IMPACT OF E–LEARNING APPLICATION ON LEARNING STYLES AMONG STUDENTS OF NATIONAL OPEN UNIVERSITY OF NIGERIA

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ABSTRACT

Research was conducted to investigate the impact of E-learning application on learning styles among students of National Open University of Nigeria. One thousand students were randomly selected from the over sixty study centres of the university. A pretested self-developed questionnaire was used for data collection. The instrument contained 35 items. The reliability co-efficient of the instrument stood at 0.90. The data collected were analyzed using frequency distribution, mean and t - test. The findings revealed: acute shortage of E-learning materials such as e-mail facilities, video/tele conferencing and television facilities, multimedia, computer and internet facilities such as projectors, photocopiers and scanners. It was also revealed that the few available ones such as off-line/desktop computers, printers and ready-made courseware were not fully utilized because of lack of network connectivity and power failure. The findings also revealed strong impact of E-learning application on students learning styles. It also indicates the extent of the effectiveness of E-learning on learning styles of students. It was recommended among other things that, the students should carry out a test to know the impact of the E-learning on their learning styles type. The school should improve and provide sufficient learning materials for use by students. Tutors should be trained and retrained through in–service training, seminars, workshops and conferences for acquisition of the knowledge and skills needed for E-learning application in National Open University of Nigeria.

Key words: Impact, E–Learning, Learning Styles

INTRODUCTION

Hedge and Hayward (2004), defined E-learning as an innovative approach for delivering electronically mediated, well-designed, learner-centered and interactive learning environments to anyone, anyplace, anytime by utilizing the internet and digital technologies concerned with instructional design principles. E-learning is usually associated with the use of computers but generally, it is a form of instructional delivery which can be provided through any appropriate electronic media such as the mobile phone, television, radio, among others. In this age, learning with the use of computer is simply online ways of acquiring knowledge through the internet or through the offline CD-ROM. The online approach involves the use of Internet explorer/navigator. It may be in form of Audio, Visual, and or Audio/Visual. The convergence of the Internet and learning, or Internet enabled learning is called E-learning as opined by Sabina

(2008). E-learning in education is the wholesome integration of modern telecommunications equipment and information and communication technology (ICT) resources, particularly the internet, into the education system. Shavinina (2001) defines ICT as all the digital technologies, including: computer, scanner, printer, telephone, internet, digital satellite system (DSS), direct broadcast satellite (DBS), pocket-switching, fiber optic cables, laserdisc, microwaves, and multi-media systems for collection, processing, storage and dissemination of information all-over the world.

E-learning as an aspect of ICT is relatively new in Nigeria's educational system. It embraces a wide variety of media configurations, including radio, telephone and television broadcast, cable and satellite, Heinich, Molenva Russell, Smuldina (2002). Teaster and Blieszer, (1999) were of the view that E-learning has been applied to many institutional methods; however, its primary distinction is that the teacher and the learner are separated in space and possibly time.

IMPACT OF E-LEARNING ON STUDENTS' PERFORMANCE

There are two types of E-learning: asynchronous or self-paced, and synchronous or instructor led, Bates (2001). The degree of interactivity, sophistication and expense is different in each of the types. The synchronous form is so-called because of its comprehensive features that allow for interactivity between the learning content and the learners. It has in-built features like the forum chatting and audio/video-effect thus; students are separated from the teacher thereby providing multi-outlet opportunities to meaningfully engaged learners while aiding comprehension. Asynchronous form of E-learning on the other hand, is the direct opposite of synchronous form designed with multifarious features, the former does not. It only presents the learning content for the students to read, internalize and download if need be. Also, whereas synchronous E-learning allows for immediate feedback as much as possible, asynchronous may not necessarily allow for immediate feedback. E-learning is not traditional computer based learning (CBL). Neither is it downloaded to a hard drive like CBL; rather, it is stored on a server and accessed over a network by a web browser. E-learning programs therefore are saved on the internet/intranet and can be accessed anytime, anywhere, regardless of the computer platform, as long as the user has subscribed to an internet service. E-learning has become an increasingly popular learning approach in higher educational institutions due to vast growth of internet technology. Nowadays E-learning has a competitive advantage and many universities have implemented it and this has impacts on students' performance or Grade point average (GPA). However, still there are other universities and academic institutions that use very low interactive E-learning, which is not enough to contribute to the performance of the students. In contrary to that, other higher educational institutions use highly interactive E-learning, which directly improves students' performance in general (Rodgers, 2008).

