JOURNAL OF SCIENCE TECHNOLOGY AND EDUCATION 14(2), JUNE, 2026
E-ISSN: 3093-0898, PRINT ISSN: 2277-0011; Journal homepage: www.atbufstejoste.com

Strategies for Improving the Available E-Learning Devices for Teaching Technical Drawing in Technical Colleges in North-Central, Nigeria.

[1]Shaluko Yohanna Doma, [2] Aliyu Adamu Beji [3]Abdullahi Mohammed Mohammed
[1&3]School of Vocational and Technical Education, Department of Electrical Electronics College of Education Minna
[2]Mechnical Engineering Department, Automobile Section Minna, Institute of Technology and Innovation Niger State

ABSTRACT
This study investigated strategies for improving the available e- learning devices for teaching technical drawing in technical colleges North-Central, Nigeria. Three research questions and one null hypothesis tested at 0.05 level of significance were used for the study. The design of the study was a descriptive survey research design. The population of this study comprised all the 89 technical drawing teachers in 29 technical colleges North-Central, Nigeria. A 26-item questionnaire structured and validated was used to generate data for the study. Data obtained were analyzed using percentage, mean and standard deviation to answer the research questions while t-test statistic was used to test the hypothesis. The findings revealed that most schools have computer laboratories, laptops, some computers and standby generators but lack some e-learning devices such as slides, projectors, among others. The study also revealed that technical drawing teachers encounter a lot of problems in the use of available e-learning devices such as poor power supply and illiteracy. However, some strategies were suggested by the researcher for improvement of e-learning devices by technology teachers such as provision of adequate ICT infrastructure. Some recommendations were made such as organizing seminars and workshops for technical drawing teachers and improving power supply.

ARTICLE INFO
Article History
Received: January, 2026
Received in revised form: April, 2026
Accepted: June, 2026
Published online: June, 2026

KEYWORDS
E-learning, e-learning devices, teaching and learning, technical drawing subjects and technical drawing teachers.

INTRODUCTION

Information and communication technology (ICT) has been generally adopted by all levels of education in the country as an innovative system in teaching and learning. The new technology has reduced the world to a global village with significant impact in the field of education leading to electronic teaching and learning known as e-learning. With e-learning there is now a shift away from the traditional approach in which the teacher directs the learning process in a conventional classroom and more modern and flexible method assisted by computers and allied information and communication technologies (ICTs) (Chuma, 2018). With the aid of these e-technologies, many students now teach themselves and study independently using certain technologies. Consequently, learners/students can connect to the classrooms from anywhere and receive lectures without seeing their classmates and teachers/lecturers. This innovation comes under the ambits of electronic learning (e-learning) and e-learning technologies

E-learning could be defined as the utilization of technologies or electronic devices such as desktop/laptop computers, CD/DVD players, smart phones, and other modern-day tools, to enhance traditional face-to-face method of learning (Bashir & Lapshun, 2024). It is the use of electronic educational technology in learning and teaching to enhance and support the process of knowledge dissemination (Rajasekaran *et al.,* 2024). According to Dritsas and Trigka (2025), the e-learning has opened up opportunities for individuals to access information and learning programmes through the internet. This implies that e-learning is revolutionalizing education by removing distance and making knowledge more accessible to all. All branches of education have accepted this emergent technology as a veritable tool for education services delivery. Due to its importance, technology subjects have to align with this emergent ICT. This is necessary because

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

according to Hodges *et al*. (2020), ICT provides teachers and students access to vast stores of knowledge beyond the school, as well as multi-media tool to add to this store of knowledge.

