

## Assessing the availability of Information and Communication Technologies in teaching and learning in High School Education in Ghana.

**Christopher A. Abilimi**, Lecturer, CSE Department, Christian Service University College, Kumasi, Ghana.

**Linda Amoako**, Lecturer, CSE, Christian Service University College, Kumasi, Ghana.

**Judith N Ayembillah**, Lecturer, CSE Department, Christian Service University College, Kumasi, Ghana.

**Dr. Thomas Yeboah**, HOD, CSE Department, Christian Service University College, Kumasi, Ghana.

---

### ABSTRACT

*The need to use Information and Communication Technology (ICT) in education has gained universal grounds because it is a significant means for improving the quality and standard of education. This accession is due to the fact that the use of ICT in education has an optimistic advantage on teachers and students motivation to teach and learn respectively. This study investigates the availability of Information and Communication Technologies (ICTs) in high schools education in Ghana at the Akuapem North Municipality. The methods used were questionnaire, and interview with both students and teachers. The study concludes that majority of respondents surveyed indicated that many schools in the municipality had computer laboratories and use various ICT tools like the computer, printers, pen drive and digital cameras to enhance teaching and learning.*

**Keywords** Availability, Teaching, Learning, Information and Communication Technology, Education, High School

---

### 1. Introduction

According to Pelgrum and Law (2003), the issue of 'computers in education' started to become popular in educational policy-making in the early 1980s, when relatively cheap microcomputers became available for the consumer market. They also note that with regard to the early introduction of microcomputers in education in 1980s, there were high expectations that it would make education more effective and motivating.

Hepp, Hinoestroza, Laval and Rehbein (2004) claimed in their paper "Technology in Schools: Education, Information and Communication Technology (ICT) and the Knowledge Society" that ICTs have been utilized in education ever since their inception, but they have not always been massively present.

Although at that time computers had not been fully integrated in the learning of traditional subject matter, the commonly accepted rhetoric that educational systems would need to prepare citizens for lifelong learning in an information society boosted interest in ICTs (Pelgrum & Law, 2003).

Moreover, Kozma and Anderson (2002) wrote in their paper "ICT and Educational Reform in Developed and Developing Countries" that education is at the core of the knowledge economy and learning society and that correspondingly, the role of ICTs in schools is shifting dramatically.

In a similar vein, Kozma and Wagner (2003) contended that the promise of information and communications technologies to enhance the basic education is a tremendously challenging area of development work today, in both poor and wealthy nations. Access and use of Information and Communication Technology facilities as indicated by Lima (2006), "undoubtedly the internet and other ICT tools in general constitute a valuable channel for knowledge dissemination and opportunities for development and growth among nations in the world".

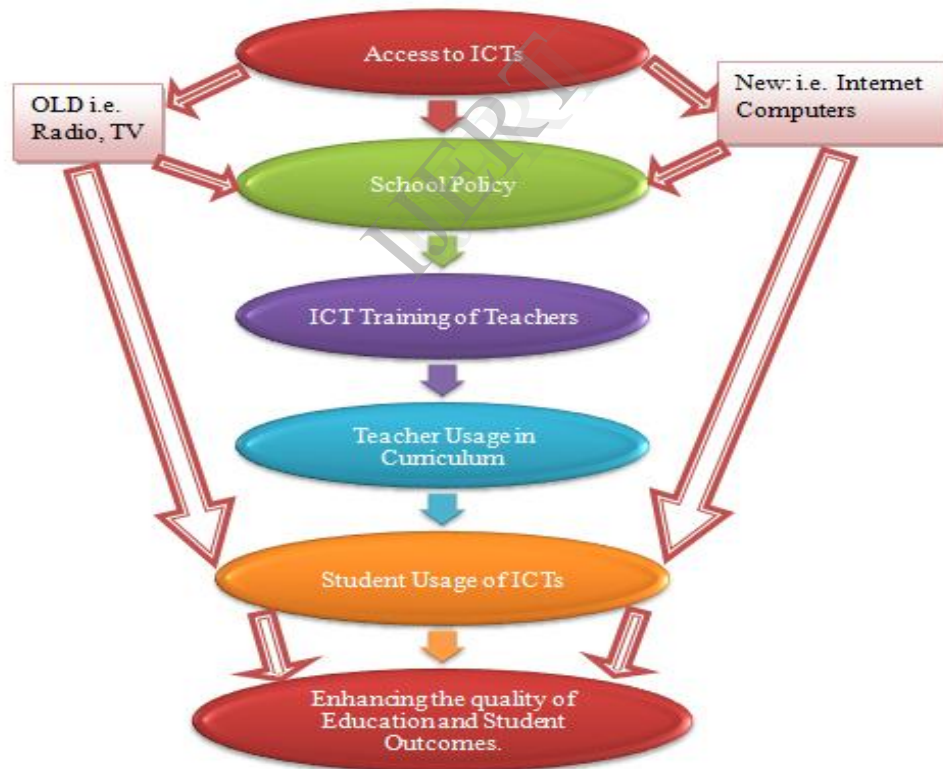
Furthermore, Harvey (1993) envisaged that the effectiveness of the use of computers in education may be an important factor in determining which countries will succeed in the future.