LEARNING STYLES AS CONSTRAINT TO E-LEARNING

The term learning styles refers to the view that different people learn information in different ways. In recent decades, the concept of learning styles has steadily gained influence. Learning styles appear to have wide acceptance not only among educators but also among parents and the general public. This acceptance is perhaps not surprising because the learning-styles idea is actively promoted by vendors offering many different tests, assessment devices, and online

technologies to help educators identify their students' learning styles and adapt their instructional approaches accordingly.

Learning styles are affected by age, experience, physiology, culture, and many other factors. When learning style is considered in educational content, it is seen that every student has his/her own learning style. These differences (personality, perception, ability, intelligence) affect students' motivation and attitudes towards the lessons. As a result, these differences affect the effectiveness of the lesson. Beside those, the student's gender, intelligence and personal characteristics influence the learning style as well (Erden & Altun, 2006). Learning style is related to individual characteristics and preferences thus, reflect the students' preferences on how they perceive and, interact with the environment, react and experience learning in this process. When individual learning styles are determined, both the kind of the teaching environment they need to be in and the way to precisely determine the issues to be learned inside and outside of the class may be raised, Özbek (2007). When the lessons are taught by taking into consideration the individuals' learning styles; their interests and successes increase considerably. What is important here is that learning styles are neither better nor worse than each other. If a teacher keeps this matter in mind, he can turn this difference in learning styles into an advantage.

NOUN HISTORY AND FOCUS

The National Open University of Nigeria (NOUN), satellite-based video and audio conferencing supplemented by print-materials and recorded video was founded by the then Nigerian President, Chief Olusegun Obasanjo, to train teachers and others who have not obtained the requisite degree for their current job placement from any geographical distance. In 2003, the National Open University of Nigeria took off with their administrative office located at the Old Federal Ministry of Education Head Quarters, 14/16 Ahmadu Bello Way, Victoria Island, Lagos. The course delivery at the NOUN is through a combination of web-based modules, textual materials, audio and video CD ROMs. The long distance study mode of education employed by NOUN uses ICT resources, which makes it have the following advantages over the conventional mode of study, viz: quick access to information, provision of support materials and management of learning experiences, speed and volume of material for processing, investigating reality and building knowledge, active learning and authentic assessment, engages students by motivation and challenge, provide tools to increase student productivity, provide scaffolding to support higher level thinking, increasing learner independence, collaborative and cooperative learning, tailoring learning to the learner, and overcome physical disabilities among others. Thus, the impact of this type of E-learning involves acquisition, display and use of necessary skills with the help of ICT to reach the target audience. This helps individuals who need educational services to obtain it wherever they are irrespective of time and place. The use of ICT is relevant and important in the marketing of educational services, hence the need for academic staff to be trained and/or retrained to be able to market educational services properly in the institution for the purpose of meeting the demand of the consumers of its services.

STATEMENT OF PROBLEM

The call for application of E-learning in schools is to infuse and inject efficiency and effectiveness in the teaching-learning process. However, in developing countries like Nigeria, E-learning is challenged with the problems of material devices such as computer, computer

laboratories, internet and E-mail facilities, videophone systems and teleconferencing devices, fax and wireless applications, digital library, digital classrooms, multimedia systems and the problem of multimedia courseware development among others (Global Information Technology Report, 2010) . Other studies indicated that there is dearth of trained teachers for E-learning, lack of facilities, infrastructures and equipment (Ikemenjima, 2005; and Jegede & Owolabi, 2008).

