

Impact Assessment of ICT Tools for Pedagogical Process among Students of Faculty of Environmental Sciences University of Jos Nigeria

S. M. MATON¹; C. D. DAYIL¹; C. Y. OCHE¹; I.S. LAKA¹; L. BOMBOM¹; M. J. MARUT²;
D. CHOJI³ AND B. M. MATUR⁴

Abstract

Information and communication technological facilities are in use these days in many countries of the world, to enhance quality outreach and cost effectiveness in teaching and learning process. In Nigeria, educational institutions are not left out of this global system. This study is aimed at determining the level of awareness and usage of the University of Jos Learning Management System (LMS) among students of the Faculty of Environmental Sciences, University of Jos, Nigeria. A total of 280 respondents were selected through stratified random sampling technique using semi-structured questionnaire. The data obtained was analysed using SPSS version 16.0 and results presented in descriptive statistical methods. Results showed that LMS is a widely known server site software system aiding teaching and learning in the University of Jos. However, it was

observed that there is low usage by students of the Faculty of Environmental Sciences partly due to inadequate facilities, unreliable power supply and high charges for usage. It was recommended that there is need for greater efforts to be channelled towards skills training, sensitization of staff and students and provision of more efficient ICT gadgets to enhance learning. Stakeholders in education such as UNDP, UNESCO, UNICEF and philanthropists are further encouraged to procure ICT gadgets and donate same to educational institutions for use in order to meet global standards in teaching and learning.

Key Words: ICT, Skill Training, Assessment, UNIJOS LMS, Environmental Sciences, Students

Introduction

There has been a sharp growth of interest and concern on the consequences of global environmental changes over the past decades. Many scholars, including Biologists, Ecologists and Environmentalists among others, are showing concern over the consequences of global changes such as global warming, changes in the atmosphere, pollution of air, sea level change, accelerated erosion, desertification, drought, deforestation, ozone layer depletion, flood, hazardous waste

disposal, atmospheric hazards and acid rain (Graves & Reavey, 1996). Nevertheless, these environmental problems are global, but are conspicuously manifesting in Nigeria, assuming disturbing proportions which are not unconnected with high illiteracy, ignorance, urbanization and extreme poverty (Adelakun, 2004).

Many Nigerians derive their livelihood from the environment through unscientific farming practices, illegal mining, indiscriminate fuel wood harvest and lumbering, accepting relocation into Nigeria of environment-polluting industries and dumping of toxic waste from developed countries just for peanuts. These practices today are fast degrading the natural environment that houses, feeds and clothes us. Rapid urbanization and population explosion, in addition to other anthropogenic activities, are some of the major causes of unlawful disposal of waste, secretion of effluents and emission of harmful gases into the land, air, and water; with deleterious effects on fauna, flora, and human health. Many people are still outright illiterates and environmentally

¹Department of Geography and Planning, University of Jos, Nigeria ²Department of Mathematics, University of Jos, Nigeria ³Department of Computer Science, University of Jos, Nigeria ⁴Department of Zoology, University of Jos, Nigeria

Corresponding Authors

S. M. MATON¹; C. D. DAYIL¹; C. Y. OCHE¹; I.S. LAKA¹; L. BOMBOM¹; M. J. MARUT²; D. CHOJI³ and B. M. MATUR
E-mail: matonsamuel99@gmail.com;

uneducated, despite the fact that we are presently living in a world shaped by Information and Communication Technology (ICT). Environmental education appears to be new in the curriculum of many educational institutions in Nigeria. This is not unconnected with the fact that some decades ago, there was no serious commitment on the part of Government to environmental education, but of recent, Faculties and Schools of Environmental Sciences have been established to promote awareness and understanding among students on the environment, our relationship to the environment—the concern and responsible action necessary to assure our survival and to improve the quality of life (Okpala & Obi 1997).

