

Application of E-Devices in Teaching and its Effectiveness in State Universities in Nigeria

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Abstract

Since ICT has become a new and pervasive supplementary tool in teaching job, this descriptive survey research examines the application of electronic devices in teaching and its influence on teaching effectiveness of academic staff of Nigeria universities. Tai Solarin University of Education and Olabisi Onabanjo University, both in Ogun State, were used as case studies. The study population comprises all the students and lecturers in the two universities. Multi-stage sampling technique utilizing proportional random sampling was used to select the study sample. In choosing the sample size, each university was grouped into strata based on colleges/faculties amounting to ten colleges/faculties and 20 participants (10 students and 10 lecturers) were selected from each department. Hence a total of 400 pre-tested questionnaires were administered on the sample size. Two versions of the instrument was prepared; one for the students and the other for the lecturers. However, 336 were returned and analysed using frequency counts percentages and chi-square statistics. The study revealed that application of electronic devices in teaching significantly influences lecturers' performance and teaching quality. Though instruction delivered using electronic devices were found to be adequate for students' knowledge acquisition, students low level of ICT literacy seriously undermines teaching performance and effectiveness. Consequent upon these findings, the study recommends a mass ICT literacy programs (especially its appreciation) for Nigerian students.

Key Words: Electronic Devices, ICT Literacy, Learning Effectiveness, Teaching Performance, Universities

INTRODUCTION

In the current information-powered society, all aspects of lives have been altered courtesy of technological innovation and advancement. Electronic literacy and information resources, rather than material resources, are now critical to both human and organisational survival. Workplace relations are resultantly reshuffled because enhancement strategies for jobs are now 'electronic' rather than 'mechanical'. Employers now hire and pay for 'mind power' rather than 'man power'. In educational institutions, e-teaching and learning becomes a new philosophical paradigm with the aim of meeting up with, or at least, competing with global trends in the knowledge based society. In the words of Torruam (2012), e-teaching and learning is one of the educational challenges of modern age about which progressive academic institutions must make bold efforts to compete favourably and excel in the global

market where education is a commodity. In a world driven by knowledge and technology, the role of teachers and academic staff is fundamental to literacy development as well as building well equipped and marketable graduates for positive social and economic transformation. This is evident in the roles they play in knowledge advancement through research, knowledge dissemination through teaching, and community services. University academics thus, rely on recent and timely information which, nowadays, is mostly sought through electronic means. They adopt electronic means on the job of teaching or delivering post-secondary instructions to students. This is because adoption of electronic means in teaching and learning offers flexibility in space and time (Ozioma & Offordile, 2001). Something however remains unclear from all these: on the part of the teacher, can the application of e-devices enhance teaching performance of the teachers? On the part of the learners, the adequacy of curricula instructions delivered to the learners using electronics means is also uncertain.

Delivering instructions with the aid of electronic means is to facilitate teaching and learning and it is working positively across the globe. The Nigerian experience however poses reasons for scepticism as students' ICT literacy level is still low (Adetimirin, 2012; Danner, & Pessu, 2013; Kwache, 2013; Patrick, & Benwari, 2014). Many of them do not have, and do not strive to own a personal computer. The consequence of this is very worrisome. Teacher gives students assignment and all they do is contract it out to those who render typesetting services to people. The contractors, in a bid to serve more students and make much money, *google* related materials, press *_ctrl+C* and *ctrl+V*, edit title, replace author's information with that of students' and print. The student, without perusing submits same. That is when asked to submit hard copy offline. If submission were made online via email, one gets surprised that different assignments may be submitted via the same email (the contractor's). Reading through, it is often discovered that the different assignments submitted are not actually different; the introductory and concluding parts are. The main contents are paraphrased same, if not verbatim. On the part of the instructor/lecturer, this can be frustrating because it renders all efforts a futile exercise. The most telling effect is on the overall educational deliveries in Nigerian universities. Educational standards are now believed to be questionable because students' academic performances have comparatively become low (Akinsanya & Oludeyi, 2013) while various forms of examination malpractices are on the increase. In fact, the situation has assumed such an alarming dimension that the general public now accuses our ivory towers of turning out unemployable graduates that are ill-equipped both in character and learning. Consequently today, Nigeria educational system is being perceived as incapable of oiling the wheel of sustainable, socio-economic and political development (Oludeyi, 2013).

