Childhood programmes in the Winneba municipality?
2. What challenges if any, are associated with ICT use in the Winneba municipality?

Participants

Participants consisted of 44 early childhood educators each representing a center drawn from selected early childhood centers within the Winneba municipality. Purposive sampling approach was used. The total population consisted of all Basic schools in the Winneba municipality with the sampled population consisting of Basic schools that ran early childhood programs, as well as private institutions that ran specifically early childhood programmes. Letters asking for participation were sent to all schools involved in early childhood programmes requesting for participation in the study. In all, 44 schools and centers agreed to participate in the study. Of the total participants, 26 (59.1%) were female and 18 were male (40.9%). Educators consisted of proprietors, heads of early childhood centers, as well as early childhood practitioners; specialists, assistants, and attendants drawn from public and private institutions. All participants were teachingin schools in the Winneba municipality.

Instrumentation

A researcher–developed questionnaire consisting of 36 items was used in collecting data for the study (Irwin & Nucci, 2004). The broad headings under which data were collected using the questionnaire were participants' bio-data, presence of ICT equipment at schools, ICT accessibility, reasons for ICT usage, teacher competence in ICT, and challenges associated with ICT use. The nature of questions differed based on which item the study intended to address. In some instances, respondents were asked to indicate the number of ICT equipment available or the number of times used. Also, certain items required participants to respond in the form of either "Agree" or "Disagree".

Procedure

Questionnaires were administered by the researcher to 44 participants (representing early childhood centers) who agreed to participate in the study. Questionnaires were requested to be completed in a week and were picked up by the researcher. For purposes of anonymity, participants were asked not to indicate their names and those of their schools. Prior to the distribution of questionnaires, participants were educated about the essence of the study.

RESULTS AND DISCUSSION

Participants' bio-data

Table 1 provides a bio-data of participants who were involved in this study. In this table, it is revealed that, out of 44 participants who responded to the questionnaire provided, 40.9% were males while 59.1% were females. Of the total number of respondents, also indicated in Table 1, 22.7% hold a Certificate "A" in teaching, while 20.5% hold a Diploma in teaching, and 20.5% hold a Post Graduate Certificate in teaching, while 25.0% hold a Bachelor's degree, with four point five percent holding a Master's degree, and six point eight percent holding Senior High School Certificate.

In addition to providing the gender differences as well as levels of education of the participants, Table 1 also

Table 1. Participants bio-data.

Variable	N	%
Gender		
Male	18	40.9
Female	26	59.1
Highest Educational Qualification		
Cert A	10	22.7
Diploma	9	20.5
Post Graduate Cert	9	20.5
Bachelor	11	25.0
Master	2	4.5
SHS Cert	3	6.8
Length of Service		
1-5 yrs	28	59.1
6-10 yrs	8	18.2
10 yrs & above	10	22.7

Table 2. ICT equipment at school.

Item	Functional	Non-Functional
	N	N
Computers (desktop, laptop)	19	7
Digital/video cameras	1	3
Telephones/fax machines	5	3
Programmable toys	-	3
Projectors	4	3

provides data on the number of years of service by respondents. As revealed once again in Table 1, 59.1% of the participants had teaching experience between 1 and 5 years, while 18.2% of them had teaching experience between 6 and 10 years, and 22.7%, taught for 10 years and above. Based on this, it can be conveniently concluded that, respondents in this study were quiet experienced when it comes to teaching. However, the study did not find out if there was any correlation between the educational background of early childhood educators and ICT use even though the researcher was of the assumption that such background could have effects on teacher competencies in ICT use.

In attempt to address research question 1; what is the state of ICT in early childhood education in the Winneba municipality, four areas; ICT equipment at schools, ICT accessibility, reasons for ICT usage, and teacher competence in ICT usage were looked at. Below are the findings:

ICT equipment at schools

Table 2 presents data on ICT equipment at the various schools. The ICT equipments were grouped into the following categories: computers (Desktop, Laptops), digital/video cameras, telephones/fax machines, programmable toys, and projectors. Availability of this equipment was grouped under functioning and non-functioning. The data in Table 2 revealed that, of the 26 computers identified in the study area, 19 were functional, while seven were non-functional. With regards to the availability of digital/video cameras which are critical in early childhood evaluation**,** the data revealed that one was functional while three were non-functional. Of the eight telephone/fax machines available in the 44 schools, five were functional while three were non-functional. There were no functional programmable toys and the three available were all not functioning. Four functional projectors were recorded as functional while three projectors were recorded as non-functional. Details are given in Table 2.

It has been revealed in this study that, when it comes to the availability of ICT equipments, there is no doubt that early childhood centers in the Winneba municipality are under resourced. Of the 44 centers represented by practitioners, of the most traditional of ICT equipment; computers (Edwards, 2001), just 26 were recorded. Of more

Table 3. ICT accessibility.

