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Effects of Teachers' ICT Knowledge and Utilisation on Achievement in Secondary School Economics in Southwest, Nigeria

Ikmat Olanrewaju Junaid* & Esther Abidemi Salisu**

*Institute of Education, University of Ibadan

GSM: +2348068063892 E-Mail: iojunaid@yahoo.com

**Institute of Education, University of Ibadan

GSM: +2347061967442 E-mail: miracleesther@yahoo.com

Abstract

The integration of Information Communication Technology (ICT) into educational practice continues to be lauded as having the potential to dramatically transform the teaching and learning processes. This study investigated the effect of teachers' ICT knowledge and utilization on students' achievement in Economics in Secondary Schools in Southwest, Nigeria. Multistage sampling technique was used and data were collected from 30 Economics teachers and 360 students in 18 schools from Federal, State and Private secondary schools in Southwest Nigeria. Five research hypotheses and three research instruments guided the study: Economics Achievement test (EAT), Teachers' ICT Knowledge Questionnaire (TIKQ) and Teachers' ICT Utilisation Questionnaire (TIUQ). Their reliability coefficients were between 0.5 and 0.9 respectively. Data were analysed using Independent T-test and One-way Analysis of Variance (ANOVA). The result revealed that there is no significant difference between teachers level of ICT knowledge on students achievement ($t = -0.497, p = 0.69$); there is no significant difference between students achievement in Economics and teachers ICT utilization ($t = 1.05, p = 0.53$). It however revealed a significant difference between student achievement in Economics and school type ($F = 7.55, p = 0.001$) while it shows that there is no significant difference between Economics achievement of students and teachers gender ($t = -0.01; p = 0.11$). The results thus recommend that constant training workshops, seminars and conferences should be made available by government and school proprietors to teachers in order to improve their teaching skills and use of ICT incorporated resources in their teaching-learning processes in the classroom.

Introduction

Education worldwide experienced many changes in the last century, but none of them is as profound as the effects of Information and Communication Technology (ICT). The world is witnessing a wonderful global transformation with the introduction of the computer and the internet. The Internet is a world network of computers which allows people to share information, programmes, pictures and music as well as store information (Mbonu, 2003). ICT can be deployed in virtually every field of human endeavour. In education, ICT can exert a positive influence on both teaching and learning, even though,

the impacts vary from subject to subject and from level to level. Overall, when ICT is used strategically the result is always an enhanced and engaging experience for both teacher and students.

The mass media, including the internet have succeeded in welding peoples and nations into a global village. In other words, millions of people scattered all over the globe can communicate with one another through the radio, television, newspaper and the internet without necessarily being in physical contact with one another. The internet can be used for exchange of e-mails with millions of people who have email addresses; search for, retrieve and read millions of files stored on computers world wide web; send or receive sound, animation and picture files to and from distant places; browse through resources of private or public information services that are on the internet; communicate in real time with others connected on the internet through tele-conferencing. It can also be used to create and provide information on demand. Tele-texts and video-texts lend themselves to this form of communication. Examples of tele-text and video text messages are those displayed on television screen and handsets which are read or viewed on the screen.

According to Adu (2002), the study of economics serves a useful purpose in modern life. It gives us facts and shows us what may be expected to be the outcome of certain lines of conduct; it helps us to decide which of several alternatives to choose. It charged its recipient to make wise choice that will satisfy their needs in the presence of unlimited wants and resources. Obemeata (1991) says economics as a subject adds various values to the learners which includes cultural values, intellectual training and vocational training.

The senior secondary school Economics curriculum (2004) states the following as the reasons for teaching Economics as a school subject:

- Economics teaches the consumer how to make rational use of scarce resources to satisfy unlimited wants.
- It provides a rational guide to the firm and government in the allocation of scarce resources.
- It helps the planners to plan for economic development.
- It helps to solve problems of what to produce, how to produce, and where to produce.
- It trains students to better understand the economic problems of society and be able to offer solutions.
- It helps for a better understanding of government economic problems.

In summary, the objective of Economics is to inculcate in secondary school students a culture of economic literacy which will enable them to apply its theoretical knowledge to real life situations. However the performance of students at the Senior School Certificate Examination (SSCE) shows that the school system has not been able to achieve these objectives (Olaoye, 2005). In achieving these aims and objectives, the use of Information

and Communication Technology (ICT) as a teaching aid in facilitating teaching and learning of economics in senior secondary schools arises.