Unfortunately again, in spite of the much attention concentrated on the way advances in ICT have revolutionised teaching and learning by scholars and researchers, a further and more deeper thought on the conclusions of these studies pose more questions than answers. These numerous studies (such as Tella, Tella, Toyobo, Adika, & Adeyinka, 2007; Adoni, & Kpangban, 2010; Kennedy, 2012; Salman, Ogunlade, Ogunlade, & Adegbam, 2013) have attempted establishing empirical connection between ICT resources and teaching/learning in secondary schools classrooms. One

conclusive theme in these researches is that application of electronic gadgets in teaching enhances teaching effectiveness. Other researchers who confine their studies within tertiary institutions also revealed significant positive relationship between the use of electronics devices to aid teaching and the quality of teaching (Ozioma & Offordile, 2001; Nwezeh, 2010; Bashorun, Abdumumin, & Adisa, 2011; Danner, & Pessu, 2013). Since the activities of teaching in classroom go *pari pasu* with the activities of learning, it seems disturbing how these studies place more emphases on teachers (or teaching) rather than weighing it simultaneously with the learners (or learning). Some schools of thought hold the notion that the exercise of teaching is incomplete when learning has not taken place in the learners, or when learning has not been meaningfully transferred to real-life situation. Can application of e-resources bring about effectiveness in learning when ICT literacy is woefully low among learners? (This informs the 5th research question). This question begs for answer as several empirical evidence abound showing the serious lack of ICT competencies among Nigeria students (see Adetimirin, 2012; Danner, & Pessu, 2013; Kwache, 2013; Patrick, & Benwari, 2014). With adequate attention to both lecturers and students of the two state universities in Ogun State, this study examined the influence of application of electronic devices on teaching effectiveness. Application here means effective and independent use of resources in communicating curricula instructions to students and in personal studying by students. The study was thus designed to provide answers to the following research questions;

1. How often do lecturers use electronic resources in their teaching activity?
2. What is the relationship between application of electronic devices in teaching and teaching effectiveness?
3. Can application of electronic devices improve teaching effectiveness of academic staff in higher institutions of learning?
4. Are curricular instructions adequately communicated to learners with the aid of electronic devices?
5. What is the influence of students' level of ICT literacy on teaching and learning aided by electronics devices?

MATERIALS AND METHODS

A descriptive survey research was used to examine the application of electronic devices in teaching and its influence on teaching performance of academic staff of Nigeria universities. Tai Solarin University of Education and Olabisi Onabanjo University, both in Ogun State, were used as case study. The study population comprises all the students and lecturers in the universities. Multi-stage sampling technique utilizing proportional random sampling was used to select the sample for this study. In choosing the sample size, each university was grouped into strata based on colleges/faculties making a total of ten colleges/faculties (four colleges in Tai Solarin and six of seven faculties in Olabisi Onabanjo). Secondly, simple random sampling technique was used in choosing 20 departments (two from each of the colleges/faculties) and 20 participants (10 students and 10 lecturers) were selected from each department. Hence a total of 400 pre-tested questionnaires titled 'Scale on Application of Electronic Devices on Teaching Effectiveness' (SAEDTE) utilising a Four-Point Likert rating scale was developed and administered on the sample size.

The close-ended instrument was structured into four parts (A to D). The four sub-sections include: demographic data of the respondents, level of application of electronics devices in teaching job, the influence of such application on job performance of the lecturers, influence of students' level of ICT on effectiveness of teaching aided by electronics devices. Two versions of the instruments were prepared; one for the students and the other for the lecturers. However 316 were returned and analysed amounting to 79% return rate. The responses from the copies of the completed questionnaires comprising 198 (62.6%) males and 118 (37.4%) female responses were coded and analyzed using frequency counts and percentages. The following hypotheses were tested at 0.05 levels of significance using inferential statistics of chi-square.