The huge growth of computers, the internet and other electronic devices provide opportunities for the development of quality teaching and learning of technology subjects. Technology subjects taught in the secondary schools include basic technology, technical drawing, building construction, woodwork, applied electricity/electronics, auto-mechanics, general metalwork, home economics, food and nutrition, physics among others (FRN, 2013). The teaching of this technology subjects are confined to the classrooms with few ill-equipped workshops and laboratories using the teacher centered method. Teachers are the key factors in any educational innovation. They need training in the use of the new technology (e-learning devices) to enhance teaching and learning of technology subjects. E-learning simply means electronic learning. Martin and Bolliger (2022). refers to e-learning as comprising the combination, implementation and relationship of teaching and learning via different ICT media such as computer, internet, multimedia, projector, video tapes, CD-ROM, flash drives, satellite, telephone, television among others. Some of the technologies that can be used for e-learning include: computers, the Internet, telecommunications, www, CD-ROM, electronic databases and e-mail. Other e-learning resources are magnetic tapes, optical disks, CD/DVD, radio and television which increasingly pervade various aspects of work, business, leisure, teaching and learning. According to Marriot (2019) e-learning enables teachers to combine traditional methods of teaching with the internet facilities. Hodges *et al*. (2020) agreed that e-learning compliments the work of teachers because extra materials and questions could be provided on-line for students.

As the world is increasingly getting technologically driven, globalized, competitive and competent-based, the role of teachers for effective e-learning programmes becomes critical. Just as the students need media competence to manage knowledge independently, teachers on the other hand have to be willing to structure content differently and put the students at the center of activities (Martin & Bolliger, 2022). By so doing, e-learning centres on the students. In this case, the teacher acts as a resource person or facilitator meeting students at continued contact and increased guidance and feedback. Bashir and Lapshun (2024) opined that e-learning offers well designed, learner centered and interactive learning environment to anyone, anyplace and anytime by utilizing the internet and digital technologies in connection with instructional design principle. There is no gain saying the fact that teachers are the key factors in e-learning programs which requires competence in managing the required e-learning devices. However, Rogers-Shaw *et al.* (2023) lamented the infrastructural deficiencies and shortage of e-learning facilities such as online classroom, software, telecommunication facilities and inadequate power supply for teaching and learning in secondary schools. However, they advised that certain infrastructures like computers, internet facilities, sustainable power supply, human capacity development and political-will by the government should be put in place to make e-learning a reality in schools.

To design and develop on-line courses, teachers require a thorough knowledge of the main components of on-line teaching and learning. Khalil *et al.* (2023) identified such components as content development, multimedia, internet tools, computers, storage devices, service providers and browsers. Abidoye and Omotunde (2025) however, pointed out that the problem is that teachers lack necessary competencies for utilizing the computer and operating other educational software and connecting to the internet to source information on education. E-learning devices make teaching and learning less burdensome, effective and result-oriented by providing avenue for sharing ideas and information (Dritsas & Trigka, 2025). E-learning comprises of all forms of electronically supported teaching and learning, which are procedural in nature and aim at construction of

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

knowledge with reference to an individual experience and practice.

Statement of the Problem

With advancement in digital technologies, colleges and institutions are progressively searching for the potential utilization of information and communication technologies (ICT) to facilitate flexible teaching needs (Dritsas & Trigka, 2025). Inspite of the proliferation of ICT and benefits of e-Learning Management System (eLMS) in most developing countries, its effective use and operation has been a major concern to stakeholders. According to Rajasekaran *et al.* (2024) e- learning is the delivery of a learning, training or education programme by electronic means which involves the use of a computer or electronic device in some way to provide training, educational or learning material. The teaching of technical drawing in technical and vocational schools require instructional materials such as ICT facilities. ICT facilities are set of tools that help one work with information and perform tasks related to information processing. There are various forms of ICT facilities in the society ranging from computer, laptops, internet, digital calculators, among others (Scherer *et al.,* 2021). According to Uzodinma (2026) some technical drawing teachers in these schools cannot effectively use ICT facilities in teaching due to lack of competence in basic ICT. However, Uzodinma noted that the emergence of e-learning applications in educational delivery services in technical and vocational schools pose a lot of problems to the teachers. Notably, some of the technical drawing teachers in these technical schools lack the adequate knowledge and skills required for effective e-learning instructional delivery. There are also problems associated with erratic power supply, poor funding, inadequate bandwidth, insufficient computers, low literacy, weak and inadequate infrastructures, shortages and inadequate teaching materials among others (Aboderin & Kumuyi, (2023). The existences of these problems challenge the full utilization of e-learning applications in teaching and learning of technical drawing as a subject (Abidoye & Omotunde, 2025). In the nation's quest for technological development, technology education has an important role to play. One innovation that may boost the teaching and learning of technical drawing as a subjects is the use of modern technologies which help bring knowledge to the door steps of every Nigerian. The degree of efficiency of technical drawing teachers in carrying out their function is to a great extent dependent on the availability and usage of the necessary ICT facilities in the classrooms. It therefore becomes necessary to investigate the available e-learning devices and strategies for their improvement for teaching technical drawing in technical Colleges in North-Central Nigeria.