Environment-related courses are aimed at exposing students to a multitude of processes and activities by which an understanding of the environment is developed and through which caring and committed responses to the environment are evolved. This implies that the major objective of the Faculty of Environmental Sciences is the inculcation of knowledge, emotions, feelings, attitudes and values of our surroundings in terms of preventing, protecting, controlling, conserving, maintaining and managing (PCM) the components in students through the programmes for sustainable development. Adequate knowledge of the environment is expected to help students develop greater consciousness for human communities and their habitat. Deployment of ICT tools can be very helpful for environmental education. For instance, where pictures of the degraded environment having implication on human health and other environmental issues could be posted on the Internet for people to see, understand, and take mitigating measures to prevent further degradation (Adelakun 2004). With the understanding of the world we live and the interdependence of groups and nations, environmental education, therefore, exposes students to information of the physical environment and human interaction from local, regional, national to global in a wholistic manner that incorporates cultural, political and economic dimensions. Since inculcating environmental awareness and consciousness requires literacy, articulacy (oracy), numeracy and graphicy (Okpala & Obi 1997), the need to employ the use of modern

Information and Communication Technology (ICT) gadgets becomes inevitable in educational institutions. This is because ICT can enhance students' understanding and equip them with the skills for addressing common environmental problem thereby playing a key role in mitigating them, adapting to global environmental change and preventing catastrophes caused by natural disasters (Palacios 2011). Scholars (Palacios 2011) observed that though earthquakes and tsunamis are impossible to predict, the number of victims could be reduced with basic knowledge acquired through ICT tools about what to do in such situations and in the event of other natural disasters.

According to Bottle (cited in Ugwuanyi & Alokun 2004), the history of Information and Communication Technology (ICT) could be traced to the mid 13th century when Cardinal Hugo produced his first concordance as vulgate version of the Holy Bible using '**D word power**'. Ever since, the entire world has been witnessing a serious push towards a multi-media approach in ICT. Afolabi (2001) traced the beginning of application of ICT to the successful attempt by USA Defense Department Agency Network in conjunction with the University of Stanford, Los Angeles in designing and connecting 213 computers to network in the 1970s, linking thousands of others across the world. The rationale behind this invention was to have computers that could resist even bomb attack which much later ushered in the development of electronic mail.

In Nigeria, however, modern ICT is a new development, considering the fact that many countries including Britain, France, Japan, USA, Malaysia, India, Kenya, Mauritius, Zimbabwe, Nicaragua and Dominican Republic have long embraced and injected the technology into their educational programmes. Although Nigeria was ranked lowest among other five prominent African countries (South Africa, Egypt, Libya and Gambia) in the use of telephone and its connection to information **super high way**, Learning Management System (LMS) is emerging as a potential delivery medium for educative process and education.

Kulshrestha, Kant and Thrissur (2013) stated that LMS is a server site software system (SSSS) designed as a framework which integrates all

available resources into a defined tool used to address real life challenges when used over the Internet. Alghamdi and Bayaga (2016) also reported that LMS is a tool that provides a medium for assignment marking, handout note-making, uploading and downloading of useful educational materials. In a similar vein, Nasser, Cherif and Romanowski (2011) defined LMS as a tool that organizes and regulates classroom administrative tasks, supports teachers and students in the teaching and learning process and informs parents of their children's (wards') progress and school activities.

From the foregoing definitions, it can be seen that LMS is a management tool for delivering online teaching and learning activities, enabling users to access course information anywhere at any time according to one's preference. This implies that greater communication between students within and outside the class and their lecturer through multi-modal methods of communications is enhanced via the use of LMS. Modern society is heavily dependent on the communication, processing and storage of information in which a reasonable number of labour force and educational institutions are engaged in the use of information technology to enhance productivity. Therefore, LMS has a lot to offer: it brings new opportunities for interaction among users; for sharing of the world's knowledge, resources and expertise; and for transforming people's life which ultimately contributes to national development. Afri (2004) has identified the socio-economic benefits of ICT gadgets (LMS) to the nation as provision of individuals with different paid job services such as e-mail, e-library, e-cards, e-mail filters, e-mail managers, online GSM phoning, hardware and software as well as wall cameras for tracking crimes, examination malpractice and other computer-based educational business enterprise, which all have significantly reduced unemployment. According to World Bank Report (cited in Ajiji & Maikano, 2013), firms that use ICT tools grow faster, are more productive, and make more profit than those that do not use the ICT facilities. Thus, every nation aspiring to achieve greatness, self-reliance and economic progress requires research activities which ICT and its attributes, LMS, provides.