E-learning has already influenced the field of teaching, training and development in the developed world. A growing number of college courses are delivered over the web and are increasing student numbers (Chang, 2001). Many directors of corporate training believe that web-based learning is the future method for their training programmes (Barron, 1999). However, the field lacks enough documentation to show that E-learning is an effective delivery mechanism in relation to the individuals being taught. For example, research on learning styles has consistently shown that considering personality attribute in preparing and delivering instruction can significantly improve the learning process (Dwyer, 2008). Aroyo and Dicheva (2004) indicate that many researchers in the area of education systems are concerned with moving their research to a coherent space of collaborative intelligence from scattered intelligent. There are only a few practical studies that have investigated the effect of this methodology on student knowledge when considering learner's learning styles. This paper therefore investigates the impact of E-learning on student knowledge based on learning styles thereby providing evidence that E-learning application is effective in student's learning style.

OBJECTIVES OF THE STUDY

The purpose of this study is to:
1. Determine the impact of E-learning application on learning styles among students of National Open University of Nigeria
2. Assess the effectiveness of E-learning application on learning styles among students of National Open University of Nigeria
3. Examine the constraints of E-learning application on learning styles among students of National Open University of Nigeria

METHODOLOGY

The research design was an analytical survey, which as diagnostic study attempts to describe and explain why certain situations exist. In this approach two or more variables are usually examined to test research hypotheses. The results allow researchers to examine the differences among variables and to draw explanatory inferences. In the study, the researcher sought to establish the impact of E-learning applications on learning styles amongst students of National Open University of Nigeria.

Sample and Sampling Techniques
A sample of 100 students was drawn using systematic random sampling technique where a neutral starting point was identified by the researcher where the first student was identified randomly, within the study location. It was keyed to consider gender parity in the study. If a male student was picked the next was to be a female respondent. Identification of the starting point was done at the gate of the National Open University of Nigeria Bauchi study center. After identification of the first respondent, five students were past then the sixth was included in the

study, if the sixth student was not of the opposite gender, five more students were past till the opposite gender was found. The process was repeated until 100 respondents were selected.

Instrumentation

The instrument for data collection was a researcher designed 35-items questionnaire scaled using a modified four-point likert scale of strongly agree, agree, disagree and strongly disagree. The face, construct and criterion validity of the instrument was ascertained in a test and measurement and educational technology of the department of educational foundation of the University. Their criticisms and corrections were used in validating the instrument. The reliability of the instrument was pilot tested among twenty (20) students of the University campus in Kaduna, Nigeria. The test-re-test reliability method was applied with an interval of two weeks. The Pearson correlation coefficient was used to correlate the two set of scores. The result established had a coefficient index of 0.90. This showed that the instrument is reliable for testing the impact of E-learning application on learning styles among students of National Open University of Nigeria.

Data Collection and Analysis

The researcher administered 100 copies of the questionnaire to the respondents of the National Open University of Nigeria. Items which needed clarification were explained to the respondents. The researcher collected the filled questionnaires instantly for marking. Descriptive testing in analyzing the personal information and the research questions were used. The Statistical Package for the Social Sciences (SPSS) software was used in analysing the data collected by applying the simple t-test analysis.

RESULTS AND DISCUSSION

Table 1: Respondent's Bio-Data

Variable	Frequency	Percentage Frequency (%)
Gender		
Male	50	50.00
Female	50	50.00
Total	**100**	**100.00**
Marital Status		
Married	26	26.00
Widowed	4	4.00
Divorced	12	12.00
Single	18	18.00
Total		**100.00**
Age Distribution		
Adolescent (10 – 19)	3	3.00
Adult (20 – 45)	66	66.00
Middle Age (46 – 60)	29	29.00
Old Age (> 60)	2	2.00
Total	**100**	**100.00**
Distribution by Faculty		
Education	36	36.00
Agriculture	16	15.00
Arts and Social Sciences	15	15.00

Management Sciences	8	8.00
Basic Medical Sciences	3	3.00
Total	**100**	**100.00**
Distribution by Course		
Certificate	29	29.00
Undergraduate	55	55.00
Postgraduate	14	14.00
Ph. D	2	2.00
Total	**100**	**100.00**

Source: Survey *20015*

It was observed in table 1 above that (50%) of the respondents were male while 50% of the sample were female. The findings show an even distribution of students of National Open University of Nigeria.

