

Educational Resource Centre: A Veritable Delivery System for Effective Implementation of Distance Learning Education in a Cloud Computing Environment in Nigeria

Okworo, Gibson Samuel (Ph.D) & Adie, Paul Ingiona
Department of Educational Technology and Library Science
University of Uyo,
Akwa Ibom State
Nigeria
gibsonokworo62@gmail.com

Abstract

This study investigated the influence of Educational Resource Centre on the effective implementation of Distance Learning Education in a Cloud Computing Environment in Nigeria. The Research objectives were: to assess the effectiveness of computer based learning resources, network based learning resources and instructional technology skills on the implementation of Distance Learning Education. The Design adopted for this study was the Survey. The population of the study comprises all the National Teachers Institute study centres in Akwa Ibom State which is 342 students. The sample was drawn through stratified random sampling technique from the Four Towns study and the Uyo City Polytechnic study centers respectively. The sample size was one hundred and sixty three respondents. The Instrument used was the Questionnaire. The instrument was submitted to two experts in the Department of Educational Technology and Library Science for content validation. The Instrument was thereafter submitted to an Educational research expert for vilification. The findings reveal that there is a significant influence of Educational Resource Centre on effective implementation of Distance Learning Education in Nigeria. It was strongly recommended that Educational Resource Centres be incorporated fully in Distance Learning Education so as to realize the plethora of instructional benefits and resource based learning opportunities it presents.

Keywords: *ERC, Distance Learning Education and Cloud Computing*

INTRODUCTION

Cloud computing is an ICT framework for enabling ubiquitous, convenient, on-demand access to a shared pool of configurable computing resources. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centers. It relies on sharing of resources to achieve coherence and economies of scale, similar to a utility (like the electricity grid) over a network. At the foundation of cloud computing is the broader concept of converged infrastructure and shared services (www.wikipedia.org) with cloud computing there is no more carrying around devices, such as thumb drives or CDs. No need to worry about losing the device, breaking the CD, or not having your information load properly. Easy access to Lesson plans, laboratories, grades, notes, PowerPoint slides just about anything digital that can be used in teaching is easily uploaded and accessed anytime. It offers Stability as cloud computing is now to the point of being a very stable technology that teachers and students can rely on. Cloud Computing offers Security as data,

content, information, images-anything that is stored in the cloud usually requires authentication (ID and Password, for example) so it is not easily accessible by anyone. In addition, should something happen to the technology at school, the content will still be available to teachers and students if it is stored elsewhere. Cloud computing offers Shareability as a teacher can work on an instructional assignment with other teachers in real time. Users can also share some or all of their files that they have stored in the cloud. No more obtaining an extra thumb drive or burning another CD or DVD. They just need to send a link to the file's destination. It also offers Trackability as teachers can make changes to a lesson and if they want to change it back. Cloud computing will save multiple revisions and versions of a document so that teachers can chronologically trace back the evolution of an item. Cloud computing offers Collaboration as teachers can set-up various student groups to work on projects and assignments in the cloud. With cloud computing, the amount of photocopying is reduced significantly even more so if each student has their own smart device (computer, laptop, tablet, etc.). Quizzes, tests, assignments all can be taken, scored, shared with student and parents, and stored. With cloud computing there is no longer the need to both save files digitally as well as in paper format. Cloud computing systems are regularly backed-up, so the chances of losing content are quite small. And, no more file cabinets mean more classroom space for teachers and students!

The National Policy on Education (2004) section 1 sub section 9 stipulates; (a) Education shall continue to be highly rated in the national development plans because education is the most important instrument of change; any fundamental change in the intellectual and social outlook of any society has to be preceded by an educational revolution; (b) Life-long education shall be the basis of the nation's educational policy; (c) Education and training facilities shall continue to be expanded in response to societal needs and made progressively accessible to afford the individual a far more diversified and flexible choice; (d) Educational activities shall be centered on the learner for maximum self-development and self-fulfillment; (e) Efforts shall be made to relate education to overall community needs; (f) Modern educational techniques shall be increasingly used and improved upon at all levels of the education system; (g) The education system shall be structured to develop the practice or self-learning. (h) At any stage of the educational process after junior secondary education, an individual shall be able to choose between continuing full-time studies, combining work with study, or embarking on full-time employment without excluding the prospect of resuming studies later on.