- Ho1:** Application of electronic devices is not significantly related to teaching effectiveness in higher institutions of learning
- Ho2** Teaching performance will not significantly improve with the aid of electronic resources among academic staff of higher institutions of learning.
- Ho3:** Curricular instructions are not adequately delivered with the aid of electronic devices
- Ho4:** The quality of teaching supplemented by electronic devices will not be affected by level of ICT literacy of university students

RESULTS AND DISCUSSION OF

FINDINGS Demographic Data of Participants

The participants were between the age of 20 and 40 where 62.6 % of them were men while 49% are married. The average number of years in teaching activities by the lecturers was 15.5% (6 to 10 years), 22.6% (11 to 15 years), 40.5% (15 to 20 years) and 14.9% (21 to 25 years). The percentage of respondents' level of education was 18.7 % for the PhD holders, 64.6% for the Master's Degree holders, and 5.5 % for the First Degree holders. While the students who were in first year constitute 22.5%, second year students are 21.2%, those in penultimate year were 37% while those in final year were 19.3%.

Testing and Interpretation of Hypotheses

The hypotheses were tested using chi-square under two (2) level of confidence of 95 per cent and a significant level of 0.05 to ensure the degree of differences between the observed and expected frequencies. Degree of freedom = $K - 1 = 3$ (where K is the Number of variables). Decisions are made base on the general rule of decision: If $X^2_c > X^2_t$, reject H_0 and accept H_1 but If $X^2_c < X^2_t$ accept H_0 and reject H_1 . This means that if the value of chi-square calculated (X^2_c) is greater than the table value (X^2_t), the null hypotheses (H_0) is rejected and the alternative hypotheses (H_1) is accepted but if result shows the other way round, then H_0 is accepted while H_1 is rejected.

Research question one: How often do lecturers apply electronics devices to teaching activity?

Table 1. Level of application of electronics devices in teaching activity

ELECTRONIC DEVICES	RESPONSES				REMARKS
	Very often	Often	Rarely	Never	
Internet	67 (21.2%)	119 (37.6%)	101 (32%)	29 (9.2%)	Used poorly
LCD Projectors	-	-	10 (3.2%)	306 (96.8)	Used very poorly
Computers	78 (24.7%)	128 (40.5%)	96 (30.4%)	14 (4.4%)	Used fairly
CD Rom	-	-	29(9.2%)	287(90.8%)	Used very poorly
Emails	99 (31.3%)	101 (32%)	88 (27.8%)	28 (8.9%)	Used fairly
Audio Resources	-	-	187 (59.2%)	129(40.8%)	Used very poorly
Video Resources	-	-	18 (5.7%)	298(94.3%)	Used very poorly

Table 2. Chi-square distribution on relationship between application of electronic devices and teaching effectiveness in higher institutions of learning (Ho1)

VARIABLES	O	E	o-e	(o-e) ²	$\frac{(o-e)^2}{E}$	(%)	Decision
Strongly Agree	14	79	-65	4225	53.5	4.4	Application of electronic devices is significantly related to teaching effectiveness in higher institutions of learning
Agree	38	79	-41	1681	21.3	12.1	
Disagree	106	79	27	729	9.2	33.5	
Strongly Disagree	158	79	79	6241	79	50	
Total	316	316			163	100	

$$X^2_c > X^2_t \text{ (i.e. } 163 > 7.81)$$

$$e = Ef = 316/4 = 79$$

Table 3. Chi-square distribution on level of improvement of teaching performance with the aid of electronic resources among academic staff of higher institutions of learning (Ho2)

