EFFECTS OF INSTRUCTIONAL SCREENCAST ON THE PERFORMANCE OF NATIONAL OPEN UNIVERSITY UNDERGRADUATES IN EDUCATIONAL TECHNOLOGY IN KWARA STATE, NIGERIA

Amosa Isiaka GAMBARI, Shehu Ahmed HASSAN

Federal University of Technology, NIGERIA

Abstract. Screencast is a digital video and audio recording of what occurs on a presenter's computer screen which gives learners the chance to control the pace at which they learn; thereby influencing their academic performance positively. Despite these benefits of screencast in enhancing teaching and learning in distance learning programmes, they are being adopted in Nigerian higher institutions. The research adopted the mix-method approach, using quantitative and qualitative data analyses with 50 undergraduates forming the sample for the study. Two research instruments were used to gather data in the study, namely Educational Technology Achievement Test and Screencast Attitude Questionnaire. The former was tested using split-half reliability statistics and yielded a value of 0.727, while the latter was subjected to Cronbach's Alpha reliability statistics and yielded a value of 0.662. The research questions were answered using mean while research hypotheses 1-3 were tested using ANCOVA. Findings of this study showed that: (i) there was significant difference in the performance of the experimental and the control

group in favor of the experimental group; (ii) there was no significant difference in the mean score performance of male and female undergraduates exposed to screencast; (iii) the undergraduates that were exposed to screencast had positive attitudes toward the use of podcast; (iv) there was significant difference in the retention-test performance of the experimental and the control group in favour of the experimental group. Based on the findings, it was recommended that courseware developers should develop and utilize screencast to supplement course materials.

Keywords: assessment, screencast, performance, educational technology, distance education

---

Introduction

Open and distance education is a teaching and learning situation in which the instructor and learners are geographically separated, and therefore, rely on electronic devices and print materials for instructional delivery. It provides opportunities to its targets by preparing some combination of educational components such as printed course material, creating face-to-face interactive medium for academic counseling and student guidance using satellite, internet, video or teleconferences, broadcasting radio and television courses. It is concerned with providing other student support services like library, online communication, Computer Assisted Instruction (such as screencast) and many others.

Open and distance learning was established as a programme of studies which provides opportunities for educational advancement for members of society who find themselves in any of the following stations in life: workers who desire education to improve their skills but who cannot afford to leave their jobs for full-time study; persons who appear frustrated with the bottlenecks in the processes of seeking admission to conventional institutions; persons who

began their studies in conventional institutions but had to drop out for various reasons, including loss of educational sponsors /benefactors. The mass of people who seek education to improve themselves find solace in open and distance learning programmes.[1)] It is against this background that the Federal Government of Nigeria came up with different policy documents: National Policy on Education, 1977, the Open University act, 1980, volume XVII, revised 1998, 2004, which made provision for the National Open University of Nigeria (NOUN). The NOUN was established to provide opportunities for learners in professional bodies, governmental institutions that wish to have degrees and certificates in law, business administration, sciences and education related courses like Counselor Education, Educational Management, Educational Psychology and Educational Technology.

Educational technology can be regarded, as the application of systematic knowledge about learning and instruction to teaching and training with the aim of improving their quality and efficiency. Educational Technology experts have long heralded the power of technology- from the printing press, to blackboards - to laptops, to transform education. As an emerging technology innovation, screencast have shown great promise in recent for facilitating these organizational processes (Brown et al., 2009).

Screencast can be a medium for various purposes such as demonstrating algorithms for problem solving, supporting software instructions, and providing interpretation-based conceptual understanding in an active learning format (Lloyd & Robertson, 2012). Screencast specifically combines narration and animation that presents information in multimodal form. This may lead to problem-solving that may encourage active cognitive processing and cognitive load reduction which promote deeper learning (Mayer et al., 2004; Mayer & Moreno, 2003). Due to its portability and easy accessibility, screencast can make learning easy for learners whose daily activities do not permit them to spend much time on studying. Bankers, Nursing mothers, Chauffeurs and every learner that does one job or the other can access lectures anywhere and any-

time via the use of electronic gadgets such as television, radios, car-tapes, mobile phones etc. (Mayer, 2001).

Screencast can be used to supplement or substitute lectures. However, it is mostly used for recording lectures as they are delivered in the classroom, then share them using portable devices and/or online for the student to access. The video capture enables the lecturer to record himself during lectures, using the webcam of the computer attached to camera, thus giving the chance for eye contact and demonstration by the lecturers (Lloyd & Robertson, 2012).

In terms of student support, Stansfield & Freake[2)] reported that they used screencast for 'building confidence' in Open University physics students prior to examination. In another study, Lloyd & Robertson (2012) assessed the effect of screencast tutorials on learning outcomes that include statistical knowledge, application, and interpretation. The participating students were randomly assigned to a control text tutorial and experimental video tutorial groups and were tasked with completing a novel statistics problem. The results indicated that screencast tutorials were effective and efficient media for enhancing student learning, particularly for higher order conceptual statistical knowledge compared to traditional instructional techniques.

