

Review of the Usage of E-learning Facilities by Economics Teachers in Eastern Cape Secondary Schools, South Africa

Olusesan A. Adelabu and Emmanuel O. Adu*

University of Fort Hare, South Africa
Telephone: +27 (0)84 998 9985, E-mail: seccie2003@yahoo.com

KEYWORDS E-learning. Information Technology. Economics. Educational Development. E-learning Infrastructures. Curriculum

ABSTRACT E-learning in South Africa and African countries is generally increasing and dramatically growing. However, while there is a great deal of knowledge about how e-learning is being used in developed countries, there is not much information on its usage by teachers in developing countries. Hence this study was to appraise the assessment of the usage of e-learning facilities by Economics teachers in secondary schools in Eastern Cape Province, South Africa. The study adopted a survey research design. A total of 100 questionnaires were distributed to Economics teachers across government secondary schools in the province out of which eighty eight were retrieved and the data were analyzed using descriptive statistics. The study finds that most secondary schools lack the necessary e-learning devices for teaching and learning and therefore recommends the need for school management and government authorities to brace up to this challenge through provision of modern e-learning infrastructures.

INTRODUCTION

The role of e-learning facilities in teaching and learning has become one of the most important and widely discussed issues in contemporary education policy. E-learning is an important factor in this information age; it holds a great promise to improving teaching and learning in educational institutions, when properly adopted and applied. It is an important instructional tool to facilitate the transfer of many types of information and an effective means of communication in schools and colleges. E-learning or Internet-based instruction has been manifested in one-to-one (teacher-to-student), one-to-many (teacher-to-group) and many-to-many (group to group) approaches to instruction (Webb et al. 2004). E-learning is the application of a whole range of technologies involved in information processing and electronic communications, such as computers, internet, e-mail, computer software, satellite, mobile communication gadgets, and other allied electronic devices for dissemination of knowledge and information. It involves the application of computer and information technology in teaching and learning. According

to Adesoji (2012), e-learning comprises computer and ICT materials and applications, which aid information collection and dissemination, research and global exchange of ideas that are critical for advancing meaningful, educational initiatives and understanding issues related to global development. The introduction of e-learning facilities to the education systems is aimed at improving educational delivery and preparing students for a role in an information age.

Application of e-learning facilities provide productive teaching and learning in order to increase people's creative and intellectual resources especially in today's information society and gives ample and exceptional opportunities to the teachers and students to develop capacities for high quality learning and to increase their ability to innovate (Aduwa-Ogiegbaen and Iyanmu 2005). Ozioma and Offordile (2011) stated that teachers are able to fashion a focused and relevant assignment for discussion between students and teachers, and among students through e-learning devices. Abidoeye (2010) maintained that e-learning devices such as the web, internet, multimedia, computer, projector, television, etc. provide easy access to quality learning materials and make reasonable and responsible contributions to the learning process. E-learning increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. It can influence the way students are taught and how they

Address for correspondence:
Emmanuel O. Adu
Professor
School of Continuing and General Education
University of Fort Hare, South Africa
Telephone: +27 (0)84 925 1948
E-mail: eadu@ufh.ac.za

learn as now the processes are learner driven and not by teachers. This in turn would better prepare the learners for lifelong learning as well as to improve the quality of learning (Adu and Olatundun 2013).

Educational institutions in South Africa, most especially, previously disadvantaged schools, face numerous challenges, such as the dwindling ability to collect school fees from parents of learners and declining financial support from the government. The failure or challenge faced by schools in South Africa that do not use ICT as a means of enhancing teaching and learning has led to South Africa's failing to close the 'digital divide'. The digital divide is defined as the gap between those individuals who benefit from digital technology and those who do not (International Telecommunication Union 2001). The use of ICT in schools to enhance learning could help overcome some of the challenges of improving the efficiency and productivity of both learning and teaching in South African schools, thereby narrowing the digital divide.

