Availability of E – Learning Facilities for Science Education Programme in Federal Universities in South East Nigeria

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Abstract

This study was carried out to ascertain the availability of e-learning facilities for science education programme in Federal Universities in South- east Nigeria. One research question guided the study while one null hypothesis was tested at 0.05 level of significance. Design of the study was a descriptive survey. Population of the study comprised all the 65 science educators in Federal Universities in South-East Nigeria. The entire population was studied without sampling due to the manageable size. Instrument for data collection was a check list which was validated by experts. The checklist was assessed for reliability using the Kendal Coefficient of concordance. It yielded a reliability estimate of 0.75 Data collected were analysed using frequency counts, percentages and chi-square. The findings of the study revealed among others that a greater number and percentage of the e-learning facilities are available in science education programme in Federal Universities in South-east Nigeria. More so, there is no significant difference in the mean ratings of science educators on the availability of e-learning facilities for teaching of science education courses in the Universities based on gender. The study recommended among others that science educators in the universities should constantly update their knowledge on new technologies available for teaching and learning through conferences, seminars and workshops.

Key words: Availability, E – learning facilities, Science education programme, university

Introduction

The emergence and explosion of Information and Communication Technology (ICT) over the past few years has brought drastic changes in the nature of the learning environment. This has brought a paradigm shift in the method of learning from traditional to modern where the teacher is seen as a facilitator of learning and the learners participating actively through the use of modern learning facilities. Science education programme was not left out in these developments in the Universities. The Science educators as professional teachers who impact knowledge necessary for effective performance in the science field are equally expected to

move in pace with these changes. Federal Republic of Nigeria (FRN, 2013) noted that science educators are required to be regularly exposed to innovations in their fields such as the use of e-learning facilities to be professionally competent, in addition to the basic and professional training received as educators in science. As agents of change through discoveries to improve human existence, science educators are not just expected to transmit knowledge in today's information driven society, but to be mentors and facilitators in helping students to navigate through the ocean of science and to learn electronically using electronic learning facilities.

Jegede (2005) defined electronic learning (e-learning) as the presentation and delivery of lessons using the electronic media such as the web, internet or other multimedia facilities like computer, projector, television, audio and audio visual cassette and radio disc. E-learning makes use of many technologies – some of which have been developed specifically for it, whilst others conveniently complemented the learning process. These technologies include communication facilities that are widely used in teaching and learning such as the use of email and instant messaging, message forums and social network tools that any internet user would use. E–learning facilities in education means integration of modern telecommunication equipment and Internet Communication Technology resources such as the computer, scanner, printer, internet, intranet, e-mail, video phone system, teleconferencing devices, Wireless Application Protocols (WAP), radio and microwaves, television and satellites, multimedia computer and multimedia projector in teaching and learning and in curriculum implementation. The relevance of e-learning facilities in science education programme in tertiary institutions is in terms of its usage for instructional delivery, assessment, research and hands – on experience. Adesoji (2013) noted such as, use of the facilities in video conferencing which permits real interaction to be like conventional classrooms even where the recipients are far apart, web conferencing that permits sharing of presentation, documents and application demonstration. Others are usage in audio conferencing for collaborative discussions that involve certain

number of persons, chat as in texts and graphic capabilities for information sharing, instant messaging for message delivery, white boarding for demonstration and co-development of ideas among others. The integration and the use of these facilities in educational delivery of universities therefore becomes imperative.

University education has been described as the highest level of tertiary education given to persons who are qualified for enrolment for a course after the post primary education; and having fulfilled the admission requirement (Ekpang, 2008). Public universities are owned and managed by federal and state governments. Initially, they were the only ones in existence until private universities were established under Federal Government Act No 19 of 1993 following the insurgency in demand for university education; and which encouraged private participation in university ownership (National University Commission, NUC, 1999). At university level, programmes are configured to achieve among others, the ability of individuals to contribute to national development through high level manpower training, develop intellectual capability to understand and appreciate the local and external environments and acquire both physical and intellectual skills to become self-reliant and useful members of the society (FGN, 2013). The performances of these universities are constantly evaluated, monitored and supervised by NUC to maintain set standards. Conscious of the comp (BSc) effectiveness endangered by globalization, university programmes were reviewed and ICT was integrated into the curricula to solve societal problems

University awards Bachelor of Science (BSc) Degree in Science education after four years training offering courses in areas of chemistry, physics, biology, integrated science, mathematics, computer science education among others. The objectives of Science education Programme in university as noted by NUC (2008) are to: enable students gain the concept of the fundamental unit of science, provide learning opportunities which will help the students

acquire experience in the basic skills for effective implementation of integrated science curriculum in the junior secondary schools and develop in students, the spirit of inquiry into living and non-living things and energy changes in the environment. However, these objectives of science education at university level of education could only be achieved if the necessary facilities for teaching and learning are available for instructional delivery.

