ICT integration in Teacher Education - A study of University of Education, Winneba

Kofi Bentum Wilson, UEW –Winneba

Kofi Ayebi-Arthur, UCC – Cape Coast

Emmanuel Yamoah Tenkorang, UCC – Cape Coast

ABSTRACT

This paper generally sought to investigate the integration level of ICT in the training of teacher trainees at University of Education, Winneba. All level 100 students were purposive targeted in particular since they were registered to take the ICT course. One hundred of the Level 100 students were randomly selected in class to perform tasks in ICT. As part of information gathering for this research work, set tasks were prepared for the students to perform and an observation checklist was used to collect data. All these activities were done both before the intervention and after the intervention. In order to determine if the observed differences in performance of activities were statistically significant, the chi square test of independence was used. There were statistically significant relationship between the success of the tasks before or after the intervention was made. It was established that the interventions had resulted in the improvement of the ability of the respondents to undertake various ICT tasks. It is therefore recommended that the university should continue with the integration of ICT in the programmes offered in the university

INTRODUCTION

The past fifteen years have seen rapid globalisation and technological change processes that have created a new global economy powered by technology, fuelled by information and driven by knowledge. The emergence of this technological change process has serious implications for the kind of human resource that are produced to enter

the economy to produce goods and services for consumption. One of the technological change vehicles has been Information and Communication Technology (ICT). ICTs have diverse set of technological tools and resources deployed to create, disseminate, store, manage retrieve and to communicate information. These ICT technologies include computers, Internet, broad-casting technologies (radio and television), and telephony. They have also enabled learning through multi-media as ICT has introduced learning through simulation, games, TV, radio and others. It promotes active learning through our senses. It is generally believed that ICT can empower teachers and learners, making significant contributions to learning and achievement.

Governments have had to be proactive in perceiving the needs of the economy and to ensure that there is a constant stream of appropriately trained human resource supplied to the economy. The Government of Ghana, recognising the importance of ICT in taking advantage of globalisation and technological change introduced the Ghana ICT for Accelerated Development Policy (ICT4AD, 2003) with the vision to improve the quality of life of the people of Ghana by enriching their economic, social and cultural well being through the rapid development and modernisation of the economy and society using ICT as the main engine for accelerated and sustainable economic and social development in 2003. Within this policy, 14 pillars that defined the policy priority areas and focus were identified. Promoting ICTs in education was one of these pillars with the objective of transforming the educational system to provide the requisite educational and training services and environment capable of producing the right types of skills and human resources required for developing and driving Ghana's information and knowledge based economy and society.

As the half-life of information continues to shrink and access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time. Rather, schools should promote learning to learn among learners. The 21st century has changed and for that matter "the illiterate of the 21st century," according to futurist Toffler (2007) "will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn" (p. 3). The nature and purpose of educational institutions, for any country that wants to develop, will have to reflect this background.

It was against this background and also within this broad national ICT policy framework that in 2006, the Ghana ICT in education policy was out-doored with an overall goal to "enable every Ghanaian to be able to use the ICT tools and resources confidently and creatively to develop the skills and knowledge needed to achieve personal goals and be full participants in the global economy by 2015" (Ghana, 2006:17). President Kufour, launching the current reform on 11th April, 2007, stated that teacher quality is critical to the implementation of the reform programme at all levels, hence the commitment of government to improve conditions of service and training for teachers to put in their best.

The term ICT is often spoken of in a particular context such as ICT in education, health care, libraries, sports, commerce and others. ICTs are useful in numerous instances to facilitate the development of various aspects of the society. They have brought about innovations in the way people learn, communicate, and do business.

The education sector is arguably one major area benefiting from the role ICTs are playing but the impact has not been as extensive as in other fields. Education is a social oriented activity and traditionally, quality education has been associated with strong teachers having high degrees of personal contact with learners.

The purpose of ICT in Education means deploying ICT Equipment and Tools in Teaching-Learning process as a media and methodology. This is because ICT is touted as one of the major contemporary factors shaping the global economy and producing rapid changes in society. They can transform the nature of education, where and how learning takes place and the roles of students and teachers in the learning process (Janssens-Bevernage, Cornille & Mwaniki, 2002).

Recent developments of innovative technologies have provided new possibilities to the teaching profession but at the same time have placed more demands on teachers to learn how to use these technologies in their teaching (Robinson and Latchem, 2003). Teaching has become one of the most challenging professions in our society today, where knowledge is expanding rapidly and much of it is available to students as well as teachers at the same time (Perraton, Robinson and Creed, 2001). As computers have become available and more visible to an increasing number of schools, more attention needs to be given to the capacity building of the key transformers in this process, namely, teachers.