Aims and Objectives of the Study

The purpose of this study was to investigate the strategies for improving the available e-learning devices for teaching of technical drawing in technical Colleges in North-Central Nigeria. Specifically, the study intends to find out

(1) The e-learning devices available for teaching technical drawing in technical colleges.
(2) The problems encountered by technical drawing teachers in the use of e-learning devices.
(3) Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical colleges.

Research Questions

The following research questions guided the study:

1. What are the e-learning devices available for teaching technical drawing subjects in technical Colleges in North-Central Nigeria.?
2. What are the problems encountered by technical drawing teachers in the use of e-learning devices?
3. What strategies could be used to improve the use of e-learning devices by technical drawing teachers in technical Colleges in North-Central Nigeria.?

Null Hypothesis

The following null hypothesis was tested at 0.05 level of significance.

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

Ho1: There is no significance difference between the mean rating of male and female technical drawing teachers on the e-learning devices available for teaching technical drawing in technical Colleges in North-Central Nigeria.

Ho2: There is no significance difference between the mean rating of male and female technical drawing teachers on the problems encountered in the use of e-learning devices.

Ho2: There is no significance difference between the mean rating of male and female technical drawing teachers on the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical Colleges in North-Central Nigeria.

METHODOLOGY

The study adopted a descriptive survey research design aimed at investigating the strategies for improving the available e-learning devices for teaching of technical drawing in technical Colleges in North-Central Nigeria. The population of the study consisted of all the 89 technical drawing teachers teaching in technical Colleges in North-Central Nigeria. All the 89 technical drawing teachers in 29 technical colleges formed the population of the study. A 26- item structured questionnaire developed by the researcher and based on the three research questions titled "Improvement of E-learning Devices Questionnaire" (IEDQ) was used for data collection. The first section of the questionnaire contained nine e-learning devices to which the respondents were to rate whether they were available or not. The second and third parts of the questionnaire on the problems encountered and strategies for improving the use of e-learning devices respectively had four point response scale option of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) which the respondents responded to.

The instrument was face and content validated by two (2) experts from Niger state college of Education Minna School of technical education and one (1) from computer science department which is not part of the study area. The data collected were analyzed using Cronbach Alpha and a reliability coefficient of 0.79 was obtained which was considered adequate. The researcher distributed 31 copies of the questionnaire directly to the respondents and had a 100% return. Percentages, mean ratings and standard deviation were used to analyze data from the research questions while the t-test statistic was used to indicate the existence of significant difference at 0.05 level of significance. A mean of 2.50 and above indicated that the respondents agreed with an item while a mean of 2.49 and below indicated that respondents disagreed with the item.

RESULTS

The findings of the study based on analysis of data to the research questions and hypothesis are presented in the tables below

Research Question 1: What is the e-learning devices available for teaching technical drawing in technical Colleges in North-Central Nigeria?