The table also revealed that 52% of the respondents were married, 28% single, 12% divorced while only 8% were found to be widowed. This study shows that majority (52%) of the respondents were married. The findings is consistent with Owino (2013) who revealed that marital status was a big determinant on one's choice of mode of study as it was found that the married category mostly constituted those who were on the e-learning mode of the university who by extension had a family to attend to besides school.

Further the result indicates that 66% of the respondents were adults, those at the middle age constitute 29%, only 3% were at the adolescent category while 2% are of old age. The results showed that majority of the students were adults. This result conforms to Salisu (2014) who opined that (34.4%) form the majority of the respondents which were adults.

The result also depicts that 36% of the respondents were from the school of education, 16% from the school of Agriculture, 15% from the school of Arts and social sciences, 8% from management science while only 3% were from the school of health. This shows that majority of the students who responded were from the school of education. This finding was in line with Salisu (2014), which in his study found out that majority (45%) of students studying at NOUN was at the school of education.

Results from the table indicate that 55% of the respondents were undergraduate students, 29% are studying certificate course, 14% are postgraduate students while only 2% are Ph. D students. This shows that majority (55%) of the students at NOUN are undergraduates. Undergraduate students were found to be of the majority (52.2%) opined by Salisu (2014).

Table 2: Respondents' Learning Style Type and Recognition

Item	Frequency	Percentage Frequency (%)
Learning Style Type		
Seeing	11	11.00
Hearing	20	20.00
Seeing and hearing	62	62.00
Undecided	7	7.00
Total	**100**	**100.00**
Learning Style Recognition		
I have done a test on the net	1	1.00
I have done a test somewhere else	3	3.00
I have concluded it myself	60	60.00

I haven't thought about it	36	36.00	
Total	**100**	**100.00**	

Source: Survey 20015

The result from table 2 indicates that 62% of the respondents were of the view that they belong to the seeing and hearing category of learning style, 20% belong to the hearing category, 11% for seeing and 7% are undecided. This depicts that majority of the respondents belongs to the seeing and hearing type of learning style. This result was consistent with Kanninen (2009) that majority of the respondents were aesthetic learners. Jennifer (2011) was also of the view that aesthetic learners were the majority in terms of quick assimilation of concepts.

The table also shows 60% of the respondents concluded that they determined their learning styles themselves, 36% have not even thought about it, 3% conducted the test to know their learning styles while 1% did the test on the internet. This shows that majority (60%) of the respondents determined their learning styles themselves.

Table 3: Availability of E-Learning Materials (n=100)

S/N	Items: Availability of Materials	Agree	Disagree	Decision
a.	Off-line/ordinary computers	88	12	AV
b.	Telephone/wireless Applications	74	26	AV
c.	On-line/Internet Computers	80	20	AV
d.	Scanner	44	56	NA
e.	Printers	66	34	AV
f.	E-mail facilities	32	68	NA
g.	Multimedia Television	26	74	NA
h.	Multimedia Projectors	20	80	NA
i.	Digital Library	72	28	AV
j.	Ready-made courseware: CD-Rom, etc	76	24	AV
	Mean (x)	**57.80**	**42.20**	