Education is accepted as the process by which individuals acquire knowledge, skills and attitudes which enable them to develop their faculties in full. It is also accepted universally that good education enables individuals to contribute to development and improvement in the quality of life for themselves, their communities and the nation as a whole.

As technology has affected almost every aspect of our lives, it is important that we vary the way we teach today and as new concepts of learning have evolved, teachers are expected to facilitate learning and make it meaningful to individual learners rather than just to provide knowledge and skills. ICT as an emerging technology has brought about a sharp contrast to the traditional teaching-learning paradigm.

The emergence of this new global economy has serious implications for the nature and purpose of educational institutions.

Statement of the problem

Swan, Hooft, and Kratcoski (2005) argue that students' motivation to learn and engage in learning processes were improved by the use of mobile computing. In another study exploring the use of ICT tools to engage students in higher-order thinking in a Singapore school, Lim and Tay (2003) observed higher students' engagement in higher-order thinking by using ICT tools.

The University of Education, Winneba, having recognised that of access to modern ICT is essential for providing students with educational services of the highest quality has integrated ICT in its curricula for some time now. Although this ICT may facilitate independent self-paced learning, the actual extent to which the integration of ICT in the curricula of UEW appears not to be documented.

Research objectives

This paper generally sought to investigate the integration level of ICT in the training of teacher trainees at University of Education, Winneba.

The specific objectives of the study were to:

(i)   investigate the ICT literacy level of students of UEW before they were admitted into the institution

(ii)   and the extent to which the training programmes adopted for increasing the literacy level of students

Research questions

1   What is the ICT literacy level of students of UEW before they were admitted into the institution and the training programmes adopted for increasing the literacy level of students?

2   To what extent has the training programme resulted in actual improvement in literacy of the students?

Conceptual framework

The we adopts Davis' Technology Acceptance Model (TAM) (Davis, Bagozzi, & Warshaw, 1989) and   Ajzen and M. Fishbein Theory of Reasoned Action. ICT has permeated all facets of the society. If the students find the usage of ICT helpful then they will integrate the use of ICT in their environment. TAM has been applied to various IT applications such as World Wide Web (Lederer, Maupin, Sena, and Zhuang, 2000) and (Moon and Kim, 2001), e-commerce (Gefen, Karahanna, and Straub 2003), and mobile games under mobile broadband wireless access environment (Ha, Yoon, & Choi, 2007). These studies used appropriate context-specific antecedent variables that may be of value to investigate various IT (Information Technology) applications and the reasons why users accept different IT. Ajzen and M. Fishbein Theory of Reasoned Action postulates that if a person perceives that the outcome from performing a behaviour is positive, she/he will have a positive attitude toward performing that behaviour. The opposite can also be stated if the behaviour is thought to be negative. If ICTs are integrated well into the training of teachers and they find it helpful in things they do then they will have a positive attitude to it and therefore take it more seriously so as to imbibe it in them, thereby improving their competency in ICT activities. Also, the teachers are most likely to introduce it in their environment even after graduation which will then influence the way they teach their students to learn and also the skills and attitude will rub on their students, diffusing the competency throughout the educational system.

RESEARCH DESIGN

The research design adopted was the case study type. This method was chosen because it gave the researchers the opportunity to explore complex issues from multiple

sources of information. Soy (1997) and Osuala (2001) believe that case studies can extend experience or add strength to what is already known through previous research.

Population

The population used for this study consisted of students from University of Education, Winneba. ICT resources at the University of Education, Winneba are intended primarily to serve the University community and its resources are purely for educational purposes only. The ICT Policy of UEW is to ensure that the University's IT resources are used responsibly, effectively and efficiently to promote the basic mission of the University in teaching, research, administration and service.

UEW was chosen because of the fact that the University boasts of both pre-service and in-service teachers. There is a policy in UEW that all level 100 students should offer an ICT course which counts towards their academic programme. Departments then offer ICT based courses to equip students to become ICT literate. Products from this university are absorbed by the Ghana Education Service (GES) as professional teachers. More so, a good chunk of the students are teachers on further studies. The products are distributed over all levels of the educational sector of Ghana such as the basic level, secondary level and tertiary level, therefore products of this university are expected to be found in all corners of the country contributing to the development of the much needed human resources the nation needs to develop.