Table 1: Mean Responses of Technical drawing Teachers on the E-learning Devices Available for Teaching and Learning Technical drawing

S/N	Items	Available	Not available	% Availability
1.	Computers	29	2	93.5
2.	Laptops	25	6	80.6
3.	Standby generators	24	7	74.4
4.	Internet facility	14	17	45.2
5.	CD-Roms and flash Drives	12	19	38.7
6.	Computer laboratories	30	1	96.8
7.	Projectors	12	19	38.7
8.	Slides	10	21	32.3
9	Audio- Visual devices	9	22	29.0

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

Table 1 showed the percentage availability of e-learning devices. This shows that some e-learning devices such as computers, laptops, standby generator, and computer laboratories with percentage values of more than 50 each were available in these technical colleges. However, items 4, 5, 7, 8 and 9 with percentage values of less than 50 were indicated as e-learning devices that were not available. This showed that e-learning devices were lacking in these technical Colleges in North-Central Nigeria.

Research Question 2: What are the problems encountered by technical drawing teachers in the use of e-learning devices in these technical colleges?

Table 2: Mean Responses of Technical Drawing Teachers on Problems encountered on the use of e-learning Devices in Teaching and Learning Technical drawing.

S/N	Items	X	SD	Decision
1.	Lack of fund	3.64	0.82	Agree
2.	Irregular power supply	4.52	0.99	Agree
3.	Low computer literacy level of technology teachers	3.75	0.91	Agree
4	Lack of support from the government	3.07	0.73	Agree
5.	Lack of ready access to internet (insufficient bandwidth)	3.02	0.91	Agree
6.	Inadequate ICT infrastructure(computer software and accessories)	2.63	0.87	Agree
7.	Lack of time in use of ICT devices due to teaching load	3.18	0.92	Agree
	Grand Mean	**3.40**		

All the items in Table 2 had mean values above cut-off point of 2.50 showing that the respondents agreed to all the items. This implies that technology teachers encounter a lot of problems in the use of e-learning devices. The grand mean of 3.40 showed that technical drawing teachers are faced with a lot of challenges which hinder their effective use of the available devices.

Research Question 3: What strategies could be used to improve the use of e-learning devices by technical drawing teachers in both these technical Colleges in North-Central Nigeria?

Table 3: Mean Responses of Technical Drawing Teachers on Strategies to be adopted to improve the use of e-learning Devices.

S/N	Items	X	SD	Decision
1.	Organizing seminars and workshops for teachers	3.56	0.67	Agree
2.	Bandwidth to be increased	3.12	0.97	Agree
3.	Erratic power supply should be addressed	4.00	0.88	Agree
4.	Adequate e-learning infrastructural facilities should be provided	3.61	0.86	Agree
5.	Public private partnership should be used in funding e- learning	3.75	0.91	Agree
6.	Employment of enough ICT teachers in the secondary schools	3.41	0.73	Agree
7.	Teachers to develop themselves in ICT	1.34	0.30	Disagree
8.	Monitoring team on the available e-learning devices should be set up	3.07	0.82	Agree
9.	Distributing laptops to teachers	3.39	0.62	Agree
10.	Computation of students' results using computer software	3.62	0.90	Agree
	Grand mean	**3.30**		

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

From the analysis in Table 3, all the items except item 7 had mean values of more than 2.50. This indicated that technology teachers strongly agreed on the identified strategies for improving the use of e-learning devices in this technical schools. The grand mean of 3.30 indicated that the respondents agreed to these strategies.

Hypothesis One

There is no significance difference between the mean rating of male and female technical drawing teachers on the e-learning devices available for teaching technical drawing in technical Colleges in North-Central Nigeria.

Table 4: Summary of T-test statistic on the e-learning devices available for teaching technical drawing in technical colleges.

Respondents	N	X	SD	DF	t-cal	t-crit	Decision
Female Technical Drg Teachers	9	2.88	0.59	29	0.69	2.00	Not
Male Technical Drg Teachers	22	2.96	0.60				significant

From Table 4 above, it can be observed that the calculated t is 0.69 at 0.05 level of significance, which is less than the critical value of 2.00 with df as 29. Therefore, the null hypothesis was accepted indicating that there is no significant difference in the mean ratings of male and female technical drawing teachers on the e-learning devices available for teaching technical drawing in technical Colleges in North-Central Nigeria. The null hypothesis is hence accepted since they did not differ in their opinion on the e-learning devices available for teaching technical drawing in technical colleges

Hypothesis Two

There is no significance difference between the mean rating of male and female technology teachers in the use of e-learning devices.