The use of computers was introduced into schools in South Africa during the 1980s, primarily in private schools and a few well-resourced government schools, which were initially used mainly for administrative purposes, such as keeping student records, recording examination marks, producing school reports and creating timetables, but there was a transformation in the usage of computers in South Africa, with the continuous advances in ICT (Department of Education 2003).

The Presidential National Commission on Information Society and Development (PNC on ISAD) was established in 2001, which comprised of members from both the public and private sector, and its main goal was to act as an advisory group to the government on challenges regarding ICT/E-learning development in South Africa and how these challenges could be addressed in order for South Africa to be globally competitive. Also, the Department of Communications (DoC) established the Electronic and Communications Transaction Act, No. 25 of 2002, in a bid to lead all ICT initiatives in South Africa and to develop a five-year national e-strategy which would empower all citizens, especially the education sector (Howie et al. 2005). One of the biggest challenges to implementation of e-learning across all South African schools is that the Government of South Africa does not have

enough funds to purchase computers and build infrastructure with regard to ICT/e-learning in the various provincial educational departments, and also, government does not prioritize the issue of ICT implementation as compared with other basic necessities like communities having clean running water, sanitation and electricity, which always take precedence over ICT implementation. This has now resulted to lagging behind of South African schools as regards ICT implementation and educational development.

Recent advances in the contemporary world, especially in the area of computer technology, have heralded the development and implementation of new and innovative curriculum delivery strategies and particularly with the Internet revolution (Oye et al. 2012). In the world at large, it is acknowledged that ICT is growing at a rapid pace with emerging technologies continuing to develop. Information and Communication Technology (ICT) plays a vital role in the development of any nation. It has been an instrument for achieving social, economic, educational, scientific and technological development (Yussuf and Afolabi 2010). E-learning has greatly influenced the educational sector especially on curriculum delivery, learning and research. Its application is not only emphasized in corporate business and the industrial sector, but it is an essential part of education at all levels. As Olibie and Nkem (2013) observed, global interconnectedness enabled by information technology calls for new skills, knowledge and ways of learning to prepare students for living and working in the 21st century. This study aims to survey the opinion of Economics secondary school teachers on the extent of use of e-learning facilities in order to provide insights on how e-learning impact on teaching and learning as well as to highlight the support of school management on the e-learning initiative.

Literature Review

E-learning Facilities and its Effect

The Economic Commission for Africa has indicated that the ability to access and effectively utilize information is no longer a luxury but a necessity for development. From an education point of view, e-learning as a tool for teaching and learning cannot be overemphasized. The advent of the computers and internet has im-

pected so much on educational process over the years. The e-learning approach has the capacity to provide higher interactive potential for users to develop their individual, intellectual and creative ability (Olojo et al. 2012).

The growth in Internet characterized by the decreasing costs and increasing bandwidth has facilitated the expansion and increased use of e-learning to offer formal as well as informal educational opportunities that were previously not possible to hundreds of millions of learners (Kang et al. 2009).

In developing countries e-learning is still in its infancy and early adoption stage, and the countries experience challenges unique from developed countries (Bhuasiri et al. 2012). There are deliberate efforts in such countries to implement e-learning.

Benefits provided by e-learning are undoubtedly several as discussed by various authors. According to Intel (2012), use of ICTs for effective e-learning leads to a range of educational opportunities to help students develop required skills essential to their countries. E-Learning further leads to student learning, teaching and administration, family and home, social and community, and economic development

In the field of formal education, e-learning is increasingly deployed as a tool to extend the learner's capacity to perceive, understand and communicate, as seen in the increase in online learning programs and the use of the computer as a learning support tool in the classroom. Although universities were certainly leaders in engineering the Internet and interoperable computer systems to connect researchers for e-mail and data exchange, the use of ICTs for education and training has lagged behind other sectors in society (Eze and Adu 2013).

