

ENHANCEMENT OF ICT IN POLYTECHNICS FOR ACCELERATED DEVELOPMENT

Edwin Mends-Brew
Accra Polytechnic, Tudu,
GHANA.

ABSTRACT

Information and communication technologies in education deal with the use of Information and Communication Technologies (ICTs) within educational technology. Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. The study is to determine the types of ICT facilities available for students' usage. The efficient use of these ICT facilities by students for effective learning and self development that gear towards accelerated development and the extent to which students appreciate the use of these facilities in their studies; The ICT facilities that require enhancement for effective teaching and learning. The study made use of primary data collected using stratified random sampling. The data is analyzed using graphs and tables as well as percentages and chi-square test of goodness-of-fit. The results show that the introduction of ICT facilities in the Polytechnics has improved teaching and learning. There are ICT facilities available for students use to facilitate teaching and learning for accelerated development. The ICT facilities are efficiently used by students in the course of their studies for self development and accelerated national development. The study recommends that there should be an enhancement in some ICT facilities such as Audio-visuals, Applications software, networking facilities etc. The study thus concluded that the Enhancement of ICT facilities in the Polytechnics has resulted in the advancement of human capabilities for accelerated development.

Keywords: Information and Communication Technologies (ICTs), Educational Technology, Technical Vocational Education and Training (TVET)

INTRODUCTION

According to Richey (2008) Definitions of the Field Technology Trends), information and communication technologies in education deal with the use of Information and Communication Technologies (ICTs) within educational technology. Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources. The term educational technology is often associated with, and encompasses, instructional theory and learning theory. While instructional technology covers the processes and systems of learning and instruction, educational technology includes other systems used in the process of developing human capability. Educational Technology includes, but is not limited to, software, hardware, as well as Internet applications and search engines including Google, Wikipedia, and social networks such as Facebook and Twitter.

The integration of ICT in education is to familiarize students with the use of information technology, since all jobs in the society of the future will be dependent on it for accelerated development is paramount. In the last decade, teachers have had to face major challenges as new Information and Communication Technology (ICT) was progressively introduced into the classroom. With the growing popularity of home computers and the Internet, it seemed that technology could significantly transform learning and teaching practices that will improve human capability for accelerated development.

At the same time, some people question the relevance of widespread use of ICT in the classroom as most studies show no significant improvement in student performances and learning (Russell, 1999). Integrating technology into the classroom is not unanimously accepted among scholars and teachers and, according to some; it entails many dangers (Armstrong & Casement, 1998; Postman, 2000)

Polytechnic education in Ghana is a three-year programme of study leading to the award of the Higher National Diploma certificate. The programme is designed specifically to equip graduates to occupy

middle level manpower positions in both the public and the private sectors of the economy. It is a practical-oriented diploma programme which provides technical knowledge to graduates essentially to enhance accelerated development (Owusu-Agyeman, Yaw (2006) *Government access-policies on polytechnic education in Ghana*)

The Government of the Republic of Ghana is committed to pursuing an ICT for Accelerated Development (ICT4AD) vision. This is aimed at improving the quality of life of the people of Ghana by significantly enriching their social, economic and cultural well-being through the rapid development and modernization of the economy and society through the use of information and communication technologies as the main engine for accelerated and sustainable economic and social development (The Ghana ICT in Education Policy, 2006).

Modernizing Ghana's educational system using ICTs to improve and expand access to education, training and research resources and facilities, as well as to improve the quality of education and training, make the educational system responsive to the needs and requirements of the economy and society with specific reference to the development of information and knowledge-based economy and society.

The introduction of ICT facilities coupled with traditional methods of teaching in the Polytechnics has improved efficiency and effectiveness of teaching and learning in all the departments of the Polytechnics for accelerated development.

The question of interest is whether enhancement of ICT in the polytechnic has resulted in advancement of human capability for accelerated development. Whether the introduction of ICT facilities in the Polytechnics has improved teaching and learning and the type of ICT facilities available for students use to facilitate teaching and learning for accelerated development.