The role of e-learning facilities in curriculum implementation is recognized by the Nigeria National Policy on Education where it stated that, "the government shall provide facilities and necessary infrastructures for the promotion of ICT and e-learning" (FRN, 2013 p.53). In the modern age therefore, availability of e-learning facilities for science education in universities are considered necessary.

Availability of e-learning facilities depicts the presence and accessibility of electronic devices that are applied in teaching and learning. These devices when applied offers powerful learning environment and can transform the teaching/learning process in a manner that students can manipulate them for active participation, even in a self-directed way. Ko and Rosen (2004) opined that instructors should be assisted with all the software required to deliver courses on-line using sites on the web that offer recordings, document articles and photo essays. This implies that electronic learning facilities should be provided with the enabling environment and connectivity, that makes it accessible to users.

Unfortunately, the availability and adequacy of e-learning facilities in Nigerian tertiary institutions are doubtful (Wokocha, Elechi, Babalola, Agbagbue, Adanma and Umah, 2017); Osuafor and Emeji (2012) and Gabadeen, Alabi and Akinnubi (2015) discovered that these e-learning technologies are relatively available to the teachers and students in Nigerian universities. Evidence available also shows that the educators are seriously challenged in the use of available ones owing to such factors as poor awareness of electronic learning facilities available for instruction, irregular power supply, poor bandwidth connectivity and poor

maintenance of available facilities for sustainability (Okoli, 2012). Science education programme is not an exception as the achievement of its objectives seems also threatened by the poor availability of these e- learning facilities. These problems to a great extent will likely affect the performance of science education students in catching up with the speed of innovations in the field of science during training and on graduation in performing their functions; both as teachers in implementation of science education curriculum using the modern e-learning facilities, and other science- related responsibilities in their environment. In fact, unavailability of e–learning facilities among science educators may hamper the achievement of the overall science education objectives in universities.

There is a great feeling that there could be a difference in the availability of these e-learning facilities in universities based on ownership and gender of science educators. Federal universities are expected to be more furnished with these e-learning gadgets considering the federal might in its funding and as an example to state and private institutions. It also seems that male science educators are more interested in the availability of electronic facilities for science discoveries and learning than their female counterparts are. Rupere (2006) discovered that women are less involved in e-learning activities than their male counterpart in rural Zimbabwe. Observably, in Nigerian society and African continent in general, it appears that women are less involved in the use of electronic gadgets than their male counterparts with younger ones showing more interest. However, Chiaha, Eze and Ezeudu (2013) reported that there was no significant difference in gender with regards to students' access to e- learning facilities.

Nevertheless, these issues of availability of e- learning facilities in science education programme and factors as ownership and gender as they affect it need to be empirically proven in universities in south- east Nigeria. This study therefore investigated these facts with the aim

of proffering suggestions to enhance the overall objectives of science education programme in federal universities in south- east Nigeria.

Purpose of the Study

The purpose of this study was to determine the availability of e-learning facilities for teaching in science education programme in federal universities in south- east Nigeria.

Research Questions

What are the e-learning facilities available for teaching in science education programme in federal universities in South east, Nigeria?

Hypothesis

This null hypothesis was tested as 0.05 level of significance. There is no significant difference in the mean rating of science educators on the e-learning facilities available for teaching in science education programme in federal universities in South east, Nigeria based on gender.

Method

The study was a descriptive survey, carried out in South-east, Nigeria. South East is one of the six geo-political zones consisting of the Abia State, Ebonyi State, Enugu State, Imo State and Anambra State. The population comprised all 65 science educators from three federal universities in South-East Nigeria namely; University of Nigeria Nsukka, Nnamdi Azikiwe University, Awka and University of Agriculture, Umuahia. The entire population was studied without sampling because the size is manageable. One research question guided the study, with one hypothesis tested at 0.05 level of significance. A checklist was used to elicit information on availability of e-learning facilities for teaching and learning in the universities. This contains 15 items with two response categories, available and not available. The checklist was assessed for reliability using the Kendal Co-efficiency of concordance otherwise known

as inter-rater reliability. It yielded a reliability estimate of 0.75.A period of two weeks was used by the researchers to collect data on the availability of the e-learning facilities in the universities. The research instrument was administered personally by the researchers with the help of three research assistants from each of the universities. Relevant data on the availability of the e-learning facilities in the three universities were obtained.