According to Calverley and Shephard (2003), information and communication technologies are being used in the developed and developing world for instructional functions and that computers and internet perform a host of functions in teaching and learning as many nations are adding computer literacy, reading and writing literacy as skills students will need for succeeding in a technologically developed world. According to Nwana (2009), e-learning provides the relevant platform for teachers to develop capacities for high quality research and teaching which increase their ability to innovate. Aburime and Uhomobhi (2010) also observe that

other than teaching, e-learning facilities could also be used to provide information about staff and participants, subscriptions for examinations, marking of students' examination scripts, communication about the instructional process, collaborative learning, self-assessment and collaborative research activities.

The use of ICT in teaching, learning and managing educational institutions, just like any other innovation, compels the emergence of a new set of skills, attitudes and pedagogical approaches which requires continuous training-programs to build sufficient capacity among teachers, administrators, educators and developers (RME 2008). This means that, while most schools (especially in developed countries, and relatively in urban areas of developing countries) are now equipped with computers, Internet access and occasionally more sophisticated equipments such as interactive whiteboards and effective e-Learning requires far more than the mere introduction of hardware in the classroom (van Rij and Warrington 2010). For this ICT equipment to mean anything, teachers must be conversant in utilizing them to implement an integrated approach in ICT use and new approaches (Bialobrzaska and Cohen 2005). Hence, in view of the current scenario characterized by lack of capacity, there is a heightened need to fast-track the training of teachers (Beyers 2000). Aduwa-Ogiegbaen and Iyanmu (2005) explained the use of e-learning as an aid to teaching in secondary schools and suggest that e-learning and ICT can enhance educational efficiency. They maintain that efficiency in teaching various subjects could be improved. For instance, many secondary school teachers are already teaching large classes of students. In this situation, students no longer receive the much desired individual assistance. Adu et al. (2013) suggested the possibility of using carefully prepared computer programs to ensure that learners are accurately and systematically instructed.

E-learning also has the potentials that will offer teacher improved method of researching for topics and definitions. The outdated attitude of going to the library to find articles or journals using indexes can be made very easy through the use of google search on the internet which will provide extensive list of articles, publications and topics by different authors just in a flash.

Some of the South African Government initiatives to deal with ICT training for teachers include the nine centers being established in each of the provinces as part of the Vodacom Mobile Education Programme, which is the realization of a partnership formed between Vodacom and the Department of Education to help boost teacher training across all nine provinces of South Africa (Ayemoba 2013). The intention of the programme is to train about 1400 teachers annually in the use of ICT to support teaching and learning, though focusing in mathematics and science subjects. Additionally a number of teachers from rural areas of South Africa are continuing to benefit from the “Train the Trainer” Project which has been initiated by the Internet Service Providers ‘Association of SA (ISPA) since 2001. The initiative is said to have already provided ICT skills training to more than 2 000 teachers across South Africa since its inception in 2001. A large part of the initiative targets schools in under-resourced and rural areas and is set to deliver beginner and intermediate level courses (Mathevela and Uwizeyimana 2014).

However, there is a concern that these initiatives focus on beginners and intermediate computer skills without equipping teachers with the necessary skills to benefit fully from ICT usage (Miller et al. 2006). Such skills should include evaluation of material found on websites: “How to make educationally appropriate use of resources for learning, including how to develop visual literacy skills, adapt material, design differentiated activities using the same resources and develop material” (Bialobrzaska and Cohen 2005). Finally, because of continuing changes in the technology sector, teachers need to be lifelong learners to keep themselves updated with the changes in technology and new teaching methods.

E-learning in Education

The idea that teaching and learning can successfully take place through the application of electronic communication facilities between teachers and students is one which had generated, sometimes, hope and dismay and at other times, excitement and fear. Hope that many more learners can be reached at a more convenient pace that had erstwhile been the case, dismay that the infrastructures necessary for deploying an effective e-learning platform is lacking in developing countries like Nigeria, Kenya South Africa (Olakulehin 2007; Tinio 2003).