There are so many techniques by which teacher can teach the students, like, Mobile phone, computer, e-mail, e-Newspaper, and conferencing. With the help of these facets, information can be accessed, stored, processed and spread wherever necessary. Information and Communication Technology in education can be understood as the application of digital equipment to all aspects of teaching and learning. It is present in almost all schools in advance countries and is of growing influence. ICT is useful for effective teaching-learning processes, quality education and overall development of students and teachers.

One important factor that has separated the modern era from those that have gone before it is technology. Technology is developed to solve problems associated with human needs in more productive ways (Newhouse, 2002). Students now use learning software on computer and other information and Communication Technology (ICT) devices to support learning, most especially Books and Journals which are the primary source of information or learning. ICT is also used to support learning in many different ways in schools, for instance, the internet promotes self-monitoring ability, encourages the use of multimedia and network technology and skills of online literacy (Zhong, 2008).

The need to operate in accordance with global Orders and standards makes ICT as an indispensable standard for the 21st century teaching and learning in Nigeria. It has already been stressed that the modern world is an information society, driven by a complex set of digital devices and telecommunication networks and having the World Wide Web as an all-encompassing platform. The teachers can no longer credibly do their jobs without themselves being leaders in ICT. As teachers, they are leaders as well as flag-bearers; they are managers; they are opinion leaders and moulders; they dictate the pace of learning and the direction of change; they evaluate learning and give verdicts about learners' abilities which shape the life chances of learners; their influences even go beyond the walls of the classrooms and schools and they could ignite and manage revolutions; etc. Such powers vested on the teacher by virtue of their jobs cannot be exercised responsibly and successfully when teachers wallop in ignorance and are themselves no better than the children whose character and intellect they are moulding. It has become a public scandal recently that many teachers cannot even pass the examinations set for students under them. Which direction is such educational system heading?

As stated by the National Policy on Education (Federal Government of Nigeria, 2008), it is difficult for students to attain their highest academic potentials while being groomed by teachers who themselves are ignorant of the exploits they could do with the main driving force in modern times such as ICT. As the most important agents of change and the pivot of the education system, teachers ought to be master of the art in the use of

ICT considering that the students they are teaching are "digital natives" born into the ICT culture and who can best be taught and groomed using ICT. Amazing number of students today are familiar with the internet (the World Wide Web), the search engines, many software applications online and offline, hardware, etc. They communicate through a variety of social media-facebook, Twitter, Skype, Yahoo Messenger, LinkedIn; Skills Page; YouTube; etc. In a single handset they could have over 100 applications running live, informing and entertaining them, they also have electronic games to play with, while the students carry out such exploits, teachers cannot just remain complacent. A teacher's role in pacing students' use of computer is of paramount importance. Despite the fact that the ICT provides sufficient access to rich information resources, a teacher is needed to motivate, guide and act as facilitator of learning (Noordin, 2006).

New instructional techniques that use ICTs provide a different modality of instruments. For the student, ICT use allows for increased individualization of learning. In schools where new technologies are used, students have access to tools that adjust to their attention span and provide valuable and immediate feedback for literacy enhancement, which is currently not fully implemented in the Nigerian school system (Emuku and Emuku, (1999) & (2000). The feedback afforded by ICT packages is usually provided continuously (rather than just at the end of the module), reinforcing the positives (rather than emphasising the negatives), and focusing feedback on how performance can be improved in the future (rather than dwelling on the past). Such feedback deals explicitly with any misconceptions that the students have and may help in self-correction. When feedback is delivered as soon as possible after the act that initiated it, it can become a very powerful reinforcer: that is, it is possible to change behaviour quickly and to maintain it in strength for long periods of time (Skinner, 1986).

ICT application and use will prove beneficial in improving Nigeria's educational system and giving students a better education. A technologically-advanced workforce will lead to ICT growth in Nigeria, with the potential to improve military technology and telecommunications, media communications, and skilled ICT professionals who will be well-equipped to solve IT problems in Nigeria and other parts of the world (Goshit, 2006).

Statement of Problem

The use of information and communication technology (ICT) is becoming an integral part of Education in many parts of the globe as the trend in Education has witnessed a lot of reform; Nigeria is not left behind as ICT gradually finds its way into the Educational systems. However, not all schools with ICT functions efficiently due to power failure, inability to renew internet access and regular maintenance of facilities. Where ICT functions, not all teachers have access, and where there is access, the teachers' knowledge of how to transfer learning through ICTs is in doubt. Hence, this study is

designed to evaluate the effect of teachers' ICT knowledge and use on teaching and learning of Economics with a view to finding out how the introduction of ICT has benefitted in the transfer of Economics knowledge to students.