Furthermore, there is resource based learning which presupposes a holistic instructional approach that advocates the employment of print, non-print and non-human resources to foster learning of individuals which is a global practice aimed at ensuring meaningful learning outcomes as it is being necessitated by; the increase in number of students, increase in the number of schools, inadequacy of skilled teachers, paradigm-shift from the talk-chalk teaching methodology and several innovations and changes in the curriculum (Okworo, G. Personal communication 2015).

Distance Learning Education is a response to the changing nature of the world, the Nation, technologies and the desire by working individuals to strike a considerable balance between earning a living and self-development. However, the Distance Education System is usually confronted by some serious challenges that make policy makers, facilitators, and directors of study centre and other stakeholders to worry about how to mitigate these obstacles to distance learning efforts. Some of these challenges include: staff shortages, outdated equipment, custom made software programs with built-in security that staff cannot operate, inadequate funding, lack of facilitators in some courses, inability of the centre directors to recruit committed

facilitators, insufficient and unequal distribution of course materials, high cost of technology to support the programme, appointment of non-specialists as centre directors, Accommodation problems, irregular payment and omission and delayed payment of some facilitators honorarium, course allocation conflicts, inaccurate data for effective planning, lack of supervisors etc. (Moja 2000, Obioha and Ndidi).

Educational Technology is charged to systematically identify educational problems at the macro-level and then propose sustainable solutions and even help implement the solutions by employing both human and non-human resources with the view to achieving replicable outcomes so is instructional technology which is a subset of Educational Technology while the former is charged with identifying, proffering solutions and solving problems at the micro-level i.e. classroom (sub system).The latter in focused in problems at the suprasystem. (Inyangabia, 2004: 74, 86).

The challenges confronted by operators and stakeholders of the Distance Education System can be solved through the inclusion of Educational Resource Centers in the scheme of Distance Education Instructional delivery and Operational Framework as it will ensure the introduction of media by utilization concept with the view to achieving the set goals and objectives of the Distance Education System Implementation.

It is often harped that the progress of a people in science, technology, civilization is tied strongly to their quality of education thus if the Nigerian Government wishes to keep her promise as spelt out in the National Policy on Education the time for implementation is now through her drafting of the Educational Resource Centre as Distance Education Instructional media Workshop, Library, Resource Center, lecture venue and also a veritable source of academic subject specialists and an army of well-trained media specialists that will ensure the provision of immediate and local instructional technology skills to meet the growth and changing needs of the Distance Education System.

Purpose of the Study

The main purpose of this study is to assess the effectiveness of Educational Resource Centre for the Implementation of Distance Learning Education in Nigeria. Specifically the study sought to;

1. Determine the effectiveness of computer based learning resources on the implementation of Distance Learning Education in Nigeria.
2. Examine the effectiveness of Network based learning resources on the implementation of Distance Learning Education in Nigeria.
3. Assess the effectiveness of instructional technology skills on the implementation of Distance Learning Education in Nigeria.

Research Questions

The following research questions were stated to guide the study;

1. Does computer based learning resources have any influence on the implementation of Distance Learning Education in Nigeria?
2. Does network based learning resources have any influence on the implementation of Distance Learning education in Nigeria?
3. Does instructional technology skills have any influence on the implementation of Distance Learning Education in Nigeria?

Research Hypotheses

This study also tested three null hypotheses at 0.05 level of significant. These are:

1. There is no significant influence of Computer Based Learning Resources on Distance Learning Education in Nigeria.
2. There is no significant influence of Network based learning Resources on effective implementation of Distance Learning Education in Nigeria.
3. There is no significant influence of Instructional Technology skills on effective implementation of Distance Learning Education in Nigeria.

Review of Related Literature

Related literature is reviewed including empirical studies. It considers the concept of Educational Resource Center and the effective implementation of distance education as well as relevant theories.

Constructivism is a theory of knowledge that argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas. During its infancy, constructivism examined the interaction between human experiences and their reflexes or behavior-patterns. Jean Piaget called these systems of knowledge *schemata*. Piaget's theory of constructivist learning has had wide ranging impact on learning theories and teaching methods in education and is an underlying theme of many education reform movements.

