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THE EXTENT OF AVAILABILITY AND UTILIZATION OF E-LEARNING RESOURCES FOR TEACHING SCIENCE EDUCATION COURSES IN NOUN DISTANCE LEARNING STUDY CENTRES IN SOUTH-EAST NIGERIA

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ABSTRACT

The study sought to determine the extent of availability and utilization of e-learning resources for teaching science education courses in National Open University Nigeria (NOUN) distance learning study centres in South-East Nigeria (SEN). Two research questions and one null hypothesis tested at 0.05 level of significance guided the study. Survey research design was adopted for the study. All the population of 109 teachers in South-east Distance Learning study centres was used as sample. A structured checklist and questionnaire with two-point rating scale were used for data collection. The instrument was validated by three experts and reliability was established using Cronbach Alpha Method. The reliability co-efficient value of 0.82 was obtained using SPSS. The data collected were analyzed using frequency counts, percentages (%) for the research questions while the chi-square (X^2) was the statistical tools used for testing the null hypothesis formulated for the study. The findings revealed that majority e-learning resources were not available and the few that were available were not being used by science teachers for teaching. In conclusion it was discovered that location did significantly affect the opinion of science education teachers on the extent of availability and utilization of e-learning resources for teaching science education courses in NOUN distance learning study centres in SEN. Consequently, it was recommended among others, that Government should grant permission for science teachers to undertake in-service trainings, workshops, seminars and conferences in order to keep them abreast with the use of e-learning resources.

Keywords: Availability, Utilization, E-learning Resources, Science Education, NOUN Distance Learning

Introduction

Education is an investment in human capital. No country can achieve sustainable economic development without substantial investment in human capital through education (Adebayo, 2014). By spending huge resources in education, a country equips its citizens with knowledge and skill to make them more productive in future. As such, the skills and knowledge which each citizen should have in order to understand the society in which he lives and play an

intelligent part in its affairs are acquired through education. Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, morals, beliefs, and habits (National Council of Educational Research and Training, 2014). Education can take place in formal or informal settings and any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational (Adebayo, 2014). In the process of education, various bodies of knowledge are formed. These bodies of knowledge could be broadly grouped as arts or sciences.

Science education simply refers to the study of computer, biology, chemistry, physics, or mathematics with a method of teaching in other to be able to impart scientific knowledge to any individual or community (Omosewo, 2012). The modern era however, has brought a shift in the views about science education from objective fact based knowledge to practical activity which caters to the learners' skills, attitude, and values along with understanding (Donnelly & Jenkins in Jessani, 2015). This means acquiring both scientific knowledge and education to be able to share the scientific knowledge with an individual or a community. Of note however, is that science education is of vital necessity to human existence. In fact, according to Adegbite (2015) stated that a good knowledge of science education helps in improving the quality of life as it helps to solve many societal problems relating to health, poverty, food shortage, crop production and even environmental conservation. According to Omoedu (2019), there is a shift needed in science education from scientist focused curriculum in conventional classrooms to learner focused curriculum by changing socially isolated content to interesting, engaging, and relevant content using electronic learning (E-learning).

E-learning, refers to the use of electronic resources to facilitate learning. It facilitates the development and transformation of skills and concept-based knowledge to deliver and make information and education accessible to a larger audience easily, speedily and at less cost. Elaborating further, Anowor in Ezenwafor & Nwaokwa (2017) stated that e-learning consists of the use of different Information Communication Technology (ICT) resources (hardware and software) with instructional media to achieve learning at all levels and types of education. They further added that e-learning unites two main areas, learning and technology; learning is a cognitive process for achieving knowledge while technology is an enabler of the learning process, meaning that technology is used like any other tool/resource in the education sector.

E-learning resources are hardware and software technologies which can be used to achieve academic objectives. Moreso, Bupo & Ndinechi (2015) stated that e-learning resources are digital educational resources which are developed into units that are reusable, adaptive and can be repurposed to different learning styles, knowledge levels and conditions. Jackson

(2013) viewed e-learning resources as technology-aided learning tools that blend both online and face-to-face learning approaches which include hardware and software components like internet, video conferencing, mobile technologies, CD/DVD, electronic learning platforms, such as computers and software learning tools, hand-held digital devices, digital cameras, camcorders, projectors, course management software, computer simulators, hypermedia, microcomputer based lab, and software/video resources. To this end, the availability of e-learning resources and their utilization are important ingredients for twenty-first century instructional delivery.

