ABSTRACT
There is growing concern in Africa about the use of computers to support learning in educational institutions. Information and communication technologies (ICT) are used to gather, analyze, modify and exchange information. They are used in almost all spheres of human activity. The computer and the internet are increasingly making their way into teaching and learning practices and processes. This paper discusses teachers’ readiness for the use of ICT in Ghanaian schools. Findings come from research that employed the case study approach, with schools and classrooms as cases, in which both quantitative and qualitative data was gathered to understand the use of ICT in the selected schools. The following results were obtained: 71% of teachers do not use ICT in classrooms, 49% of teachers use ICT to prepare lesson notes, 55% of teachers have some knowledge of web browsing, 71% use email, and 78% try to make an effort to learn how to use the computer. Despite the limited use of computers by teachers in their teaching, many agree that the computer has changed the way students learn. And 24% of teachers have received some form of training in the use of computers, with quite minimal training in the pedagogical integration of ICT. In conclusion, most teachers do not seem prepared to integrate ICT in their teaching practices. Teachers’ use of ICT to facilitate learning merits ongoing research and reflection.

Key words: pedagogy – ICT integration – teacher readiness – learning – teaching

RESUME
L’intérêt concernant l’utilisation de l’informatique dans les institutions éducatives va grandissant en Afrique. Les technologies de l’information et de la communication (TIC) sont utilisées pour rassembler, analyser, modifier et échanger des informations. Elles sont utilisées dans presque toutes les sphères de l’activité humaine. L’ordinateur et internet prennent de plus en plus de place dans les pratiques et processus d’enseignement et d’apprentissage. La question soulevée dans ce papier est de savoir si les professeurs au Ghana sont prêts à utiliser les TIC dans leur enseignement. Les résultats proviennent de recherches basées sur une étude multi-cas, avec des écoles et des classes étudiées comme cas, dans lesquelles des données à la fois quantitatives et qualitatives ont été recollées pour comprendre l’utilisation des TIC dans les écoles sélectionnées. Les résultats suivants ont été obtenus : 71% des professeurs n’utilisent pas les TIC dans leurs classes, 49% des professeurs utilisent les TIC pour leurs préparations de cours, 55% des professeurs disposent de quelques notions pour naviguer sur internet, 71% utilisent la correspondance électronique et 78% font des efforts pour accroître leurs compétences en informatique. Malgré une utilisation limitée de l’informatique par les professeurs dans leur enseignement, beaucoup s’accordent à dire qu’elle a modifié le comportement des élèves en matière d’apprentissage. Et 24% des professeurs ont suivi une formation pour utiliser un ordinateur, avec une formation minimale liée à l’intégration des TIC à la pédagogie. En conclusion, la plupart des professeurs ne semblent pas préparé à intégrer les TIC dans leurs pratiques pédagogiques. L’utilisation des TIC par les professeurs pour faciliter les apprentissages mérite encore recherche et réflexion.
Introduction
From the early 1990s, education stakeholders in Ghana have been concerned about how teachers and students use computers in schools and how their use supports learning. Teachers use computers to write lesson plans, prepare materials for teaching, record and calculate student grades, and communicate with other teachers. As such “computers have become a routine tool for helping teachers accomplish their professional work” (Becker, Ravitz & Wong, 1999: 32). However, many teachers do not facilitate substantial student use of computers for learning activities (Becker, Ravitz & Wong, 1999: 31; de Corte, 1990; Karsenti & Tchaméni-Ngamo, 2007, Newhouse, 1999).

Information and communication technologies (ICT) do not “automatically add quality to teaching and learning. It is possible to use [them] for trivial purposes, to waste students’ time ... or even worse, [use them] for destructive or immoral purposes” (Dellit, 2002: 56) or to entrench differences. A case in point for Dellit (2002) was the fact that African American students in the USA are “less likely to be exposed to higher order uses of computers and more likely to be exposed to lower order uses than white students. Similarly, poor, urban, and rural students [are] less likely to be exposed to higher-order uses than non-poor and suburban students” (Wenglinsky, 1998: 3; see also Kreuger, 2000).

However, literature attests to the power ICT can have in teaching and learning processes (Fonkoua, 2006; Newhouse, 2002). It has been suggested that using technology well in classrooms can even prepare students to be more effective citizens (John & Sutherland, 2004) in increasingly open and democratic societies. Research in West and Central Africa shows that ICT for teaching and learning in school environments can contribute to developing a more child-centred approach to pedagogy (ROCARE, 2006).

Teachers with pedagogical proficiency who are ready and willing to transmit knowledge and support students to construct knowledge will normally make a difference in any learning process. In this age of ICT and its integration in the educational system, the role of the teacher, just like in the traditional classroom environment, should not be overlooked or underestimated. If teachers possess little knowledge of ICT as is the case of most Ghanaian teachers then the integration of ICT into pedagogical practices is seriously compromised.