Source: Survey 20015

Results from Table 3 shows that all the items except items d, f, g and h are available. They include: scanners, E-mail facilities, multimedia television and multimedia projectors. This result is consistent with Solomon and Janet (2012) who opined that all the items except item scanners, E-mail facilities and projectors are not available. They include: computers, scanners and printers. This supports the findings of Akinola (2005) in which only five out of the twelve ICT tools needed for Business Education were available. The overall result showed that there is availability of E-learning materials since the mean score of agree (57.80) is greater than the mean score (42.20) of disagree. The result is also consistent with the findings of Ikemenjima (2005) and Jegede and Owolabi (2003) that there are infrastructural deficiencies and shortage of facilities, including: computers, computer laboratories and online-classroom for the study of Computer Education in secondary schools. Similarly, the findings agree with the research reports of Ololube, Ubogu, and Egbezor (2007) that ICT infrastructures and facilities are not available for instructional delivery in Nigerian tertiary institutions. The findings are also in line with the

Global Information Technology Report (2012) which revealed that Nigeria ranked 112 out of 142 countries surveyed for network readiness to participate and benefit from ICT development.

Figure 1: Chart summary showing availability of E-learning Materials
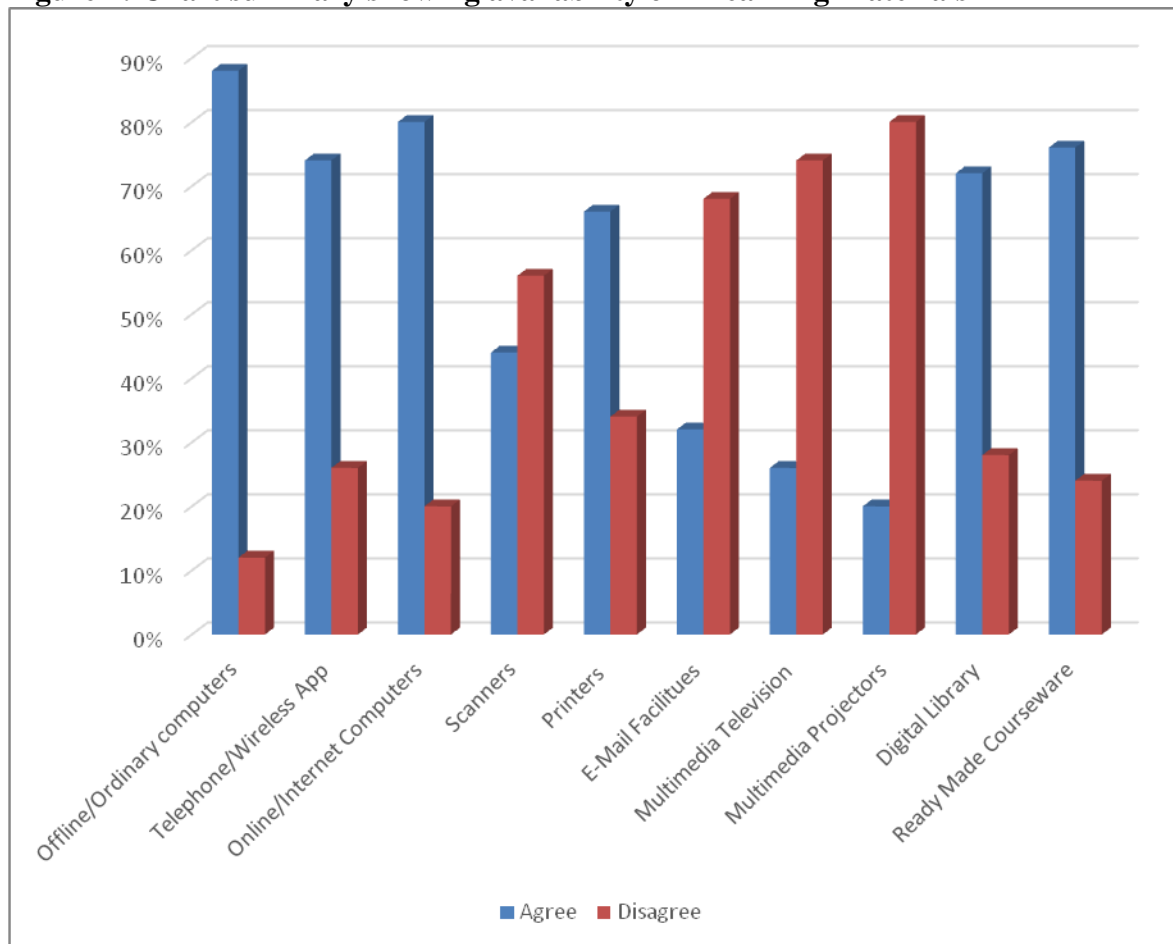