It was in realization of this that the University of Jos introduced UNIJOS LMS known as 'moodle' into its educational programmes recently. The 'moodle' is highly supported by some kind of pedagogical device that offers a unique teaching experience beyond traditional one-to-one and face-to-face teaching and learning. The rationale behind the introduction and adoption of UNIJOS LMS is for staff and students of the institution to save time and money by accessing online teaching, learning and assessment through Assignments, Tests and Examinations (ATE). Despite the benefits of the UNIJOS LMS, past research studies indicate that its availability, access and use by staff and students have been limited by a number of manipulative and non-manipulative factors such as inadequate skilled manpower, incessant network failure, unreliable power supply, fire outbreaks, high cost, lack of sufficient computers and inadequate office facilities.

Although there are a number of scholarly works which have been done across the world on LMS tool (Nasser, Cherif & Romanowski 2011; Alghamdi & Bayaga 2016; Althobaiti & Mayhew 2016), none of these studies made deliberate efforts to assess users' awareness, ease of use, perceived benefits and challenges that influenced patronage of the UNIJOS LMS by students of the Faculty of Environmental Sciences. It is against this backdrop that the current research has been undertaken. It is hoped that the recommendations made will spur the Management of the University to improve the services of UNIJOS ICT tools for maximum utilization to enhance pedagogical process.

The current research has attempted to answer the following thought-provoking, perplexing question:

To what extent do students of Environmental Sciences access UNIJOS LMS for pedagogical process?

Methodology

Study Setting: This study is situated within Jos, the Plateau State capital. Jos city is roughly defined by latitudes 9°45'N and 9°55'N of the Equator, and longitudes 8°45'E and 8° 58'E of Greenwich Meridian. It has an average elevation of 1200m, bifurcated into east and west by River Delimi, flowing from South to North before curving

northeast to discharge its contents into Lake Chad through River Yobe. The area experiences a near temperate climate with average temperature of 22°C and rainfall amount of 1450mm per year. The climate supports guinea savanna vegetation, consisting of grasses interspersed with trees. Jos is a cosmopolitan city with different ethnic groups present, estimated at about 900,000 people. There are a number of educational institutions of which University of Jos is one of them. University of Jos is one of the 140 public universities in the country, established in 1971 first as a Campus of University of Ibadan with 9 Faculties (Lawal & Akintunde, 2013). The University now has 11 Faculties with 78 programmes and a population of 19,816 undergraduates, 2,192 postgraduates and 1,058 academic staff as at 2017.

Research Design, Population and Sample: The study design is the prospective survey type. The population comprises the Departments of Architecture, Building, Estate Management, Fine and Applied Art, Geography and Planning, Quantity Survey and Urban and Regional Planning. A sample was drawn from the population using stratified random sampling technique (SRS) in order to ensure that elements from the seven Departments are fairly represented while taking into consideration gender and level of the students.

Instrument: A semi- structured questionnaire tagged “Opinion Questionnaire on UNIJOS LMS” was constructed. Informed consent was sought and gained from two experts for reliability and validation before administering to respondents. The instrument consists of five sections. Section A elicits the personal information about the sociodemographic characteristics of participants while their awareness level, ease of use, perceived usefulness and challenges faced in using the UNIJOS LMS covers sections B, C, D and E respectively.

Data Collection: Most of the data were captured on a modified Likert's 4-point scale of Strongly Disagree (SD), Disagree (D), Agree (A) and Strongly Agree (SA) with respective scores of 1, 2, 3 and 4. The questionnaire contained 28 items and students were required to fill in the response to each

question by ticking with pen or pencil the options that applied to them with the option of extra comments or suggestions where applicable. Copies of 300 questionnaire were distributed to students of all the Departments of Environmental Sciences and programmes in varying proportion; Architecture 38, Building 28, Estate Management 28, Fine & Applied Art 24, Geography & Planning 50, Quantity Survey 30 and Urban & Regional Planning 40 while 38 and 24 copies were randomly given to Master's and PhD students respectively. Four trained field assistants were recruited from the Faculty of Environmental Sciences to administer the questionnaire for three days, 22nd, 23rd & 24th January 2018. Out of the 300 questionnaires distributed, 280 copies were recovered for analysis as the remaining 20 copies were either missing or partially filled, hence, not suitable for use.

Data Analysis: SPSS version 16.0 was employed to analyse the comparison of means of variables and χ^2 was used for testing the socio-economic characteristics of the respondents. Other reports are presented in descriptive statistical methods of frequency distribution tables and percentages, bar graphs as well as pie charts.