The role of Information and Communication Technologies (ICTs) in the development of any nation is so vital that it cannot be over-emphasised. There is no doubt that ICTs present a revolutionary approach to addressing developmental questions due to their unequalled capacity to provide access to information instantaneously from any location in the world at a relatively low cost. This has brought down global geographic boundaries faster than ever thought possible. The resulting new interconnected digital world has brought in its wake rapidity in flow of information, capital, ideas, people and products

The Government of the Republic of Ghana, in its commitment to reviewing the national socio-economic development agenda has made education the pivot of its development plan. Information and communications Technology (ICT) has been identified as a significant tool to be used in the delivery of quality education. Thus "McLuhan's notion of a Global Village" seems more appropriate now than when it was first carved.

Information and Communication Technologies (ICTs) as introduced in tertiary institutions by the Government through the Ministry of Education was informed by the following Policy considerations among others:

- The dawn of information age, characterised by ICTs, is making information and knowledge-based economies more globally competitive.
- For the Labour market environment, ICT usage and professional skills are required in the educational sector which has the responsibility of developing the human resource base for national development. The educational sector is therefore obliged to put in place the necessary mechanisms to ensure that the human resource outputs of education can be suitably absorbed.
- ICTs will also help Ghana achieve its goals set within the wider developmental objectives as defined by the Ghana Poverty Reduction Strategy, the Education Strategic Plan, Ghana Government White Paper on the Report of the Education Reform Review Committee, the Science and Technology Policy among others.(The Ghana ICT in Education Policy, 2006)
- To minimize the digital divide, it is prudent that any developing country develops its national ICT policy and strategic plans as a guide for the development process.

To this end, Technical Vocational Education and Training (TVET) institutions like the Polytechnics and other training providers have been sufficiently empowered to spearhead the formation of well balanced individuals with the requisite knowledge, skills, values, aptitudes and attitudes to become functional and productive citizens who are adaptable to the demands of a fast changing world driven by modern science and technology to the intent that they are capable of using ICTs confidently and creatively to achieve personal goals for full participation` in the global and knowledge economy.

Have these ICT facilities been used efficiently and effectively by students in the course of their studies for self and accelerated development? Does any of these ICT facilities require enhancement for effective teaching and learning,

The hypothesis is that enhancement of ICT facilities in the Polytechnics will not result in advancement of human capability for accelerated development. The expectation is that the enhancement of ICT facilities in the Polytechnic will improve human capability hence accelerated development will be accomplished.

There are increasing signs, undeniably, to believe that the introduction of ICT facilities in the Polytechnics have contributed to effective teaching and learning over the years.

MATERIALS AND METHODS

The main instrument used in this research work was design questionnaire. Due to the nature of the research, equipment which might have been employed in other types of research were not of importance to this study.

The data used for this research is primary data obtained from the survey of 2000 final year student of Accra Polytechnic as secondary information was not accessible on the variables mentioned in the specific objectives of this research.

The sampling procedure for selecting the sample for interviewing was stratified random sampling. Stratified random sampling is categorizing a heterogeneous population into homogeneous subgroups called strata and the sample is drawn either proportionately or disproportionately from each stratum. This probability sampling procedure was adopted because of the nature and size of the population. The population constituted of final year students (2000) from the various departments in the Polytechnic which have different characteristics thus enabling this sampling procedure to be used. The various departments form the strata because each final year student in the Polytechnic could be assigned to only one department (stratum). Proportionate stratification was used with sampling fraction of $\frac{n}{N} = \frac{100}{2000} = 0.05$ to select the sample size from each stratum. This means that out of the 2000 final year students($N = 2000$) only 100 ($n = 100$) were desired for this study. This indicates that with proportionate stratification, the sample size of each stratum (department) is proportionate to the population size of the stratum (department). This means that each stratum has the same sampling fraction.

The data was analyzed using both descriptive and inferential statistics. Descriptive statistics such as tables and graph were used to display facts diagrammatically. Inferential statistics such as chi-square test of goodness-of –fit was specifically used to answer the research hypothesis.

RESULTS

The results obtained from the interview are presented in this aspect of the research.

From the appendices, Table 1 illustrates the age groups of the students who responded to the questionnaire. The two most prevailing age groups were 20-29 years (49 out of 100) and 30-39 years (34 out of 100) representing 49% and 34% respectively. The two age groups which were least represented were 10 -19 (11 out of 100) and 40-49 (6 out of 100) constituting 11% and 6% of the total respondents respectively.

