

## **Impact of e-Learning and Open Education Resources on the Teaching and Learning of Metalwork Trades in Technical Colleges in Benue State, Nigeria**

<sup>1</sup>Nwokolo-Ojo, J. O, <sup>2</sup>Igwe, C. O. & <sup>2</sup>Umar, I. Y.

<sup>1</sup>Department of Vocational and Technical Education,  
Benue State University, Makurdi, Nigeria

<sup>2</sup>Department of Industrial and Technology Education,  
Federal University of Technology, Minna, Nigeria

**Abstract:** *This study assessed the impact of e-learning and open education resources on the teaching and learning of metalwork trades in Technical Colleges in Benue State; Nigeria. The study adopted a survey research design. A questionnaire with reliability coefficient of 0.83 was employed, and was distributed to metalwork trades teachers in the six technical colleges selected for the study in Benue State. Two research questions and one hypothesis guided the study. The subjects for the study comprised 100 technical teachers sampled using simple random sampling technique. Responses were analyzed using statistical package for social sciences (SPSS). It was found out that e-learning and open education resources for teaching and learning of metalwork trade courses are available in all the technical colleges. It was recommended that Government should ensure that all the tertiary institutions in the country where teachers are trained are provided with e-learning services such as computers connected to internet, multimedia projectors among others, this will make would be teachers to be e-learning compliant and that all the teachers of metalwork trade courses in Benue State technical colleges should be exposed to training and retraining programmes on the use of e-learning resources for effective teaching and learning of metalwork trade courses.*

**Keywords:** *E-learning, Metalwork trade, Open Educational Resources, Teaching, Technical college*

### **I. INTRODUCTION**

Technology has permeated all aspects of human life. The ubiquity is clearly felt in the educational sector where emphasis has been shifted from the conventional method of instruction to a more controlled environment that is technology-driven. By the emergence of e-learning services and wireless communication technologies, the educational world has therefore, witnessed a great transformation (Akinwale, 2014).

E-learning is an important instructional tool that facilitates the transfer of many types of information, and an effective means of communication in schools and colleges (Osorji, 2015). As an internet-based instruction, it mainly tests on one-to-one (teacher-to-student), one-to-many (teacher-to-group) and many-to-many (group-to-group) approach, to instruction (Webb, Jones, Barker & Schalk, 2004). It guarantees freedom of learning, provides the opportunity for students to assess their learning capabilities and engenders effective participation in the learning process (Bolaji, 2011).

E-learning is succinctly conceptualized as 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 any other allied electronic devices for dissemination of knowledge and information. It involves the application of computer and information technology, and comprises of computer and Information Communication Technology (ICT) materials and application, which aid information collection and dissemination, research and global exchanges of ideas that are critical for advancing meaningful educational initiatives and understanding issues related to global development (Adesoji, 2012).

Aside from the fact that e-learning facilities improve educational delivery and prepare students for role in an information age, its application provides productive teaching and learning in order to increase people's creative and intellectual resources, especially in today's information society. It also 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-Ogieban & Iyanmu, 2005). E-learning devices such as the internet, computer, web, multimedia, television, projectors, among others, provide easy access to quality learning materials and make reasonable and responsible contribution to the learning process (Abidoye, 2010).

The synchronized form of e-learning has comprehensive teachers that allow for interactivity between the learning content and the learners. It has inbuilt teachers like the forum chatting and audio-effect and it is aimed

at providing multi-outlet opportunities to meaningfully engage the learner and aid comprehension (Thompson, 2012). But the asynchronous form of e-learning only presents the learning content for the students to read, internalize. It does not allow for immediate feedback (Ogwa, 2002). Open Education Resources (OER) on the other hand, are freely accessible licensed documents and media that are useful for teaching, learning and assessing as well as for research purpose. There are many numerous working definitions of OER. William (2014) defines open education resource as teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposes by others. They are textbooks, streaming videos, tests, software, course materials, modules and many other tools, materials or techniques used to support access to knowledge. They are also defined as digitized materials offered freely and openly for educators, students, and self-learners to use and reuse for teaching, learning and research (Jawal, 2009).

The questions that loom large are these resources (e-learning and open education resources) available in technical colleges in Benue State? If available, to what extent do teachers use them to teach metalwork trade courses? Technical colleges are regarded as principal vocational institutions in Nigeria, they give full vocational training intended to prepare students for entry into various occupations (Okoro, 1996). Technical colleges offer range of courses among which include mechanical engineering craft practice, foundry craft practice, welding and fabrication engineering craft practice. These three courses are classified as metalwork trade courses, which are technical field of study that involves working with metals to create individual parts assemblies or large scale structures. It also involves a corresponding wide range of skills, processes and tools, and cover also wide range of work from large ships and bridges to precise engine parts and delicate jewelry.