The data collected from the study were analysed using frequency, percentages and Chi-Square statistics. Frequency and percentages were used to answer the research question while Chi-square statistic was used to test the null hypothesis. Statistical Package for Social Sciences (SPSS) Version 21 was used to analyse data.

In taking decision on availability of the listed e-learning facilities, each item is equated to 100 percent. Any item of 50 percent and above was regarded as available and not available if below 50 percent.

Results

The results of the study are presented in Tables 1 to 3

Research Question 1: What are the e-learning facilities available for teaching in science education programme in federal universities in South-East Nigeria? Analysis of data for answering research question 1 is presented in Table 1.

Table 1: Frequency and percentages of the e-learning facilities available for teaching in science education programme in federal universities in South East Nigeria

S/N	E-LEARNING FACILITIES	AVAILABLE		NOT AVAILABLE		REMARK
		N	%	N	%	
1	Computers	42	70.0	18	30	Available
2	Projectors	36	60	24	40	Available
3	Internet	40	66.7	20	33.3	Available
4	Video tape	18	30	42	70	Not available
5	Audio tape	16	26.7	44	73.3	Not available
6	Instructional radio	15	25	45	75	Not available
7	Instructional television	17	28.3	43	71.7	Not available
8	Text messaging	56	93.3	4	6.7	Available
9	E-mail facilities	51	85	9	15	Available
10	Telephone	56	93.3	4	6.7	Available
11	CD/DVD ROM	54	90	6	10	Available
12	WhatsApp	48	80	12	20	Available
13	Facebook	40	66.7	40	33.3	Available
14	YouTube	26	43.3	34	56.7	Not available
15	Flash drive	49	81.7	11	18.3	Available

The data contained in Table 1 shows that out of the 15 facilities rated, 10 items were available and five not available, giving 66.7% availability for teaching science education in the Federal Universities in South-East Nigeria. A higher number and percentage, 56(93.3%), 56(93.3%), 54 (90 percent), 51(85%), 49(81.7%) and 48(80%) indicated that telephone/ mobile phone, instant text messaging, CD/DVD ROM, e-mail facilities, flash drive, and WhatsApp are available. Other available facilities are computers, internet, face book and projectors with 42 (70 percent), 40 (66.7 percent), 40 (66.7 percent) and 36 (60percent) respectively. On the other hand, some e-learning facilities, instructional radio, audio tape, instructional television, video tape and You- tube with 45(75percent), 44(73.3%), 43(71.7%), 42(70 percent) and 30 (56.7percent) respectively are not available for teaching.

Hypothesis 1

There is no significant difference in the responses of science educators on the availability of e-learning facilities in Federal Universities in South East Nigeria based on gender.

Table 2: Chi-Square Analysis of the Difference in the Responses of Science Educators on the Availability of E-Learning Facilities in Federal Universities in South East Nigeria based on gender

S/N	E-LEARNING FACILITIES	GENDER				Df	χ^2	P-VALUE	REMARK
		MALE		FEMALE					
		Available	Not Available	Availa-ble	Not avail-able				
1	Computers	22	0	20	13	1	3.082	0.096	NS
2	Projectors	20	7	16	17	1	4.052	0.064	NS
3	Internet	20	7	20	13	1	1.212	0.409	NS
4	Video tape	10	17	8	25	1	1.158	0.397	NS
5	Audio tape	10	17	6	27	1	2.700	0.144	NS
6	Instructional radio	10	17	5	28	1	3.793	0.073	NS
7	Instructional television	10	17	7	26	1	1.831	0.251	NS
8	Text messaging	27	0	29	4	1	3.506	0.120	NS
9	E-mail facility	27	0	24	9	1	8.663	0.003	S
10	Telephone	27	0	29	4	1	3.506	0.120	NS
11	CD/DVD ROM	27	0	27	6	1	5.455	0.028	S
12	WhatsApp	27	0	21	12	1	12.273	0.000	S
13	Facebook	20	7	20	13	1	1.212	0.409	NS
14	YouTube	16	11	10	23	1	5.071	0.036	S
15	Flash drive	27	0	22	11	1	11.020	0.001	S