Teacher Role in Distance Education based on Constructivist Approach;

1. Teacher promotes learner autonomy and is aware of individual differences.
2. Teacher uses relevant and current information to transmit knowledge. Teacher constantly researches the curriculum and provides concrete up-to-date examples.
3. Teacher gives importance to the thoughts of students and promotes students' research, evaluation, discussion, and reporting.
4. Teacher is aware of individual student differences when designing course materials.
5. Teacher knows student prerequisite skills and knowledge and uses this foundation to build new knowledge. In addition, the teacher knows how learners can learn.
6. Teacher initiates student-teacher interaction, and has communication and technological skills to effectively implement distance education.
7. Teacher constructs student-centered learning with opportunities for interaction. Students are responsible for learning and responsible for contacting teacher when the need arises.
8. Teacher collaborates with student in self-development and responsibility.
9. Teacher provides environment, materials, and guidance for collaborative learning, interactive discussion groups, individual learning, and research.
10. Teacher provides prompt and accurate feedback to students to facilitate learning.

Student Role in Distance Education based on Constructivist Approach;

1. Students use appropriate technology to interact collaboratively with each other and teacher, and use feedback and consultation to develop and refine knowledge, skills and attitudes.
2. Students are self-responsible for their own learning. They should decide what they want to learn, establish their goal, research and develop their subject.
3. Students research current data to answer questions and solve problems.
4. Students learn to solve problems by assessment, data collection, and developing and

implementing strategies using relevant information.

5. Students identify communication barriers, their causes and solutions.
6. Students promote life-long learning and know how to access and use information when instruction is finished.

More so, George Siemens (2007) and Stephen Downes (2007) have written defining connectivist papers, arguing that learning is the process of building networks of information, contacts and resources that are applied to real problems. Connectivism was developed in the information age of a networked era and assumes ubiquitous access to networked technologies. Connectivist learning focuses on building and maintaining networked connections that are current and flexible enough to be applied to existing and emergent problems. Connectivism also assumes that information is plentiful and that the learner's role is not to memorize or even understand everything, but to have the capacity to find and apply knowledge when and where it is needed. Connectivism assumes that much mental processing and problem solving can and should be off-loaded to machines, leading to Siemens' (2005) claim that "learning may reside in non-human appliance". Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements-not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets and the connections that enable us to learn more important than our current state of knowing.

Principles

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Learning is more critical than knowing.
- Maintaining and nurturing connections is needed to facilitate continual learning.
- Perceiving connections between fields, ideas and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. New information is continually being acquired. The ability to draw distinctions between important and unimportant information is vital. The ability to recognize when new information alters the landscape based on decisions made yesterday is also critical.

The starting point of connectivism is the individual. Personal knowledge is comprised of a network, which feeds into organizations and institutions, which in turn feed back into the network, and then continue to provide learning to individual. This cycle of knowledge development (personal to network to organization) allows learners to remain current in their field through the connections they have formed.

It is noteworthy that connectivist models explicitly rely on the ubiquity of networked connections between people, digital artifacts, and content, which would have been inconceivable

as forms of distance learning were the World Wide Web not available to mediate the process. Thus, as we have seen in the case of the earlier generations of distance learning, technology has played a major role in determining the potential pedagogies that may be employed.

Assessment in connectivist pedagogy combines self-reflection with teacher assessment of the contributions to the current and future courses. These contributions may be reflections, critical comments, learning objects and resources, and other digital artifacts of knowledge creation, dissemination, and problem solving. Teaching presence in connectivist learning environments also focuses on teaching by example. The teachers' construction of learning artifacts, critical contributions to class and external discussion, capacity to make connections across discipline and context boundaries, and the sum of their net presence serve to model connectivist presence and learning. A final stress to teaching presence is the challenge presented by rapidly changing technologies. No one is current on all learning and communications applications, but teachers are often less competent and have less self-efficacy; thus, connectivist learning includes learners teaching teachers and each other, in conjunction with teachers aiding the connectivist learning of all.

As regards Distance Education, Technology under connectivist framework usually comprises Web 2.0, social networks, aggregation and recommended systems. Learning activities usually involve exploration, connection, creation and evaluation. Learner granularity is network; content granularity is coarse mainly at object and person level, self-created. Evaluation usually consists of the creation of artifact. The teacher's role is that of a critical friend, co-traveler and the scalability is medium.

Cloud computing services are generally regarded as falling into three separate categories or levels (Johnson, Levine and Smith, 2009). The lowest level is sometimes known as **infrastructure as a service (IaaS)**. Here schools can rent basic computing resources such as processors and storage, and use them to run their own operating systems and applications.