There is abundant evidence to support the proposition that the integration of ICTs (for example: computer, internet, mobile phone) effectively in teaching and instruction can facilitate acquisition of 21<sup>st</sup> century skills. According to Kozma (1991), taking into consideration the processing capabilities of ICT tools, it must be argued that: ICT may enable learners to elaborate their mental models and correct their misconceptions with the use of a macro world; ICT can enable learners to connect their symbolic learning in school to real world situations; and ICT can also enable learners share ideas across different cultures. Bransford, Brown and Cocking (1999), claimed that a number of features of ICT tools are consistent with principles of the science of learning and hold promise for improving teaching and learning.

However, Land and Hannafin (2000), indicated that lack of pragmatic factors (for example; lack of access of ICT) can inhibit full utilization of ICT (computer, mobile phone and internet) in teaching and learning. Access and use of ICT are variable assets in effective education, and hence the benefit of ICT in education can be realized if students have access to ICT tools and use them pedagogically. Since technology is financially expensive in developing countries, access to and use of technology in schools and institutions might be problematic as compared to developed nations. Thus access to and use of ICT tools in terms of ratio of teachers and students might differ significantly among developing countries and developed countries. In this regard, effective innovative pedagogical models developed from the perspective of ICT in developed countries might not directly work successfully in developing countries.

The usage and access of ICTs needs to be carefully monitored to ensure that they are used effectively. There exist a number of internationally sponsored and periodically administered surveys, each of which collect some limited information on ICTs within schools and provide a preliminary overview of the situation for many countries (UNESCO, 2006). However, there is a lack of systematically collected data on the availability, access, use and impact of ICT in education at the national level. Although many countries do not conduct dedicated national school surveys, most national ministries of education or national statistical offices do collect some basic administrative data related to infrastructure and availability of ICTs within schools from which a core set of indicators can be built and analyzed

Ultimately, where a country has high levels of ICT skills and expertise, society will be better placed to combat social exclusion and the information divide, as well as to identify opportunities for economic growth. From the individual standpoint, access to certain forms of ICTs may increase the choices available to individuals. With increased access to information, individuals are able to make more informed decisions. This is the very essence of empowerment. The access and use of technologies for education can be seen in various aspects of the education system and can be represented by the following diagram:



**Figure 1:** The Place of ICTs in the School System (UNESCO, 2006)

## 2. Methodology

According to Leedy and Ormond (2005), if the population size is around 1,500 samples size should be 20%, and if it is above a certain population size (approx  $N > 5000$ ) a sample size of about 400 is adequate. The population is more than 5000 and thus 400 of the population were considered as the suitable samples size and were used for the study. The researchers administered 400 total questionnaires, interviews and focus groups discussions, and a sample of three hundred and three (303) respondents made up of eighty eight (88) teachers and two hundred and fifteen (215) students responded to them.