However, the use of information and communication technologies in the education process has been divided into two broad categories: ICTs for Education and ICTs in Education. ICTs for education connote the development of information and communications technology specifically for teaching/learning purposes, while the ICTs in Education involves the adoption of general components of information and communication technologies in the teaching learning process (Olakulehin 2007). Generally, the educational relevance of computers and other components of information technology cannot be over-emphasized. Reference can be made to the period when skinner applied programmed instructions to teaching machines, through Brunner’s experiment with computers in instruction, to the current wave of information transmission and exchange via the worldwide web; we have seen different applications of ICTs in enhancing cognitive development. Thomas and Ranga in UNESCO (2004) in their classification divided the application of computers and other communication technologies in education into three broad categories. These are: Pedagogy, Training and Continuing Education. The pedagogical applicability of the ICTs is concerned essentially with the more effective learning and with the support of the various components of ICTs. Almost all subjects ranging from mathematics (the most structured) to music (the least structured) can be learnt with the help of computers. Olakulehin (2007) emphasized that pedagogic application of ICTs, involves effective learning with the aid of computers and other information technologies, serving the purpose of learning aids, which plays complementary roles in teaching/learning situations, rather than supplements to the teacher/instructor/facilitator.

Computer is regarded as add-on rather than a replacing device. The pedagogic uses of the computer necessitate the development, among teachers as well as students, of skills and attitude related to effective use of information and communications technologies. Aside of literacy, ICTs also facilitates learning to programme, learning in subject areas and learning at home on one’s own, and these necessitate the use of new methods like modeling, simulation, use of data bases, guided discovery, closed-word exploration etc. The implications in terms of changes in the teaching strategy, instructional content, role of the teachers and context of the cur-

ricula are obvious as well as inevitable. Pedagogy through the application of information and communications technologies has the advantage of heightening the motivation; helping recall previous learning; providing new instructional stimuli; activating the learner's response; providing systematic and steady feedback; facilitating appropriate practice; sequencing learning appropriately; and providing a viable source of information for enhanced learning. Teachers who use this system of instructional strategy would be able to kindle in the hearts of the learners a desirable attitude towards information technology tools in their entire way of life.

Research Questions

The following research questions guided the study:

- 1) To what extent are Economics teachers in Eastern Cape secondary schools aware of the potentials of e-learning for Economics' teaching and learning?
- 2) To what extent do the teachers use e-learning facilities in teaching Economics in secondary schools?
- 3) What strategies did the teachers perceive that would improve the awareness and use of e-learning in teaching Economics?

METHODOLOGY

Research Design

In order to create a professional survey that has a high response rate and gathers only the most useful information, it is important to have a great research design. Research design can be seen as the overall framework of your study. It addresses the research problem by identifying the study's purpose and its objectives, while also providing the researcher with a strategy to effectively gain the information required. The survey research design was adopted for this study.

Population

The population for this study comprises of all the 452 Economics teachers in government schools in Eastern Cape, South Africa.

Sample and Sample Techniques

A simple random sample approach was used to select 100 secondary schools teachers of Economics which amounted to 22.1 percent was used and according to Stoker 1985 cited by Adu et al. (2014:15), the sample size was representative enough. A total of 100 questionnaires were randomly distributed to Economics teachers across secondary schools in the province. 88 completed questionnaires were retrieved which represents a recovery rate of eighty eight percent.

Instruments

The structured questionnaire was used to elicit information from the participants. The questionnaire contains three parts. Part one elicits information about the extent of use of e-learning facility structured from 'Great Extent' (3) to 'Not Available' (0). Part two of the questionnaire was designed using the 4-point scale ranging from 'Strongly agree' (4) to 'Strongly disagree' (1) while part three asked for information on support of educational management ranging from 'High Support' (3) to 'Not at all' (0). The Statistical Package for the Social Sciences (SPSS) software and descriptive statistics were employed to analyze and interpret the data.

Validity and Reliability

The instrument was validated by the expert in economics education and its reliability was measured using Cronbach alpha of which the co-efficient value was 0.81.