## **II. Statement of the Problem**

The development and implementation of new and innovative curriculum delivery strategy in education has been heralded by the Information Technology (IT) revolution, essentially in the areas of internet and computer technology. The growth in internet technology and its application in education has resulted in the improvement in teaching and learning process. Today, teaching and learning have become very effective and result-oriented, and have provided avenue for sharing idea and information. Teachers can prepare and package well researched teaching materials in metalwork trades and deliver them to students through e-learning services such as video tutorials, computer-based training and web based training, power point presentation and e-books. Despite the relevance of these services in the teaching process, they are hardly available when the teachers need them. There is also the difficulty in their application. In Africa, and other less advanced countries, the dearth of these services pose a challenge to technical teachers. There is therefore, the need to enrich the e-learning programmes and open education resources for effective teaching and learning of metalwork trades in technical colleges. This study therefore sought to specifically determine:

1. the extent e-learning resources and open education resources are available for Metalwork trade courses in technical colleges in Benue State.
2. how e-learning and open education resources impact on teaching Metalwork trade courses in technical colleges in Benue State.

### **Research Questions**

Based on the focus of this study, the following research questions were raised:

1. To what extent are e-learning resources and open education resources available for teaching Metalwork trade courses in technical colleges in Benue State?
2. How do the use of e-learning and open education resources impact on the teaching of Metalwork courses in technical colleges in Benue State?

### **Hypothesis**

**Ho<sub>1</sub>:** There is no significance relationship between the availability of e-learning resources/open education resources and the impact of the teaching of metalwork Trade courses in technical colleges in Benue State.

## **III. Methodology**

The study was conducted using survey research design. The accessible population for this study consisted of 100 Metalwork teachers in Benue State. A sample size of six technical colleges was used for this study and a total of 100 questionnaires were randomly distributed to Metalwork teachers across the technical colleges offering Metalwork trade courses. Out of the 100 questionnaires distributed, 89 completed questionnaires were returned, representing a return rate of 89 percent. The questionnaire was divided into three different sections. Section A was on bio-data of respondents; section B addressed research question one on the extent of the use of e-learning facilities, this section was structured on 4-point rating scale from "Great Extent" (4) to "Not Available" (1); section C addressed research question two on how the use of e-learning and open

education resources impact on the teaching of metalwork trade courses in technical colleges, this section was also structured on 4-point rating scale of "Strongly Agree" (4), "Agree" (3), "Disagree" (2), and "Strongly Disagree" (1).

The instrument was validated by three experts in the field of metalwork and educational research. Validated instrument was subjected to reliability test using Cronbach Alpha statistics. This yielded a reliability coefficient of 0.83 and the instrument was therefore adopted for the study. Statistical Package for Social Science (SPSS) Software was used to analyze the data. Mean and standard deviation were employed to answer the research questions while Pearson Product Moment Correlation Coefficient (PPMCC) was used to test the null hypothesis at .05 level of significance. A criterion mean, 2.50 was chosen as decision point for answering the research questions based on the 4-point rating scale used for the study.

#### IV. Result

##### Research Question 1

To what extent are e-learning facilities available for teaching Metalworktrade courses in technical colleges in Benue State?

**Table 1 Mean and Standard Deviation of Teachers on the Extent of Availability of e-learning Resources and Open Education Resources in Technical Colleges**

<i>S/No:</i>	<i>Extent of Availability of Resources</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Remark</i>
1	Computers and internet-based courseware	89	3.01	1.31	Available
2	Web-based learning	89	3.20	0.93	Available
3	Multimedia projector/application	89	3.33	0.78	Available
4	Power point facilities	89	3.62	0.64	Available
5	e-mail facilities	89	4.00	0.00	Available
6	Digital library	89	4.00	0.00	Available
7	Streaming videos	89	3.78	0.40	Available
8	Simulations/syllabi	89	3.34	0.72	Available
9	Software tools	89	4.00	0.00	Available
10	Off-line ordinary computer	89	3.75	0.46	Available
	<b>Grand Mean/SD</b>	<b>89</b>	<b>3.60</b>	<b>0.52</b>	<b>Available</b>

Key: *SD* = Standard Deviation, *N* = Number of Metalwork Teachers

Table 1 shows the descriptive statistic on the extent of availability of e-learning resources and open education resources in the technical colleges surveyed. It revealed that virtually all the schools have e-learning resources and open education resources as the mean of the 10 items listed were greater than the criterion mean. The mean ranges from 3.01 – 4.00 while standard deviation ranges from 0.00 – 1.31 indicating that mean responses of teachers were not too far from each other. Evidence from the grand mean also showed that institutions under study have all the e-learning resources and open education resources for instructional purposes.