The table revealed that the P-values for the e-learning facilities namely, computers, projectors, internet, video tape, audio tape, instructional radio, instructional television, text messaging, telephone and face book are greater than the critical p-value (0.05) hence the difference in opinion of the male and female science educators for the items are not significant. The p-value for e-learning facilities as e-mail, CD/DVD ROM, WhatsApp, YouTube and flash drive are less than the critical p-value (0.05). Based on item by item analyses the opinions of these science educators were found to be significant and the null hypothesis not rejected. Hence, there is no significant difference in the responses of male and female science educators regarding the availability of e-learning facilities in Federal Universities in South East Nigeria

Discussion of Findings and Implications

The findings of this study revealed that the available e-learning facilities in teaching and learning of science education in Federal Universities in South east Nigeria are text messaging, telephone, CD/DVD Rom, e-mail facilities, flash drive, WhatsApp, computers,

internet, projectors and face book as rated from the most to the least available. E-learning facilities as instructional radio, audio tape, instructional television, video tape and you tube were indicated by the science educators as not available for teaching in the federal universities in South east Nigeria. This indicates a fairly high availability level of 66.7 percent. The finding from this study is in line with Atsumbe (2012) and Gabadeen, Alabi and Akinnubi (2015) which revealed that e-learning technologies are relatively available to the teachers and students in Nigerian universities. This is also similar to Osuafor and Emeji (2015) discovery that some listed e- learning facilities that include computer, printer, computer laboratory and public address system were moderately available for science educators in teaching pre-service teachers in South-East Nigerian Colleges of Education. Emesi and Yellowe, (2018) also revealed that information and communication technology gadgets are moderately available for teaching and learning in faculties of education in Rivers State Universities. This is not surprising as provision of ICTs in educational institutions has been the priority of Nigerian government, to improve the availability and utilization of e-learning facilities especially in the higher institutions. This is to move in pace with global competitiveness and to achieve programmes objectives in line with international standards.

The high availability of text messaging, telephone/mobile facilities, WhatsApp among others is a reflection of the flare among people today for android phones which have many facilities that could be used in teaching and learning. CD/DVD ROMs, flash drives even text messaging facilities are always available as they could be used offline, in asynchronous mode for individual and student to student interaction after teaching. This is in line with Er, Ozden and Asifogulu (2009) assertions that in an asynchronous learning environment where internet facilities are not readily available, e-learning facilities enable students to actively participate in their own learning, giving them the opportunity to interact with their peer, provide peer feedback, and reflect on the status of their personal learning goals and outcomes. This present

study has also confirmed the observation of Meloni (2010) that asynchronous communication using e-learning is by far the more popular learning type because many of the learning tools are free, require minimal hardware, and are used at the student's pace.

However, it is also worthy to note that the unavailability of such e-learning facilities as internet, instructional radio, audio tape, instructional television, video tape and Facebook at 33.3 percentage level is not negligible and calls for attention. Tarus, Gichoya and Muumbo (2015) also discovered the poor availability of these e-learning facilities in Kenyan public universities and as highly challenging in the implementation of e-learning for achievement of programme objectives. This shows that African universities are having similar problems with availability of e-learning facilities for teaching and learning. The problem in availability of these facilities for instruction could be as a result of financial constraints among teachers, students and the university management, energy crisis and lack of operational e-learning policies necessary for steady on- line instruction in the universities.

Furthermore, there is no significant difference in the mean ratings of science educators on the availability of e-learning facilities for teaching of science education based on gender. This indicates that the ratings of both male and female science educators do not differ significantly on the availability of e-learning facilities for teaching of science education in federal universities in South east, Nigeria. This finding is in line with Chiaha, Eze and Ezeudu (2013) report that there was no significant difference in gender with regards to students' access to e- learning facilities in federal universities in South east Nigeria.

The findings of this study have implications for science educators to constantly update their knowledge on e-learning facilities available for application in instruction, governments and stakeholders in tertiary institutions in making internet facilities adequately available for increased usage level of some e-learning facilities that is applied at synchronous mode. The

findings also imply the need for management of universities to encourage male and female science educators to continually develop themselves in the usage of e-learning facilities through adequate provision of the required facilities in the departments with enabling environments for frequent use.

Conclusion

The findings of this study indicates that Federal Universities in South-east Nigeria operates in conformity with NUC guidelines and expectations on integration of e- learning facilities in teaching and learning, to solve societal problems in line with global standards and in achieving objectives of science education programme in Universities.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Government should provide internet facilities and others that are not sufficient available, to be accessible to teachers and student in the universities. This is to ensure constant usage among teachers especially science educators and students in order to facilitate their e-learning activities.
2. Policy makers in the Ministry of Education should make regulations that will encourage the provision of e- learning facilities in universities by government and university management and for use in science education programme.

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