An Evaluative Study of the E-learning Resources of National Open University of Nigeria

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Abstract

Open and Distance Learning (ODL) emerged to broaden access to higher education for learners. Besides print materials, e-learning is fast becoming the most widely used medium of instructional delivery in open and distance learning environment worldwide. The trend cannot but be traceable to the rapid development in information and communications technology. Among the e-learning tools and technology which currently support instructional delivery in ODL include the internet, intranet, video conferencing, teleconferencing, educational radio and television, CD- ROM, e-mail and mobile phone. These technologies complement the regular print materials and periodic face-to-face contact between students and their course facilitators. The use of technology to enhance learning has led to such nomenclatures as online learning, virtual learning, distributed learning, network learning, independent learning, cyber schooling, and tele-learning. In line with the emerging global trend in e-learning support for ODL, the National Open University of Nigeria (NOUN), in addition to its widely used print materials has embraced aspects of e-learning technology in its instructional delivery. Based on descriptive survey design, this paper evaluates the e-learning resources used to complement other modes of instructional delivery in NOUN. The findings indicate that while the institution's e-learning tools and technology resources are still at the infancy and thus not often user-friendly, the e-maturity of a significant number of NOUN students is still very low. The study, further found that students' interest in e-learning could be motivated in the foreseeable future, if certain technological challenges confronting the institution's e- learning platform are addressed. Finally, the study makes some recommendations to improve the e-learning services of the National Open University of Nigeria; especially in the 21st century where e-learning is becoming the preferred mode of instructional delivery in ODL.

Keywords: E-learning, tools, technology, instructional delivery, open and distance learning, National Open University of Nigeria

Introduction

The emergence of Open and Distance Learning (ODL), as a means of accelerating enhanced access to education for all, remains one of the far-reaching innovations of the 20th century. UNESCO (2002:22) posits that the rationale for distance learning 'has been to open opportunities for learners to study regardless of geographic, socio-economic or other constraints'. ODL complements the conventional education system with advancements in information and communications technology providing the driving force. The term open and distance learning has been defined variously by scholars. Robinson and Latchem (2003: 28-29) see open and distance learning as '...an education process in which teachers and learners are separated in space and/or time for some or all of the time of study and in which the learning materials take over some of the traditional role of the teacher'. They argue that e-learning 'exploits the capabilities of the internet and Web in providing access to learning materials and supporting two-way communications between individuals and groups'. For UNESCO (2002:7), the term open and distance learning represents:

> approaches that focus on opening access to education and training provision, freeing learners from the constraints of time and place, and offering flexible learning opportunities to individuals and groups of learners. Open and Distance Learning is one of the most rapidly growing fields of education, and its potential impact on all education delivery systems has been greatly accentuated through the development of internet-based information technologies, and in particular the World Wide Web.

Daniel (2002:3) notes that two factors have aided the development of distance learning. The first is 'the growing need for continued skill upgrading and retraining'; and second, 'the technological advances that have made it possible to teach more and more subjects at a distance'. Indeed, technological innovations remain pivotal in instructional delivery in ODL, hence the term 'distance education' or 'distributed education' as it is called in places like North America.

Nigeria, through the National Open University of Nigeria (NOUN), has joined many other countries in the world to provide higher education

opportunities for its teeming population using the open distance learning mode. The institutional objective of NOUN is to provide flexible access to quality education to as many Nigerians as possible. The National Open University of Nigeria (NOUN) was resuscitated in 2002 and commenced distance learning programmes in 2004 principally through printed course materials (Jegede, 2010; Ipaye,2005) Since the take-off of NOUN, many Nigerians have embraced distance learning as evidenced by the large enrollment of students in its various programmes and courses.

Theoretical Clarifications

The subject of e-learning has become a buzz concept in the dynamic world of today; driven largely by information and communications technology. E-learning is made possible by computers, mobile devices and the World Wide Web. Electronic learning ensures that every learner who has access to the internet can access study materials, solve and submit assignments, and write examinations online. It also enables learners to share and communicate information with tutors and other learners from any location and access other learning resources online. In fact, e-learning resources provide solutions to various educational tasks, especially in such critical areas as teaching, learning, research and administrative management. For instance, through e-learning. students' registration, assignments and examination can be undertaken online. Many other learner- support services can also be provided to students through e-mails or mobile SMS.