Discussion of Results

The analyses of findings are presented in this section and are compared with earlier studies carried out in other places. Comments on the implication of the results are also made in this section.

The results and analyses of the socio-demographic characteristics of the respondents indicate that over half (53.5%) of them were below the age of 26 years, three-quarters (75%) were undergraduates while 25% were undergoing Masters and PhD programmes. Nearly two-thirds (57.1%) of the respondents were in their 1st or 2nd year in the various programmes. About 68% of the participants used for the study were males while females constituted 32%.

Analysis of the responses showed significant variations in terms of their age group, programme, year into the program and gender. Test of the hypothesis formulated shows that the calculated χ^2 values of 1.120, 5.600, 5.950 and 2.800 for age, programme, year into the programme and gender

respectively are all greater than the critical P-values of 0.242, 0.199, 0.213 and 0.001 at P-0.05 alpha level. Therefore, we conclude that participants' responses to the usability of UNIJOS LMS differ significantly by age, program, year into the programme and gender.

Socio-Demographic Characteristics of Respondents

Variable	Freq.	(%)	df	X ²	P-value
Age (years):					
16 - 20	55	19.6			
21 - 25	95	33.9			
26 - 30	40	14.3			
31 - 35	35	12.5	20	1.120	0.242
36 - 40	35	12.5			
>40	20	7.2			
Total	280	100			
Program:					
B.Sc	210	75.0			
M.Sc.	45	16.1	4	5.600	0.199
Ph.D	25	8.9			
Total	280	100			
Years in the Program:					
1-2	160	57.1			
3 - 4	65	23.2			
5 - 6	55	19.7	9	5.950	0.213
> 6	0	0			
Total	280	100			
Gender:					
Male	190	67.9	1	2.800	0.001
Female	90	32.1			
Total	280	100			

Source: Researchers' Field Survey, 2018

These findings are at variance with the work of Akinbobola, Inyang and Usie (2007), who found no significant difference between male and female science students of two tertiary institutions in Akwa-Ibom State.

Respondents who Possess Laptop Computers and Smart Phones

This section presents the analysis on respondents with or without laptop and smart phones.

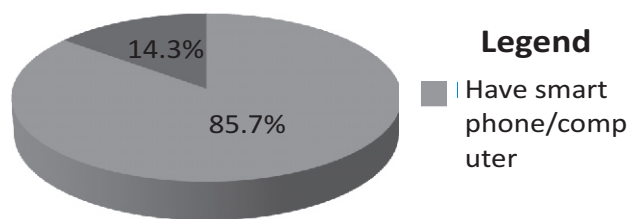


Figure 1: Respondents who possess laptop computers and smart phones

Source: Researchers' Field Survey, 2018

Figure 1 shows students who own laptop computers and smart phones. The figure reveals that about 85.7% of students own either laptop computers or smart phones. However, 14.3% do not have, hence, it can be difficult for them to utilize the UNIJOS LMS for assignments, note making and downloading relevant learning materials on environmental issues at any time they want. The overwhelming majority (85.7%) of the respondents indicates that they were in a better position to utilize UNIJOS LMS in the institution. These findings contrast significantly with that of Nasser, Cherif and Romanowski (2011), who reported that 26.2% of students in Qatar University do not have computer at home to use neither do they have internet access. On the other hand, the 14.3% of the respondents without ICT tools poses a great challenge to the University Management to ensure there are adequate public ICT gadgets stock in laboratories or libraries so that students who do not have the facilities can still access relevant materials to promote learning. Studying and learning that rely on ICT-based tools require a high degree of students' access to computer technology.

Respondents' Rate of Using Laptop Computers and Smart Phones

Analysis on frequency of usage of ICT tools among students of Faculty of Environmental Sciences is presented in Figure 2.