Table 5: Summary of T-test statistic on the Problems encountered by Male and Female Technical Drawing Teachers on the use of e-learning Devices in Teaching.

Respondents	N	X	SD	DF	t-cal	t-crit	Decision
Female Technical Drg Teachers	9	3.56	1.14	29	1.35	2.00	Not
Male Technical Drg Teachers	22	3.85	1.26				significant

From Table 5 above, it can be observed that the calculated t is 1.35 at 0.05 level of significance, which is less than the critical value of 2.00. Therefore, the null hypothesis was accepted indicating that there is no significant difference in the mean ratings of male and female technical drawing teachers on the problems encountered in use of e-learning devices in teaching.

Hypothesis Three

There is no significance difference between the mean rating of male and female technical drawing teachers on the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical Colleges in North-Central Nigeria.

Table 6: Summary of T-test statistic on the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical colleges.

Respondents	N	X	SD	DF	t-cal	t-crit	Decision
Female Technical Drg Teachers	9	2.36	0.59	29	0.75	2.00	Not
Male Technical Drg Teachers	22	2.65	0.74				significant

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

Table 6 above, it can be observed that the calculated t is 0.75 at 0.05 level of significance, which is less than the critical value of 2.00 with df as 29. Therefore, the null hypothesis was accepted indicating that there was no significant difference in the mean ratings of male and female technical drawing teachers on the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical and vocational schools. The null hypothesis is hence accepted since they did not differ in their opinion on the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical Colleges in North-Central Nigeria.

FINDINGS OF THE STUDY

Based on information gathered from this research and analyzed, the following discoveries were observed:

1. The e-learning devices that were not available in our technical and vocational schools
2. Finding showed that technical drawing teachers are faced with a lot of challenges which hinder their effective use of the available devices.
3. The technical drawing teachers strongly agreed on the identified strategies for improving the use of e-learning devices in our technical Colleges in North-Central Nigeria.
4. There was no significance difference between the mean rating of male and female technical drawing teachers on the e-learning devices available for teaching technical drawing in technical Colleges in North-Central Nigeria hence the null hypothesis was accepted
5. The null hypothesis was accepted indicating that there was no significant difference in the mean ratings of male and female technical drawing teachers in this technical Colleges in North-Central Nigeria still encountered a lot of problems in use of e-learning devices in teaching
6. The null hypothesis was accepted since there was no significance difference between the mean rating of male and female technical drawing teachers on the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical Colleges in North-Central Nigeria.

DISCUSSION F FINDINGS

The result obtained from Table 1 showed that the technical and vocational schools in Niger State have some e-learning devices and infrastructure such as computers, laptops, computer laboratories and standby generators while some other devices like CD-ROMs/ flash drives, projectors, slides and audio-visual devices were not available for teachers to work with. The findings are in line with the works of Evoh, (2021) who lamented that e-learning facilities such as on-line classrooms, slides and projectors for teachers were not available for teaching. In agreement with the above finding electronic softwares used for teaching learning technical drawing are Computer- Assisted Instruction (CAI), Video-Based Instruction and Game-Based Instruction (Abidoye & Omotunde, 2025). Finding by Anumkua, Uwa and Unagha (2016) identified the specific softwares used in technical colleges for teaching technical drawings to include, among others: ArchiCAD, AutoCAD, Ms Excel, Ms Word, Ms Access, Power Point and CorelDraw. The frequency at which these technologies are used seems to differ in individual institutions.