Availability refers to services/resources that can be obtained in the discharge of certain functions. Onyejiemezie in Ugwuanyi (2013) noted that availability is a state of making provision for a satisfactory standard requirement in terms of teaching resource to enhance effective instructional activity in a particular subject. In other words, availability can be defined as human and material resources ready for use in teaching science education. In recognition of the importance of availability of resources in teaching Ugwuanyi (2013) noted that no meaningful learning or transfer of what has been learned will take place if such learning occurs in a situation devoid of relevant resources and activities as well as concrete experiences. The importance of availability of resources cannot be over-emphasized in teaching of science education in schools. According to Ugwuanyi (2013), adequate availability of equipment and facilities and their utilization have been positively correlated to good performance in examinations.

Utilization refers to making use of available services at the individual's disposal (Hornby in Ugwuanyi, 2013). These resources include resources, equipment and experienced personnel. Olagunju & Abiona (2008) opined that the process of managing and organizing resources is resource utilization. They added that in any school, the available resources should be utilized by both male and female teachers alike in such a way that it enables them to acquire desirable competencies. Utilization of resources in teaching brings about fruitful learning since it stimulates teacher's senses and motivates them. Utilization refers to making use of something in a purposeful and effective way. According to Lynch (2020), utilization of e-learning for instructional delivery is becoming more popular because it helps the teacher to teach better. However, the utilization of these resources could also differ in characteristics relative to location (urban/rural) for teaching science education courses in Distance Education.

Distance Education is one of the most rapidly growing fields of education in recent time where learners and teachers need not be in physical contact; which possesses high range of flexible learning environment; that enhances access to tertiary education; that has the capacity to deliver variety of

skills; and which uses a variety of media and technologies to provide quality education for large number of learners (Federal Republic of Nigeria, 2014). Generally, distance education has four major characteristics: institutional accreditation where learning is certified by an institution or agency; use of variety of media for instructional delivery; provision of two-way communication to ensure tutor-learner, and learner-learner interaction; and possibility of face-to-face meetings for tutorials for leaner-learner interaction, laboratory or practice session or library study (Creed, 2011). It could be said that distance education refers to the delivery of useful learning opportunities at convenient place and time for learners, irrespective of the distance learning study centers providing the learning opportunity. Distance learning has become an important part of educational process even in Nigeria, as seen in National Open University of Nigeria (NOUN).

In the light of the foregoing, questions persist on the availability and utilization of e-learning resources for the execution of instructions in science education courses especially in National Open University where distance education is practiced. Mapping out wonderful proposals towards the realization of educational objectives is one thing, executing them is another thing. Against this backdrop, the researcher sought to investigate the extent of availability and utilization of e-learning resources for teaching science education courses in distance learning institutions in South-East Nigeria (SEN).

Statement of the Problem

Science education courses are designated to be of high importance owing to the values attached to the import of the knowledge therein to human life and existence. In fact, a good knowledge of science education helps in improving the quality of life as it helps to solve many societal problems relating to health, poverty, food shortage, crop production and even environmental conservation. As a consequence of this, the attainment of the lofty goals of science education has been the utmost concern of educational stakeholders.

The twenty-first century has offered that in the form of e-learning wherein students go through learning in a way that support self-directed learning, promotes greater motivation to the learner, enhances critical and reflective skills, and lead to greater student satisfaction and encouraging the transition from classroom to independent lifelong learning. National Open University has embraced distance learning with the aim of utilizing e-learning to achieve boundless leaning. Relying on the principle that the erection of lofty proposals does not immediately translate to reality, carrying out an empirical investigation on the availability and utilization of e-learning resources for teaching science education courses could go a long way to answer so many questions surrounding the feasibility of such procedure in our environment. Distance learning is not

a common practice in our environment especially as it concerns the teaching of science education courses. This engineered the researcher to investigate the extent of availability and utilization of e-learning resources for teaching science education courses in distance learning institutions in South-East Nigeria.

Research Questions

The following research questions guided the study:

1. What are the available e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria?
2. To what extent are the e-learning resources utilized for teaching science education courses in NOUN distance learning study centres in South-East Nigeria?

Hypothesis

The following null hypothesis was tested at 0.05 level of significance:

Ho1: There will be no significant difference in the mean ratings of urban and rural teachers on availability of e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria.