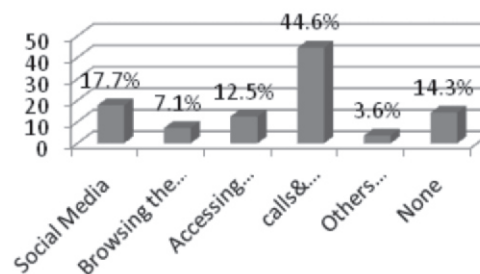
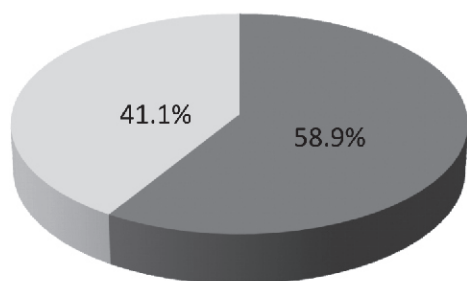


Figure 2: Respondents, Most Frequent use of ICT tools (Laptop) Smart Phone

Source: Researchers' Field Survey, 2018

The pattern indicates that 44.6% used laptop computers and smart phones mainly to make calls and check emails, 17.7% for social media, 12.5% for course materials and tutorials, 7.1% for browsing while 3.6% used theirs for other non-pedagogical activities such as online videos, online games and online commerce. This finding contrasts sharply with the discovery made by Nasser, Cherif and Romanowski (2011) among students of Qatar University where 82% used the computer for class work, 72% for homework and 73.3% for research. The comparatively low (13%) utilization of UNIJOS LMS for pedagogical activities indicates the need for serious orientation, so students can take advantage of this technology to enhance learning.



Legend

- Have good knowledge
- Have poor knowledge

Figure 3: Knowledge of the Existence of UNIJOS LMS

Source: Researchers' Field Survey, 2018

Figure 3 displays students' level of knowledge of the availability of UNIJOS LMS as an educational facility. About three fifths (58.9%) of students of the Faculty of Environmental Sciences affirmed having good knowledge about

the existence of UNIJOS LMS for the promotion of pedagogical process. However, 41.1% did not have good knowledge of this ICT tool. This implies that poor knowledge may, in no small amount inhibit usage by this substantial population (41.1%) of students, hence, the need for extensive and intensive publicity about the new technology, LMS, so that students can take advantage of it to promote pedagogical process in the University of Jos in general and Faculty of Environmental Sciences in particular. Althobaiti and Mayhew (2016) also reported similar findings among students of higher education in Saudi Arabia, where 50% affirmed the availability of LMS in their schools.

Awareness Level of the Use of UNIJOS LMS

The awareness level of the respondents has been determined and presented in Table 2.

Table 2: Awareness Level of the Installed UNIJOS LMS

Awareness	N	Mean	Std. Deviation	Std. Error	95% Confidence Lower Bound	Interval for Mean Upper Bound
LMS is for assignment	280	138.75	74.633	4.460	129.97	147.53
I can uses LMS for note making	280	83.57	28.863	1.725	80.18	86.97
I can offload & download materials	280	105.00	40.206	2.403	100.27	109.73
LMS facilitates computer-based exams	280	174.46	74.341	4.443	165.72	183.21
Total	1120	125.45	67.575	2.019	121.48	129.41

Source: Researchers' Field Survey, 2018

Table 2 shows the depth of respondents' awareness of UNIJOS LMS. Findings show a decline in their awareness level from computer-based exams (mean= 174.46), assignment marking (mean=138.75), offloading and downloading (mean=105.00) to note-making (mean=83.57). This implies that students of the Faculty of Environmental Sciences are very much aware of the tasks which UNIJOS LMS can do. However, they were somewhat not quite aware that LMS can assist in note making. The high level of awareness among students of the Faculty of Environmental Sciences could be attributed to the fact that most of them have entered the University through UTME and have done GST courses, whose mode of assessment is computer-based test (CBT). Similar findings have been reported by Althobaiti and

Mayhew (2016), where over half of the learners (58%) in higher education in Saudi Arabia responded positively to being aware of ICT tool being in use for pedagogical process, against just 21% that were never aware at all. Therefore, with more publicity about the contribution of UNIJOS LMS to note making, many students will utilize it maximally and have ready notes which will enable them to participate actively in class during lectures.

Ease of Use of UNIJOS LMS

Table 3 is a report of students' responses to the ease of use of UNIJOS LMS.