Platform as a service (PaaS) is the next level up. This enables schools to install their own applications using a platform specified by the service provider. An example here is the Google Apps Engine where developers can write and install applications using the Python language.

The highest level of cloud computing service is known as **software as a service (SaaS)**. This is currently of most interest in education. Not only is the data stored in the cloud but the application is too, with the user requiring only a web browser. The best known examples of this are Google Apps for Education and Microsoft Live@edu which provide communication and office applications such as email and spreadsheets.

Cloud Deployment models

Private cloud: is cloud infrastructure operated solely for a single organization, whether managed internally or by a third-party, and hosted either internally or externally undertaking a private cloud project requires a significant level and degree of engagement to virtualize the be to business environment, and requires the organization to reevaluate decisions about existing resources. When done right, it can improve business, but every step in the project raises security issues that must be addressed to prevent serious vulnerabilities. Self-run data centers are generally capital intensive. They have a significant physical footprint, requiring allocations of space, hardware, and environmental controls. These assets have to be refreshed periodically, resulting in additional capital expenditures. They have attracted criticism because users "still have to buy, build, and manage them" and thus do not benefit from less hands-on management,

essentially “[lacking] the economic model that makes cloud computing such an intriguing concept”.

Public cloud: A cloud is called a “public cloud” when the services are rendered over a network that is open for public use. Public cloud services may be free. Technically there may be little or no difference between public and private cloud architecture, however, security consideration may be substantially different for services (applications, storage, and other resources) that are made available by a service provider for a public cloud audience and when communication is effected over a non-trusted network. Generally, public cloud service providers like Amazon AWS, Microsoft and Google own and operate the infrastructure at their data center and access is generally via the Internet. AWS and Microsoft also offer direct connect services called “AWS Direct Connect” and Azure Express Route” respectively, such connections require customers to purchase or lease a private connection to a peering point offered by the cloud provider.

Hybrid cloud: is a composition of two or more clouds (private, community or public) that remain distinct entities but are bound together, offering the benefits of multiple deployment models. Hybrid cloud can also mean the ability to connect collocation, managed and/or dedicated services with cloud resources. Gartner, Inc. defines a hybrid cloud service as a cloud computing service that is composed of some combination of private, public and community cloud services, from different service providers. A hybrid cloud service crosses isolation and provider boundaries so that it can’t be simply put in one category of private, public or community cloud service. It allows one to extend either the capacity or the capability of a cloud service, by aggregation, integration or customization with another cloud service.

Benefits of Cloud Computing for Institutions and Students

There are some major potential benefits to institutions deploying cloud services.

Economics

The primary advantage for many institutions is economic. This is particularly clear where services such as email are offered for free by external providers. Hardware for such services can be redeployed or removed, potentially freeing up valuable real estate- increasingly at a premium in settings such as city centre university campuses. Personnel costs can be cut or staff redeployed. The fact that institutions pay per use rather than for often underutilized hardware is appealing.

Elasticity

A second major benefit is the elastic facet of cloud computing discussed earlier. This allows institutions to begin with small-scale services and builds them up gradually without significant up-front investment. It also allows for rapid escalations in demand at peak times such as at the start of the academic year or during exam periods. There is therefore no need to plan usage levels in advance.

Enhanced availability

A further benefit is that availability may be higher with less downtime due to the superior resources and skills available to cloud providers. Whereas a university computing service department may aim to achieve 99.5% availability for its educational services such as the

LMS, Google offers 99.9% availability for its educational application suite and appears to outperform this target. Students increasingly dependent on online services for learning and assessment should be given the best possible availability.

Lower environment impact

In some countries there are now “green” targets for reductions in power usage by organizations. Cloud computing enables educational institutions to reduce their own electricity consumption and, in theory, cloud providers should be able to optimize power usage over a group of customers. However it is not easy to obtain figures for power usage from cloud providers and it is likely that their power consumption worldwide is growing significantly.

Concentration on core business

Another claimed advantage of cloud computing is that it allows institutions to concentrate on their core business of education and research. Schools and universities do not normally have their own sewage plants and power stations; similarly it can be argued that computing services are becoming commoditized and are handled better by organizations with specific expertise and economies of scale.