.Arguably, there is yet to emerge any definitive or grand theoretical framework which explicates in its entirety the concept of e-learning. Therefore, the theoretical framework on which this study is based is that of 'an integrated, process-based quality management system, applied to web-supported processes and products' proposed by J.W. Fresen and L.G. Boyd (2005: 317-331). The framework is modeled into three parts, namely the methodology of the quality management system, critical success factors for web-supported learning, and a student feedback survey measuring client satisfaction.

The Commonwealth of Learning (2010:8) has asserted unequivocally that e-learning technology is indispensable in the drive towards making distance learning available to a large segment of learners. Although a nebulous term, the concept of e-learning has been defined in various ways

by scholars. Some scholars define e-learning in relation to technology. That is learning delivered using any electronic means like the internet, mobile devices and computers.

The Joint Information System Committee (J1SC:2OO4:10), a United Kingdom-based agency which provides services in the use of ICT to support learning, teaching, research and administration defines e-learning as 'learning facilitated and supported through the use of information and communications technology'. It further states that e-learning 'covers a spectrum of activities from supporting learning to blended learning (the combination of traditional and e-learning practices) to learning that is delivered entirely online'.

The United States Commission on Technology and Adult Learning ((2001:4) defines e-learning as 'instructional content or learning experiences delivered or enabled by electronic technology'. Allen (2007: 9) opines that e-learning entails the use of internet technologies to create and deliver a rich learning environment, which comprises a broad array of instruction and information resources and solutions; the goal of which is to enhance individual and organisational learning. Rosenberg (2001:28) argues that e-learning is the use of internet technologies to deliver a broad array of solutions that enhance knowledge and performance. He contends that there are three fundamental criteria for e-learning:

1)   it is networked, which makes it capable of instant updating, storage, retrieval, distribution and sharing of instruction and information.
2).   it is delivered to the end user via a computer using standard internet and intranet technology.
3).   it focuses on the broadest view of learning, which is learning that goes beyond traditional paradigms of training.

Doug Hum and Anne Ladoucour (2001:5) define e-learning broadly as 'using an electronic means to access information and learn about a topic, be it for personal interest job at hand or career advancement'.

Despite the plethora of definitions, what is evident is that e-learning encompasses all the technologies used for producing, transmitting and acquiring knowledge. These technologies which include the internet, e-

mail, video-conferencing, audio- conferencing, chat facilities, discussion boards, CD-ROMS and DVDs facilitate the creation, dissemination and application of knowledge. Electronic learning technologies also include mobile devices such as phones, IPods, MP3 players, podcasts and blogs etc.

Benefits of E-Learning

The methods of teaching and learning continuously change as society evolves new forms of technology. This requires that distance learning institutions globally should embrace e-learning platform to deliver instruction anytime, anywhere and on any device. Technology is the platform for a successful electronic learning thereby making education accessible to a large number of people on a grand scale. According to UNESCO (2002:41), e-learning 'permits more learner-instructor and learner-learner communication and dialogue and thus a high degree of individualization of learning and learner construction of knowledge'.

In a special report entitled *Final Workshop Report: Multi-media Learning in Swaziland,* the Commonwealth of Learning (2010:57), an organisation which has been at the forefront of promoting open and distance learning, outlines the benefits of e-learning to include:

i.   e-learning does not require physical attendance learning is self-paced (not too slow, not too fast)
ii.   the student is unbound to time and place - courses are available anywhere and any time (24/7)
iii.   technology tools make collaboration among students much easier e-learning complements, enriches and supports the conventional classroom experience
iv.   e-learning can be used to support the print -based instruction offered by an institution: and
v.   e-learning can also enhance students' learning experience in order to meet their different learning styles through use of multimedia techniques.

E-learning enhances and arouses students' interest in learning. According to Rumble (2009:61), one of the arguments in favour of using e-learning technology in ODL:

> is that it brings the unit cost of education down. In distance education, this has been done through the achievement of increases in productivity following the substitution of capital (in the form of technology) for labour (teachers). Indeed, one of the strongest arguments for using text, reusable (recorded) audio and video, and ICT as a repository of information in education rather than using face-to-face teaching is that it shifts some of the teaching from the teacher to the medium, thus helping to bring down the unit cost of education (provided student numbers are high enough).