Table 2. Shows the sex distribution of the respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	47	47.0	47.0	47.0
Female	53	53.0	53.0	100.0
Total	100	100.0	100.0	

From **Table 2**, it is observed that an overwhelming majority of the respondents were females representing 53.0% (53 out of 100) whiles the rest representing 47.0% (47 out of 100) of the total number of respondents who participated were males

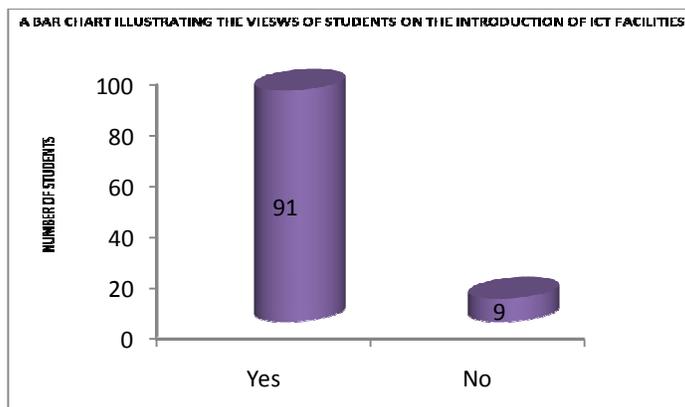


Figure 1. Shows the views of students on the introduction of ICT facilities.

The chart above shows that a remarkable majority of the respondents (91%) were of the opinion that the deployment and usage of ICT facilities have contributed immensely to effective teaching and learning while 9 out of 100 respondents representing (9%) maintained a divergent view contrary to the effective contribution of ICT to teaching and learning. Hence it can be said that the introduction and exploitation of ICT facilities in the Polytechnic have effectively enhanced teaching and learning.

From the appendices; the Table 4 illustrates the responses based on the existing ICT facilities that are available for student use. It can be inferred from the table that Computers and Accessories (98%) as well as Computer based training programmes including applications such as AutoCad, Photo application/Presentations, MATLAB etc. (62%) are the dominant ICT facilities available for students usage. Other ICT facilities such as Audio-visuals (53%) and Application software (57%) are also fairly available to be used by students.

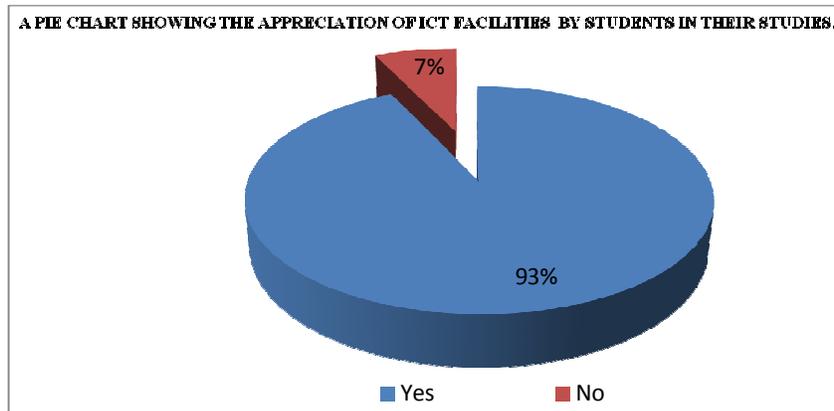


Figure 2. Illustrates the appreciation of ICT facilities by students in their studies.

It can be deduced from the chart above that an overwhelming number of students (93 out of 100) representing 93.0% said they do appreciate the use of ICT facilities in their studies while the rest of the students who took part in the survey (7 out of 100) representing 7.0% do not appreciate the use of these ICT facilities in their studies. It can be concluded that the use of ICT facilities by students, build their potential because at the institutional level, faculties have similar needs just like any small business setup and the use of the same kinds of software for such tasks as drawing and illustration, document preparation and printing etc. thus contributing to the individual's benefits and accelerated development.

Table 2. Shows how often students get access to these ICT facilities in the course of their studies

	Frequency	Percent	Valid Percent	Cumulative Percent
Available for use all the times	13	13.0	13.0	13.0
Available for use only at lecture periods	72	72.0	72.0	85.0
Not available after lecture periods	15	15.0	15.0	100.0
Total	100	100.0	100.0	

From Table 2, a significant number of students (72 out of 100) representing 72% said ICT facilities are available to them only at lecture periods while the least majority of the participants (15 out of 100) and (13 out of 100) representing 15% and 13% could access these ICT facilities particularly after lectures and at all times respectively. This is an indication of the fact that students do not have adequate time to practice on these ICT facilities.