Table 3: Ease of Use of UNIJOS LMS

Easy to use	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Ease to use	280	83.39	30.145	1.801	79.85	86.94
Can be used without following steps	280	164.11	79.752	4.766	154.73	173.49
Only few steps are required to use LMS	280	100.36	34.753	2.077	96.27	104.45
It is effortless to use LMS	280	83.39	30.145	1.801	79.85	86.94
LMS is user-friendly	280	148.21	71.770	4.289	139.77	156.66
Total	1400	115.89	63.596	1.700	112.56	119.23

Source: Researchers' Field Survey, 2018

In decreasing order of magnitude their mean responses to the ease of use of UNIJOS LMS are presented thus: can be used without following steps (mean= 164.11), it is user-friendly (mean= 148.21), only few steps are required to use the LMS (mean = 100.36) and it is effortless to use it (mean= 83.39). These findings confirm the work of Akinbobola, Inyang and Ushie (2007) who discovered that computer literacy level of science students in Nigeria's tertiary institutions is low, coupled with their low level of accessibility and utilization of ICT resources. This signifies that the UNIJOS LMS installed for pedagogical process is not being harnessed maximally by students of the Faculty of Environmental Sciences; hence, there is need to have sufficient technical staff that will always

be available for students who have difficulty accessing it for assignments, note making and downloading useful learning information (ANDULI). The issue of ease of use of LMS may be a factor constituting a setback to the patronage of the facility for teaching and learning process.

Perceived Usefulness of UNIJOS LMS

Table 4 shows respondents' perceived usefulness of UNIJOS LMS.

The table indicates that perception of the UNIJOS LMS in downloading lecture notes to allow active participation in class is very high. However, their perception about the usefulness of the tool relatively declines from listening better in class without note (mean= 164.11) to assisting students to concentrate more in class (mean= 139.29), active participation without note taking (mean= 82.46) and helping users to access course materials always (mean=80.36). This implies that students of Faculty of the Environmental Sciences are still accustomed to the traditional one-to-one and face-to-face pedagogical process, despite the installation of ICT tool by the University Management. Thus, students need to be given orientation on the usefulness of LMS so they can embrace it in order to key properly into globalization in ICT education of the 21st century. Similar findings were reported when Althobaiti and Mayhew (2016) found that 50% of the respondents in Saudi Arabian higher education admitted the availability of the usefulness of LMS generally, but not for other pedagogical activities such as interaction (31%), learning (9%), motivation to learning (3%), contents (3%), visual design (2%) and navigation (2%).

Table 4: Perceived Usefulness of UNIJOS LMS

Usefulness	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound
Course material can be accessed always	280	80.36	24.899	1.488	77.43	83.29
There is high concentration in class because of materials	280	139.29	73.953	4.420	130.59	147.99
Can listen better in class without taking notes	280	164.11	79.752	4.766	154.73	173.49
There is active participation in class without note-taking	280	82.46	23.390	1.362	79.78	85.14
Total	1120	116.10	67.204	1.995	112.19	120.02

Source: Researchers' Field Survey, 2018

Challenges in the Use of UNIJOS LMS

Table 5 is the display of respondents' challenges which they might have faced in using the server site software system, UNIJOS LMS

Table 5: Challenges in the use of UNIJOS LMS

Challenges	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean Lower Bound	Upper Bound
Constant electric power outages limit my use of the LMS	280	110.18	47.159	2.818	104.63	115.73
Poor network/no Wi-Fi limits my use of the LMS	280	128.04	42.730	2.554	123.01	133.06
Insufficient labs and computers limit my use of LMS	280	93.75	32.216	1.925	89.96	97.54
Not having a smart phone limit use of LMS	280	132.14	27.741	1.658	128.88	135.41
Lack of technical support limit my use of LMS	280	158.04	78.000	4.661	148.86	167.21
Total	1400	124.43	53.395	1.427	121.63	127.23

Source: Researchers' Field Survey, 2018

In descending order of magnitude, the use of UNIJOS LMS is limited by lack of technical support (mean= 158.04), lack of smart phone (mean= 132.14), poor network (mean= 128.04), constant electric power outages (mean= 110.18) and insufficient laboratories and computers (mean= 93.75). These finding simply that for the University of Jos to key properly into globalization in ICT education, the management and indeed stakeholders in education have to work harder in order to overcome these challenges with the urgency they deserve.

Similar problems hampering the effective use of ICT materials in Nigeria have also been observed by Duguryil (2015) to include inadequate qualified staff in the area of ICT, very limited materials, poor financial support from government and other donor organizations, epileptic power supply and constant outages.