Generally, contemporary trend in e-learning indicates that new technological innovations tend to trigger new systems of instructional delivery, especially in open and distance learning environment. With e-learning, students can take online classes with their personal computers, download course lectures, course syllabus, solve and submit assignment and write examination. Through e-mail and chat room discussions, for instance, students could set up study sessions with their colleagues and exchange ideas on different topics. With e-examinations for instance, a greater degree of accuracy and objectivity is ensured as the computer carries out most of the administrative duties such as scoring, grading and recording of students' marks.

Critical Factors for Adoption of E-Learning

Bassoppo-Moyo and Temba (2006:7-22), examined e-learning from three related perspectives, namely planning and administration of online courses, implementation, assessment and evaluation of learning outcomes in an e-learning environment. The authors, in addition, addressed issues of 'physical, technical, pedagogical, professional and environmental elements including other reliable and valid approaches to online measurement and testing methods that are designed to eliminate such problems as plagiarism, technical problems associated with access, matching learners' and instructors' technical skill levels, learner isolation,

and the impersonality of computerized assessment'. Emphasising the organisational aims and vision within which e-learning can be applied, the authors submit that 'front-end approaches to improving online instruction' remain a viable option. The authors' position is anchored on the belief that in an e-learning environment, the web-based courses must be easily navigable by students.

Banerfree (2008:100) contends that open and distance learning institutions should embark in trial launching prior to adopting e-learning as part of their instructional delivery system. He argues that 'ICT-based education is not just transferring class notes or a video-taped lecture to the internet, new paradigms of content delivery are needed. Interactivity between instructors and amongst students should have priority. Distance learning should not be delivered just by CD-ROMS, but by motivated live qualified teachers'. The implication is that teachers should be able to provide real time online instruction to learners. E-learning is not just about putting slides or setting up course outlines, assignments and deadlines online. There must be elements of interactivity with the contents, where learners can capture a complete lecture or topic as video or audio accompanied with slides. Meyer (2002: 16) attests to this view when she notes that one of the hallmarks of a quality online course is the ample opportunities for interaction between and among faculty, students and the course materials.

Why E-Learning in NOUN?

As used in the paper, e-learning tools and technology comprise all the information and communications technology resources used for teaching, learning, and research in National Open University of Nigeria. With high increase in students' population coupled with the emergence of more study centres across the country, the National Open University of Nigeria has decided to broaden the range of its instructional delivery system hoping to use the latest information and communication technologies available. Thus, NOUN at present provides its students e-learning resources that support administration, teaching and learning activities beginning from course registration to examination and much more. The National Policy on Education, NPE, 2004, in Nigeria also supports this move.

The unique selling point of e-learning is that it opens up access to, and reduces the cost of education. Adeola, Alese, and Adewale (2009: 325-332)

explore how e-learning has revolutionalised learning in the universities and contend that in an e-learning environment, the class and instruction can be communicated virtually with instructors and students in different locations. They argue that in e-learning, technology is the basic carrier of knowledge between teachers and learners, and contend that it encompasses the use of email, the internet, discussion boards, blogs, text chat, educational animation, simulations, learning management software, and other audio- visual materials. In their opinion:

The flexibility of e-learning makes it the most suitable means of education in this part of the globe. E-learning can be synchronous or asynchronous. In synchronous e- learning classes take place in real time. Instructions are communicated to students at real time through audio or video or through a chat room. Asynchronous e-learning allows students to access pre-packaged learning materials at real time (Adeola, Alese, and Adewale, 2009: 325-332).