Sampling Techniques

The target population for this study was 2539 Level 100 Students who were yet to offer ICT courses. However the sample size for this study was one hundred (100) respondents made up of sixty four males (64) and thirty six (36) females.

All level 100 students were purposive targeted in particular since they were registered to take the ICT course. One hundred of the Level 100 students were randomly selected in class to perform tasks in ICT.

Research instruments

As part of information gathering for this research work, set tasks were prepared for the students to perform and an observation checklist was used to collect data. These

tasks were performed by the same batch of students before registration for the ICT course and 10 weeks after they had taken the course.

The tasks performed were grouped into four major themes,

a. ICT basis

b. Use of ICT tools

c. Use of mobile phones

d. Ms Word

RESULTS

Students were made to undertake specific activities in ICT covering four main themes. These were: ICT basics; use of ICT tools; use of mobile phones and use of MS Word application. All these activities were done both before the intervention and after the intervention. In order to determine if the observed differences in performance of activities were statistically significant, the chi square test of independence was used.

ICT basics

This group of activities entailed undertaking specific tasks like booting a personal computer (pc); shutting down a pc; installation of software; using external storage; print from pc; select printer; use a webcam and using a camera. There were eight activities involved and a successful or non-successful operation was noted. Since, there were 100 respondents performing 8 different operations, 800 experiments were done for both the pre- and post interventions.

Table 1 shows the distribution of observed successful/non-successful experiments for the before and after situations.

Table 1: Contingency table for ICT basic operations

| Situation | Result of experiment | | | | Total |
	Successful	%	Not successful	%	
Before	193	34	607	58.14	800
After	363	65.3	437	41.86	800
Total	556	100	104	100	1600

The chi squared test was used to test the following hypothesis:

H_o: There is no significant difference in the success of operating basic ICT procedures before and after the intervention.

A table of expected frequencies was generated from Table 1 and shown in Table 2 and the chi squared statistics obtained.

Table 2: Expected counts for basic ICT operations of respondents

| Situation | Result of experiment | | Total |
	Successful	Not successful	
Before	1600	522	2122
After	278	522	800
Total	1878	1044	1044

$p = 1.04E^{-282}$, $X^2 = 1290.951826$, $\alpha = 0.05$, X^2 critical = 3.841

The p-value obtained was less than the α-value of 0.5 and therefore, we fail to accept the null hypothesis. The alternate hypothesis is therefore accepted. There is therefore, a statistically significant relationship between the success of the operations of basic ICT before or after the intervention was made.

From Table 1, of the successful operation column, 65.3% of the successful operations were done after the intervention. Also, of the not successful column, 58.14% of the failures were done before the intervention while after the intervention, the failures dropped to 41.86%. It can therefore be established that the intervention had resulted in the improvement of the ability of the respondents to undertake basic ICT operations.

Use of ICT tools

This group of activities entailed undertaking specific tasks like tuning in to TV lessons, tuning in to radio lessons, use video camera, setup video, use photocopier and using overhead projector. There were six activities involved and a successful or non-successful operation was noted. Since, there were 100 respondents performing 6 different operations, 600 experiments were done for both the pre- and post interventions. Table 2 shows the distribution of observed successful/non-successful experiments for the before and after situations.

Table 3: Contingency table for use of ICT tools

Situation	Result of experiment	Total

	Successful	%	Not successful	%	
Before	125	40.8	475	53.1	600
After	181	59.2	419	46.9	600
Total	306	100	894	100	1200

Source: Field work, 2009

The chi squared test was used to test the following hypothesis:

H_o: There is no significant difference in the success of use of ICT tools before and after the intervention.

A table of expected frequencies was generated from Table 2 and shown in Table 3 and the chi squared statistics obtained.

Table 4: Expected counts for use of ICT tools of respondents

Situation	Result of experiment		Total
	Successful	Not successful	
Before	1200	447	1647
After	153	447	600
Total	1353	894	2247

$p = 2.6062E^{-282}$, $X^2 = 971.6528$, $\alpha = 0.05$, X^2 critical $= 3.841$

The p-value obtained was less than the α-value of 0.5 and therefore, we fail to accept the null hypothesis. The alternate hypothesis is therefore accepted. There is therefore, a statistically significant relationship between the success of the operations of use of ICT tools before or after the intervention was made.