##### Research Questions 2

How do the use of e-learning resources and open education resources impact on the teaching of Metalwork trade courses in technical colleges in Benue State?

**Table 2 Mean and Standard Deviation of Teachers on the Impact of e-learning Resources and Open Education Resources in Technical Colleges**

<i>S/N</i>	<i>Impact of e-learning/open education resources</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Remark</i>
1	e-learning resources and open education resources improve teaching	89	3.57	0.45	Agree
2	The resources are easy to store and retrieved when necessary for teaching	89	3.85	0.12	Agree
3	They are significant sources of relevant information for learning	89	4.00	0.00	Agree
4	They provide opportunity for group learning	89	4.00	0.00	Agree
5	They are very vital for teaching metal work technology courses	89	4.00	0.00	Agree
6	They are very vital in the development of metal work technology based curriculum	89	4.00	0.00	Agree
7	They also provide opportunity for individualized	89	3.78	0.40	Agree

8	learning They make teaching to be very interesting and easier	89	4.00	0.00	Agree
9	They are practically oriented and develop the practical skills of the learners	89	3.80	0.36	Agree
10	They are applicable to all levels of education	89	3.46	0.79	Agree
	<b>Grand Mean/SD</b>	<b>89</b>	<b>3.85</b>	<b>0.21</b>	<b>Agree</b>

Key: *SD* = Standard Deviation, *N* = Number of Metalwork Teachers

Table 2 shows the descriptive statistics on the impact of e-learning resources and open education resources on the teaching of metalwork trade courses in technical colleges in Benue State. Mean responses of respondents ranged from 3.46 – 4.00 indicating that all of them agreed with 10 items listed as impact of e-learning resource and open education resources on the teaching of metalwork trade courses. The standard deviation ranged from a high of 0.79 – 0.00, this revealed that mean responses of teachers were not far from each other in their decision on the issue being investigated. A close look at grand mean and standard deviation indicated that e-learning resources and open education resources have impact on the teaching of metalwork trade courses.

**Hypothesis**

There is no significant relationship between the availability of e-learning resources/open education resources and impact of the teaching of metalwork trade courses in technical colleges.

**Table 3 Relationship Between the Availability of e-learning Resources/Open Education Resource and Impact of the teaching of Metalwork Trade Courses**

Variable	Mean	SD	N	df	r-cal	r-crit
Availability of e-learning/open education resources	3.60	0.52	89	87	0.18	0.208
Impact of the teaching of metalwork trade Courses	3.85	0.21				

Key: *SD* = Standard Deviation, *N* = Number of Metalwork teachers, *df* = Degree of freedom  
*r-cal* = calculated correlation coefficient, *r-crit* = critical correlation coefficient

Table 3 shows the correlation analysis of the relationship between the availability of e-learning resources, open education resources and impact of the teaching of metalwork trade courses in the study area. The table revealed that there is a very low, although positive relationship between the availability of e-learning resources/open education resources and impact of the teaching of metalwork trade courses in the technical colleges used for the study. This was confirmed by the fact that 0.18 was less than the r-critical (0.208) at 5% level of significance ( $p = 0.05$ ). The null hypothesis of no significant relationship was therefore upheld. The positive relationship indicates that high score on one variable relates to high score on the second. This shows that availability of e-learning/open education resources could impact on the teaching of metalwork trade courses in technical colleges.

**V. Discussion of findings**

The study was carried out to assess the impact of e-learning and open education resources on teaching of metalwork trade courses in Technical Colleges in Benue State, Nigeria. The study found out that most of the e-learning resources and open education resources such as computers, web-based learning, multimedia projectors, e-mail facilities, among others are available in the Technical Colleges used for the study. Computer with internet connectivity are also provided in those Technical Colleges. This according to Asthana (2012) will bring about a more practical change in the teacher-centered approach of teaching to a facilitated and student-centered approach through the incorporation of multi-media instructional approach into teaching and learning of vocational and technology education subjects. In the same vein Ho (2009) observed that the incorporation of hardware and software into teaching and learning of technology courses has effectively encouraged participation among students. The study also revealed that e-learning resources and open education resources enhance the teaching of metalwork trade courses through the provision of better research information, platform for the update of teachers' knowledge and group learning. The findings agreed with work of some researchers such as Johnson (2010), Wagid (2005), and Okoroh (2006) who stated that "some of these resources help to integrate curriculum content with instructional supports and help students to address their varied needs". Atsumbe, Raymond, Umar and Ajunwa (2014) maintained that classroom utilization of multi-media (e-learning and open education resources inclusive) was an attention gaining teaching strategy that helps to reduce demand in short memory. Olabode (2012) also affirmed that the teaching of metalwork trade courses can also be significantly improved when these resources are used by teachers for instructional purposes.