As evident from the above submission, e-learning has been classified into two major types based on instructional delivery method and the relationship between students and instructors in terms of time and space. The first is synchronous e-learning which involves students-instructor interaction and asynchronous e-learning, which does not require simultaneous participation between students and instructors. While interaction in synchronous e-learning is undertaken in real time and is immediate, in asynchronous e-learning, students choose their preferred time, making learning self-paced. The methods of e-learning currently available in National Open University of Nigeria are basically asynchronous and include:

1) Online Tutor-Marked Assignments(TMAs)
2) E-examination
3) Downloadable Online Course Materials
4) Online Course Registration
5) E-mail Support Services; and SMS Support Services
6) CD-ROMS
7) Radio Broadcast (NOUN Radio 105.9FM)
8) E-library

Statement of the Problem

Bates (1995:15) observes that the use of e-learning technological resources is one of the driving forces of open and distance learning globally. In developing countries like Nigeria, however, the success of ODL has been hampered by the low level of technological infrastructure, inadequate skilled personnel and students' lack of access to computer and the internet. This paper therefore seeks to investigate the following problems:

1) How user-friendly are the e-learning tools and technological devices used by NOUN?
2) How accessible is NOUN online course materials?
3) Are NOUN e-learning courses interactive and learner- friendly?
4) Do NOUN students have access to personal computers with
5) internet connectivity to tap from the rich potential of e-learning?
6) Is high level computer proficiency emphasised as a condition for admission into NOUN?

Research Hypotheses

1. NOUN students see the online admission and registration procedure as user-friendly

2. NOUN online course materials are easily accessible

3. NOUN students prefer online tutor-marked assignments to handwritten assignments

4. NOUN students prefer e-examination to handwritten examination

5. The e-learning maturity of NOUN students is high.

Methodology

Research Design

The paper employs descriptive survey design to evaluate the e-learning resources and technology available in National Open University of Nigeria. Descriptive method of research often describes the population being studied. It draws sample from a population from which the researcher infers the characteristics or behaviour of that population. Osuala (2005:254) contends that one of the advantages of this research

method is that since it is difficult to study an entire population, drawing inferences from a sample becomes inevitable. Ali (1996:16) corroborates this assertion noting that "descriptive surveys are mainly concerned with describing event as they are without any manipulation of what is being observed'.

Sample and Sampling Procedure

A purposeful sampling procedure was adopted for the study, drawn from the target population of old and new students of National Open University of Nigeria in Kaduna Study Centre. Respondents included both male and female students at undergraduate, post-graduate diploma and master's degree levels. In order to ensure that at least 80% of the questionnaires were returned, the Kaduna Study Centre student counsellors were given 300 copies of the questionnaire to administer to students out of which 245 (180 males and 65 females) were completed and returned. The researcher also conducted interview with two NOUN web-content developers in Lagos and Kaduna Study Centres respectively.

Instrumentation

Two major research instruments were used to generate the relevant data. The first was entitled 'Questionnaire for Evaluating NOUN E-learning Tools and Technologies(QENELTT). The second was interview with two NOUN web-content developers in Kaduna and Lagos Study Centres respectively. QENELTT was used to gather categorical data about respondents' experiences about NOUN e-learning services. It has 6 items and divided into two (2) sections lettered A-B. **Section A** dealt with respondents' bio data such as age, sex, course of study, level of study, and

year of admission. **Section B** contains the e-learning tools and resources being evaluated.

Validity

According to Emele and Emele (1995:72), 'validity is the degree of accuracy with which a test measures what it purports to measure'. QENELTT was developed by the researcher while the content validity was established with significant input from two NOUN web-content developers.

Procedure for Data Collection

QENELTT was given to five student counsellors in the two study centres in Kaduna to administer to respondents. The reason was because they have access and also relate to students on one-on-one basis in terms of course registration, enquiries, and many other student support services. The counsellors were those of the Schools of Arts and Social Sciences, Management Science, Science and Technology, Education and Law. The questionnaires were administered by the counsellors and collected on the spot. The period of data collection for the study lasted about 8 weeks. Instructions in the questionnaire informed respondents to be as objective as possible since it was intended strictly for research purpose.

Variables Evaluated

The following variables considered pertinent in the evaluation of NOUN e- learning resources were tested by means of the carefully designed questionnaire intended to elicit appropriate responses from the students. The simple responses provide critical insights into students' experiences in the use of NOUN e-leaming resources.