From Table 3, of the successful operation column, 59.2% of the successful operations were done after the intervention. Also, of the not successful column, 53.1% of the failures were done before the intervention while after the intervention, the failures dropped to 46.9%. It can therefore be established that the intervention had resulted in the improvement of the ability of the respondents to use ICT tools.

Use of mobile phones

Another group of activities entailed undertaking specific tasks like make voice calls, send text message, use Bluetooth, use infrared, record video, take picture, use

calculator, use light, use alarm, take notes, and set tasks. There were 12 activities involved and a successful or non-successful operation was noted. Since, there were 100 respondents performing 12 different operations, 1200 experiments were done for both the pre- and post interventions.

Table 5 shows the distribution of observed successful/non-successful experiments for the before and after situations.

Table 5: Contingency table for use of mobile phones

| Situation | Result of experiment | | | | Total |
	Successful	%	Not successful	%	
Before	434	44.1	366	59.5	800
After	551	55.9	249	40.5	800
Total	985	100	615	100	1600

The chi squared test was used to test the following hypothesis:

H_o: There is no significant difference in the success of use of mobile phones before and after the intervention.

A table of expected frequencies was generated from Table 5 and shown in Table 6 and the chi squared statistics obtained.

Table 6: Expected counts for use of mobile phones operations of respondents

| Situation | Result of experiment | | Total |
	Successful	Not successful	
Before	1600	307.5	1907.5
After	492.5	307.5	800
Total	2092.5	615	2707.5

$p = 3.735E^{-193}$, $X^2 = 878.9297675$, $\alpha = 0.05$, X^2 critical = 3.841

The p-value obtained was less than the α-value of 0.5 and therefore, we fail to accept the null hypothesis. The alternate hypothesis is therefore accepted. There is therefore, a statistically significant relationship between the success of the operations of use of mobile phones before or after the intervention was made.

From Table 5, of the successful operation column, 55.9% of the successful operations were done after the intervention. Also, of the not successful column, 59.5% of the failures were done before the intervention while after the intervention, the failures

dropped to 40.5%. It can therefore be established that the intervention had resulted in the improvement of the ability of the respondents to undertake use of mobile phones operations.

Use of MS Office applications

This group of activities entailed undertaking specific tasks like booting a personal computer (pc); shut down pc; installation of software; using external storage; print from pc; select printer; use a webcam and using a camera. There were eight activities involved and a successful or non-successful operation was noted. Since, there were 100 respondents performing 8 different operations, 800 experiments were done for both the pre- and post interventions.

Table 1 shows the distribution of observed successful/non-successful experiments for the before and after situations.

Table 7: Contingency table for MS-Word application

Situation	Result of experiment					Total
	Successful	%	Not successful	%	
Before	193	34	607	58.14	800
After	363	65.3	437	41.86	800
Total	556	100	104	100	1600

The chi squared test was used to test the following hypothesis:

H_o: There is no significant difference in the success of operating basic ICT procedures before and after the intervention.

A table of expected frequencies was generated from Table 1 and shown in Table 2 and the chi squared statistics obtained.

Table 8: Expected counts for basic ICT operations of respondents

Situation	Result of experiment		Total
	Successful	Not successful	

Before	1600	522	2122
After	278	522	800
Total	1878	1044	1044

$p = 1.04E^{-282}$, $X^2 = 1290.951826$, $\alpha = 0.05$, X^2 critical = 3.841

The p-value obtained was less than the α-value of 0.5 and therefore, we fail to accept the null hypothesis. The alternate hypothesis is therefore accepted. There is therefore, a statistically significant relationship between the success of the operations of basic ICT before or after the intervention was made.

From Table 7, of the successful operation column, 65.3% of the successful operations were done after the intervention. Also, of the not successful column, 58.14% of the failures were done before the intervention while after the intervention, the failures dropped to 41.86%. It can therefore be established that the intervention had resulted in the improvement of the ability of the respondents to undertake basic ICT operations.

CONCLUSION

The ICT course increased the literacy level of the students. This is evident in the significant differences observed in the pre-test and post-test activities in ICT covering the four themes: ICT basics; use of ICT tools; use of mobile phones and the use of MS-Word.

RECOMMENDATION

The university should continue with the integration of ICT in the programmes offered in the university. This is because this research has shown that the integration of ICT is successful. Facilities and equipments that are used in the integration of ICT should be maintained and expanded; not allowed to run down. Other universities should emulate the example of University of Education, Winneba in integrating ICT into their programmes.

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