Item	Every day		Once a week		Once a month		Never	
	N	%	N	%	N	%	N	%
Computers (desktop, laptop)	8	18.2	12	27.3	6	13.6	18	40.9
Digital/video cameras	1	2.3			1	2.3	23	52.3
Telephones/fax machines	2	4.5	1	2.3	1	2.3	23	52.3
Programmable toys	-	-	-	-	-	-	25	56.8
Projectors	2	4.5	1	2.3	2	4.5	23	52.3

Table 4. Reasons for ICT usage.

Variables	Agree		Disagree	
	N	%	N	%
I use ICT to motivate my learners	33	75.0	11	25.0
I use ICT to arouse learners interest	29	66.0	15	34.0
I use ICT to gain learners interest	29	66.0	15	34.0
I use ICT when I do not have adequate knowledge on topic to be taught	14	31.8	30	68.2
I use ICT when I have access to it	27	61.3	17	38.7
I use ICT only when it is available	14	31.8	30	68.2

concern, seven of the 26 were non-functional. A look at other facilities such as programmable toys and basic gadgets of communication and reporting of activities to parents such as cameras, telephones/fax machines, the findings at best can describe as unavailable. In fact, in terms of availability of ICT equipments, the results of this study revealed a shortfall if not an inadequacy.

ICT accessibility

Table 3 provides information on ICT accessibility to early childhood educators in the study area. With regard to how accessible computers were to participants as evidenced in the results presented in Table 3, 18.2% of total respondents indicated they use computers every day, while 27.3% said once a week, 13.6% stated they use it once a month and 40.9% responded they never use computers in their teaching. On the question of digital and video/cameras usage, of the total number of participants who responded to this question (n = 25), two point three percent each of the total number of participants in the study (n = 44) responded to everyday and once a month respectively. There was no response for once a week and 52.3% responded to never used digital/video cameras in teaching. With regards to responses on the use of telephone and fax machines, four point five percent responded to using it every day, while two point three percent each responded to using it once a week and once a month respectively, and 52.3% responded to never using telephone and fax machines in their teaching activities. With regard to programmable toys, 25 participants once again responded to the question, and all responded to never using it in teaching. With reference to the usage of projectors, four point five percent each said they used it every day, and two point three percent said they used it once a week, while 52.3% never used projectors.

Responses on ICT accessibility goes to reaffirm and probably to a reasonable extent validate findings on the question of ICT equipments in schools. Of course if the equipments are not available there is no way the teacher or practitioner can use it in any way. Even with the most traditional gadgets of classroom instruction, computers, 40.9% of respondents never use it. It then can be inferred from these responses that lesson notes, research, and evaluation as well as other classroom activities are still done in the traditional ways of “paper and pencil” practice by most participants of this study. The use of programmable toys based on the results of this study seems alien to participants. It could be that, most participants as revealed in the number of participants who responded to this question did not understand what constitutes programmable toys or did not in actual fact make use of this device in their teaching activities.

Reasons for using ICT

Apart from taking an inventory of the availability and accessibility of ICT equipment at early childhood centers and schools, the study went further to probe educators on reasons why they used ICT equipment. Reasons why ICT equipment was used by participants are stated in Table 4.

The data in Table 4 on ICT usage revealed that there were disparities on the reasons assigned by early childhood educators for the use of ICT equipment. In response to ICT

Table 5. Teacher competence in ICT usage.

Variables	Agree		Disagree	
	N	%	N	%
I have access to training in ICT	33	75.0	11	25.0
I have ample time for hands on practice	23	52.3	21	47.7
I have support service that kept me going	17	38.6	27	61.4
I am proficient in the use of ICT equipment	27	61.3	17	38.7
I can manipulate the overhead projector	15	34.1	29	65.9
I prepare my lesson plan with MS word	5	11.4	39	88.6
I present lessons using PowerPoint	5	11.4	39	88.6
I am able to find information from the internet to argument my note	29	65.9	15	34.1
I am able to interact with colleagues using the social network	29	65.9	15	34.1

usage being a source of motivation for learners, 75% of the participants responded in the affirmative whiles 25.0% of the participants disagreed. Also, when the participants were asked as to whether ICT usage helped in arousing learners' interest, 66% of the participants agreed while 34% of them disagreed. In response to ICT being used as a means of gaining learners interest 66% of the participants agreed, while 34% disagreed. Again, 31.8% of the participants agreed that, they used ICT equipment when they did not have adequate knowledge on a topic to be taught, while 68.2% disagreed. Also, 61.3% of the participants agreed to the fact that, they used ICT when they had access to it, while 38.7% of them disagreed. In addition, 31.8% of respondents agreed that they used ICT only when it was available, while 68.2% disagreed.