Studies have also documented no relation between computer use and academic achievement. For example, no relationship was found between time spent on the computer at home and GPA in a sample of adolescents (Hunley et al., 2005). Other researchers have found that recreational Internet use is strongly associated with impaired academic performance (Kubey et al., 2001). These assertions could have telling impact on Open and Distance learners, as they are major users of the internet and its facilities.

In a study[3)] the effect of screencast with narration and without narration in enhancing learning performance was investigated in Malaysia. Much has not been done in the area of research on screencast; especially checking its effect on undergraduates' performance.

Gender has been identified as one of the factors that influence students' academic performance. The issue of gender on students' performance has been controversial. Most Africans belief that young female are less useful than males and this is one of the factors that militate against women education and full participation in social, political, economic and technology activities (Ayanniyi, 1999). However, Yakubu & Ali (2002) opined that neither male nor female is superior to each other in terms of their knowledge and attitudes to the nation upliftment and the community. However, Gambari & Fagbemi (2010) found that gender had influence on lecturers' attitudes towards the use of ICT facilities/equipment in tertiary institutions in favour of male lecturers.

Previous researches on gender conflicts in educational achievement have poduced contrasting results. For example, Mallum (2000) conducted a study on gender conflict in educational attainment and found no significant difference between the performance of male and female students. On the contrary, Agbatogun (2006) found that both male and female teachers normally exercise fear of failure in implementing new technology. The aforementioned reports show there is no agreement in findings from previous researches. And these studies didn't test the effect of screencast on male and female undergraduates. Hence, the need to research into the effect gender difference has on the performance of undergraduates in educational technology using screencast.

The way new technologies are perceived by potential users largely depend on their attitude towards the technologies. Attitude simply refers to mindset or tendency to act in a particular way due to an individual's experience and temperament. Attitude controls the actual behavior of an individual, consciously and unconsciously. Lecturers being the implementers of instruction are important in the quest for successful implementation of ICT and students' attitude go a long way to determine how they accept the innovation or/and instruction in education in Nigerian tertiary institutions (Yusuf, 1998). Their knowledge and attitude may be critical to the success or otherwise of any ICT in education programme. This was evident in a research by Yusuf (1998),

who found that secondary school teachers have positive attitudes towards the feelings about computer, computer in education and learning about computer. In another research by Agbatagun (2006), it was reported that younger teachers are more amiable to new challenges than the older teachers.

Yusuf (1998) found that secondary school teachers have positive attitudes towards the feelings about computer, computer in education and learning about computer. Similarly, Mustapha (2007) investigated the attitudes, knowledge and utilization of computer in education by college of education science lecturers. Meanwhile, these studies have not established how undergraduates react to adoption of new instruction delivery tool like screencast. Thus the present study seeks to find out how attitude of undergraduates' affect their adoption of screencast.

Anything that aids learning improves retention while things that lead to confusion or interference among learned materials decrease the speed of and efficiency of learning and accelerate forgetting (Bichi, 2001). It can be asserted that the low assimilation of adult distance learners might be attributed to poor retention. Using screencast instruction to teach distance learners may help in solving their learning problems by increasing their motivation, achievements and hence retention. Serin (2011) identified that computer-based instruction (CBI), an aspect of screencast is more effective on less successful students as it enables them to progress at their own pace and provides them with appropriate alternative ways of learning by individualizing the learning process. This implies that CBI has records of facilitating learning in science-oriented courses.

It is clear from the review that there is the need to research into the effect of screencast on educational technology undergraduates' performance in distance education. Taking into consideration how the variables – gender, attitude, and retention have effect on their performance in educational technology. Although screencast has been recommended for teaching of various courses but the success recorded, lack some empirical supports. In addition, studies on

the use of screencast are very scanty. More so, no study on screencast known to this present researcher that particularly compare the effect of screencast on gender achievement and retention among National Open University Undergraduates in educational technology in Kwara state has been conducted. This study therefore, investigates the effect of screencast on the performance of National Open University undergraduates in educational technology in Kwara State, Nigeria.

Instruction needs to incorporate new methods for content delivery; however, advances in technology have left pedagogy far behind (Hess, 2009; Mishra et al., 2009). Computer models and simulations can assist learners of all ages by helping them develop clarity and understanding for many complex topics in science. However, the classroom integration and availability of instructional technology tools are often overshadowed by the lack of adoption and integration of the available instruction tools. In a developing country like Nigeria, it is important to investigate how instructional screencast will improve Nigerian undergraduates' performance in distance learning programmes.

From the literature available to the researcher, there were no previous researches on effect of instructional screencast on the performance of National Open University undergraduates in educational technology in Kwara State. Therefore, this research examined the effects of instructional screencast on the performance of National Open University undergraduates in educational technology in Kwara State, Nigeria.

Research questions

The following research questions were answered in the study: (i) what is the difference between the performance of undergraduates taught using screencast and those taught using conventional teaching method; (ii) is there any difference in the performance of educational technology undergraduates taught using screencast and those taught using the conventional teaching method, based on their retention; (iii) how does gender affect the performance

of undergraduates taught educational technology using screencast; (iv) what are undergraduates' attitudes toward screencast.

Research hypotheses

Based on the research questions stated, the following Null hypotheses were formulated:

Ho_1 There is no significant difference between the performance of undergraduates taught using screencast and those taught using the conventional method.