Conclusion and Recommendations

Education in the 21st century is geared towards sharing useful information. In order for the University of Jos to meet up with this global challenge in ICT education, it succeeded in installing UNIJOS LMS to facilitate pedagogical process. However, this study reveals that the utilization of this tool among students of the Faculty of Environmental Sciences as a case study of the entire University is abysmally low, because of the difficulty in using it for learning. Further, the research shows that there are many challenges hindering the use of this server site software system; unless urgent action is taken to surmount them, meeting the global challenges in ICT (UNIJOS LMS) education will be a mirage.

Based on the findings the following suggestions have been made:

1. The University Management should negotiate with Jos Electricity

Distribution Company (JEDC) to make power supply to the institution constant and uninterrupted in order to make it possible for students to network by accessing and exchanging information freely, at anytime and from anywhere.

2. There is need for the University of Jos Management to procure functional and standby generators for use whenever there is power outage.
3. The Management should employ professionals in technical fields of the ICT to train students and staff to acquire skills in the use of ICT tools to enhance pedagogical process.
4. Government at all levels, philanthropists and donor organizations such as UNDP, UNESCO and UNICEF who have been collaborating with Nigeria can still do more by providing grants for procurement of ICT equipment for disbursement to tertiary institutions to enhance teaching-learning process.
5. ICT tools like e-learning should be introduced in all Nigerian educational institutions to ensure that students harness them for revision and learning generally so that teaching will no longer be teacher-centered.
6. There should be consistent sensitization of owners of educational institutions on the need to include ICT education in their curricula and instructors should be granted in-service training to acquire sufficient skills to help impact same to learners.

References

- Adelakun, K. (2004). Information and Communication Technology: Implication for advancing environmental education in Nigeria. *Environmental Watch Journal*, 1(1), 114-122.
- Afolabi, M. (2001). Internet connectivity: Library services and research potentials. In Usyaku *et al.* (eds.), *Teacher Education in the Information Age*.
- Afri, O. (2004). *A Beginner's guide to computers and Internet*. Jos: Platinum Education and Resources, House Press.
- Ajiji, E. A. & Maikano, P. N. (2013). Information and Communication Technology (ICT): Issues in the transformation agenda in Nigeria. *Pankshin Journal of Educational Psychology*, 2, 113–120.
- Akinbobola, A.O., Inyang. G.B. & Ushie, B.C. (2001). Effective utilization of Information and Communications Technology (ICT) for boosting research in science education: Implications for the challenge of globalization. *Eureka International Journal of Educational Studies*, 1(2), 66–76.
- Alghamdi, R. S., & Bayaga, A. (2016). Use and attitude towards learning management systems (LMS) in Saudi Arabian Universities. *Eurabia Journal of Mathematics, Sciences Technology Education*, 12 (9), pp.2309-2330
- Althobaiti, M. M. and Mayhew, P. (2016). Assessing the usability of learning management systems user experience study Institute for Computer Sciences, Social Informatics and Telecommunications Engineering. Vincentiret 21 (eds.), 9-18.
- Duguryil, A. P. (2015). Information and Communication Technology (ICT): A tool in the promotion of national security and conflict prevention in Nigeria. *The Conference: A Journal of Contemporary Educational Thoughts*, 3(1), 14-22.
- Graves, J. & Reavey, D. (1996). *Global Environmental Change* (1st ed.). London: Longman.
- Lawal, V. & Akintunde, S. (2013). Impact assessment of e-Learning initiatives at the University of Jos and the role of information literacy in teaching and learning. *Proceedings of the IATUL Conference*, 14 – 18th April, 2013 held at International Conference Centre, Cape Town, South Africa.
- Nasser, R. Cherif, M. & Romanowski, M. (2011). Factors that impact students usage of the learning management system in Qatari Schools.-*The International Review of Research in Open and Distances Learning*, 12(6), 1-26.
- Palacios, L. (2011, March). Information and Communication Technology and Environment. *Newsletter ECLAC*, 1-12.
- Ugwuanyi, C. & Olokun, M.G. (2004). The status of Information and Communication Technology (ICT) in Colleges of Education in Nigeria. *International Journal of Continuing Education*, 3(3), 38 – 53.