A.   Students' perception and experience of NOUN online admission and registration process
B.   Accessibility of NOUN Online course material
C.   Students' choice between electronic tutor-marked assignment and handwritten tutor-marked assignment (TMA)
D.   Students'   choice between   e-examination and handwritten examination

E.   Students' access to PC/Laptop and Internet Connectivity
F.   Students' current e-learning maturity

Data Collection and Analysis

The period of data collection for the study lasted about 8 weeks. The results were analysed based on each item of assessment in the questionnaire using percentage and chi-square tests as descriptive tools.

They helped to answer the research questions.

(a)   Tables one to six (1-6) analysed the six items of assessment using simple percentages followed by their chi-square tests
(b)   Table 7 shows the percentage distribution of respondents on gender basis
(c)   Table 8 shows the percentage distribution and chi-square values on basis of respondents' courses and levels of study.

Results

Table la: Students' Experience of NOUN Online Admission and Registration Process

	User- Friendly	Not user- Friendly	Total
Number of Respondents	205	40	245
Percentage (%)	83.7	16.3	100

Table lb: X^2 Test of Students' Perception of NOUN Online Admission and Registration Process

Students' experience of online admission/registration	No	%	X2	Cal
User-friendly	205	83.7	122.5	111.12
Not use-friendly	40	16.3		
Total	245	100		

Table 2a: **Accessibility of NOUN Online Course Materials**

	Easily Accessible	Difficult to Access	Total
Number of respondents	74	171	245
Percentage (%)	30.2	69.8	100

Table 2b: **X^2 Test of Students' Perception of Accessibility of NOUN Online Course Materials**

Students' perception of accessibility of online course materials	No	%	X^2	Cal
Easily Accessible	74	30.2	122.5	38.40
Difficult to Access	171	69.8		
Total	245	100		

Table 3a: **Students' Perception/Experience of Tutor- Marked Assignment (TMA)**

	Prefers Online TMA	Prefers Handwritten TMA	Total
Number of respondents	215	30	245
Percentage (%)	87.8	12.2	100

Table 3b: **X^2 Test of Students' Perception/Experience of Tutor- Marked Assignment (TMA)**

Students' preference between e-TMA & handwritten TMA	No	%	X^2	Cal
Prefers online TMA	215	87.8	122.5	139.69
Prefers handwritten TMA	30	12.2		
Total	245	100		

Table 4: **Students' Preference between E-examination and Handwritten Examination**

	Prefers Online TMA	Prefers Handwritten TMA	Total
Number of Respondents	215	30	245
Percentage (%)	87.8	12.2	100

Table 4b: X^2 **Test of Students' Preference between E-examination and Handwritten Examination**

Students' preference between e-exam & handwritten exam	No	%	X^2	Cal
Prefers Online examination	215	87.8	122.5	139.69
Prefers handwritten examination	30	12.2		
Total	245	100		

Table 5a: Students' Access to PC/Laptop and Internet Connectivity

	Owns Laptop/PC & Internet Access	Owns Laptop/PC but no internet	Do not own either	Total
Number of respondents	45	157	43	245
Percentage (%)	18.4	64.1	17.5	100

Table 5b: X^2 **Test of Students' Access to PC/Laptop and Internet Connectivity'**

Students' access to Laptop/PC/ Internet	No	%	X^2	Cal
Owns Laptop + Internet Access	45	18.4	81.7	104.22
Owns Laptop/PC but no Internet Access	157	64.1		
Do not own either	43	17.5		
Total	245	100		

Table 6a: Students' Current E-learning Maturity

	Good	Average	Minimal	Total
Number of respondents	98	104	43	245
Percentage (%)	40	42.5	17.5	100

Table 6b: X^2 Test of Students' Current E-learning Maturity

Students' current e-learning maturity	No	%	X^2	Cal
Good	98	40	81.7	27.67
Average	104	42.5		
Minimal	43	17.5		
Total	245	100		

Discussion

The result of this study has shown that NOUN students differ significantly in their perceptions and experiences in the use of the university's e-learning resources and technology. **Table1a** indicates that a significant number of students (83.7%) say they are satisfied with the online admission and registration process of National Open University of Nigeria. The admission procedure in NOUN is automatic. Upon completion of the online application form, a qualified applicant gets an admission letter which is generated instantly with which the student proceeds to the study centre to complete registration formalities. In respect of course registration in a semester, every NOUN student has a portal where s/he can login and carry out all his/her course registration activities ranging from payment for study materials to adding/dropping of courses etc.