Ho_2 There is no significant difference in the retention performance of educational technology undergraduates taught using screencast and those taught using the conventional teaching method.

Ho_3 There is no significant difference in the performance of male and female educational technology undergraduates using screencast.

Methodology

Research design

This study adopted a mixed method research combining qualitative and quantitative research methods. A quasi-experimental design of the pretest, posttest, non-equivalent, non-randomized control group (Fraenkel & Wallen, 2003) was used to compare the performance of undergraduates taught using Screencast Instructional Package (SIP) and those taught using the Conventional Teaching Method (CTM); while descriptive research of the survey type using the questionnaire was employed to elicit responses about the undergraduates' attitude towards the use of SIP.

There were two levels of independent primary variable (one treatment and a control) and two levels of gender (male and female). The experimental and control groups were given the pretest, posttest and the delayed posttest. The Experimental Group was subjected to treatment using Screencast while

the Control Group was taught using the Conventional Teaching Method. The design layout is as shown in Table 1.

Table 1. Research design layout

Groups	***Pre-test***	***Treatment***	***Post-test***	***Delay Period***	***Delayed Posttest***
Experimental Group	O_1	X_1*(SIP)*	O_2	Y	O_3
Control Group		X_0*(CTM)*			

There were two different levels of independent variables in this study. These were: (i) Screencast Instructional Package (SIP), and (ii) Conventional Teaching Method (CTM). The dependent variable was the post-test performance of the undergraduates in the two groups.

Sample and sampling techniques

The population for the research comprised of all undergraduates in the National Open University of Nigeria (NOUN). The target population was 300 level education undergraduates of the National Open University of Nigeria (NOUN) and the sample was all the 300 level education students from NOUN. The study was limited to the two National Open University (NOUN) study centres in Kwara state. The reason for purposively choosing the sample was based on the fact that: (i) Educational Technology (EDU 332) is a core course that every 300 level education students must register and pass; (ii) 300 level education students in NOUN were not more than 30 in each study centre in Kwara state; and there are only two National Open University of Nigeria (NOUN) study centres in Kwara State. The distribution of sample along the variables is as shown in Table 2.

Table 2. Distribution of samples for the study

S/N	Sample	Gender		Total
		Male	Female	
1	Experimental group	10	15	25
2	Control group	11	14	25
	Total	21	29	

Table 2 shows the distribution of samples for the study. From the table 2, the two groups comprised a total of 50 students that were selected as samples for this study. 25 of them were exposed to the Screencast (Experimental group) while 25 of them were exposed to the Conventional Teaching Method (Control Group).

Research instruments

The research instruments that were employed for this study were (i) The Treatment Instrument - researcher developed Screencast Instructional Package (SIP), (ii) Test Instrument – Educational Technology Achievement Test (ETAT), and (iii) The Questionnaires – Field Trial Validation Questionnaire (FTVQ) and Screencast Attitude Questionnaire (SAQ).

Treatment instrument

Screencast Instructional Package (SIP) was developed for the purpose of this research. The SIP was developed using the ADDIE model. With the assistance of the researcher's supervisor, the screencast was developed based on the National Open University of Nigeria (NOUN) Educational Technology course (EDU 332) which is an open courseware available on the NOUN's website.

The SIP consisted of two topics: (i) improvisation and (ii) production of Visual and Audio Visual Media. Each topic was divided into two parts (parts I and II). The Screencast was produced using Camtasia Studio software.

Other computer applications that were also utilized during the development process were Portable Document Format (PDF) Reader, Microsoft PowerPoint and graphics software.

The Screencast Instructional Package (SIP) was saved on Undergraduates' personal computers. The contents of the two selected Educational Technology topics were presented through the computer and the learners interacted and responded to the computer prompts. The production of the SIP package was effected through a team of professionals and specialists.

Educational technology achievement test (ETAT)

The test instrument that was used for collecting data for this study was Educational Technology Achievement Test (ETAT). The ETAT was based on Educational Technology undergraduate curriculum on concepts of: (i) improvisation, and (ii) production of Visual and Audio Visual Media covered in the Screencast instructional package.

The ETAT contained two sections. Section A comprised of demographic data of the students such as name of study centre, level, course of study and gender. Section B of the ETAT consisted of 30 multiple-choice objective questions with four options (A-D) as possible answers to each question. ETAT questions were extracted from the two topics that were taught for four weeks. Students were required to indicate the correct answers by ticking/shading the appropriate option with precise letter (A-D) that corresponds to the correct option for each item.

Educational Technology Achievement Test (ETAT) was administered to the experimental and control groups as pre-test, posttest, and delayed posttest respectively. To reduce the retest effects, the questions were reshuffled and administered in a different random order as pretest, posttest and delayed posttest. On the scoring of the multiple-choice items, '1' was awarded for each correct answer and '0' for each wrong answer.