End user satisfaction

For end users, apart from better availability, there are other clear benefits of cloud-based services, particularly evident with the range of new applications being provided. These contain the latest tools and features from innovative companies such as Microsoft and Google. Students can use office applications for free without having to purchase, install and keep these applications up to date on their computers. Possibilities for collaboration are greatly enhanced. They do not have to worry about backing up or losing data as it should be safely stored in the cloud- with large storage capacity provided for free. Their data is accessible to them from any location or from a range of devices such as their mobile phone. Technologies such as HTML5 will increasingly allow users to work offline when Internet access is intermittent.

For the purpose of this research, we will use the taxonomy of resource based learning found in Brown (1997) which outlines the following types of resources:

- **Paper based learning resources** including course guides, booklets, manuals, study units, textbooks, reading guides, lecture notes
- **Computer-based materials** including computer-based tutorials, on-line objective testing and multimedia.
- **Net worked learning resources** like on-line tutorials, networked study programmes and computer conferences.
- **Media-based material** including audiotapes, video tapes, transparencies, slides.

This study seeks to uphold educational resource centre as a veritable delivery system for the effective implementation of the distance learning education in Nigeria, this is necessary when looked at the distance education system with its resource insufficiency plague and the overwhelming abundance of resource based learning as offered by educational resource centre.

METHODOLOGY

The research design adopted for this study was the Survey design. The survey design according to Nworgu (1991) is one in which a group of people or items is studied by collecting and analyzing data from only a few people or items considered to be representative of the entire

group. The data collection was done by the use of questionnaire.

The research area used for this study is Uyo, the capital City of Akwa Ibom State, a major oil producing state of Nigeria. Uyo lies between $5^{\circ} 2'N$ and $7^{\circ} 55'E$, the population of Uyo, according to the 2006 Nigerian Census which comprises Uyo and Itu, is 436,606, while the urban Area, including Uruan, is 554,906. The city can be accessed by road via the A342 highway, as well as Abak Road, Nwaniba Road, Itu Road, and Aka Road. Nearby airports include the Uyo Airport, also known as the Akwa Ibom International Airport. Uyo is a fast-growing city, as the city had witnessed massive infrastructural growth in the past nine years. It has an intensive network of divided highways, such as the IBB Way, Atiku Abubakar Avenue, Udo Udoma Avenue, Nsikak Eduok Avenue, and Edet Akpan Avenue which is an eight-lane superhighway and currently the widest road in the Uyo metropolis. Currently, flyovers are being constructed to ease traffic. Three flyovers have already been completed at the Itam axis of the urban area which is under Itu jurisdiction. Plans are in process for more flyovers as well as ongoing dualisation of Aka road, ongoing construction of Ring Road 3 with flyovers (a portion of it will be ten lanes) and the dualization of Wellington Bassey Way. Uyo is home to the University of Uyo, Uyo is also home to a campus of the National Open University of Nigeria and the Uyo City Polytechnic.

The population of the study comprises all the National Teachers Institute Study centers in Uyo which is 342 students. The population was drawn from the Four Towns Study centre and the Uyo City Polytechnic study centre respectively.

The total sample size was 163 students which were selected from the Uyo axis of the National Teachers Institute of Nigeria setup to constitute the respondents for this research study.

The sampling technique adopted for this study was Stratified random sampling technique. It was used because the population is divided into strata such that elements within each are more alike than are the elements in the population as a whole. The population was divided into the N.C.E students and the PGDE students respectively. The total population of the N.C.E student's was 137 while that of the PGDE was 205 students. 60% for N.C.E (i.e. 79 students) while 40% to the PGDE (because it was larger than the N.C.E) thus its sample size is 84 students. The total of both sample sizes was 163 students in all were selected from the Uyo axis of the NTI framework to constitute the sample size for this research study.

The researcher personally administered the questionnaire to the respondents. All the questionnaires were retrieved the same day, while the centre co-ordinators were interviewed and their inputs collected.

The instruments used for this study was a structured Questionnaire "Educational Resource Centre and Effective Implementation for Distance Education Questionnaire (ERCEIDQ) and the interview method. Section A for Demographic information; section B for the variables of the study.

Questionnaire according to Udoh (2014) is a means of gathering data that is widely used by researchers and educators. It usually has a number of items which are believed would elicit information on the variables being studied. While the formal interview is a tool in educational research which involves obtaining information from someone in a question and answer session. It involves interaction between a respondent and an investigator. (Udoh 2014).