Table 2 sought to find out the problems encountered by technical drawing teachers in the use of e-learning devices. Such problems as lack of fund, irregular power supply, low computer literacy, lack of support from the government, insufficient bandwidth, inadequate ICT infrastructure and lack of time in the use of ICT devices affect the use of available e-learning devices. This finding agreed with the view of Abidoye and Omotunde (2025) who pointed out that teachers lack necessary competencies in using and operating educational software as well as connecting to the internet so as to source information on education. That is why Aboderin and Kumuyi (2023) advised that all the teachers should be trained to be familiar with e-leaning experiences as ongoing professional development. Also in agreement with the

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

submission by Scherer *et al.,* (2021) to the effect that whilst some technical drawing teachers have enthusiastically integrated e-technologies like computers and Internet in the discharge of their responsibilities, others have been cautious in their welcome while some simply reject these technologies. He pointed out the major challenges to the use of e-technologies for teaching and learning in our colleges are insufficient infrastructure and poor funding. Al-Suqri (2021) also reported the issue of poor Internet connection speed and the constraints of public power supply emphasizing that electronic resources can be destroyed by frequent power failures and hacking.

From the analysis on Table 3, it was found out that the respondents strongly agreed that seminars and workshops for technical drawing teachers, employing enough ICT teachers in technical Colleges in North-Central Nigeria, involving public private partnership in funding e-learning programs, improving power supply and bandwidth as well as setting up monitoring team to monitor the use of available devices are effective strategies for improving the use of e-learning devices in teaching technical drawing. This finding is in line with the view of Martin and Bolliger (2022) who stated that certain things are needed to enable e-learning programmes spread fast. Such things according to Martin and Bolliger include adequate funding, increased power supply, sufficient bandwidth as well as well-trained ICT teachers. In agreement with Rogers-Shaw *et al.* (2023) heightened emphasis on the Internet as a facilitator of teaching and learning to be reinforced and he says further that e-learning is a type of learning supported by information and communication technology (ICT) via the Internet, intranets, extranets or many others to improve the quality of teaching and learning and for this internet to be effective a wide broadband is needed. Dritsas and Trigka (2025) also drew attention to the challenges arising from the high cost of e-technologies. Bashir and Lapshun (2024) pointed out that stressing that high cost e-learning devices a lot of funds are needed to purchase, install, service/maintain and update various electronic devices for optimal performance. The hypothesis stated that there was no significance difference between the mean ratings of male and female technical drawing teachers in the use of e-learning devices. The result in Table 4, 5 and 6 showed that the calculated t- value was less than the critical value at 0.05, level of significance and so the null hypothesis was accepted. This implies that male and female technical drawing teachers did not differ in their mean responses on the e-learning devices available for teaching technical drawing in technical Colleges in North-Central Nigeria, problems encountered in the use of e-learning devices and the Strategies for improving the use of e-learning devices in teaching technical drawing subjects in technical Colleges in North-Central Nigeria.

CONCLUSION

The study addressed the strategies for improving the available e-learning devices for teaching of technical drawing in technical Colleges in North-Central Nigeria. The findings showed that some of the devices needed in e-learning are still lacking such as internet connectivity, laptops for teachers as well as basic software. Even where computers are found in these technical and vocational schools, the teachers encounter lot problems in their usage. Such problems include irregular power supply, low computer literacy on the part of teachers, and lack of internet connection. However, the use of e-learning in teaching technical drawing subjects in these technical Colleges in North-Central Nigeria would be realized if certain strategies are put in place. Such strategies as seminars and workshops for teachers, increasing bandwidth, improving power supply, provision of adequate e-learning infrastructural facilities, setting up a monitoring team to monitor the use of available devices as well as involving public private partnership in the funding of e-learning programs. As Nigeria joins the rest of the world in the transformation of the education sector through e-learning, it has become imperative for teachers of technical drawing subjects to be adequately prepared in the area of ICT. ICTs and other e-learning technologies does not only extend and expand peoples' ability to access information; they provide new opportunities for both

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

teachers and students to transform conventional schools or colleges and university systems and bring advantages and other benefits to the entire country. Students go online to complete teacher-directed research activities and support the attainment of summary is that availability of electronic information resources tremendously improve the quality of research.