Research Method

The design for this study was descriptive survey. Descriptive survey is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group using questionnaire or interview (Nworgu, 2015). The population of the study comprised 109 teachers of DL study centres in South-east states of Nigeria. There was no sampling because the entire population was not too large for the researcher to cover. A self structured checklist tagged Checklist On Availability Of E-Learning Resources (CAER) and a self structured questionnaire tagged Questionnaire On Utilization Of E-Learning Resources (QUER) were developed by the researcher with the insight gained from literature review. The instruments were face-validated using the opinions of three experts: one from science education department, one from measurement and evaluation unit of Education Foundations both in Nnamdi Azikiwe University, Awka and one from science education department in National Open University Nigeria study centre, Asaba. To ascertain the internal consistency of the instrument, pilot test of 20 selected teachers from Asaba NOUN study center, South-South, Nigeria was used, which was outside the study area but have similar features to the area of study. Data collected were analysed using Cronbach Alpha Method. The data obtained from the pilot test were subjected to statistical analysis using SPSS to determine the reliability of each of the two clusters of the instrument. The mean reliability value of 0.82 was

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obtained. Copies of the final version of the instruments were personally administered to the respondents with the help of five research assistants who were briefed on the method adopted for administration and collection of the instruments. The data collected were analyzed using frequency counts, percentages (%) for the research questions. The chi-square (X^2) was the statistical tools used for testing the null hypotheses formulated for the study. The Chi-square was used to test the null hypotheses at .05 level of significance. A null hypothesis was rejected where the p-value was equal to or less than the .05 level of significance, as it meant that there was significance difference. Conversely, where the p-value was greater than the .05 level of significance, as it meant that there was no significance and the hypothesis was not rejected.

Presentation of Results

Research Question 1: What are the available e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria?

Table 1: Frequencies and Percentages on the available e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria

		Available (AV)		Not Available (NA)		Remarks
S/N	**E-learning Resources**	**Freq**	**%**	**Freq**	**%**	
1	Internet- Computer	71	65.14	38	34.86	A
2	Laptop- Computer	65	59.63	44	40.37	A
3	Notebook Computer	47	43.12	62	56.88	NA
4	Audio Discs	69	63.30	40	36.70	A
5	Video Discs	78	71.56	31	28.44	A
6	Modem	40	36.70	69	63.30	NA
7	Flash Drives	85	77.98	24	22.02	A
8	Memory Cards (SD Cards)	70	64.22	39	35.78	A
9	Bluetooth Devices	54	49.54	55	50.46	NA
10	Power-point Slides	42	38.53	67	61.47	NA
11	E-books	44	40.37	65	59.63	NA
12	E-readers	36	33.03	73	66.97	NA
13	E-boards (Smart/Interactive Board)	40	36.70	69	63.30	NA
14	Scanner	55	50.46	54	49.54	A
15	Printer	63	57.80	46	42.20	A
16	Digital recorder eg MP3 recorder	47	43.12	62	56.88	NA
17	Smartphone/Cellular/Mobile phones	77	70.64	32	29.36	A
18	Digital head-set (ear piece)	36	33.03	73	66.97	NA
19	Teleconferencing devices	35	32.11	74	67.89	NA
20	Videophone systems	25	22.94	84	77.06	NA
21	Multimedia Television (MMTV)	44	40.37	65	59.63	NA

22	Multimedia Projector (MMP)	24	22.02	85	77.98	NA
23	Digital Classroom and Lecture halls	42	38.53	67	61.47	NA
24	Digital Library	65	59.63	44	40.37	A
25	Digital Laboratory	35	32.11	74	67.89	NA

Data in Table 1 show the frequencies and percentages of available e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria. The analysis indicates that out of the 25 e-learning resources listed, 10 were available for teaching science education courses in NOUN distance learning study centres in South-East Nigeria. They include: Internet computer, Laptop computer, Audio discs, Video discs, Flash drives, Memory cards (SD cards), Scanner, Printer, Smartphone/Cellular/Mobile phones and Digital library. However, the remaining 15 e-learning resources were not available, they include: Notebook computer, Modem, Bluetooth devices, Power-point slides, E-book, E-readers, E-boards (Smart/Interactive board), Digital recorder eg MP3 recorder, Digital head set (ear piece), Teleconferencing devices, Videophone systems, Multimedia Television (MMTV), Multimedia Projector (MMP), Digital classroom and Lecture halls and Digital laboratory.

Research Question 2: To what extent are the e-learning resources utilized for teaching science education courses in NOUN distance learning study centres in South-East Nigeria?