Method of Data Collection

The researchers administered copies of the questionnaires with the help of two research assistants who were teachers in secondary schools in the province. The researcher trained the research assistants. Training involved explaining the essence of the study, location of the teachers and formats for providing responses to the items in case of questions from the respondents. In each school, copies of the questionnaire accompanied by a letter of introduction were administered on the Economics teachers. Repeated visits were made for the collection of the completed questionnaires. At the end of one month, 88 copies were retrieved and used for data analysis.

Data Analysis

The data were analyzed using descriptive statistics of percentage and mean deviation.

FINDINGS AND DISCUSSION

Research Question 1: To what extent are e-learning facilities available for teaching Economics in secondary schools in Eastern Cape?

Table 1 shows the descriptive statistics on the extent of availability of e-learning facilities in the schools surveyed. It shows that most schools do not apply web based learning as over 50 percent of the schools under study do not adopt it. It can also be observed from the table that electronic board and computers with internet connection are not available for teachers in most schools with 86.5 percent and 60.3 percent respectively indicating non-availability opinion. However, responses show that offline ordinary computers are made available for use with a mean score of 1.39 and 12.5 percent, 32 percent and 36 percent for great extent, medium extent and low extent respectively. 98.9 percent of schools are yet to adopt use of computer or electronic device in marking multiple choice questions answers. This was in line with the findings of Adelabu et al. (2014) which says that e-learning facilities are not available in most schools

due to poor infrastructure amenities and attitude of students and teachers

Research Question 2: How does the use of e-learning enhance teaching of Economics in secondary schools in Eastern Cape?

Table 2 shows the descriptive statistics on the impact of e-learning on teaching of Economics in secondary schools. Respondents agree that it helps teachers to express ideas better, enhances easier storage and retrieval of information and raises quality of teaching. These can be observed from responses to items 5, 1 and 4 with mean scores of 2.52, 3.21 and 3.01 respectively. 68.1 percent of teachers strongly believe that e-learning facilities serve as a source of up to date information for teaching. The table also shows that e-learning provides a platform for group learning with a mean item score of 3.03 and 26.1 percent and 56 percent in agreement. This was in line with what Adu et al. (2014) found out about the impact of ICT for sustaining education development through the use of e-learning to impact knowledge on students.

On the non-applicability of e-learning in secondary school setting, 31.9 percent disagree while 55.7 percent strongly disagree. This can also be observed with the low mean score of 1.59 on the item. Further, responses to item 6 shows disagreement on the question of e-learning

Table 1: the extent of availability of e-learning devices

S. No.	Extent of availability of devices	GE	ME	LE	NA	MIS
1	Screen touch electronic board	3 (3.4%)	2 (2.2%)	7 (7.9%)	76 (86.5%)	0.22
2	Multimedia projectors/PowerPoint	1 (1.1%)	5 (5.6%)	11 (12.5%)	71 (80.8%)	0.27
3	Web based learning	12 (13.6%)	9 (10.2%)	23 (26.2%)	44 (50%)	0.88
4	Computer room	7 (7.9%)	9 (10.3%)	51 (57.9%)	21 (23.9%)	1.02
5	Off-line ordinary computer	11 (12.5%)	29 (32.9%)	32 (36.3%)	16 (18.3%)	1.39
6	Digital Library	0 (0%)	3 (3.5%)	5 (5.6%)	80 (90.9%)	0.12
7	E-mail facilities	6 (6.9%)	12 (13.6%)	22 (25%)	44 (50%)	0.72
8	On-line/Internet computers	9 (10.2%)	11 (12.5%)	15 (17%)	53 (60.3%)	0.72
9	Laptops+ modem+ flash drives, discs	13 (14.8%)	21 (23.9%)	38 (43.1%)	16 (18.2%)	1.35
10	Electronic device for marking multiple choice questions	0 (0%)	0 (0%)	1 (1.1%)	87 (98.9%)	0.01

Source: Field work November 2014.