The result of X^2 test in **Table 1b** accepts the hypothesis which states that NOUN students see the online admission and registration procedure as being user-friendly.

As indicated in **Table 2a,** many students (69.8%) experience difficulties in accessing the institution's online course materials. They complained that it takes about 25-35 minutes to download a course material from the university website. During an interview with two NOUN web content

developers, the researcher learnt that the problem of low bandwidth was responsible for the difficulty in accessing study materials online by students. Low bandwidth capacity results to students wasting valuable time and money in commercial cyber cafes trying to download learning materials or submit assignments online. As is well known, high bandwidth makes internet access faster and e-learning experience rewarding. The high cost of internet connectivity and other ICT infrastructure is a major challenge to NOUN e-learning system. One of the critical success factors to consider prior to the adoption of e-learning is the cost implication (which includes hardware, software, internet connectivity, electronic library and site access, academic and technical support). It is based on this factor that Philip, Paul and Molelu (2004: 67-80) advised that 'e-learning needs to be implemented within a strategically developed framework based on a clear and unified vision and a central educational rationale'. Thus, the X^2 test in **Table 2b** rejects the hypothesis that NOUN online course materials are easily accessible.

Responses from **Table 3a** show that students' perception/experience of online tutor-marked assignment (TMA) is positive (87.8%). However, those who said they prefer handwritten tutor-marked assignments based their reason on failure to find questions on their portals, delay in uploading questions by web content managers, high cost of commercial cyber cafes, incomplete questions and slow internet access. As can be inferred, the X^2 statistics in **Table 3b** accepts the hypothesis that NOUN students prefer online tutor-marked assignment to handwritten assignments.

Table 4a indicates that students prefer e-examination to handwritten examination. Respondents who prefer electronic examination (87.8%) do so because it is based largely on multiple choice questions and short essays; it minimises malpractices; it is less stressful and finally, they can sit for examination anywhere and performance can be known immediately. Those who prefer handwritten examination (12.2%) argue that e-examination is quite demanding because it requires the student to cover the entire course material (sometimes very bulky) in order to excel. They also point to their minimal literacy level in computer as another reason they prefer handwritten examination. As can be observed, the X^2 test in **Table 4b** accepts the hypothesis that NOUN students prefer e-examination to handwritten examination. It would be recalled that NOUN began e-examination in June 2010 as a way of removing the delays and administrative bottlenecks that go

with paper and pencil examinations including delays in the release of results.

Table 5a reveals that students' access to PC/Laptop and internet connectivity is very low. While only 18.4% (majority of them postgraduate students) has access to computer and internet connectivity (either in the office or at home), 64.1% has access to computers without internet connectivity and 17.5% neither owns a computer nor internet access. The X^2 result in **Table 5b** indicates that of the three areas of assessment, only ownership of personal computer and laptop made a significant difference while access to internet connectivity is far from the point of significance. One of the fundamental prerequisites for success in open and distance learning in the 21st century is possession of computer skills and easy access to the internet. When a significant population of the students neither has access to personal computers nor high speed internet connections, e-learning becomes a distraction rather than an incentive.

From the result shown in **Table 6a** students' current e-learning maturity is relatively significant although very far from what is expected of distance learners in a knowledge- based economy. While 40% are skilled in both computer and internet operations, 42.5% have good computer skills but with little knowledge of internet operation and 17.5% have very low knowledge of both computer and internet skills. The X^2 result in **Table 6b** accepts the hypothesis which states that the e-learning maturity of NOUN students is high.