VARIABLES	O	E	o-e	(o-e) ²	$\frac{(o-e)^2}{E}$	(%)	Decision
Strongly Agree	73	79	-6	36	0.92	23.1	Teaching performance significantly improves with the aid of electronic resources among academic staff of higher institution of learning
Agree	38	79	-41	1681	21.3	12.1	
Disagree	99	79	20	400	5.1	31.3	
Strongly Disagree	106	79	27	729	9.2	33.5	
Total	316	316			36.57	100	

$$X^2_c > X^2_t \text{ (i.e. } 36.57 > 7.81)$$

Table 4. Chi-square distribution on adequacy of curricular instructions delivered with the aid of electronic devices (Ho3)

VARIABLES	O	E	o-e	(o-e) ²	$\frac{(o-e)^2}{E}$	(%)	Decision
Strongly Agree	29	79	-50	2500	31.6	9.2	Curricular instructions are adequately delivered with the aid of electronic devices
Agree	39	79	-40	1600	20.3	12.3	
Disagree	149	79	70	4900	62	47.2	
Strongly Disagree	99	79	20	400	5.1	31.3	
Total	316	316			119	100	

$$X^2_c > X^2_t \text{ (i.e. } 119 > 7.81)$$

Table 5. Chi-square Distribution for Hypothesis four: relationship between quality of teaching supplemented by electronic devices and ICT literacy level of university students (Ho4)

VARIABLES	O	E	o-e	(o-e) ²	$\frac{(o-e)^2}{E}$	(%)	Decision
Strongly Agree	39	79	-40	1600	20.3	12.3	The quality of teaching supplemented by electronic devices are affected by level of ICT literacy of university students
Agree	40	79	-39	1521	19.3	12.7	
Disagree	149	79	70	4900	62	47.2	
Strongly Disagree	88	79	9	81	1	27.8	
Total	316	316			102.6	100	

$$X^2_c > X^2_t \text{ (i.e. } 102.6 > 7.81)$$

The study revealed that application of electronic devices in teaching significantly influenced teaching effectiveness. This is supported by the hypothesis tested in table 2 ($163 > 7.81$) and in corroboration with previous studies of Ozioma and Offordile (2001), Nwezeh (2010), Bashorun *et al.* (2011), and Danner, and Pessu (2013) which were carried out in the tertiary institutions of learning. The present findings also support the findings of studies conducted in post-primary schools (Tella *et al.*, 2007; Adoni, & Kpangban, 2010; Kennedy, 2012; Salman, *et al.*, 2013). This revelation answers the second research question and further confirms what already exists in the body of knowledge about the use of e-resources in teaching.

About the first research question, Table 1 shows the frequency and percentage of application of electronic facilities in teaching by academic staff of the studied universities. From the table, 21.2% of the respondents indicated that internet was utilised very often, 32% of them believed it was rarely used while only 9.2% said that internet had never been used in teaching. The usage of LCD Projectors in teaching was not very pervasive in the two universities studied. 96.8% of the respondents claimed that it was never used in teaching while only 3.2% believed it was rarely used a large majority of the respondents maintained that though it had never been used in the conventional classroom arrangement it had been used during periodic seminars and sometimes conferences organised by the schools. Forty point five percent (40.5%) of the participants believed that computer and computer software were utilised in teaching and learning exercise in their school; another 24.7% did not just claim that it was often used, but believed that it was utilised very often. While the use of CD ROM was not common among the teachers, a few (9.2%) of the participants were final year students whose project supervisors rarely instructed them to use CD ROMs for final submission of their research project.

Email facilities were utilised very well by lecturers in the studied universities. 31.3% and 32% of the participants testified, respectively, that the use of email was very often and often used. The use of audio and video devices was not very common in the two universities studied. In summary, the level of application of e-devices in teaching was considerably low among staff and students of the two universities. This finding is consistent with the findings of Bashorun *et al.* (2011) that the use of e-resources by academic staff of UNILORIN, was not at the expected level that would effectively enhance the learning and research process in the university.