Key: GE=Great Extent, ME=Medium Extent, LE=Low Extent, NA=Not Available, MIS=Mean Item Score

Table 2: Impact of e-learning in teaching Economics (N=88)

S. No.	Impact of e-learning	Sa	A	D	Sd	Mis
1	Easier storage and retrieval of teaching materials.	45 (51.1%)	29 (32.9%)	2 (2.2%)	12 (13.6%)	3.21
2	Source of up to date information	60 (68.1%)	21 (23.8%)	7 (7.9%)	0 (0%)	3.60
3	Greater opportunity for individual learning.	31 (35.2%)	37 (42.1%)	16 (18.1%)	4 (4.5%)	3.07
4	Raise the quality of teaching	34 (38.6%)	32 (36.3%)	11 (12.5%)	11 (12.5%)	3.01
5	E-learning devices help express teaching ideas better	18 (20.5%)	22 (25%)	36 (40.9%)	12 (13.6%)	2.52
6	Not suitable for practical subjects like Economics	7 (7.9%)	13 (14.7%)	41 (46.5%)	27 (30.9%)	2.00
7	Easier to demonstrate how to use Economics tools	2 (2.2%)	19 (21.5%)	45 (51.1%)	22 (25%)	0.91
8	Not applicable to secondary school settings	2 (2.2%)	9 (10.2%)	28 (31.9%)	49 (55.7%)	1.59
9	Provides platform for group learning	23 (26.1%)	50 (56.8%)	10 (11.3%)	5 (5.6%)	3.03
10	Development of ICT based curriculum	36 (40.9%)	32 (36.3%)	11 (12.5%)	9 (10.3%)	3.07

Source: Field work November 2014.

Key = SA=Strongly Agree, A=Agree, D=Disagree, SD=Strongly Disagree, MIS= Mean Item Score.

ing not suitable for Economics as a subject in secondary schools with a mean score of 2.0 and 46.5 percent and 30.9 percent disagree and strongly disagree respectively.

Research Question 3: How are school managements supporting e-learning initiatives in secondary schools?

Table 3 indicates the mean scores and percentage responses on the level of support teach-

ers of Economics are receiving from school management as regards e-learning initiatives. All the responses have mean scores of less than 1.50 showing that school authorities are not doing enough to support e-learning initiatives in schools. On sponsoring teachers for ICT training and retraining, 53.6 percent respondents said not at all. Item 6 bothers on provision of incentives for courseware development, 55.8 percent also answered not at all.

Table 3: Level of support of school management on e-learning initiatives (N=88)

S. No.	Level of sch. mgt support	HS	AS	N	NA	MIS
1	Sponsoring ICT training and retraining for Teachers	4 (4.5%)	16 (18.1%)	21 (23.8%)	47 (53.6%)	0.73
2	Use of computer internet facilities in internal communication	5 (5.6%)	13 (14.7%)	8 (9.0%)	62 (70.7%)	0.55
3	Encouraging teachers and students to keep pace with e-learning devices	21 (23.8%)	18 (20.4%)	28 (31%)	21 (23.8%)	1.44
4	Provision of new versions of software	0	6	19	63	0.35
5	Acquisition and installation of modern e-learning infrastructures.	4 (4.6%)	8 (9.0%)	26 (29.5%)	50 (56.9%)	0.61
6	Provision of incentives for courseware development	8 (9.0%)	14 (15.9%)	17 (19.3%)	49 (55.8%)	0.78
7	Active involvement of e-learning in all school curriculum	1 (1.1%)	2 (2.2%)	54 (61.3%)	31 (35.4%)	0.69
8	Upgrade of digital library	0 (0%)	6 (6.8%)	12 (13.6%)	70 (79.6%)	0.27
9	Improved management –academia interaction	12 (13.6%)	31 (35.2%)	29 (32.9%)	16 (18.3%)	1.44

Source: Field work November 2014.

Key = HS=High Support, AS = Average Support, N= Negligible, Na=Not at all, MIS= Mean Item Score.