Questionnaires

Two types of questionnaire were administered in this study. They are: Field Trial Validation Questionnaire (FTVQ), and Screencast Attitude Questionnaire (SAQ): (a) Researcher-developed FTVQ was used to elicit responses from students for validating Screencast Instructional Package. The questionnaire was divided into two main parts. Part A dealt with biography data of the students while part B contained questionnaire items. Part B was sub-divided into six parts namely, content, interactivity, navigation, feedback, screen design and students' preference toward the use of screencast instructional package as compared to traditional methods. FTVQ consisted of 20 question items in 4-point scale type, namely, 1 as Strongly Disagree, 2 as Disagree, 3 as Agree and 4 as Strongly Agree; (b) The instrument that was used for collecting data on students' attitude towards the use of Screencast instructional package is a researcher-developed questionnaire. The questionnaire was divided into two sections. Section A dealt with biography information of the students while part B contained questionnaire items. Part B consisted of 20-item statements that were used to elicit responses from students on their attitude towards Educational Technology while using Screencast instructional package. SAQ consist of 20 question items in 4-point scale type, namely, 1 as Strongly Disagree, 2 as Disagree, 3 as Agree and 4 as Strongly Agree.

Validation of research instruments

The Screencast Instructional Package (SIP) was validated by three educational Technology experts from university of Ilorin. The field trial validation of the SIP was carried out by twenty 300 level students from the faculty of education, National Open University, Minna study centre. All corrections and comments made by the experts and students were used for the final phase of the development of the SIP.

The Educational Technology Achievement Test (ETAT) was validated by three Educational Technology experts from University of Ilorin who assessed the face and content validity of the test instrument in relation to the background of undergraduate programme in Educational Technology. Observations from the experts were used to modify the ETAT.

To test the reliability of the ETAT, it was pilot-tested on twenty 300level students of the National Open University of Nigeria, Minna study centre. The ETAT was administered once on the students and split-half reliability statistic was used to determine its reliability coefficient which yielded 0.728 (see appendix V). Hence, the instrument was considered to be reliable and consistent.

The Field Trial Validation Questionnaire (FTVQ) and Screencast Attitude Questionnaire (SAQ) were validated by three educational technology experts from university of Ilorin. Some items were dropped and some were modified based on the validation reports.

To determine the reliability of the SAQ, it was administered once on twenty 300 level education students of the National Open University of Nigeria, Minna study center. Cronbach's Alpha was used to measure the internal consistency of the instrument and it yielded 0.665. Hence, the instrument was considered to be reliable and consistent.

Procedure for data collection

Data were collected with the help of research assistants. Intact classes were used in both universities that were used as both experimental and control groups.

The ETAT was administered as pretest on the first week to the experimental group. The treatment lasted for four weeks after which the researcher administered the posttest and the questionnaire to the experimental group before proceeding to the university study centre with the control group. The control group was given the ETAT as pretest and they were given the NOUN's

EDU 332 Open Courseware to study-which is the Conventional Teaching Method (CTM) for four weeks after which the posttest was administered to them. The period of delay before the retention test was 2 weeks. The delayed post test was administered two weeks after the posttest to the experimental and the control groups respectively.

To test the attitudes of undergraduates toward SIP and the effect of Screencast on undergraduates' performance, the SAQ was administered to the experimental group that was exposed to the SIP. The samples for this study were drawn from two universities. The experimental group was exposed to Screencast. It was conducted at National Open University of Nigeria (NOUN), Kulende study centre, Ilorin, with 300 level education students as the sample. The control group was exposed to the conventional teaching method and it was conducted at National Open University of Nigeria (NOUN), Sobi Barracks study centre, Ilorin, with 300 level education students making up the sample.

The ETAT was administered to both groups as pretest. The experimental group was exposed to SIP while the control group was subjected to conventional teaching method. Posttest was administered on both groups after the four weeks. The four weeks was as a result of the splitting each concept into two weeks respectively. After which a delayed posttest was administered on both groups two weeks after the posttest to test the retention.

Results

The analysis and interpretation of data collected through the test items and questionnaire were done using inferential and descriptive statistics. The frequencies were converted to means and percentages to answer research question 4, while Analysis of Covariance (ANCOVA) statistical technique was used to test research hypotheses 1-3, with the aid of Statistical Package for Social Science (SPSS) version 20. All hypotheses were tested at 0.05 level of significance.

Research question 4:

What are undergraduates' (experimental) attitudes (reaction) toward the use of screencast?

To answer research question 4, the researcher collected data on undergraduates' attitude towards the use of screencast. A total of 25 students (experimental group) accessed the screencast and completed the questionnaires. They responded to 20 questionnaire items and their responses were analyzed using mean score. The result is presented in Table 3.

Table 3. Mean scores on undergraduates' attitudes toward the use of screencast

S/N	Statement	N	SA	A	D	SD	Mean	Decision
1.	Screencast enhances students' learning	25	18	7	0	0	1.28	Agree
2.	Open and Distance learning should include Screencast	25	17	8	0	0	1.32	Agree
3.	Screencast more information between teachers and learners	25	16	9	0	0	1.36	Agree
4.	Screencast provides better learning experiences	25	13	11	1	0	1.52	Agree
5.	I would work harder if I could use Screencast	25	12	13	0	0	1.52	Agree
6.	I learn more from Screencast than I do from books	25	18	7	0	0	1.32	Agree
7.	Screencast is useful in dissemination of information	25	18	7	0	0	1.40	Agree
8.	Screencast makes course more interesting	25	12	13	0	0	1.52	Agree
9.	Screencast skill is worthwhile	25	12	11	2	0	1.60	Agree
10.	Screencast gives opportunity to learn more	25	10	13	0	2	1.76	Agree
11.	I won't have anything to do with Screencast	25	0	0	20	5	1.80	Disagree
12.	I have phobia for ICT equipment	25	0	0	17	8	1.68	Disagree
13.	Screencast distracts me from the real lesson	25	0	0	14	11	1.56	Disagree
14.	The state of facilities discourages me from using Screencast	25	1	5	14	5	2.08	Agree
15.	With Screencast, I can control the pace at which I learn	25	17	6	2	0	1.40	Agree
16.	I just don't like screencast	25	1	0	9	15	1.48	Disagree