Hypotheses

Base on the stated problems, the following hypotheses were tested:

- i. There is no significant difference in Economics achievement of students taught by teachers with low and high ICT knowledge.
- ii. There is no significant difference in Economics achievement of students taught by teachers with low and high ICT utilization.
- iii. There is no significant difference in Economics achievement of students and school ownership.
- iv. There is no significant difference in Economics achievement of students and teacher's gender.
- v. There is no significant difference in economics achievement of students and teacher's age.

Methodology

This study is an ex-post facto survey research. The target population of this study comprised all S.S.S. II students that offered Economics in Federal, State and Private Secondary Schools and Economics Teachers in Southwest Nigeria. Multistage sampling technique was employed in this study. Cluster sampling technique was used to classify the schools into existing Federal, State and Private schools. The Schools include Senior Secondary Schools with fully installed ICT facilities and those without ICT facilities. All Economics teachers from six Federal Government Schools, six State Secondary Schools and six Private Secondary Schools in Southwest Nigeria were purposively selected. Students were chosen using probability proportion to size as sample for the study. In all, a total of 360 students and 30 teachers formed the study sample. The three instruments constructed by the researchers for data collection were (i) Teachers' ICT Knowledge Assessment Questionnaire (TIKT) used to assess teachers' basic knowledge of ICT and activities employed when teaching Economics with ICT; (ii) Teachers' Utilization of ICT Questionnaire (TUIQ) used to elicit information from the teachers on utilization of ICT in teaching students; (iii) Economics Achievement Test (EAT) comprising 30 objective test items constructed from the topics selected from S.S.S. 2 Economics scheme of works. All these were developed by the researchers. Validation exercise was conducted on 30 samples of the population after necessary corrections had been effected and the reliability co-efficient of 0.9; 0.5 and 0.9 were established respectively. Data were collected with the help of eight trained research assistants and analysed using Independent Sample T-test and Analysis of Variance.

Results

Research hypothesis 1: There is no significant difference in Economics achievement of students taught by teachers with low and high ICT knowledge.

Table 1: Independent Sample T-test analysis showing the difference in Economics achievement of students taught by teachers with low and high ICT knowledge

Knowledge	N	Mean	Std. Deviation	t	df	P value	Decision
Low	18	14.67	3.361				
High	12	15.33	3.939	-0.497	28	0.684	NS

Table 1 indicates that there is no significant difference in Economics achievement of students taught by teachers with low and high ICT knowledge given the P-value of 0.684 and t-value of -0.497, therefore the null hypothesis is not rejected. This implies that teachers' level of ICT knowledge does not affect students' achievement in Economics. This can be traced to the fact that teachers' with ICT knowledge may not apply their knowledge of ICT in classroom teaching. This was corroborated by Fakeye (2010) when he carried out a research on the assessment of English language teachers' knowledge and use of ICT in Ibadan South West in Oyo State and came up with the result that English teachers ICT knowledge does not affect students' performance.

Research hypothesis 2: There is no significant difference in Economics achievement of students taught by teachers with low and high ICT utilisation.

Table 2 indicates that there is no significant difference in Economics achievement of students taught by teachers with low and high ICT utilisation given the P-value of 0.534 and t-value of 1.053, therefore the null hypothesis is not rejected. This implies that teachers' ICT utilisation does not affect students' achievement; this may be that teachers' who utilises ICT does not use it for classroom purpose or instructional delivery but for personal information transmission base.

Table 2: Independent Sample T-test analysis showing the difference in Economics achievement of students taught by teachers with low and high ICT utilisation

Utilisation	N	Mean	Std. Deviation	T	Df	P value	Decision
Low	17	15.53	3.659				
High	13	14.15	3.387	1.053	28	0.534	NS

This result agrees with Hassan (2003) who discovered that the provision of sufficient information technology equipment to schools may not necessarily influence the health tutors to use them as learning resources in their classes. It was also supported by Fakeye (2010) when he carried out a research on the assessment of English language teachers' knowledge and use of ICT in Ibadan South West in Oyo State and came up with the result that English teachers ICT knowledge does not affect students' performance.

Research hypothesis 3: There is no significant difference in Economics achievement of students and school ownership.