It is not just acquiring the knowledge of ICT that is important. Teachers need to understand how to use ICT pedagogically. ICT used appropriately can stimulate the development of higher cognitive skills, deepen learning and contribute to the acquisition of skills needed for learning all life long and for working in today’s job market (Tchombe, Maiga, Toure, Mbangwana, Diarra & Karsenti, 2008). But teachers must have opportunities to develop requisite aptitudes, be able to observe or experience constructive learning, and be motivated. In most countries innovation is thought about, invited into educational practices, and pushed down the throats of teachers without warning or preparation (Maclure, 1997). To make innovations and reforms meaningful, those who will be most directly effected – in schools, this would be teachers, students, parents and administrators – need to be part of the conception and planning process (Samoff, Sebatane & Dembélé, 2003; Weva, 2003).
The objective of our investigation is to determine if teachers are being involved in the process of integrating ICT into education in Ghana and whether they are ready to use ICT to contribute to improving the quality of education. We will describe the current technological skills of teachers, whether students are benefiting from the use of ICT, and how ready teachers are to use it in teaching and learning.

**Methodology**

Empirical evidence is derived from a major study on ICT integration in schools in West and Central Africa involving 66,000 students and 3,000 teachers. For Ghana though, the total student sample was 10,000 and the teacher sample 500, of which 5,048 and 221 respectively responded to the quantitative research instrument. The Ghana data was extracted from the overall data for analysis, however findings were similar as in the other countries where the study took place – Benin, Cameroon, Ghana, and Mali.

The case study approach provided the possibility for in depth study of the selected schools. A multistage, funnelling selection process was used to select schools from different levels and of different types:

- basic and secondary schools;
- public and private schools;
- mixed and unisex schools;
- schools with educational CD ROMS and schools without.

A stratified list of the categories of schools was provided and depending on the number of schools in each category, proportionate numbers of each category were picked randomly until a predetermined total number of schools (22) were selected for screening. After screening, eight schools were retained, according to their pertinence for helping to answer the research questions.

**Table 1. Selected schools and their characteristics**

<table>
<thead>
<tr>
<th>School, City</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning Star, Cantonment suburb of Accra</td>
<td>Private, Mixed, Basic</td>
</tr>
<tr>
<td>Jack and Jill, Accra</td>
<td>Private, Mixed, Basic</td>
</tr>
<tr>
<td>Soul Clinic International, Cantonment suburb of Accra</td>
<td>Private, Mixed, Basic</td>
</tr>
<tr>
<td>Presbyterian Secondary School, Osu suburb of Accra</td>
<td>Public, Mixed, Secondary</td>
</tr>
<tr>
<td>T.I. Ahmadiya Secondary School, Kumasi</td>
<td>Public, Mixed, Secondary</td>
</tr>
<tr>
<td>Armed Forces Technical School, Kumasi</td>
<td>Public, Mixed, Secondary</td>
</tr>
<tr>
<td>Saint Mary’s, Korle Bu area of Accra</td>
<td>Public, Girls, Secondary</td>
</tr>
<tr>
<td>Accra Academy, Bubiashi suburb of Accra</td>
<td>Public, Boys, Secondary</td>
</tr>
</tbody>
</table>
As Table 1 above indicates, there were five public and three private schools, five secondary and three basic schools. There were six mixed schools (with girl and boy students), one with girls only, and one with boys only. All schools were in two urban areas: six in the capital city of Accra and two in Kumasi to the north of Accra.

Qualitative data was gathered via interviews and focus group discussions with heads of schools, managing directors, teachers, students and parents as well as through school and classroom observation and review of documents produced by administrators, teachers and students. Quantitative data was gathered via questionnaires from students and teachers. SPSS (version 12) was used in analyzing quantitative data, as was linear regression.

Presentation of results and discussion

Teacher ICT skills and training

Teachers were queried about their skills with regard to ICT and use of ICT in their pedagogical practices. Of teachers questioned, 71% responded that they never use the computer in class (i.e. using a computer during class time or taking students to the computer laboratory). Ten percent said they always use it for pedagogical purposes, that is for their classroom activities.

About 44% of teachers never used the computer in preparing lesson notes while 49% did. A third of those who do use it in preparing lessons do so “always” (16% of the total teachers questioned) and the rest “occasionally.” These uses include using the computer in internet searches for content, typing out lesson notes, and designing teaching and learning materials. Those who use the computer use it at school, at home, or at cyber cafés.

Regarding knowledge of web browsing, 58% of teachers consider that they have some knowledge while 30% consider they have none, and 12% did not express an opinion in this regard. And 71% of teacher use email.

Up to 78% of teachers on their own volition learn to use the computer. Twenty eight percent of the teachers interviewed said they always tried to learn the computer on their own or with the support of their friends. Half of the teachers interviewed shared that they occasionally learnt the computer to be abreast of its use and be technically updated while 15% of them said they never did unless coerced by their peers or out of a punctual necessity to use the computer, and 7% indicated no response.