17.	I learn more with multimedia; which screencast provides	25	13	12	0	0	1.48	Agree
18.	I understand faster with screencast	25	14	11	0	0	1.44	Agree
19.	Watching screencast is a waste of time	25	0	0	13	12	1.48	Disagree
20.	With screencast, I learn anywhere, anytime	25	6	19	0	0	1.76	Agree
	Grand Mean						**1.54**	

Table 3 shows the responses of undergraduates on their attitudes toward the use of Screencast. The table reveals the mean score for each of the items with the minimum mean score being 1.28. This shows that undergraduates have positive attitudes toward Screencast. However, the states of facilities discourage the undergraduates from using Screencast; having a mean score of 2.08.

Hypotheses testing

Hypothesis 1:

There is no significant difference between the performance of undergraduates taught using screencast and those taught using the conventional method.

To determine whether there was significant difference in the posttest mean scores of undergraduates in the experimental (SIP) and control group (CTM), Analysis of Covariance using the pretest scores as the covariate was done as shown in Table 4.

Table 4 revealed that screencast had a significant effect on posttest performance score of students when covariate effect (pretest) was controlled. The table revealed that $F(1, 47) = 66.672$, $p<0.05$ was significant. Therefore, hypothesis one was rejected. Hence, there was significant difference in the performance of undergraduates taught using screencast and those taught using the conventional teaching method.

Table 4. ANCOVA result of the mean performance scores of experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	334.885	2	167.443	44.716	.000
Intercept	77.672	1	77.672	20.742	.000
Pretest	74.965	1	74.965	20.020	.000
Group(Treatment)	249.658	1	249.658	66.672	.000
Error	175.995	47	3.745		
Total	25420.000	50			
Corrected Total	510.880	49			

Table 5. Mean performance scores of undergraduates taught using screencast and conventional teaching method

Groups	N	Pretest Mean	Posttest Mean	Mean Gain Score
Experimental	25	20.12	24.6	4.48
Control	25	19.96	20.04	0.08

Table 5 shows that there was improvement in the posttest scores of the two groups. For instance, undergraduates taught using screencast had a mean gain score of 4.48 while undergraduates taught using conventional teaching method had a mean gain score of 0.08. This showsthat the two methods are effective in the teaching and learning of the selected educational technology concepts; however, using screencast is more effective.

Hypothesis 2:

There is no significant difference in the performance of educational technology undergraduates using screencast and those taught using the conventional teaching method, based on retention.

To determine whether there was significant difference in the delayed-posttest mean scores of undergraduates in the experimental group exposed to screencast and those taught using the conventional teaching method, Analysis of Covariance using the posttest scores as the covariate was done as shown in Table 6.

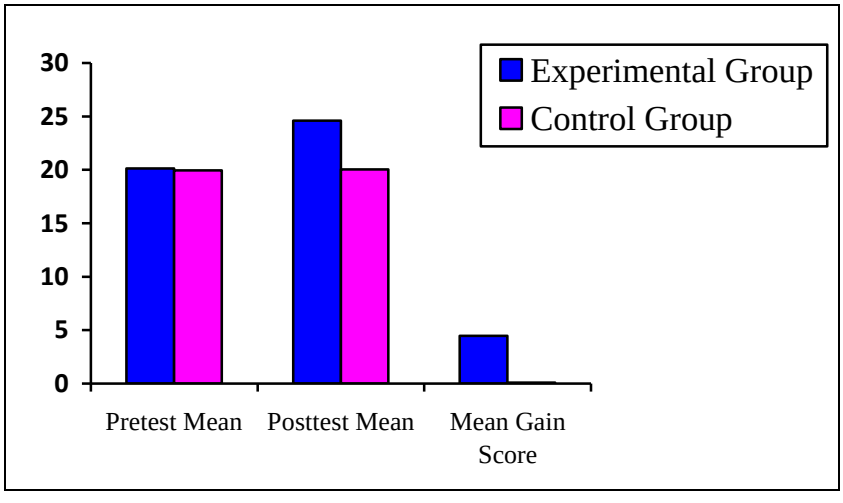

Fig. 1. Graphical illustration of the mean scores of the mean scores of the experimental and control groups

Table 6. ANCOVA result of the mean performance scores of the retention test of the experimental and control groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	710.967	2	355.483	204.919	.000
Intercept	59.250	1	59.250	34.155	.000
posttest	70.147	1	70.147	40.436	.000
Group	138.494	1	138.494	79.835	.000
Error	81.533	47	1.735		
Total	26557.000	50			
Corrected Total	792.500	49			

An examination of Table 6 revealed that screencast had a significant effect on delayed posttest (retention test) performance score of students when

covariate effect (posttest) was controlled. The results revealed that an F (1, 47) = 79.835, $p<0.05$ was significant. Therefore, hypothesis two was rejected. Hence, there was significant difference in the delayed posttest (retention) performance scores of undergraduates taught using screencast and those taught using the conventional teaching method.