Earlier study of Ozioma and Offordile (2001) revealed that application of e-devices helps teachers demonstrate experiments, explain concepts, cover a large number of people, provides opportunity for individualization, offers variety of learning resources, provides greater opportunities for interactive learning, raises the overall quality of education and provides access to unlimited information from different sources. Building on these findings, the present study hypothesised that teaching performance may improve with the aid of e-resources among academic staff of higher institutions of learning. This hypothesis (Ho2) was positively supported by the data in table 3. The use of electronic means in teaching was found capable of improving teachers' performance ($36.57 > 7.81$) and this answers the third research question. Corroborating the findings of Salman *et al.* (2013) that effective integration of technology in the classroom stimulates students and teachers in attempting more complex tasks and materials, the present findings shows further that application of e-devices enabled teachers to adequately deliver curricular instruction ($119 > 7.81$). This achievement is however thwarted with students' lack of skills in ICT usage. Table 5 shows that the quality of teaching supplemented by electronic devices was affected by level of ICT literacy of university students ($102.6 > 7.81$). This problem adds up to those that were listed in the findings of Ozioma and Offordile (2001). Since it is no longer news that there exist low level of ICT literacy among Nigeria students (as revealed in the studies of Adetimirin, 2012; Danner, &Pessu, 2013;Patrick, &Benwari, 2014), the present findings expands the scope of existing knowledge by showing that this low level of e-literacy affects teaching and learning effectiveness especially in this get age.

CONCLUSION AND RECOMMENDATIONS

The results of this study have several implications for future research and practice in the science of teaching and in the field of educational management. Based on the findings of this research, it can be concluded that though application of e-devices in teaching improves teaching effectiveness as well as teaching performance, the level of application is very low among academic staff and students in the studied universities. This may hinder the pace of knowledge acquisition and advancement among the students and thwart promotion of teaching and research among academics in the universities. The application of e-resources and e-devices in teaching, as shown in this study, enables adequate instructional communication and knowledge impartation in classrooms. Though instruction were found to be adequately delivered to students using electronics devices as aids, students' low level of ICT literacy seriously undermined the effectiveness of teaching and learning.

From the study findings, it is recommended that government, university managements and administrators, educational policy makers including all who have stakes in university education in Nigeria should intensify efforts towards ensuring that universities are fully equipped with electronic devices especially the ones that are useful in classrooms. Staff and students must be encouraged to utilise electronic gadgets in teaching and learning. To achieve this purpose, ICT support units which will be saddled with the responsibility of ensuring effectiveness of teaching and learning in the universities should be established. These units will help in the training, education, encouragement, supervision and monitoring of staff and students in their appreciation, application and usages of e-resources. This is necessary because of the pervasive role that ICT play in the lives of people in current information society. It is also important that government organise a mass ICT literacy programmes (especially its appreciation) for Nigerian students and staff. Impeding factors of utilisation such as insufficient power supply, lack of access to internet and others identified in the study of Ozioma and Offordile (2001) and Bashorun *et al.* (2011) should be tackled with intensity.

Where problems of adaptability in application of e-devices in teaching are experienced, the newest means by which electronic devices are used in pedagogy as suggested by Olojo *et al.* (2012) should be adopted. They referred to this approach as ‘blended learning’ which combines e-learning technology with traditional instructor-led training, where, for example, a lecture or demonstration is supplemented by electronic gadgets or an online tutorial. An instructor develops a course syllabus, develops goals and objective, selects quality textbooks, search online or offline for journal article readings, creates learning exercises and develops quiz and examinations. He can stand in the class to discuss concepts and issues with the students using projectors as aids, send course notes or curricula instructions to students via email and request feedback using the same route. This new mode of teaching should be encouraged in Nigerian universities.

