Does ICT influence teaching and learning in Ghana? An evidence-based study on ICT integration in classroom teaching

Research article

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Abstract

The use of information and communication technology (ICT) in Ghana's education is lagging behind expected framework. Very few schools are equipped with basic ICT infrastructure necessary for teaching and learning. Essentially, ICT in education is used to promote information literacy that is the ability to access, use, evaluate information from different sources to enhance teaching and learning, solve problems, and generate new knowledge. This study however, presents findings carried out on a total of 320 teacher trainees made up of students from eight colleges of education. They were chosen using both purposive and probability sampling techniques. Mixed methods though most preferably questionnaires were used in data collection. The study revealed that students' perceptions towards ICT would change if they are continually exposed to the capabilities of ICT. The study recommends that teachers should be provided with sufficient training on how to use ICT in the teaching and learning processes to acquire the requisite knowledge and skills in integrating the technology in classrooms.

Keywords: computer, computer literacy, curriculum, e-learning, hardware, ICT integration, integration

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Introduction

The use of ICT in teaching and learning is most definitely an expensive solution for secondary education, but by facilitating the creation of new modes of teaching and learning and provision of educational resources, it is believed to have a significant role to play in the education sector. To date, the integration of ICT tools into teaching and learning has not been successful not only in Ghana but across several developing countries. However, the emphasis has been put across the continent to provide teachers and students with relevant ICT skills in the hope that this will mystically enable them to embrace the use of ICT positively in teaching and learning in learning institutions.

Literature Review

The term Information Communication Technology (ICT) has had a long history in its evolution process. According to Pelgrum (2004), towards the end of the 1980s, the term 'computers' was replaced by ICT (Information and Communication Technology). This signified a shift of focus from computing technology to computers to enhance the capability to store and retrieve information. This was followed by the introduction of the term 'ICT' around 1992 when e-mail started to become available to the general public. The concept of Information and Communication Technology consists of three words. The term 'Information' refers to any communication or representation of knowledge such as facts, data, or opinions in any medium. 'Communication' is an integral part of human existence. It refers to the process of transferring information from a sender to a receiver with the use of a medium in which the Communication Information is understood by both. 'Technology' is the practical form of scientific knowledge or the science of the application of knowledge.

Therefore, Information Communication Technology (ICTs) are commonly defined in education as 'a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information' Blurton (2000). These technologies include computers, the internet, broadcasting technologies (Radio and Television), and (Mobile) telephony. ICT is a tool. It can be hardware (such as Computers, Digital cameras), software (such as excel, discussion forum), or both. Integration has a sense of completeness or wholeness (Earle, 2002), by which all essential elements of a system are seamlessly combined to make a whole. In education, simply handing out to students a collection of websites or CD-ROM programs, taking your students to the computer lab once a week, or using an electronic worksheet is not necessarily ICT integration. In a properly prepared ICT integrated lesson, ICT, and other crucial educational components such as content and pedagogy are molded into one entity. As a result, the objective of the lesson may be achieved: but if the ingredients were taken away from the ICT integrated lesson, the quality of the lesson would be somehow diminished. (William, 2003).

Instead, technology is integrated when it is used seamlessly to support and extend curriculum objectives and to engage students in meaningful learning. It is not something one does separately; it is part of the daily activities taking place in the classroom. Based on the above, within the education sector in Ghana, ICT is defined as the seamless incorporation of technology to support and enhance students' engagement in meaningful learning and for the attainment of curriculum adjectives. ICT integration is more of a process rather than a product. As with ICT more generally, direct causal effects are not easily identifiable. Furthermore, drawing clear conclusions on the effect of ICT from the range of research evidence and studies can be problematic. Several factors limit effective comparisons, such as differences in sample size, methodologies, and effects, not to mention many differences between education systems in different countries. Notwithstanding these reservations, several proven effects of ICT in terms of learning outcomes emerge. They include:

ICT and student performance,

When considering the effects of ICT in education, there tends to be a focus on whether and to what extent ICT can raise student performance. According to research conducted by the British Educational Communication and Technology Agency BECTA, (2006), there is evidence of a statistically positive association between ICT and higher achievement. Becker et al, (2009) support this view by arguing that computer-based education positively affected student's achievement when compared to traditional classroom instruction.