Hypothesis 3:

There is no significant difference in the performance of educational technology undergraduates using screencast based on gender.

To determine whether there was significant difference in the posttest mean scores of male and female undergraduates exposed to screencast, Analysis of Covariance using the pretest as a covariate was done as shown in Table 7.

Table 7. ANCOVA result of the mean performance scores of male and female undergraduates exposed to screencast

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	18.980	2	9.490	1.618	.221
Intercept	64.615	1	64.615	11.018	.003
Pretest	18.980	1	18.980	3.236	.086
Gender	.310	1	.310	.053	.820
Error	129.020	22	5.865		
Total	15277.000	25			
Corrected Total	148.000	24			

A close examination of Table 7 showed that an F (1, 22) = 0.053, $p>0.05$ was not significant. The result showed that there was no significant difference in the performance of undergraduates exposed to screencast based on gender. Thus, hypothesis 3 was not rejected.

Table 8. Mean performance scores of male and female undergraduates exposed to screencast

Treatment	Gender	N	Pretest mean	Posttest mean	Mean gain score
Screencast	Male	10	19.8	24.6	4.8
	Female	15	20.33	24.57	4.24

From Table 8, it was observed that both male and female undergraduates had mean gain scores of 4.8 and 4.24 respectively. This shows that the treatment improved the performance of the undergraduates regardless of the gender. However, male undergraduates had higher mean gain score than the female.

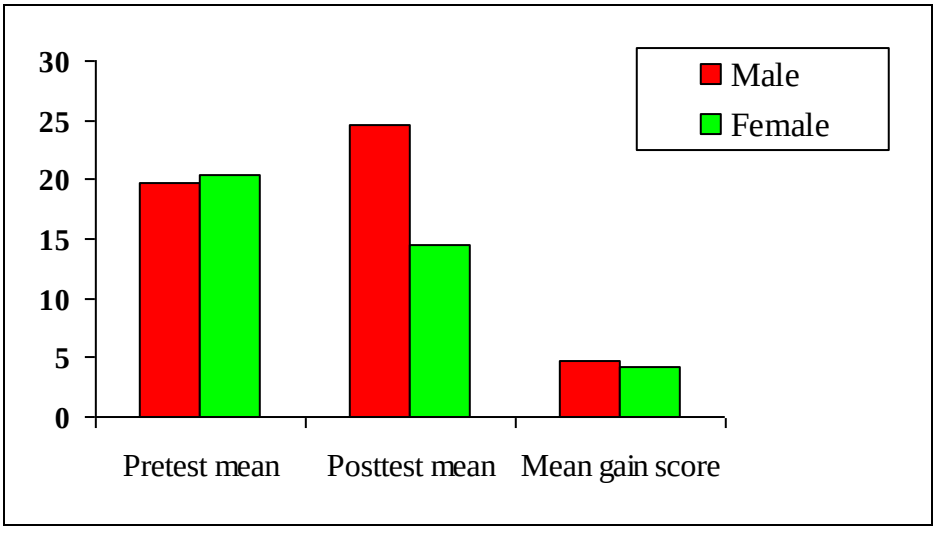

Fig. 2. Graphical illustration of the mean score of male and female undergraduates exposed to screencast

Discussion

The result of the analysis of the performance scores of undergraduates in the pretest and posttest (before and after exposure to screencast) was observed with research question 2 and hypothesis 1. The result of the ANCOVA

analysis indicated that there was significant difference between the performance of undergraduates taught using screencast and those that were taught with the conventional teaching method.

The experimental group performed significantly better than their contemporaries in the control group. These findings are consistent with the findings of prior studies which Lloyd & Robertson (2012) indicated that screencast tutorials are an effective and efficient tool for enhancing student learning and especially for higher order conceptual statistical knowledge compared to traditional instructional techniques.

The findings of Tekinarslan (2013) however found that there was no significant difference between the mean scores of the experimental group and control group on the multiple choice pretest, but agrees with the findings of this present study that screencast produce more positive effect on the posttest performance of undergraduates.

The exceptional performance of the undergraduates exposed to screencast over those taught using conventional teaching method was to testify to the fact that using screencast is a better approach for teaching in distance learning programmes in Nigeria. Nevertheless, as effective as screencast is, it should not be used to replace the conventional teaching method because of the missing real life teachings which undergraduates enjoy in conventional one. Hence, screencast should only be used to supplement and complement conventional teachings.

The influence of gender on the performance of undergraduates when exposed to screencast was examined using hypothesis two and research question 3. The ANCOVA result established no significant difference in the performance of male and female students that were exposed to screencast. Additionally, analyses also indicated that gender had no influence on the performance of undergraduates in educational technology when they were exposed to screencast. This shows that the treatment improved the performance of the undergraduates exposed to screencast regardless of gender.