Table 3: ANOVA analysis showing the difference in Economics achievement of students and school ownership

	Sum of Square	Df	Mean Square	F	Sig.	Decision
Between Groups	327.650	2	163.825	7.547	0.001	S
Within Groups	7749.325	357	21.707			
Total	8076.975	359				

Descriptive Statistics

	N	Mean	Standard Deviation
Private	120	12.98	4.978
State	120	10.70	4.927
Federal	120	12.30	4.008
Total	360	11.9	4.743

Table 3 indicates that there is significant difference in Economics achievement of students taught by teachers from either Federal, State or Private school, given the P-value of 0.001 which is lower than 0.05, therefore the null hypothesis is rejected. This implies the school type determines the performance of students in Economics. A Scheffe post Hoc and descriptive statistics were carried out to know which school type has the best performance, and it was found that the private school came first with mean score of 12.98 followed by the federal with mean score of 12.30 and lastly the state with lowest mean score of 10.70. This result is supported by Modupe and Maliki (2009) who investigated the effect of school ownership on achievement of students and found that school type has impact on student's performance.

Research hypothesis 4: There is no significant difference in Economics achievement of students and teachers' gender.

Table 4: Independent sample T-test showing the difference in Economics achievement of students and teachers' gender

Teachers' Sex	N	Mean	Std. Deviation	T	df	P value	Decision
Male	13	14.92	4.173				
Female	17	14.94	3.132	-0.014	28	0.110	NS

Table 4 indicates that there is no significant difference in Economics achievement of students and teachers' gender, given the P-value of 0.110 and t-value of -0.014, therefore the null hypothesis is not rejected. This implies that teachers' sex does not affect students' achievement in Economics which means either a male or female teaches makes no difference in students' achievement in Economics. This finding is not different from that of by Kreig (2005) who ascertain that teachers' gender has nothing to do with students' achievement. This finding also is not in contrast with the works of Adeniji (1999), Onocha (1985) and Miller (1984) who found that gender alone has no effect on academic achievement but could act in conjunction with other variables to affect learning outcomes.

Research hypothesis 5: There is no significant difference in Economics achievement of students and teachers' age.

Table 5: Independent sample T-test showing the difference in Economics achievement of students and teachers' age

Group Statistics

Teachers' Age	N	Mean	Std. Deviation	t	df	Decision
20-29 Yrs	6	11.67	3.011			
30-39 Yrs	12	14.50	3.705	0.095	16	NS

Table 5 indicates that there is no significant difference in Economics achievement of students and teachers' age, given the P-value of 0.485 and t-value of 0.095, therefore the null hypothesis is not rejected. This implies that teachers' age does not affect students' achievement in Economics. This was supported by Abuseji (2007) who investigated into student and teacher related variables as determinant of student achievement in chemistry and found that teachers' age does not have effect on students' achievement.

Summary of findings

From the results and discussion of findings, the following summaries are recorded in this study:

- It was revealed that there is no significant relationship between teachers' ICT knowledge and students' achievement.
- It was also ascertained that there is no relationship between teachers' ICT utilisation and students' achievement.
- The findings show that there is significant effect of school type on students' performance in Economics.
- As revealed by the study, teachers' sex does not determine students' achievement.

In conclusion, teachers' age does not have effect on students' performance.

Conclusions

Teachers like any other professional workers need essential tools to do their work perfectly. Certainly, it is true that the central figures in any learning situation are always the students and the teachers. But it is equally true that learning may be greatly enhanced by the utilisation of the many resources available in the school and through various school agencies. It was revealed from the study that having ICT knowledge alone cannot benefit the learning process therefore positive attitude to the utilisation of ICT knowledge by teachers is very important in order to facilitate learning and boost students' performance in Economics.

Recommendations

- There is the need to improve the academic training of teachers in Nigeria towards utilizing the potentials in information Technology.
- It imperative for planners and providers of education (federal and state governments, non-governmental organization and other stake holders) to reflect and redesign education delivery policy by making information technology one of the central focus on their curriculum. This will enhance the attitude of teachers towards information technology.
- Only qualified and competent Economics teachers should be employed to teach in our secondary schools so as to be able to utilise their ICT knowledge to transfer learning to the students.
- The government should introduce continuing education programmes in the schools such as seminars; workshops etc. on the use of modern information technology equipment as learning resources in classes will influence teachers or rather will make the teachers to form the habit of using the information technology equipment as learning resources in their classes.

- There must be regular supervisions by the schools in order to find out whether tutors are making good use of modern information technology equipments as learning resources in classes will strongly influence the use of such equipment by the health tutors.

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