RECOMMENDATIONS

Based on the findings, the following recommendations are made

1. Seminars and workshops should be organized regularly by Niger State ministry of education and science and technical schools board for pre-service and in-service teachers to make them develop positive attitude towards e-learning.
2. Federal and State Governments should partner with schools to fund e-learning programmes.
3. The State ministry of education and science and technical schools board should set up monitoring team to monitor the use of the available e-learning facilities.
4. Efforts should be made by the Federal Government to supply of electricity continuously to schools.
5. Niger State Government should make Laptops readily available to all the technical and vocational school teachers.

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.

REFERENCES

Abidoye, J. A. & Omotunde, C. T. (2025). Effect of computer animation package on senior secondary school students' academic achievement in geography in Ondo State, Nigeria. *Journal of Teaching and Teacher Education,* 3 (2), 23 - 40.

Aboderin, O. S., & Kumuyi, G. J. (2023). The problems and prospects of E-learning in curriculum implementation in secondary schools in Ondo state, Nigeria. *International Journal of Educational Research and Technology*, 4(1), 90–96.

Ajuwon, G. A. (2023). Computer and Internet use by first year clinical and nursing students in a Nigerian teaching hospital. *BMC Medical Informatics and Decision Making,* 10 (3) 12 - 23.

Al-Suqri, M. N. (2021). Information seeking behaviour of social science scholars in developing countries: a proposed model. Utilization of e-Learning Technologies amongst Selected Undergraduate Students in a Nigerian University of Agriculture: *The Umudike Study International Information and Library Review,* 54 (2), 250-255.

Anumkua, C. U., Uwa, I. N. & Amanze-Unagha, B. (2016). Use of Internet-based library service by students of Imo State University, Owerri, Nigeria. *Ebonyi Journal of Library and Information Science,* 3 (1), 243 - 254.

Bashir, S., & Lapshun, A. L. (2024). E-learning future trends in higher education in the 2020s and beyond. *Cogent Education*, *12*(1), 24-44

Dritsas, E., & Trigka, M. (2025). Methodological and Technological Advancements in E-Learning. *Information*, *16*(1), 56-72

Evoh, C.J. (2021). Policy network and the transformation of secondary education through ICTs in Africa. The prospects and the challenges of NEPAD schools initiatives. *International Journal of Education and Development*.3 (1), 24-30.

Federal Republic of Nigeria (2013). *National Policy on Education.* Lagos: NERDC Press.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The Difference between Emergency Remote Teaching and Online Learning. *EDUCAUSE Review*. Retrieved from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Khalil, H., Elkhider, I., & Ahmed, S. (2023). The role of digital transformation in higher education: A review. *Education and Information Technologies*, 28(10), 13231–13254. https://doi.org/10.1007/s10639-023-11601-2

Marriot, S.I. (2019). Concepts of e-learning solutions: Better or worse. Retrieved on August 2nd, 2012 from http://www.articlegold.com.

Martin, F., & Bolliger, D. U. (2022). Engagement Matters: Student Perceptions on the Importance of Engagement Strategies in the Online Learning Environment. *Online Learning Journal*, 26(1), 137–156. https://doi.org/10.24059/olj.v26i1.2623

Rajasekaran, S., Adam, T., & Tilmes, K. (2024). *Digital Pathways for Education: Enabling Greater Impact for All*. World Bank. https://doi.org/10.1596/42386

Rogers-Shaw, C., Carr-Chellman, D. J., & Choi, J. (2023). Universal Design for Learning and Digital Accessibility in Online Education: A Systematic Review. *International Journal of Inclusive Education*, 27(1), 106–123.

Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for online teaching and learning in higher education: Who's ready? *Computers in Human Behavior, 118*, 106675. https://doi.org/10.1016/j.chb.2020.106675

Corresponding author: Shaluko Yohanna Doma
abramjs@gmail.com
School of Vocational and Technical Education, Department of Electrical, Electronics, College of Education, Minna.