The study agrees with the findings of Gambari (2004), whose study revealed that there was no difference in the performance of male and femle students exposed to Computer-Aided Learning (CAL). The researcher could not locate any previous research on influence of gender on performance of undergraduates exposed to screencast to support or oppose this finding. However, researchers have worked on gender difference on students' performance. For example, in a study conducted by Gambari (2010), it was revealed that computer-assisted instructional package is gender friendly when employed to teach physics. This is in agreement with findings by Dantala (2006) and Nwaorgu (2006) who found that computer-assisted instructional package is gender friendly when employed to teach history and biology respectively.

Undergraduates' attitude toward the use of screencast was examined using research question 4. The result of the mean scores indicated that the students had positive attitude towards the use of podcast. The result agreed with the findings of Marriott & Teoh (2011) who reported that undergraduates' attitudes were positive towards screencast and receiving screencast feedback. This is also in line with the findings of Rocha & Continho (2011) who found that students showed great interest in screencast. Similarly, Boone & Carlson (2011) found that students showed positive attitudes toward screencasts as the students claimed it helped them understand written comments provided by tutors and used media-rich feedback to richly improve their writing.

From the findings, it is evident that integrating screencast with the distance education would be accepted by undergraduates in the National Open University of Nigeria (NOUN). It is therefore advisable for all stakeholders to work toward making it work in the university.

The influence of retention on performance of undergraduates exposed to screencast was examined using hypothesis 3 and research question 5. The result of the ANCOVA analysis indicated that there was significant difference

between the (retention test) performance of undergraduates taught using screencast and those that were taught with the conventional teaching method.

This finding is in line with the resuts of Dey et al. (2009). They found that students viewing the screencasts remembered key concepts better than those who attended the live presentation. Students reported a preference for having the image of the speaker in the screencast, but its absence had no impact on the retention of material.

The researcher found little research on influence of screencast on performance of undergraduates' retention to support or oppose this finding. However, researchers have worked on effect of Computer-Aided Instructional Package on students' retention performance. For instance, National Teacher Training Institute[4)] found that incorporating video in the classroom leads to increased retention of information by students. This was further supported by the findings of Courts & Tucker (2012). From the findings it can be inferred that using Computer-Aided Instructional Package such as screencast enhances students retention of lesson learnt.

Conclusion

The results obtained from the data gathered and analyzed in this study indicated that the screencast covered the two selected educational technology topics. The instructional screencast was found to be effective in the teaching and learning of educational technology topics that were selected. Undergraduates that were taught using screencast performed better than their counterparts that were taught using the conventional teaching method. Gender disparity in performance was not recorded as both male and female undergraduates performed equally.

The research findings showed that undergraduates had positive attitudes toward the adoption of screencast. The finding also revealed that screencast enhanced undergraduates' retention. The undergraduates taught using screencast performed better in their retention test than their counterparts that

were taught using the conventional teaching method. Screencast therefore, brings out effective learning of educational technology and positive improvement in the performance of undergraduates. This is an indication that it is an interesting and engaging alternative to supplement instruction delivery in distance learning programmes. The use of courseware, which is the conventional teaching method in distance learning programmes is becoming obsolete, losing its acceptance and is no longer encouraged. It is hoped that the utilization screencast for learning educational technology for undergraduates will allow better understanding of the topics and improve undergraduates' performance generally.

Recommendations

Based on the major findings of this study, the following recommendations were made: (i) Courseware developers should endeavour to develop and use screencast to supplement their courseware in Educational Technology and other courses in the university. This will further increase courseware developers knowledge on new innovations in ICT-Based instructional strategies; (ii) The university should expose the undergraduates to ICT-Based instructional strategies like screencast to promote undergraduates independence in knowledge acquisition, discovery learning and student-centred instructional approach; (iii) Undergraduates should explore the opportunities offered by screencast. The playback of screencast means can be utilized for revision and individualized learning; (iv) Appropriate universities authorities should welcome and support the use of screencast in National Open University of Nigeria and other distance learning programmes in Nigerian universities as this will enhance undergraduates' performances in educational technology and other programmes.

NOTES:

1. Omoh, G. How government impoverished Nigerians, poverty on rampage. *Financial Vanguard: Vanguard Newspaper,* 20th February, 2012, pp. 16-20.
2. http://www.open.ac.uk/opencetl/files/opencetl/file/ecms/web-content/Stansfield-G-and-Freake-S-June-2009-Screencasts-for-student-support-for-SMT359-Electromagnetism-PPT.pdf
3. Yakubu, A. & Ali, O. Gender conflict, educational attainment, religious orientation and national development as correlates of female and male's knowledge and attitudes in progress research in education: A paper presented at the 4th annual conference of Nigeria Association for Science Education Research, held in the auditorium, University of Jos, Nigera from 25th - 29th November, 2002
4. http://www.thirteen.org/edonline/ntti/resources/video1.html

REFERENCES

Agbatagun, O.A. (2006). Attitude of teachers towards the integration of computer education into secondary school curriculum. *J. Res. curriculum & teaching, 1*, 1-20.

Ayanniyi, R.B. (1999). Women education and cultural practice. *J. Women Colleges Education, 3*(1), 29-30.