Table 2: Frequencies and Percentages of e-learning resources utilization for teaching science education courses in NOUN distance learning study centres in South-East Nigeria

		Used (U)		Not Used (NU)		Remarks
S/N	**E-learning Resources**	**Freq**	**%**	**Freq**	**%**	
26	Internet- Computer	60	55.05	48	44.95	U
27	Laptop- Computer	55	50.46	54	49.54	U
28	Notebook Computer	38	34.86	71	65.14	NU
29	Audio Discs	65	59.63	44	40.37	U
30	Video Discs	72	66.06	37	33.94	U
31	Modem	28	25.69	81	74.31	NU
32	Flash Drives	79	72.48	30	27.52	U
33	Memory Cards (SD Cards)	65	59.63	44	40.37	U
34	Bluetooth Devices	50	45.87	59	54.13	NU
35	Power-point Slides	40	36.70	69	63.30	NU
36	E-books	35	32.11	74	67.89	NU
37	E-readers	32	29.36	77	70.64	NU
38	E-boards (Smart/Interactive Board)	36	33.03	73	66.97	NU
39	Scanner	55	50.46	54	49.54	U

40	Printer	63	57.80	46	42.20	U
41	Digital recorder eg MP3 recorder	47	43.12	62	56.88	NU
42	Smartphone/Cellular/Mobile phones	77	70.64	32	29.36	U
43	Digital head-set (ear piece)	36	33.03	73	66.97	NU
44	Teleconferencing devices	30	27.52	79	72.48	NU
45	Videophone systems	25	22.94	84	77.06	NU
46	Multimedia Television (MMTV)	44	40.37	65	59.63	NU
47	Multimedia Projector (MMP)	24	22.02	85	77.98	NU
48	Digital Classroom and Lecture halls	42	38.53	67	61.47	NU
49	Digital Library	60	55.05	49	44.95	U
50	Digital Laboratory	33	30.28	76	69.72	NU

Data in Table 2 show the frequencies and percentages of e-learning resources utilization for teaching science education courses in NOUN distance learning study centres in South-East Nigeria. The analysis indicates that out of the 25 e-learning resources listed, 10 were used for teaching science education courses in NOUN distance learning study centres in South-East Nigeria. They include: Internet computer, Laptop computer, Audio discs, Video discs, Flash drives, Memory cards (SD cards), Scanner, Printer, Smartphone/Cellular/Mobile phones and Digital library. However, the remaining 15 e-learning resources were not used, they include: Notebook computer, Modem, Bluetooth devices, Power-point slides, E-book, E-readers, E-boards (Smart/Interactive board), Digital recorder eg MP3 recorder, Digital head set (ear piece), Teleconferencing devices, Videophone systems, Multimedia Television (MMTV), Multimedia Projector (MMP), Digital classroom and Lecture halls and Digital laboratory.

Hypothesis 1: There is no significant difference in the mean ratings of rural and urban teachers on availability of e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria.

Table 3: Frequencies and Percentages of rural and urban teachers' responses on availability of e-learning resources for teaching science education courses

		Rural (n = 49)					**Urban (n = 60)**				
S/N	**E-learning Resources**	**Freq (A)**	**%**	**Freq (NA)**	**%**	**Remark**	**Freq (A)**	**%**	**Freq (NA)**	**%**	**Remark**
51	Internet-Computer	20	40.82	29	59.18	NA	51	85.00	9	15.00	A

52	Laptop-Computer	27	55.10	22	44.90	A	38	63.33	22	36.67	A
53	Notebook Computer	21	42.86	28	57.14	NA	26	43.33	34	56.67	NA
54	Audio Discs	24	48.98	25	51.02	NA	45	75.00	15	25.00	A
55	Video Discs	35	71.43	14	28.57	A	43	71.67	17	28.33	A
56	Modem	13	26.53	36	73.47	NA	27	45.00	33	55.00	NA
57	Flash Drives	30	61.22	19	38.78	A	55	91.67	5	8.33	A
58	Memory Cards (SD Cards)	28	57.14	21	42.86	A	42	70.00	18	30.00	A
59	Bluetooth Devices	14	28.57	35	71.43	NA	40	66.67	20	33.33	A
60	Power-point Slides	14	28.57	35	71.43	NA	28	46.67	32	53.33	NA
61	E-books	12	24.49	37	75.51	NA	32	53.33	28	46.67	A
62	E-readers	16	32.65	33	67.35	NA	20	33.33	40	66.67	NA
63	E-boards (Smart/Interactive Board)	13	26.53	36	73.47	NA	27	45.00	33	55.00	NA
64	Scanner	16	32.65	33	67.35	NA	39	65.00	21	35.00	A
65	Printer	21	42.86	28	57.14	NA	42	70.00	18	30.00	A
66	Digital recorder eg MP3 recorder	11	22.49	38	77.51	NA	36	60.00	24	40.00	A
67	Smartphone/ Cellular/Mobile phones	22	44.90	27	55.10	NA	55	91.67	5	8.33	A
68	Digital head-set (ear piece)	10	20.41	39	79.59	NA	26	43.33	34	56.67	NA
69	Teleconferencing devices	11	22.45	38	77.55	NA	24	40.00	36	60.00	NA
70	Videophone systems	9	18.37	40	81.63	NA	16	26.67	44	73.33	NA
71	Multimedia Television (MMTV)	12	24.49	37	75.51	NA	32	53.33	28	46.67	A
72	Multimedia Projector (MMP)	6	12.24	43	87.76	NA	18	30.00	42	70.00	NA
73	Digital Classroom and Lecture halls	8	16.33	41	83.67	NA	34	56.67	26	43.33	A
74	Digital Library	13	26.53	36	73.47	NA	52	86.67	8	13.33	A
75	Digital Laboratory	10	20.41	39	79.59	NA	25	41.67	35	58.33	NA