Despite the fact that some teaches do not use ICT at all, teachers generally agreed that the computer had changed the way students learn, with 43% responding that computers changed “significantly” the way students learn. Some of the comments made were that computer use for pedagogical purposes should be intensified and exploited to the full. Regarding training, 24% of teachers said they had received some form of training on using the computer. This included both formal and informal training although training geared towards pedagogical integration of ICT was quite minimal – as was the case in the other four countries in which the study was conducted.

Clearly then, if we were to go by the theory of Gregoire, Bracewell and Lafarriere (1996) in John and Sutherland (2004) that the “benefit to students of using new technologies is greatly dependent, at least for the moment, on the technological skill of the teacher and the teacher’s attitude to the presence of the technology in teaching,” then we may conclude to some extent that students are not really benefiting from new technologies in school. The temptation here is to say that if the teachers are not technologically inclined, then the benefits of ICT to students are minimal.
We should be careful however not to entirely link student benefits of using ICT to teacher success, as several theorists debate the role of the teacher in the acquisition of ICT knowledge by students. For instance Papert (1987) introduced the role of cultural background in learning and in developing skills and concepts to use the potential of computers. He claimed that most people, particularly children, have in their culture or environment very little of the systematic and process thinking inherent in computers. However, it must be mentioned that children in general are very quick learners and when it comes to ICT, it is a matter of curiosity, imagination and adventure.

Papert proposed that many people are hampered by their beliefs about their own lack of capabilities in these areas of thinking. Therefore, students need to be supplied with non-threatening computer environments in which they may explore their own potential. In this way students will develop workable conceptual frameworks for computer use. Papert believes that culture and environmental variables, which are quite silent variables in Gregoire’s postulation, play a vital role in ICT integration.

Despite the low skills of teachers, the students interviewed thought they had gained some benefits in using ICT. Among those who responded to the questionnaire, 62% percent claimed to use the computer for general knowledge while 13% use it for academic purposes. About 13% of the students use it for communication while 10% use it for research.

Notwithstanding the benefits mentioned by students, the role of teachers and professional development for integrating ICT cannot be downplayed. As Ofsted (2002) maintains, where “training [in England] has not yet started or has failed to meet the needs of teachers, the use of ICT is usually underdeveloped.”

**Way forward on professional development**

Using Gregoire’s contribution then, what direction is integration going if the teachers themselves have minimal knowledge, skills and differing attitudes? John and Sutherland (2004) argue that “[a]t the moment we have too much ‘innovation stretch’ where the gap between pioneers, and the medium and non-user is wide. For this ‘long tail’ to be shortened, new and innovative forms of professional development need to be instigated.” He explains that most of the professional development to date has been based on the idea of “re-tooling,” that is training is structured to “augment the existing curriculum by providing specific training to groups of teachers in the mechanics of the technology.” He further argues that what is needed is “what Watson et al. (1999) call a ‘re-forming’ approach, whereby training is built on a staged process through which teachers have to pass in order to change their practice.” Ertmer (2000) refers to this as “scaffolding” teachers through the adoption and change process. Unfortunately, NGOs and other organizations that provide ICT training for teachers in Ghana rarely conduct an evaluation of prior knowledge to inform the training.

A few teachers are experimenting the use of ICT intra and inter-subject to enhance pedagogy. Such practices are likely to take root across the country, but in an uneven fashion depending on access, individual and group initiative, and support from school administration. The broader institutionalisation of ICT use in teaching and learning will take more time, though the study did reveal the beginning of promising practices for durability of ICT in schools, such as parent involvement and the creation of school committees responsible for ICT integration.

An obvious start has to be the issue of teacher skills. In general most teachers are far less competent with ICT than their students. Many of those over the age of 45 have had little
exposure to computers until recently and are just learning to handle email. Concerted training efforts are required to get most academic staff up to a basic standard of computer competence and this should be a priority. In one school studied, the administration actually organizes training sessions in which students train groups of teachers!

As Newhouse (1999) points out, “rarely are teachers given the time or encouragement to reflect on their beliefs about learning or consider implementing new learning programmes. According to John & Sutherland (2004), it is important that teachers “engage directly in the process of learning” being offered to students. This helps teachers “get on the inside of the innovation as well as increasing their confidence, competence, experience and understanding of the technology and its pedagogical implications.”

In conclusion, although ICT skills of teachers in Ghana are limited, the number of teachers using them is on the rise and so are opportunities to learn them. What is observed is the willpower teachers have to learn ICT and ICT integration, which must be harnessed by government without delay. Technical knowledge about computers is as important as experience using computers professionally, but exemplary teachers will have objectives for student use of computers that promote “student engagement and thoughtful effort, outside of class time as well as during class” (Becker, Ravitz & Wong, 1999: 32). Teacher training and an environment that promotes reflection on teaching practice are vital to support beneficial pedagogical integration of ICT.

**Bibliography**


ERNWACA. See ROCARE.