REFERENCES

- Adetimirin, A. A. (2012). ICT literacy among undergraduates in Nigerian universities. *Journal of Education and Information Technologies* [Abstract], 17(4), Kluwer Academic Publishers Hingham, MA, USA available online at <http://dl.acm.org/citation.cfm?id=2205891>
- Adoni, E. E. & Kpangban, E. (2010). *Application of ICTs in Nigerian Secondary Schools. Library Philosophy and Practice*. Available online at <http://www.webpages.uidaho.edu/~mbolin/adoni-kpangban.htm>
- Akinsanya, A. O. & Oludeyi, O. S. (2013). The Dialectics of Staff Unionism and University Management; Critical Discourse for Effective Educational Service Delivery. *National Association of Science, Humanities and Educational Research Journal*, 11(2)
- Bashorun, M. T., Abdulmumin, I., & Adisa, M.Y. (2011) User Perception of Electronic Resources in the University of Ilorin, Nigeria (UNILORIN) *Journal of Emerging Trends in Computing and Information Sciences*, 2(11)
- Danner, R. B. & Pessu, C. O. A. (2013) A Survey of ICT Competencies among Students in Teacher Preparation Programmes at the University of Benin, Benin City, Nigeria. *Journal of Information Technology Education Research*, 12, available online <http://www.jite.org/documents/Vol12/JITEv12ResearchP033-049Danner1160.pdf>

- Kennedy, U.E. (2012). Perception of Teachers Towards the Utilization of Information and Communication Technology (ICT) in Teaching Introductory Technology in Secondary School in Delta State in Nigeria. *Journal of Educational and Social Research*, 2(7) Available online at <http://www.mcser.org/images/stories/JESR-Special-Issues/JESR%202012%20Special%20Issue%20vol%202%20no%207/umunadi%20e%20kennedy%20perceptions.pdf>
- Kwache, P. Z. (2013). An evaluation of the role of computer studies in promoting secondary education today: A case study of Jimeta Metropolis, Adamawa State. *Discourse Journal of Educational Research*, 1(1), 9-18, available online at <http://www.resjournals.org/IJER/PDF2/2013/May/Kwache.pdf>
- Nwezeh, C. M. T. (2010). *The Use of ICT in Nigerian Universities: A Case Study of Obafemi Awolowo University, Ile-Ife*. Document available online at <http://www.webpages.uidaho.edu/~mbolin/nwezeh3.pdf>
- Oludeyi, O. S. (2013) Unequal access to tertiary education; implication for national security, *IOSR Journal of Humanities and Social Science*, 9, (2), Retrieved online at <http://iosrjournals.org/iosr-jhss/pages/v9i2.html>
- Ozioma, C. A. & Offordile, S. (2011) Strategies for Improving the use of Electronic Teaching and Learning(E-Learning) for Vocational Education in Tertiary Institutions of Anambra State-Nigeria. *Mediterranean Journal of Social Sciences*, 2 (6)
- Patrick, O. & Benwari, N. N. (2014) Computer Literacy Among Undergraduate Students In Nigeria Universities. *British Journal of Education*, 2,(2), 1-8, June 2014 Published by European Centre for Research Training and Development UK available online at <http://www.eajournals.org/wp-content/uploads/Computer-Literacy-among-Undergraduate-Students-in-Nigeria-Universities.pdf>
- Salman, M. F., Ogunlade, O. O., Ogunlade, A. A. & Adegbami, A. O. (2013) Assessment of Secondary School Teachers' Professional Development in the Use of Information Communication Technology for Teaching Mathematics in Ejigbo, Nigeria *IOSR Journal of Research & Method in Education*, 2(1), 48-55
- Tella, A., Tella, A., Toyobo, O. M., Adika, L. O. & Adeyinka, A. A. (2007). An Assessment of Secondary School Teachers Uses of ICT's: Implications for Further Development of ICT's USE in Nigerian Secondary Schools. *The Turkish Online Journal of Educational Technology (TOJET)*, 6(3) available online at <http://files.eric.ed.gov/fulltext/ED500056.pdf>
- Torruam, J. T. (2012). Application of E-Teaching and E-Learning in Nigerian Educational System. *Academic Research International* 3(1) available online at [http://www.savap.org.pk/journals/ARInt./Vol.3\(1\)/2012\(3.1-03\).pdf](http://www.savap.org.pk/journals/ARInt./Vol.3(1)/2012(3.1-03).pdf)

BIO-DATA

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