It is observed that 61.3 percent of school management is giving a negligible support in terms of active involvement of e-learning in all school curriculums. Item 5 elicits response on provision of modern e-learning infrastructure in support of e-learning initiatives. However, 29.5 percent believe that this is negligible while 56.9 percent said not at all. According to Adelabu and Adu (2014), the school management is lagging behind in their professional role of supporting the use of e-learning. Not only that many school management did not make their teachers available for training or update of their knowledge about ICT. Similarly, Adu and Olatundun (2013) were of the opinion that school management's attitude affect the expansion of ICT and the use of e-learning for the teaching and learning. They further expressed their concern about the maintenance culture of the school management and their inability to out-source information technology personnel to assist the school.

CONCLUSION

This study was carried out to assess the use of e-learning facilities by Economics teachers in Eastern Cape Province of South Africa. The study finds that most e-learning devices such as computers connected to internet, web based learning, email facilities, and multimedia projectors as well as electronic marking devices are not available in these secondary schools. The study however, observes that computers with no internet connectivity are provided in some schools.

The study also finds that e-learning enhances teaching of Economics through provision of better researched information, easier storage and retrieval of teaching materials, improving quality of teaching and providing platform for update of teachers' knowledge and group learning. Based on the descriptive statistics, the study also found that e-learning can be applied in teaching Economics at the secondary school level. The paper further discovered that school authorities are not doing enough to support e-learning initiatives in secondary schools with respect to lack of training and retraining of teachers and provision of modern e-learning facilities.

RECOMMENDATIONS

There is therefore need for school management and government authorities to brace up to

this challenge through acquisition and installation of modern e-learning infrastructures and active involvement of e-learning in all school curriculums. The Department of Basic Education (DBE) and Department Higher Education and Training (DHET) should play a greater role in both the funding of ICT/E-learning resources for schools, especially those with fewer resources than others, and in the training of teachers, to equip them with the skills required to take advantage of the immense benefits that come with the use of ICT in both teaching and learning. Based on the foregoing the study concludes that in spite of the potentials inherent in use of e-learning in the process of educational development, its use for teaching and learning in secondary schools is extremely low.

REFERENCES

- Abidoye JA 2010. The role of electronic learning in improving distance education in Nigeria. *Journal of Teacher Perspective*, 4(2): 23-43.
- Aburime MO, Uhomoihi JO 2010. Impact of technology and culture on home economics and nutrition science education in developing countries. *Multicultural Education and Technology Journal*, 4(1): 4-16.
- Adelabu OA, Adjogri SJ, Adu EO 2014. The availability and utilization of e-learning infrastructures for teaching and learning. *Mediterranean Journal of Social Sciences*, 5(23): 1348-1355.
- Adelabu OA, Adu EO 2014. Assessment of accessibility and utilization of information and communication technology (ICT) for effective teaching of biological science in secondary schools. *Mediterranean Journal of Social Sciences*, 5(23): 1439-1444.
- Adesoji FF 2012. Undergraduate students' perception of the effectiveness of ICT use in improving teaching and learning in Ekiti State University, Ado-Ekiti, Nigeria. *International Journal of Library and Information Science*, 4(7): 121-130.
- Adu EO, Emunemu BO, Oshati T 2014. The role of ICT and higher education in sustainable development. *Journal of Communication*, 5(2): 181-190.
- Adu EO, Olatundun SA 2013. The use and management of ICT in schools: Strategies for school leaders. *European Journal of Computer Science and Information Technology*, 1(2): 10-16.
- Adu EO, Eze RI, Ruramayi T 2013. The teachers and the use of ICT for professional development in Botswana. *International Journal of Economy, Management and Social Sciences*, 2(2): 26-30.
- Aduwa-Ogiegbaen SE, Iyamu EOS 2005. Using information and communication technology in secondary schools in Nigeria: Problems and prospects. *Educational Technology and Society*, 8(1): 104-112.
- Ayemoba A 2013. New Limpopo ICT Resource Centre to Boost Teacher Training in Maths and Science. From <Southafricabusiness communities. com/profiles/blog/new limpopo-ict-resource-centre-to-boost