Table 3: t-Test Results on Impact, Effectiveness and Constraints of E-Learning Application on Learning Style amongst National Open University of Nigeria Students

Variable	N	Mean	SD	df	t–Value	P-Value
Impact						
Agree	3	13.33	9.283	2	2.500	0.130
Disagree	3	86.67	9.283	2	16.250	0.004
Effectiveness						
Agree	3	10.67	10.263	2	1.800	0.214
Disagree	3	89.33	10.623	2	15.076	0.004
Constraint						
Agree	9	59.78	23.229	8	7.723	0.000
Disagree	9	40.22	23.229	8	5.197	0.001

The result from the table also showed that the calculated p-value (0.004) is less than the tabulated p–value (0.05) for disagree, which indicates that there is significant effect of E-learning on the learning styles of students.

In the same table, it depicts that the mean for agree response (59.78) is greater than the mean (40.22) of disagree. Therefore, this showed that there are constraints to E-learning application on learning styles of students.

CONCLUSION AND RECOMMENDATION

The study highlights the impact of E-learning application on learning styles of students. Many students did not conduct a learning style test to ascertain the exact category they belong for them to take full advantage of it. This makes them not to be prepared to take the challenge of studying through E-learning.

The perception is that the world has become smaller as a result of the immense progress made in the field of information and communication technologies. E-learning is accessible to all across the world through the satellites, cables, and other such devices that have made man more independent and have increased his mobility by making distances shorter and communication faster. This has made a tremendous impact on the students learning abilities.

As the data gathered is on a small sample of a hundred people, there are still many issues that need to be closely considered before we can safely state that E-learning and other related learning methods have contributed to the enhancement of the learning style of students at the National Open University of Nigeria, irrespective of individual differences due to gender and/or environment. It can be confidently said that there is still a long way to go before we can make the whole world harvest the benefits from the progress of science and technology through E-learning application in enhancing the learning styles of students.

Problems hindering E-learning were identified as follows: a dearth of videophone and teleconferencing systems, massive computer illiteracy, difficulties in the internet application and use, difficulties in the use of World Wide Web (www), and problems associated with e-mail. Other factors include the opportunities for development and use of courseware, the high cost of digital libraries, cost of internet connection, cost of computer and its accessories, lack of multimedia systems, epileptic or inconsistent power supply, techno-phobia and resistance.

Recommendations

The paper elicited and examined a number of extreme points of views about the impact of E-learning application on learning style of students. Although it was discovered that certain issues have not yet been properly addressed to E-Learning application processes and learning styles, as the prime focus of the research was on how E-learning affect learning style, effectiveness of E-learning on learning style and the problems of E-learning on learning styles. The following are the recommendations based on the research hypotheses:

1. Students should conduct a test to know their learning style type as it will aid in proper understanding of concepts.
2. Availability of hardware (particularly computers)
3. Faster Internet connectivity/improved bandwidth
Improved software
4. Appropriate policies favouring E-learning
5. Provision of technical support for E-learning at a range of scales
6. Lower prices for connectivity

7. Availability of reliable electricity (power)
8. Appropriate content in appropriate languages
9. Awareness about the value of E-learning.
This research work is limited to students from the National Open University of Nigeria, Bauchi Study center, there is need to widen the research work to cover not only NOUN in Nigeria but also the entire tertiary institutions in Nigeria.

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