The researcher employed Stratified sampling method to group the school population into two (2) main categories: teaching staff, and student. Random sampling was then employed to select 400 respondents for data collection. Stratified sampling technique was adopted as it embraced the distinct categories and organized them into separate strata. This technique was more efficient because it improves accuracy of estimates.

Purposive sampling was also used as a technique in data gathering. The study started with a survey, and then finally, purposive sampling was done based on the survey of the population of students and teachers. The data (primary/secondary sources) collections were done with data collection instruments such as questionnaire, interview and focus group discussions, and the collected data was analyzed using Statistical software called general statistical package (GENSTAT), and the results interpreted and discussed.

## 3. Results

### 3.1 The Availability of ICTs in School

The analysis of the factors responsible for determining the availability of Computer Assists in Teaching is shown in Table 1.

**Table 1**

Availability of Computers in Assisting Teaching and Learning

	<b>FREQUENCY</b>	<b>PERCENT</b>
HELP ACCESS ENCYCLOPEDIA FOR INFORMATION	79	26.1
RELATE THEORY ASPECT TO PRACTICAL WORK	134	44.2
REPLACE WRITING ON THE CHALKBOARD / WHITE BOARD	32	10.6
INTERNET	46	15.2
ON-LINE DISCUSSION FORUMS	12	4.0
<b>TOTAL</b>	<b>303</b>	<b>100.0</b>