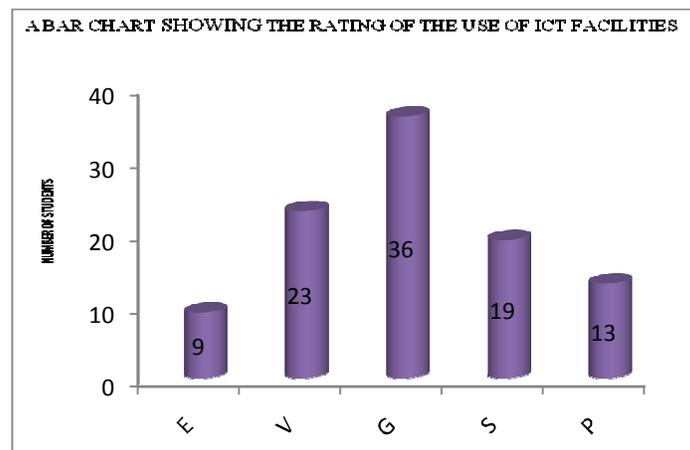


Figure 3. Illustrates the ratings of the use of ICT facilities for accelerated development.

It can be inferred from the chart above that 36.0% (36 out of 100) of the students who took part in the survey said that the ICT facilities were put into good use for individual benefits and accelerated development while 23% rated the use of the ICT facilities as very good. 19 out of 100 forming 19% rated the use of the ICT facilities as satisfactory while 13% rated it to be poor. The least majority of the respondents 9 out of 100 representing 9% rated the use of the ICT facilities as excellent.

However, the use of the ICT facilities for individual benefits and accelerated development according to the respondent can be said to be efficient.

Table 3. Shows the areas of the ICT facilities that need enhancement

Facilities	Percentage (%)
Computer & Accessories	32
Audio-Visuals	65
Application Software	52
Computer Based Training Programmes	35
Network of departments for easy Access to information	71

From Table 8, it can be deduced that Network of departments for easy access to information (71%), Audio-visuals (65%) and Application software (52%) are the most ICT facilities that require enhancement to aid students in their learning in order to foster accelerated development. However, Computer & Accessories (32%) and Computer base training programmes (35%) are the two dominant ICT facilities that might not require much enhancement.

The hypothesis to be tested is H_0 : Enhancement of ICT facilities in the Polytechnics does not result in advancement of human capability for accelerated development against the alternative H_1 : Enhancement of ICT facilities in the Polytechnics result in advancement of human capability for accelerated development.

The test is conducted at 5% ($\alpha = 0.05$) level of significance. The condition under which the null hypothesis (H_0) is rejected is when $\chi^2_{cal} > \chi^2_{0.05,1}$.

Test Statistics

Does the enhancement of ICT in the Polytechnic results in advancement of human capability for accelerated development

Chi-Square	51.840
df	1

χ^2_{cal} is 51.840

$\chi^2_{0.05,1}$ from tables is 7.879.

Since $\chi^2_{cal} > \chi^2_{0.05,1}$, that is $51.840 > 7.879$, H_0 is rejected and H_1 retained

DISCUSSION

The majority of the final year students in the Polytechnic who have benefited from the integration of ICT in education coupled with traditional methods of teaching were in the age groups between 20-29 and 30-34 years. It is also observed that individuals within the age groups of between 10-19 years and 40-49 years did not significantly participate in the survey. This in effect implies that individuals in the working age groups considerably took part in the survey.

The female participation in the survey dominated that of their male counterparts. This is an indication that, there might be more females in the final year than males.

The integration of ICT in education is to enhance effective teaching and learning for accelerated development. The results obtained from the survey revealed that a considerable number of students admitted that the introduction of ICT in the Polytechnics has contributed significantly to improving teaching and learning. This means that the development of human capacity which is the catalyst for accelerated development has been fruitfully accomplished.

One of the objectives this research is to find out the type of modern ICT facilities that are available for student use. The results show that incredible an number of students who are preparing to join the workforce confirm Computer & Accessories as well Computer Base Training Programmes which form the basis of any ICT infrastructure were adequately available for use while other ICT facilities such as Audio-Visuals and Application softwares were also available. It's an indication that the enhancement of ICT facilities in the Polytechnics will contribute to effective teaching and learning which will ensure accelerated development.