Conclusion

The awareness that e-learning is becoming the standard mode of learning and instructional delivery in ODL prompted the evaluation of the e-learning technology and resources in use at the National Open University of Nigeria. The e-learning hub of NOUN is centrally managed at the institution's headquarters in Lagos. The study centre counsellors in every location where students' registration takes place offer advice to students on available e- learning resources and how to access them. It should be restated that e- learning, even in the 21st century, has its own inherent challenges despite its huge potential as an educational tool. In the first place, e-learning is quite expensive to adopt, especially in developing countries like Nigeria where lack of funds for ICT development and purchase of hardware and software

is a major problem in most educational institutions. Also, as Ipaye (2007) noted, e-learning has two faces, the technology face and the human face. According to him, "in the Nigerian setting the human face which refers to human capacity is still low in the universities and Nigerian universities need to develop capacity in the use of e-learning for training".

The paper acknowledges the huge challenges which continue to trail NOUN effort to provide e-learning courses specifically tailored to .the online context. These challenges range from shortage of sufficient number of skilled web content developers in the university, instructional designers and poor internet connectivity and access, apparently due to infrastructure deficit, high cost of internet connectivity. It is expected that the result of the study should be of interest to the authorities of the National Open University of Nigeria.

Recommendations

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

• NOUN should review best practices in the use and integration of e-learning in open and distance learning in Africa and elsewhere in order to strengthen its own technology. This suggestion is in tandem with the submission of Rumble and Koul (2007:11) that 'there needs to be a local analysis of the context within which an ICT initiative is introduced based on factors that have been shown to influence the probability of the intervention being successful'. This requires institutions to plan adequately prior to embarking on e-learning in order to minimise the hiccups that may rear up.

• The findings of the paper underscore the need for the National Open University of Nigeria to build a robust ICT infrastructure (which can host a higher bandwidth) in order to host a robust e-learning platform. This empirical finding is consistent with Farzana Panhwar's (2008:122-124) advice that effective 'e-learning cannot take place where internet connectivity functions at a snail's pace and keep disconnecting at intervals'.

The study recommends that high level computer and internet proficiency must be emphasised as a *non-negotiable* requirement for admission into the National Open University of Nigeria. There should be a test of computer skills and appreciation for all newly admitted NOUN students prior to registration. For instance, of the total number of students sampled, only a negligible 18.4% has access to both computer and internet connectivity either at home or in the office. Without adequate knowledge of computer as well as access to internet connectivity students may not be able to tap from the rich potential of e-learning.

As reported in **Table 2,** 69.8% of students find access to NOUN online course materials very difficult. Besides, they also complained that the online study materials do not have links and other interactive activities which could enable them access additional reading materials from external web sites. There is also the problem of lack of interactivity of the online study materials which is a component of quality assessment for e-learning-based courses. What obtains at present in NOUN is to upload study materials online without any form of aesthetics or interaction. This problem arises because right from time, NOUN courses have never been written from an online perspective and e-learning is not simply uploading study materials online for students to download. In order to remedy this problem, NOUN must empower its instructional designers and web content developers with the appropriate skills to produce study materials from an online perspective. Specialised skills are required for the design and production of online study materials. In essence, Mauger's (2002:9-11) admonition is quite timely and would be of particular concern to the National Open University of Nigeria in its drive towards incorporating e-learning as part of its instructional delivery system. In his view, 'e-learning has potential benefits but it requires a "smart" environment: support staff and its instructive resources, diagnostic systems to measure electronic functionality and a system-wide approach that goes beyond mere delivery of content'.

- There is also the need to set up full and functional information and communications technology centres in the study centres where students can avail themselves of the opportunity provided by online resources of the university and other Open Educational Resources (OERs).

- One of the e-learning technologies which the National Open University of Nigeria has not utilised optimally is the mobile phone. The pervasive availability of mobile phone and students' easy access to such phones can make ODL learning effective. Text messaging (SMS) could be used to enhance the quality of administrative and academic support to students. General messages can be sent in bulk to students regarding due dates for submission of assignments, examinations and announcements of available course materials. In an environment where students have limited access to the internet like ours, mobile SMS becomes the most cost-effective way to communicate with students.

Finally, in conducting this research, one basic methodological weakness which may have implications for the design was identified. The analysis was limited by small sample size. The population sampled was NOUN students in Kaduna study centre, thus the results cannot be generalised beyond the population studied. It should be noted that NOUN has study centres in almost all the 36 states of the federation and the Federal Capital Territory and it was extremely difficult for the researcher to generate data from all the centres.

Acknowledgement

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