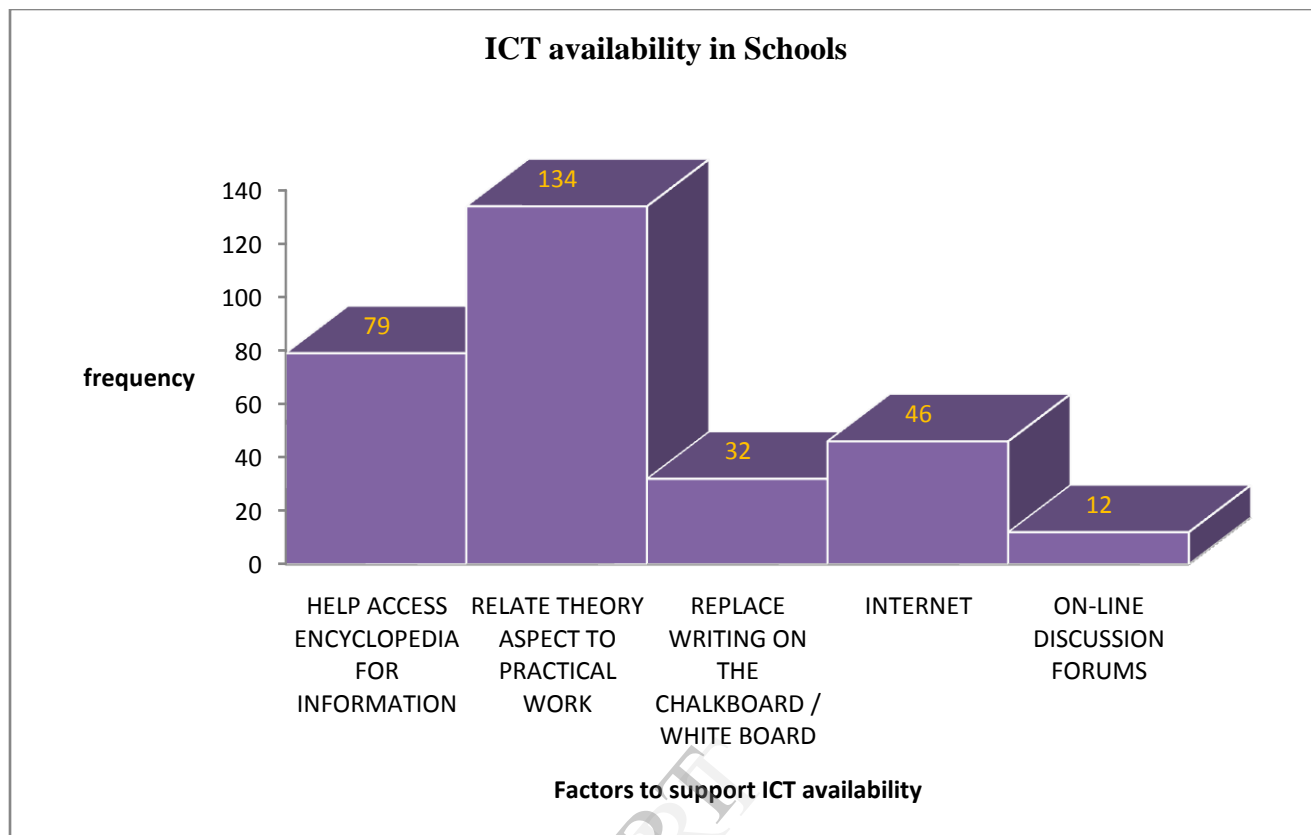


Figure 2: Computer Assists in Teaching

From Table 1 and Figure 2 above, 79 (26%) said that it helps access encyclopedia for information, 134 (44%) indicated that computer assist in teaching because you can relate theory aspect to practical work, 32 (11%) said that computer assist in teaching in the sense that it has now replaced writing on the chalkboard/white board, 46 (15%) also said that computers can now assist in teaching because there is now online discussion forums that you can join. In addition, computer assists in teaching because we can now use the computer to learn how to type using software such as Mavis Beacon Teaches Typing or Rapid Typing instead of the Typewriter.

### 3.2 ICT Enhancing Learning Outcome

The analysis of the responses of the various respondents to find out if the use of ICT enhances learning outcome in school is shown below in Table 2:

Table 2  
ICT Enhance Learning Outcome

	FREQUENCY	PERCENT
YES	279	92.1
NO	24	7.9
<b>TOTAL</b>	<b>303</b>	<b>100.0</b>

From Table 2 above, 279(92%) indicated “Yes” the use of ICT enhances learning outcome in their various schools. However, 24 (8%) said ‘No’ and that ICT does not enhance learning outcome in their school.

From the analysis it is clear that most respondent said ICT enhances learning outcome, for instance ICT helps to do basic calculation, typing, sending and retrieving information, researching and a host of others.

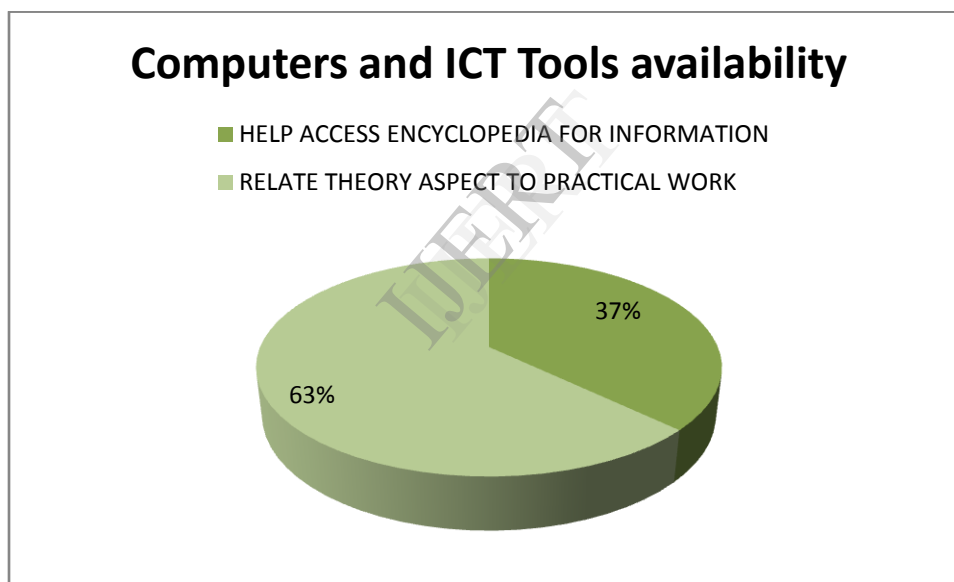
### 3.3 Computer or other ICT Equipment

**The analysis of the responses of the various respondents to find out** if they can use the computer to do basic work and the results for the analysis are shown in *Table 3*:

**Table 3**

Computer or other ICT Equipment

	FREQUENCY	PERCENT
YES	280	92.4
NO	23	7.6
<b>TOTAL</b>	<b>303</b>	<b>100.0</b>



*Figure 3:* Computer or other ICT Equipment

From Table 3 and Figure 3, it is clear that 280 (92%) showed that they can use the computer or other ICT equipment to do basic work. However, 23(8%) showed that they cannot use the Computer or other ICT equipment to do basic work. It is obvious that, most respondents can use the computer or other ICT equipment to do basic work.

#### 4. Discussion

What the research sort to find out from the Table 1, 44.2% indicated that the computer assist in teaching because student and teachers can relate theory aspect to practical work, 26.1% said that ICT helps access encyclopedia for information, however, 15.2% also said that computers can now assist in teaching because with the help of the internet student and teachers can now access, retrieve and download information, 10.6% said that computer assist in teaching in the sense that it has now replaced writing on the chalkboard/white board. The literature, review that in spite of the sums so far invested in bringing ICTs to the classroom, many schools, and indeed teachers, still seem unclear how to make the best use of them.

According to Cuban (2001), the expectations in the past were to make schools more efficient and productive, to transform teaching and learning into an engaging and active process connected to real life, and to prepare young people for future workplaces.

#### 5. Conclusions

The conclusion drawn from this section is that most teachers' use computers to teach as most schools have computers in their laboratories. Administration and some teachers even have their own laptops. The research also concluded that majority of the schools in the Akuapem North Municipality have ICT Laboratory. Also the research sought to find out how many computers can be found in their ICT laboratory. It is observed that 54.8% indicated that they have less than 20 computers, however, 33.6% have 20-30 computers, and 10.6% indicated that they have 30-40 computers in their ICT laboratory. The research also concluded that most students share computers in their various schools in the Municipality. This shows that students are able to learn and share ideas from their colleagues.

#### References

- Bransford, J.D., Brown, A.L. & Cocking, R. (1999). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press
- Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA:
- Harvey W B.( 1993) Educational technology and Third World development, *Journal of Educational Technology Systems*, 11(3): 265-270
- Hepp, K. P., Hinostroza, S.E., Laval, M.E., Rehbein, L. F. (2004) "Technology in Schools: *Education, ICT and the Knowledge Society*" OECD. Available: [www1.worldbank.org/education/pdf/ICT\\_report\\_oct04a.pdf](http://www1.worldbank.org/education/pdf/ICT_report_oct04a.pdf).
- Kozma, R. & Anderson, R.E. (2002) "*Qualitative Case Studies of Innovative*
- Land, S., & Hannafin, M. (2000). Student-Centered Learning Environments. In D. Jonassen and S. Land, (Eds), *Theoretical Foundations of Learning Environments*. Mahwah, NJ: Lawrence Erlbaum Associates
- Leedy, P.D. and Ormrod, J.E.(2005). *Practical Research – Planning and design*. (8th Ed.). USA: Pearson Prentice.
- Lima, C.O.(2006). *It's not all about access: A comparative study of global citizenship and ICT use between Brazilian and American students utilizing a social inclusion framework*. Doctoral dissertation, University of Connecticut, 2006
- Osman, M. & Hannafin, M. (1992). Metacognition research and theory: Analysis and implications for instructional design. *Educational Technology Research and Development*,
- Pelgrum, W. J., Law, N. (2003) "*ICT in Education around the World: Trends*,
- UNESCO (2006). ICTs and Education Indicators. *Suggested core indicators based on meta-analysis of selected International School Surveys*. UNESCO Institute for Statistics, Québec, Canada.