Individual learner interactivity

Recent trends towards the cognitive approach to teacher-learner integration suggest that the learning process can be enhanced through the use of ICT. For effective use of ICT in instruction, the pedagogical practices used by teachers will need to change from a teacher based on the learner-based Underwood, (2006). Furthermore, due to the interactive nature of ICT, it is well situated for the creative learning approach in which experimentation and critical thinking are emphasized. (World Bank, 2004)

Enhancing efficiency and effectiveness of education administration

New technologies can help improve the quality of administrative activities and processes including human resource management, student registration, and monitoring student's achievements in assessment tests Mugenda, (2006).

Teacher's pedagogical skills in teaching and learning processes

Teachers are a key component in the learning environment and therefore the impact of ICT on teachers and the strategies they employ to facilitate the environment is critical. They

sometimes appear to be an assumption that using ICT to support learning requires change for all whereas clearly, some teaching has been creating an appropriate learning environment for the years without using ICT. However, teachers need to use ICT because it is believed that in doing so; they will provide ever better learning environments Becker et al, (2009). The use of ICT in teaching and learning has a varied impact on teachers.

Impact on the role of teachers

The link between technological development and the transformation of learning is clear in history. The role of teachers has changed and continues to change from being an instructor to becoming a facilitator, coach, and creator of learning environments. This view is supported by Grabbe and Grabe, (2007) who point out that teachers will always need to be instructional leaders in the teaching and learning process. Additionally, Becker, (1994) emphasizes that the teacher's pedagogical practices best supported by computers-use should result in improvement in student academic competencies. Because of the above, it is clear that ICT heralded a paradigm shift in education in that its use in schools is changing how teachers teach and how students learn. Riel, (1990) suggests that teachers require new competencies to be able to integrate the use of ICT in teaching and learning. In assuming their new roles, teachers are expected to upgrade their knowledge and acquire new skills in their pedagogical practices and curriculum development to be able to integrate ICT in teaching and learning effectively. Eurydice (2005) argues that students' ICT skills cannot only be learned in school but also informal content, at home, and with friends. It is emphasized that students' informal learning and experiences in using ICT are far more attractive than the school can offer. As a result, students face a few challenges using ICT in school. Rockman and Chessler, (2000) found in their studies that students' computer literacy improves their academic achievements and positive attitudes in learning. Romboll Management, (2006) indicates that learners with special needs or behavioral difficulties also gain in different ways from the use of ICT. Finally, there can be a positive impact on students when ICT is used appropriately in learning.

Challenges affecting the use of ICT in enhancing teaching and learning attitude

Brooks, (1999) believes that many educators perceive computers as just another burden, commenting on the lack of awareness among educators of the potential offered by computers in the education context, and noting that education has tended in consequence to confine the possibilities of computer use towards processing and e-mail. Other researchers such as Pascopella, (2001) emphasize that some educators felt that computers served only a recreational function, with learners being allowed, for instance, to play games after computing work. However, Potosky and Bobko, (2001) demonstrated that computer use has a positive impact on teaching and learning.

Research design and Methodology

To relate the situation of the study area to what the literature says or discuses which orientations are applicable, fieldwork was conducted where both qualitative and quantitative approaches were adopted. A qualitative method, according to Creswell (1994), is an inquiry into an identified problem based on testing a theory composed of variables, measured with numbers and analyzed using statistical techniques where the goal to determine whether the predictive generalizations of a theory hold. According to McMillan and Schemacher (1997), a quantitative approach emphasizes objectivity and quantification of a phenomenon and thus, maximizes objectivity. In the view of Wolcott (1990), when placed alongside quantitative evidence, quantitative evidence is clear and powerful. Unfortunately, it sometimes appears so powerful that it overpowers the opinions of the people involved. With these benefits, a quantitative method was chosen. This was complemented by a qualitative method. Its advantages motivated this decision. It has the goal of understanding social or human problems from multiple perspectives. This was done to give the respondents the chance to present views which might not have been thought of by the researcher. Again, qualitative research involves an in-depth understanding of human behavior and the reasons that govern human behavior, thus, it investigates the "why" and "how" of decision-making as compared to "what", "where" and "when" of quantitative research. Qualitative research relies exclusively on the analysis of numerical or quantifiable data, which according to Keys (1997), comes in many media (text, sound, still, and moving images).

Findings and Results

Demographic information of principals

The principals were asked to indicate their gender. The information was tabulated as shown in table 1.0.