DATA ANALYSIS, RESULT AND DISCUSSION

Statistical Package for the Social Science (SPSS) Software was used to analyze the data gathered from respondents. Simple percentages was used to answer research questions while chi-square was used to test the null hypotheses

Data Analysis, Result and Discussion

4.1.1 Research Question 1

Does Computer Based Learning Resource enhance effective Implementation of Distance Education?

Table 1: Percentage analysis of responses on Computer Based Learning Resources and effective Implementation of Distance Learning Education

S/NO	ITEM	SA	A	D	SD
1	There are accessible electronic journals (e-journals)	32 (20.1%)	47 (29.6%)	41 (25.8%)	39 (24.5%)
2	There are computer based assessment facilities	34 (21.9%)	53 (34.2%)	40 (25.8%)	28 (18.1%)
3	There are available CD-ROMS for students	14 (9.2%)	42 (27.8%)	49 (32.5%)	46 (30.5%)
4	Video based learning materials are available	11 (7.3%)	30 (19.7%)	67 (44.1%)	44 (28.9%)
5	Audio based learning materials are available	9 (5.8%)	36 (23.4%)	61 (39.6%)	48 (31.2%)
6	There are obsolete computer systems	20 (13.5%)	37 (24.5%)	53 (35%)	39 (27%)
7	There is a standby computer technician for maintenance	20 (12.9%)	41 (26.5%)	52 (33.5%)	42 (27.1%)
8	Information on computer based learning materials are accessible for library users	18 (11.5%)	58 (36.9%)	54 (34.4%)	27 (17.2%)
9	No stable supply of electricity	23 (15.1%)	43 (28.3%)	49 (32.2%)	36 (24.4%)
10	There are no instructional programs on the study centre's computer	24 (15.5%)	33 (21.3%)	48 (30.8%)	50 (32.4%)
TOTAL		205	420	514	399

The ten (10) presented in the table indicates that computer based learning resources are readily in use to enhance the effective implementation of distance learning education. This shows clearly that in the responses based on Strongly Agree (205), Agree (420), while some items are not available at all with Disagree (514) and Strongly Disagree with a frequency of (399).

4.1.2 Research Question 2

Does Network Based Learning Resources enhance Effective Implementation of Distance Learning Education?

Table 2: Percentage analysis of responses on Network Based Learning Resources and effective Implementation of Distance Learning Education

S/NO	ITEM	SA	A	D	SD
1	Easy internet accessibility at the study centre facility	20 (13.0%)	38 (24.7%)	54 (35%)	42 (27.3%)
2	Adequacy of internet facilities	14 (9.2%)	40 (26.3%)	55 (36.2%)	43 (28.3%)
3	Internet connectivity is very consistent	16 (10.7%)	37 (24.8%)	55 (37%)	41 (27.5%)
4	The internet service facilities at the study centre are functional	18 (12.5%)	34 (23.6%)	52 (36.1%)	40 (27.8%)
5	There is no internet connectivity at the library	25 (17.5%)	35 (24.5%)	49 (34.2%)	34 (23.8%)
6	Our study centre management provides an electronic library for students	16 (10.7%)	29 (19.3%)	59 (40%)	43 (30%)
7	Our study centre management provides an online based class discussion forums for students	15 (9.9%)	32 (21.1%)	61 (40.1%)	44 (28.9%)
8	There is an online based self-study assessment tool for students of the centre	19 (12.5%)	44 (28.9%)	55 (36%)	33 (22.6%)
9	There are online based video tutorials for students to download from	12 (7.9%)	32 (21.1%)	66 (43.4%)	42 (27.6%)
10	There are online based audio tutorials for students to download from	16 (10.4%)	32 (20.8%)	61 (39.6%)	45 (29.2%)
TOTAL		171	353	567	407

Based on the responses obtained from the respondents on the application of network based learning resources to facilitate the implementation of effective distance learning education. The percentage analyses show clearly that less network based learning resources is used with a total frequency of 171 on Strongly Agree and 353 on Agree option. The total frequency of Disagree and Strongly Disagree options are alarming with 567 and 407 respectively.

4.1.3 Research Question 3

Does Instructional Technology Skills enhance Effective Implementation of Distance Learning Education?