Teacher competence in ICT usage

Teacher competencies in ICT usage were also investigated. In this direction, the interest was not about whether early childhood educators have ICT background in terms of certification, but whether they had periodic training in ICT usage and the extent to which such background influence practice. As evidenced in Table 5 of this study, participants were asked if they had access to training in ICT. In response, 75% of the participants responded in the affirmative (agreed), while 25% responded in the negative (disagreed). On the question of whether participants had ample time for hand on practice in ICT, 52.3% agreed while 45.5% disagreed. According to 38.6% of the participants of this study, they had support services that kept them going while 61.4 % said they did not, and 61.3% of the participants said they were proficient in the use of ICT equipment while 38.7% said they were not proficient in the use of ICT equipment. Apart from determining educators' backgrounds in ICT usage, information was also sort on teaching areas that educators used ICT. When participants were asked if they can manipulate the overhead projector, 34.1% said they could (agreed), while 65.9% said they could not (disagreed). In addition, 88.6% of the respondents said they did not use MS word to prepare their lesson plans, whiles 11.4% said they did. On the question of PowerPoint usage, 11.4% said they used it to present lessons (agreed), while 88.6% said they did not (disagreed). However, 65.9% of respondents agreed to being able to use the internet to find information to augment their notes, while 34.1% were not able to use the internet. On the question of being able to interact with colleagues using the social media, 65.9% said they did (agreed), while 34.1% said they did not (disagreed).

Challenges faced in the usage of ICT

In attempt to addressing research question 2, early childhood educators perspectives on challenges faced in the use of ICT, seven areas were examined and these are represented in Table 6 of this study. These were: difficulty in ICT usage by educators, ICT use being time consuming, lack of training on the part of educators, expensive nature of equipment, lack of interest by heads, heavy workloads in ICT use, and school facilities not being appropriate for ICT use. First, when asked if ICT use is difficult, 15.9% agreed to this assertion, while 84.1% disagreed. On the question of ICT use being time consuming, 29.5% agreed, while 70.5% disagreed. On the question of whether participants have training in ICT use, 34.1% of respondents said they did not have any training in the use of ICT; while 65.9% said they have training. As to whether ICT equipment is expensive, 75% viewed it to be too expensive, while 25% did not. On whether school heads showed interest in ICT usage, 91% of respondents disagreed that school heads did not show interest in ICT use, while 9% agreed. In effect, the study revealed that respondents agreed to the fact that, there was interest on the part of management in advancing ICT usage. But when participants were questioned on whether school facilities were appropriate for ICT use, the responses from the participants as indicated in Table 5

Table 6. Challenges faced in the usage of ICT.

Variables	Agree		Disagree	
	N	%	N	%
ICT difficult to use	7	15.9	37	84.1
It is time consuming to prepare and use ICT	13	29.5	31	70.5
I do not have any training in the use if ICT	15	34.1	29	65.9
ICT equipment are too expensive	33	75.0	11	25.0
School heads do not show interest in the use of ICT for teaching	4	9.0	40	91
Workload involve are too much for me	11	25.0	33	75.0
School facilities not appropriate for use of ICT	28	`63.7	16	36.3

shows that 63.7% agreed to being appropriate, while 36.3% disagreed. Most respondents did not see workload involved in ICT to be that much; 75% disagreed to workload involved in ICT to be too much, while 25% agreed to it being too much. Overall, one can conclude based on the responses of participants on challenges associated with ICT use that the dominant challenge as revealed in this study has to do with ICT equipments being expensive.

Conclusion

This study sought to provide some information on the place of Information and Communication Technology (ICT) in Early Childhood Education (ECE) based on the perspectives of some selected early childhood educators from the Winneba municipality in the central region of Ghana. In addition, it also aimed at examining challenges that may be associated with ICT use at the early childhood level based on the perspectives of early childhood educator's who participated in this study. Overall, the findings of this study revealed that notwithstanding the interest, understanding, and appreciation of the place of ICT in early childhood educational practices there still remain a lot of work to be done as a nation in the direction of benefitting from ICT usage especially in the educational development of the early child. Clearly, challenges manifesting in the lack of equipments, non-use of certain basic gadgets and tools such as computers, MS word, Power Point, programmable toys, telephones, fax machines, cameras and a whole of other devicesby educators in their teaching practices definitely needs to be addressed. In fact, reasons for such practices, apart from unavailability of financial resources will definitely need to be investigated and rectified.

Undoubtedly, this study even though provides just a snapshot of the state of ICT use at the early childhood level in the Winneba municipality, it is hoped it will succeed in drawing the attention of stakeholders involved in early childhood education who are conscious of the place and relevance of ICT in successful educational practices,about the challenges that early childhood educators face in the direction of ICT use. Based on this, future studies will have to look at practical and realistic solutions that can be put in place to mitigate some of the challenges revealed in this study. Also, the need to examine the effectiveness of ICT use in teaching and learning especially at the early childhood level is also important. Parental perspectives on the relevance of ICT in early childhood education are also very necessary. In addition, even though it is quiet refreshing to see a greater percentage (65.9% as evidenced in Table 5) of participants in this study agreeing to the use of the internet to augment notes, a further probe into the frequency of use within the spectrum of internet accessibility and reliability is very critical. How often teachers communicate via the social media with colleagues and for what purpose also needs to be investigated.

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