## VI. CONCLUSION

Based on the foregoing, the study concluded that the potentials inherent in the use of e-learning resources and open education resources will improve the quality of teaching and instructions in Technical Colleges in Nigeria. There is however, the need for government authorities to brace up to the challenge by acquiring and installing modern technology equipment in the institutions that are yet to have them. The resources must be used in all the institutions for effective instruction.

## VII. RECOMMENDATIONS

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

1. Government should ensure that all the tertiary institutions in the country where teachers are trained are provided with e-learning services such as computers connected to internet, multimedia projectors, electronic marking devices, web-based learning and e-mail facilities, this will make would be teachers to be e-learning compliant.
2. All the teachers of metalwork trade courses in Benue State technical colleges should be exposed to training and retraining programmes on the use of e-learning resources for effective teaching and learning of metalwork trade courses.
3. More web based learning, computers and internet based course ware should be provided by the government to facilitate learning.
4. Stream videos should be fully functional for students to be able to join live educational programmes from any part of the world.
5. Since availability of e-learning/open education resources correlated positively with impact of teaching of metalwork trade courses in technical colleges, effort should be made to provide such resources in high number to technical colleges.

## VIII. REFERENCES

- [1] Abidoye, J.A. (2010). The role of electronic learning in improving distance education in Nissie. *Journal of Teacher Perspective*, 4(2). Retrieved August 23<sup>rd</sup>, 2015 from [www.academicjournals.org/JJNAM/F32BD84246](http://www.academicjournals.org/JJNAM/F32BD84246)
- [2] Adesoji, F.F. (2012). Undergraduate students' perception of the effectiveness of ICT use in improving teaching and learning in Ekiti State University, Ado-Ekiti, Nissie. *Journal of Library and Information Science* 4(7), 121-130
- [3] Aduwa-Ogiebaen, S. E, & Iyanmu, E.O.S. (2005). Using information and communication technology in Secondary Schools in Nissie: Problems and Prospects. *Educational Technology and Society*, 8(1), 104-112
- [4] Akinwale, F.T. (2014). *Systems approach institution: A novel of application*. Ibadan: International Publishers Ltd
- [5] Asthana, A. (2012). Multimedia in education: Introduction, the element of educational requirements, classroom architecture and resources concerns. Retrieved June 12<sup>th</sup>, 2013 from <http://encyclopedia.jrank.org/articles/pages/6821/multimedia-in-Education.html>
- [6] Atsumbe, B. N; Raymond, E; Umar, I. Y. & Ajunwa, J. (2014). Multimedia: A veritable tool for teaching vocational & technology education based courses. *Journal of Information, Education, Science and Technology*. 1 (1) 1-12
- [7] Bolaji, F.D. (2011). *Information technology and institutional change*. Ibadan: Heinemann Educational Books
- [8] Ho, W. C. (2009). The role of multimedia technology in a Hong Kong higher education music program visions of research in music education. Retrieved January 13<sup>th</sup>, 2013 from <http://www-usr.rider.edu/~vrme/http://learningtechnology.wikispaces.com/>
- [9] Jawal, S.O. (2009). *Development and application of open education resources for institution*. New Jersey: Prentice-that Institutional Inc.
- [10] Johnson, O.R. (2010). *Technology-Education Learning for the Sixth Grades*. Cary, NC: S.A.S Institute,
- [11] Ogwa, C.E. (2002). *Effective Teaching Method*. Enugu: Cheston Ltd
- [12] Okoro, M. O. (1996). *Principles and methods in vocational and technical education*. Enugu: University Trust Publishers
- [13] Okoroh, L. (2006). *Information and communication technology*. Lagos: Macmillan Publishers
- [14] Olabode, A.T. (2012). *ICT. Literacy in tertiary institutions in Nissie*. Ibadan: Oxford University press
- [15] Osuorji, J.J. (2015). *Multimedia for instruction*. Onitsha: Harizona Publishers Ltd

- [16] Thompson, I.O. (2012). Multi-Classification of social media. *Information and Management Science* 36(4) 204-220
- [17] Wagid, F.A. (2005). An in-depth assessment of learning profile in physical education. *Journal of Teaching in Physical Education*. 25(4), 203-218
- [18] Webb, E., Jones, A., Barker, P. & Schalk, P. (2004). Using e-learning dialogues in higher education. *Innovations in Education and Teaching Institutional*, 41(1), 93-103
- [19] William, O.A. (2014, October 27). *Technical and Vocational Education: An Ingredient for National Development*: Daily Trust. P29-30