The research also sought to determine the degree to which students appreciate the use of ICT facilities in their studies. The outcome of the study reveals that an overwhelming number of students appreciates the use of ICT facilities in their studies while only a few students do not see the need for ICT integration in education. This means that as more ICT facilities are made available to students, their potentials would be greatly enhanced thus assuring accelerated development.

The use of ICT facilities by students has been efficient. The study disclosed that a significant number of participants rated the use of the facilities as good and very good.

The enhancement of ICT facilities in the Polytechnics is one of the major objectives of this study. The study shows that Networking departments for easy access to information, Audio-visuals and Application software are the most important ICT facilities that require enhancement to aid students in their learning in order to foster accelerated development. However, Computer & Accessories and Computer base training programmes are the two dominant ICT facilities that might not required much enhancement.

The major hypothesis of the study is enhancement of ICT facilities in the Polytechnics does not result in advancement of human capability for accelerated development. The study shows that Enhancement of ICT facilities in the Polytechnics result in advancement of human capability for accelerated development.

REFERENCES

- Richey, R.C. (2008). *Definitions of the Field Technology Trends*.
- Russell. (1999). *Systematic Planning for ICT Integration in Topic Learning*.
- Armstrong and Casement, (1998); Postman, 2000). *Teacher Enhancement in ICT Integration in Education*.
- Owusu-Agyeman, Y. (2006). *Government access-Policies on Polytechnic education in Ghana: The Relevance of Cape-Coast Polytechnic*. Pp. 1-92 Relevance paper for the award of Msc in education Science and Technology at the University of Twente.
- Holmberg, B. (2005). *The Evolution, Principles and Practices of distance education*, Bls- Verlag der : Oldenburg .
- Gordor, B.K. and Howard, N.K. (2006). *Introduction to Statistical Methods*. Ghana Mathematics Group, Ghana.
- Moore, M., Kearsley, (2005). *Distance Education: a system view*. Wadsworth: USA, 3rd Edition.
- Ministry of Education & Sports. (2006). *The Ghana Information and Communications Technology (ICT) In Education Policy*. pp.1-34
- Ronald, M.W. (2010). *Introduction to Business Statistics*, South-Western College Publications, 7TH Edition.

APPENDICES

Table 1. Age

	Frequency	Percent	Valid Percent	Cumulative Percent
15-19	11	11.0	11.0	11.0
20-29	49	49.0	49.0	60.0
30-39	34	34.0	34.0	94.0
40-50	6	6.0	6.0	100.0
Total	100	100.0	100.0	

Table 2. Sex

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	47	47.0	47.0	47.0
Female	53	53.0	53.0	100.0
Total	100	100.0	100.0	

Table 3. Does the introduction of ICT facilities contribute to effective teaching and learning

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	91	91.0	91.0	91.0
No	9	9.0	9.0	100.0
Total	100	100.0	100.0	

Table 4. Which of these ICT facilities are available in your institution for your use?

Facilities	Percentage (%)
Computer & Accessories	98
Audio-Visuals	53
Application Software	57
Computer Based Training Programmes	62

Table 5. Do you appreciate the use of these ICT facilities in your studies

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	93	93.0	93.0	93.0
No	7	7.0	7.0	100.0
Total	100	100.0	100.0	

Table 6. How often do you get access to these ICT facilities during and after lectures

	Frequency	Percent	Valid Percent	Cumulative Percent
Available for use all the times	13	13.0	13.0	13.0
Available for use only at lecture periods	72	72.0	72.0	85.0
Not available after lecture periods	15	15.0	15.0	100.0
Total	100	100.0	100.0	

Table 7. How would you rate the efficient use of these ICT facilities during and after lectures for individual benefits and accelerated development

	Frequency	Percent	Valid Percent	Cumulative Percent
Excellent	9	9.0	9.0	9.0
Very good	23	23.0	23.0	32.0
Good	36	36.0	36.0	68.0
Satisfactory	19	19.0	19.0	87.0
Poor	13	13.0	13.0	100.0
Total	100	100.0	100.0	

Table 8. Enhancement of ICT facilities

Facilities	Percentage (%)
Computer & Accessories	32
Audio-Visuals	65
Application Software	52
Computer Based Training Programmes	68
Network of departments for easy access to information	71

Table 9. Does the enhancement of ICT result in advancement of human capability for accelerated development

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	86	86.0	86.0	86.0
No	14	14.0	14.0	100.0
Total	100	100.0	100.0	