- teacher-training-in> (Retrieved on 19 December 2014).
- Beyers R 2000. The quality edge: ICT learning opportunities. *Management Today*, 16.
- Bialobrzeska M Cohen S 2005. Managing ICTs in South African Schools: A Guide for School Principals. SAIDE. From <<http://www.education.gov.za/LinkClick.aspx?fileticket=4rn8m810sXw%3D&tabid=452&mid=1036>> (Retrieved on 17 March 2014).
- Bhuasiri W, Xaymoungkhoun O, Zo H, Rho JJ, Ciganek AP 2012. Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers and Education*, 58(2): 843-855.
- Calverley G, Shephard K 2003. Assisting the uptake of on-line resources: Why good learning resources are not enough. *Computers and Education*, 41: 205-224.
- Department of Education (DoE) 2003. *Draft White Paper on e-Education: Transforming Learning and Teaching Through ICT*. Pretoria: Government Printer.
- Eze I, Adu EO 2013. The utilization of ICT in education for sustainable development. *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education*, (1): 1514-1522.
- Howie S, Muller A, Paterson A 2005. *Information and Communication Technologies in South African Secondary Schools*. Cape Town: HSRC.
- International Telecommunication Union 2001. The Digital Divide. From <<http://www.itu.int/ITU-D/digital/divide/>> (Retrieved on 15 January 2015).
- Kang I, Bonk CJ, Kim MC 2011. A case study of blog-based learning in Korea: Technology becomes pedagogy. *The Internet and Higher Education*, 14(4): 227-235.
- Miller L, Naidoo M, van Belle J 2006. *Critical Success Factors for ICT Interventions in Western Cape Schools*. Department of Information Systems. Cape Town: University of Cape Town.
- Mathevela MD, Uwizeyimana DE 2014. The challenges facing the integration of ICT in teaching and learning activities in South African rural secondary schools. *Journal of Higher Education*, 5(20): 1087-1097.
- Nwana SE 2009. Impediments to effective implementation of the National Open University in an age of computer technology. *Journal of Research and Production*, 15(1): 180-188.
- Olakulehin FK 2007. Information and communication technologies in teacher training and professional development in Nigeria. *Online Submission*, 8(1): 133-142.
- Olojo O, Adewumni M, Ajisolam K 2012. E-learning and its effects on teaching and learning in a global age. *International Journal of Academic Research in Business and Social Sciences* 2(1): 203-210.
- Olibie EI, Nkem ED 2013. Information and communications technology awareness and use for Home Economics Curriculum delivery in Anambra State: Teachers' improvement strategies. *British Journal of Arts and Social Sciences*, 13(1): 23-35.
- Oye ND, Iahad N, Madar MJ, Ab-Rahim I 2012. The impact of e-learning on students' performance in tertiary institutions. *International Journal of Computer Networks and Wireless Communications*, 2(2): 39-53.
- Ozioma CA, Offordile S 2011. Strategies for improving the use of electronic teaching and learning (e-learning) for vocational education in tertiary institutions of Anambra State-Nigeria. *Mediterranean Journal of Social Sciences*, 2(6): 123-129.
- Rwanda Ministry of Education 2008. ICT in Education Policy. From <http://planipolis.iiep.unesco.org/upload/Rwanda/Rwanda_ICT_policy.pdf> (Retrieved on 18 March 2014).
- UNESCO 2004. *ICT Pedagogy*. UNESCO Office.
- Van Rij V, Warrington B 2010. Teaching and Learning for an ICT Revolutionized Society. *The Results of a Foresight Workshop Organized as Part of the FP7 Blue Skies Project Far Horizon*, 2-3 December 2010, Brussels.
- Webb E, Jones A, Barker P, Schaik P 2004. Using e-learning dialogues in higher education. *Innovations in Education and Teaching International*, 41(1): 93-103.
- Yusuf MO, Afolabi AO 2010. Effects of computer assisted instruction (CAI) on secondary school students' performance in biology. *Turkish Online Journal of Educational Technology-TOJET*, 9(1): 62-69.