Table 1.0 Gender distribution of principals

Gender	Frequency	Percentage
Male	5	62.5
Female	3	37.5
Total	8	100

Data in table 1.0 indicates that the majority were male principals and a few females. The majority of the respondents were male.

Respondents experience, knowledge and skills in the use of ICT

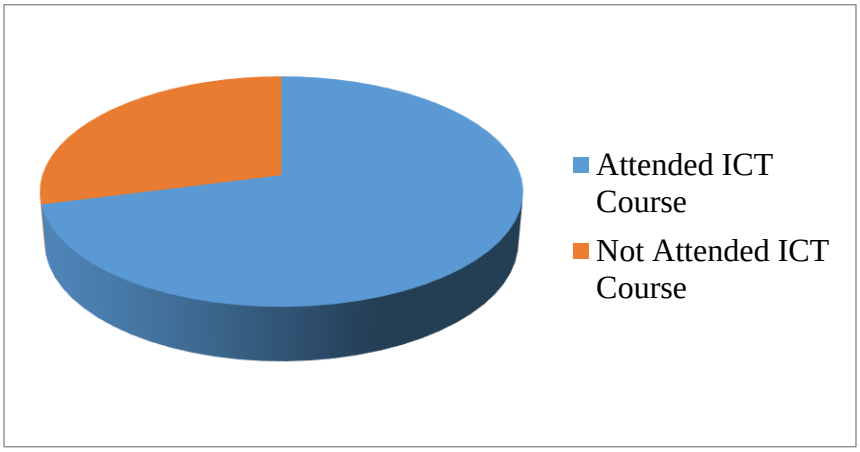
This section deals with the experience knowledge and skills of the respondents in the use of ICT in teaching and learning. The Principals were asked to rate their own experience as ICT coordinators by qualification years in their career. The findings are as indicated in table 2.0.

Table 2.0 Principal experience in using ICT

Experience in years	Frequency	Percentage
6-10 years	2	25.0
11-20 years	5	62.5
Over 20 years	1	12.5
Total	8	100

Data presented in table 2.0 reveal majority of the principals had 11-20 years' experience while a few had 6 to 10 years' experience and others had over 20years' experience. Further, the findings indicate that the majority of principals with the longest experience to make use of ICT in school is 11 years and above. The time that a principal had in a current school can be considered important in the principals' engagement in planning and implementation of ICT integration in their respective Colleges.

Figure 1.0 Tutors who had attended an ICT Course or training



Findings in figure 1.0 show the majority of teachers had attended an ICT course or training. A few teachers had not attended an ICT course or training. The majority of the teachers, therefore, had attained ICT skills and hence ICT literate.

Discussion

The results revealed that computers were not adequate for the full integration of ICT in teaching and learning. This was reported by five schools (62.5%). This signifies the low use of these hardware tools. Regarding hardware application, the results showed that computers were almost always used by tutors and students (Mean 3.79). The least used hardware by teachers was the internet. The findings revealed that the majority of students (66%) had experience in using computers in school. The finding revealed a positive correlation between ICT and competences. This result is consistent with (Petrogiannis, 2010) who found that computer experienced teachers were more ready to use ICT in their classes than non-experienced teachers. Further, the analysis revealed that teachers' perceptions, with regards to the use of ICT, were positive and low but not statistically significant. The study revealed that there was an inconsistency between teachers' belief and their actual use of technology in the classroom. Further, the analysis revealed that the majority of respondents 97%, identified inappropriate teacher training as a major barrier in the integration of ICT in teaching and learning. The evidence from the study also proves that the majority of the respondents 62.5% indicated that lack of technical support in schools to enhance the successful integration of ICT was a major hindrance.

Conclusion

The linking of computers to education across the world is known to many people because it is believed that ICT has a crucial impact on teaching and learning. Therefore Educational Institutions are witnessing a paradigm shift brought about by the use of ICT that others have even started seeing ICT as an indispensable tool in the teaching and learning process. As a result, the research findings revealed that if students are continually exposed to the capabilities of ICT, their perceptions towards ICT would change. The teacher's involvement in the use of and perception has also changed positively towards the use of ICT in teaching and learning. It is evident from the findings in the study that some Colleges that have put more effort to integrate ICT in teaching and learning. With this, teachers are faced with the responsibility to utilize ICT.

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