Table 3: percentage analysis of responses on Instructional Technology Skills and effective Implementation of Distance Learning Education

S/NO	ITEM	SA	A	D	SD
1	Tutors experience difficulty using instructional materials for teaching at the study centre	18 (11.6%)	14 (9.0%)	57 (36.8%)	66 (42.6%)
2	Improvised instructional materials are used for teaching	29 (19.1%)	60 (39.5%)	28 (18.4%)	35 (23.0%)
3	There are periodic workshops on instructional materials	16 (10.7%)	61 (40.9%)	51 (34.2%)	21 (14.2%)
4	The study centre needs to recruit media specialists for local production of instructional materials	25 (16.2%)	69 (44.8%)	38 (24.7%)	22 (14.3%)
5	The lecture style is not clear	5 (3.2%)	19 (12.3%)	57 (36.8%)	74 (47.7%)
6	Tutors use a variety of instructional materials	40 (26.5%)	59 (40%)	31 (20.5%)	20 (13%)
7	Tutors often operate instructional media effectively	39 (26.0%)	57 (38.0%)	33 (22.0%)	20 (14%)
8	There are adequate academic staff	56 (36.6%)	65 (42.5%)	15 (9.8%)	17 (11.1%)
9	There are no committed course tutors	14 (9.4%)	22 (14.8%)	44 (29.5%)	69 (46.3%)
10	My tutor is experienced in the selection of instructional resources	51 (33.8%)	69 (45.7%)	18 (11.9%)	13 (8.6%)
11	There is provision for immediate feedback to students on their academic progress	45 (29.0%)	79 (51.0%)	15 (9.7%)	16 (10.3%)
12	Lecturers are usually borrowed from neighboring institutions to facilitate lectures at the study centre	17 (11.0%)	34 (22.1%)	34 (22.1%)	68 (44.8%)
13	Tutors at the study centre usually specify instructional objectives before the beginning of every Lecture	48 (32.4%)	68 (45.9%)	22 (14.9%)	10 (6.8%)

14	Tutors promote active learning	81 (55%)	60 (40.0%)	4 (2.5%)	4 (2.5%)
15	Tutors ensure that subject matter is well organized and structured	77 (50.0%)	68 (44.2%)	6 (4%)	3 (2%)
TOTAL		561	804	453	458

Based on the result obtained from the percentage analyses of the responses from the respondents it indicates that tutors are embedded with the instructional technology skills with total frequency response of 561 and 804 respectively for strongly agree and agree options, while the total frequency responses of 453 and 458 were obtained for Disagree and Strongly disagree options.

TESTING OF HYPOTHESES

Hypothesis 1: There is no significant influence of Computer based Learning Resources on effective implementation of distance learning education

Table 5: chi square (X^2) Analysis of the influence of Computer based learning resources on effective implementation of distance learning education

Variables	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
NCE Students	105 (124.89)	220 (255.89)	310 (313.16)	299 (243.09)	934
PGDE Students	100 (80.77)	200 (165.48)	204 (202.52)	100 (57.20)	604
TOTAL	205	420	514	399	1538

*** Significant at 0.5 level of significance**

As shown in table 5, the results of testing the influence of the computer based learning resources on the effective implementation of distance learning education, indicates that the computed (X^2) value of (51.28) is greater than the critical X^2 value (7.815) at 0.5 alpha level of significance with three of freedom. Hence the null hypothesis is rejected, while the alternative is accepted (upheld) that there is a significant influence of computer based learning resources on the effective implementation of distance learning education.

Hypothesis 2: There is no significant influence of Network based Learning Resources on effective implementation of distance learning education

Table 6: chi square (X^2) Analysis of the influence of Network based learning resources on effective implementation of distance learning education

Variables	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
NCE Students	100 (103.39)	203 (214.44)	400 (344.44)	207 (247.24)	910
PGDE Students	719 (67.12)	150 (138.56)	167 (222.50)	200 (159.76)	588
TOTAL	171	353	567	407	1498

*** Significant at 0.5 level of significance**

As shown in table 6, the results of testing the influence of network based learning resources on

the effective implementation of distance education, indicates the computed X^2 value (41.39) is greater than the critical X^2 value (7.815) at .05 alpha level of significance with 3 degrees of freedom. The null hypothesis is rejected, hence there is significant influence of network based learning resources on effective implementation of distance learning education.