The analysis in table 3 shows that 21 out of 25 e-learning resources listed had p-value equal to or less than the stipulated .05 level of significance. This indicates that there was significant difference in the responses of rural and urban teachers on availability of e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria. The null hypothesis was rejected as it meant that there was significant difference.

Discussion of Findings

The findings revealed that majority of the e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East were not available while only few were available. The findings agreed with Tella (2011) who found out that only few technologies such as computers and computer laboratory were available for teaching in South-Western Nigerian Colleges of Education. The findings also agreed with Wokocha, Babalola, Agbagbue & Umah (2017) that some e-learning resources such as laptops, projectors, internet-computers are available while interactive smart boards are not available for teaching of science education courses. Similarly, the study of Akingbemisilu (2015) revealed that online learning tools are available at Adekunle Ajasin University, Akungba-Akoko but the practice has not begun hence it is not in conformity to the findings of this study. The disagreement could be as a result of the geo-political zone and method of data collection. However, the result of this study varies with Okoli & Osuafor (2019) which 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. The variation could be as a result of the location and population of the study. Based on the findings, the researcher suggests that e-learning resources that are not available should be made available for teaching of science education courses in order to enable the teachers embrace the use of e-learning resources and its advantages for teaching in NOUN distance learning study centres in South-East Nigeria.

The findings also discovered that e-learning resources were not used for teaching science education courses in NOUN distance learning study centres in South-East Nigeria. This indicated that e-learning resources were not fully utilized by teachers due to lack of knowledge in the use of e-learning resources in achieving a desired learning outcome. This is in line with Nwana, Ofoegbu & Egbe (2017) who submitted that, majority of the e-learning resources like power-point slides, e-books, e-readers, e-boards, and multimedia projector available for the teaching of computer studies are not being used by the teachers. This is in conformity with Olaniran, Duma & Nzima (2017) that there was a low utilization of e-resources to teach among the respondents. This also agreed by

the views of Osuafor & Emeji (2015) who opined that science teachers used e-learning resources to a moderate extent. The findings showed that science teachers do not extensively integrate e-learning resources for teaching science in South-East Nigerian Colleges of Education. However, based on the findings, the researcher suggested that teachers' should be encouraged to use e-learning resources for teaching of science education courses in order to enhance creation of shared portals that will facilitate information sharing and networking in NOUN distance learning study centres in South-East Nigeria.

Conclusion

Based on the findings of this study, it was concluded that e-learning resources that were not available and used should be made available to enhance creative innovation for teaching of science education courses in NOUN distance learning study centres in South-East Nigeria. It was also discovered that location did significantly affect the opinion of science education teachers on the extent of availability and utilization of e-learning resources for teaching science education courses in NOUN distance learning study centres in South-East Nigeria.

Recommendations

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

1. Government should grant permission to science educators to undertake in-service trainings (whether locally or internationally), workshops, seminars and conferences in order to keep them abreast with the use of e-learning resources.
2. Curriculum of science education should be enriched to include topics in information and communication technology, web page design, data management among others at all levels or classes. This will help to enrich the knowledge and skill base of the teachers for proper learning integration.
3. Government should support NOUN by providing relevant e-learning resources to enhance teaching of science education courses.
4. Government should provide adequate funds to NOUN administrator for proper execution of science education courses in NOUN distance learning study centres.
5. NOUN management should evaluate and monitor science education programme periodically to ensure the appropriate use of e-learning resources.
6. School administrators should acquire grants from donors to provide sufficient e-learning resources and training of teachers on e-learning resources for proper integration in their classroom.

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