Bichi, S.S. (2001). *The design of inventory skills in senior secondary schools' practical biology: MEd thesis.* Zaria: ABU.

Boone, J. & Carlson, S. (2011). Paper review revolution: screencasting feedback for developmental writers. *Nat. Assoc. Develop. Educ.*, *5*(3) 15-23.

Brown, A., Lutherbach, K. & Sugar, W. (2009). The current state of screencast technology and what is known about its instructional effectiveness (pp. 1748-1753). In: Gibsom, I., Weber, R., McFerrin, K., Karlsen, E. &

Willis, D. (Eds.). *Proceedings of Society for Information Technology & Teacher Education International Conference*. Chesapeake: AACE.

Courts, B. & Tucker, J. (2012). Using technology to create a dynamic classroom experience. *J. College Teaching & Learning*, *9*, 121-128.

Dantala, M.N. (2006). *Effects of computer assisted instructional package on the achievement of senior secondary school students in history in Minna metropolis: MTech thesis.* Minna: Federal University of Technology.

Dey, E.L., Burn, H.E. & Gerdes, D. (2009). Bringing the classroom to the web: effects of using new technologies to capture and deliver lectures. *Res. Higher Educ., 50,* 377–393.

Fraenkel, J.R. & Wallen N.E. (2003). *How to design and evaluate research in education.* New York: MacGraw-Hill.

Gambari, A.I. (2004). *The development of computer aided learning software for individualized instruction of physics in senior secondary schools in Niger State, Nigeria: MTech thesis.* Minna: Federal University of Technology.

Gambari, A.I. (2010). Effectiveness of computer-assisted instructional package in cooperative settings on senior school students' performance in physics, in Minna, Nigeria*: PhD thesis.* Ilorin: University of Ilorin. .

Gambari, A. & Fagbemi, P. (2010). Attitudes of lecturers towards integration of informaton and communication technology (ICT) into teaching and research in higher insitutions. *J. Gen. Studies*, *1*(1), 217-226.

Hess, F.M. (2009). Revitalizing teacher education by revisiting our assumptions about teaching. *J. Teach. Educ., 60,* 450-457.

Hunley, S.A., Evans, J.H., Delgado-Hachey, M., Krise, J., Rich, T. & Schell, C. (2005). Adolescent computer use and academic achievement. *Adolescence, 40,* 307-318.

Kubey, R.W., Lavin, M.J. & Barrows, J.R. (2001). Internet use and collegiate academic performance decrements: early findings. *J. Comm., 51,* 366-382.

Lloyd, S.A. & Robertson, C.L. (2012). Screencast tutorials ehance student learning of statistics. *Teach. Psych., 39,* 67-71.

Mallum, Y.A. (2000). Gender, educational as correlates with people's attitudes and knowledge to human rights. *Counsellor, 18,* 182-187.

Marriott, P.. & Teoh, L.K.. (2011). Delivering screen-cast feedback on assesment to large cohorts. *Iadis Multi Conference Oncomputer Science & Infromation Systems,* pp. 329-336.

Mayer, R.E. (2001). *Multimedia learning.* New York: Cambridge University Press.

Mayer, R.E. & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educ. Psychologist, 38*(1), 43-52.

Mayer, R.E., Fennell, S., Farmer, L. & Campbell, J.. (2004). A personalization effect in multimedia learning: students learn better when words are in conversational style ratherthan formal style. *J. Educ. Psych., 96,* 389-395.

Mishra, P., Koehler, M.J. & Kereluik, K. (2009). The song remains the same: looking back to the future of educational technology. *TechTrends, 53*(5), 48-53.

Mohamad Ali, A.Z., Samsudin, K., Hassan, M. & Sidek, S.F. (2011). Does screencast teaching software application needs narration for effective learning. *Turkish Online J. Educ. Tech., 10*(3), 76 – 82.

Mustapha, M.T. (2007). College science lecturers' attitude, knowledge and utilization of computer in education . *Nigerian Teacher Today, 13*(1), 102-108.

Nwaorgu, V.N. (2006). *Relative effectiveness of videotape, computer-assisted*

and realia instructions on biology achievement of secondary school students in Abuja municipal council: MTech thesis. Minna: Federal University of Technology.

Rocha, A.M.M. & Continho,C.P. (2011). Web 2.0 tools in high school in Portugal: creating screencasts and vodcasts for learning. *US-China Educ. Rev.*, 54-62.

Serin, O. (2011). The effects of the computer-based instruction on the achievement and problem solving skills of the science and technology students. *Turkish Online J. Educ. Tech.,10*(1), 183-201.

Tekinarslan, E. (2013). Effects of screencasting on the Turkish undergraduate students' achievement and knowledge acquisitions in spreadsheet applications. *J. Inf. Tech. Educ. Res., 12,* 271-282.

Yusuf, M.O. (1998). Computer education in Nigerian secondary schools: problems and prospects. *J. Nigeria Assoc. Educ. Media & Technology*, *8*(3), 23 – 31.

✉ Dr. Amosa Isiaka Gambari (corresponding author)
Department of Educational Technology
Federal University of Technology
Minna, Nigeria
E-Mail: gambari@futminna.edu.ng