Hypothesis 3: There is no significant influence of Instructional Technology Skills on effective implementation of distance learning education

Table 7: chi square (X^2) Analysis of the influence of Instructional Technology Skills on effective implementation of distance learning education

Variables	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
NCE Students	361 (539)	404 (486)	353(273)	258(276.89)	1376
PGDE Students	200(221.83)	400(317.93)	100 (179.13)	200 (181)	900
TOTAL	561	804	453	458	2276

*** Significant at 0.5 level of significance**

As shown in table 7, the results of testing the influence of Instructional Technology Skills on the effective implementation of distance learning education, indicates the computed X^2 value (87.43) is greater than the critical X^2 value (7.815) at .05 alpha level of significance with 3 degrees of freedom. Hence the null hypothesis is rejected while the alternative hypothesis is upheld (accepted), there is a significant influence of network based learning resources on effective implementation of distance learning education.

CONCLUSION

The topic of the study was educational resource centre: a veritable delivery system for effective implementation of distance learning education in Nigeria. Appropriate methodology was stated and statistical tools used for the analysis were simple percentages and chi square. The findings reveal that there is a significant influence of Educational Resource Centre on effective implementation of distance learning education in Nigeria. Based on the data analyzed, the following conclusions were drawn: that there is significant influence of computer based learning resources on the effective implementation of distance learning education in Nigeria, there is significant influence of network based learning resources on the effective implementation of distance learning education in Nigeria and Instructional technology skills significantly influence the effective implementation of distance learning education in Nigeria.

RECOMMENDATIONS

Based on the conclusion, the following recommendations were made;

1. Government should provide adequate computer based learning resources in our educational resource centres for effective implementation of distance learning education in Nigeria.
2. There should be quarterly capacity building for Lecturers in the distance learning education through a public-private partnership scheme to enhance effective implementation of distance learning education in Nigeria.
3. Sponsors of distance learning education should initiate and nurture the culture of design

and production of Network based instructional resources such as virtual Library and classroom, electronic courseware, online based lecture videos and audios.

4. Sponsors of distance learning education should set up well equipped instructional technology workshops to enhance the acquisition of instructional technology skills specifically in the areas of instructional techniques, instructional media selection and utilization.

REFERENCES

- Aderinoye, R. Needs analysis on the establishment of a higher education open distance learning knowledge base for decision makers in Nigeria. University of Ibadan.
<http://blogs.aspect.com/2013/06/27/the-benefits-of-cloud-computing-in-education-are-huge/>
http://edutechwiki.unige.ch/en/Resource-based_learning
http://en.wikipedia.org/wiki/National_Open_University_of_Nigeria
http://en.wikipedia.org/wiki/Networked_learning
<http://en.wikipedia.org/wiki/Uyo>
<http://iite.unesco.org/pics/publicaitons/en/files/3214674.pdf>
<http://scholar.lib.vt.edu/ejournals/JITE/v36n4/ndahi.html>
<http://www.hscdsb.on.ca/index.aspx?1=0,2,4,4511,4563,4650>
<http://www.irrodl.org/index.php/irrodl/article/view/930/2165>
http://www.itdl.org/Journal/Aug_10/article01.htm
http://www.itdl.org/Journal/May_04/article05.htm
<http://www.nou.edu.ng/>
<http://www.openclooeges.edu.au/informed/teacher-resources-for-distance-education/>
https://en.wikipedia.org/wiki/Cloud_computing
- Inyang-Abia, M.E. (2004). Essentials of educational technology: a handbook for educators and media practitioners. Calabar: Mifam Publishers
- Kononets, N. (2015). Experience in implementing resource-based learning in agrarian college of management and law Poltava stat agrarian academy. *Turkish Online Journal of Distance Education-TOJDE* April 2015 ISSN 1302-6488 Volume: 16(2) Article 12.
- Microsoft Encarta 2009.
- Mojo, T. (2000). Nigeria Education Sector Analysis: An Analytical Synthesis or performance and main issues. WorldBank
- Obioha M.F. and Ndidi U.B.(2011) Administrative problems of open distance education in Nigeria: a case study of National Open University of Nigeria. Proceeding of the 1st International Technology Education and Environment Conference. African society for scientific Research.
- Onasanya, S.A. (2004). Selection and utilization of instructional media for effective practice teaching. Institute Journal of Studies in Education 2 (1)
- Udoh, A.O. (2014). Instrument development in education. Uyo: Abaam Publishing Company.
- Usun, S.(2003). Advantages of Computer Based Educational Technologies for Adult Learners. *The Turkish Online Journal of Educational Technology-TOJET*
- Van Vuren, A.J & Hennin, J. (1998). User education in a flexible learning environment –an opportunities to stay relevant in the 21st century. *Proceedings of the IATUL Conference*.