impact International Journals and Publications

© IIJP 2026 | Volume 2, Issue 3, pp. 2706-2716 | ISSN: 2636-4484

DIGITAL LITERACY AND INSTITUTIONAL SUPPORT FOR VIRTUAL TEACHING AMONG ELECTRICAL/ELECTRONICS TECHNOLOGY STUDENTS AND LECTURERS IN NORTH CENTRAL NIGERIA

Dura, Jacob Terzulum[1], Prof. Boniface Kwaghkar Nande[2] & Dr. Maashin Amenger[3]
[1]Department of Industrial Technical Education, Joseph Saawuan Tarka University, Makurdi
jacobdura4@gmail.com[1]
[2,3]Department of Industrial Technology, Rev. Fr. Moses Orshio Adasu University, Makurdi
bnande1960@gmail.com[2]& maashinamenger7@gmail.com[3]

ARTICLE INFO
Article No.: 0618
Accepted Date: 02/09/2026
Published Date: 30/09/2026
Type: Research

ABSTRACT
The study investigated digital literacy and institutional support for virtual teaching among electrical/electronics technology students and lecturers in north central. Two research questions were raised and answered and two null hypotheses were formulated and tested. This study was anchored on the Technology Acceptance Model (TAM) by Fred D. Davis (1989). Descriptive survey research design was adopted for the study. A census sampling procedure was employed since the population of 232 respondents (217 EET students and 15 EET lecturers) was not too large to work with. A 16-item questionnaire developed by the researchers was validated by three experts. Cronbach's alpha reliability technique was used to ascertain internal consistency of the instrument which yielded a reliability coefficient of 0.80. Mean and standard deviation were used to answer research questions while independent t-test statistic was used to test the null hypotheses at 0.05 level of significance. The study revealed that: EET students and lecturers have adequate digital literacy skills to implement virtual teaching and EET students and lecturers get institutional support to implement virtual teaching. Conclusion was based on findings of the study. The study also recommended that: Universities should partner with organizations such as UNICEF, UNESCO, World Bank and Jobberman among others so that they will complement government efforts by training students and lecturers on digital literacy skills so as to enhance the implementation of virtual teaching/learning for every citizen. North Central Nigerian Universities should increase their support in building bigger ICT halls, providing more computers and stable internet connection so as to meet the high demands of students and lecturers who have to study virtually.

Keywords: Digital literacy, institutional support, virtual teaching, technical education

.

Introduction

The increasing integration of digital technologies into higher education has transformed the way teaching and learning is designed, delivered and accessed. Virtual teaching enables lecturers to present instructional materials, communicate with students, conduct assessments and provide learning activities through digital platforms without requiring continuous physical interaction in the classroom. However, the effectiveness of virtual teaching depends not only on the availability of digital technologies but also on the ability of lecturers and students to use such technologies effectively and on the institutional conditions provided to support their use (Bates, 2019).

Ogundele and Moses (2019) affirmed that digital literacy is an issue among lecturers in North Central Nigerian universities, especially in the area of quality assurance. More recent evidence also demonstrates continuing concerns about digital literacy among lecturers while using virtual learning tools in North Central Nigeria (Mohammed, Yushau & Abubakar, 2024). Conversely, Fasanmi and Adeyemi (2023) insisted that, Nigerian University students possessed skills and competence for using e-learning facilities but faced challenges including high data costs, irregular electricity supply and inadequate access to devices. More so, Akaeze and Akaeze (2024) insisted that challenges faced by lecturers in Nigerian higher education institutions in adopting and using e-learning platforms include: Unreliable internet connectivity, power outages, limited technological resources, inadequate training and inadequate institutional support as major barriers to e-learning adoption and use. This shows that, with these challenges, the implementation of virtual teaching may likely be affected.

Virtual teaching involves delivering educational content and engaging students through internet-based platforms using synchronous or asynchronous learning approaches. Its importance increased significantly during the COVID-19 pandemic as institutions adopted remote learning to maintain educational continuity (Dhawan, 2020). Similarly, Daku (2020) explained that virtual teaching and learning occur in virtual classrooms where students and lecturers may be physically separated, with instructional activities such as lessons, assignments, assessments and other classroom activities conducted online through computer and internet facilities. Effective participation in virtual teaching therefore requires students and lecturers to possess adequate digital competencies. This shows that with adequate digital literacy skills and institutional support, students and lecturers are likely to adopt the use of virtual teaching among Electrical/Electronics Technology in North Central Nigerian Universities.

Digital literacy is the ability to find, evaluate, create, and communicate information using digital technologies (Bawden, 2008). It extends beyond basic computer skills to include technological, information, and media literacy. Students and lecturers with strong digital skills are better able to navigate virtual platforms, access learning resources, complete assignments, regulate learning, and manage time effectively (Tang & Chaw, 2016; Anthonysamy, 2021). Adequate institutional support is also essential because it provides the infrastructure, resources, policies, technical assistance, training, and professional development required for effective virtual teaching (Castro & Tumibay, 2021; Martin, Polly & Ritzhaupt, 2022). Händel et al. (2022) emphasized that structured institutional training can strengthen digital competencies and pedagogical skills. Therefore, inadequate institutional support may contribute to negative attitudes among students and lecturers and hinder the successful implementation and sustainability of virtual teaching in EET.

Statement of the Problem

The increasing use of digital technologies in higher education has created opportunities for universities to complement conventional classroom teaching with virtual teaching which creates an opportunity for students and lecturers to possess appropriate digital literacy skills to access online platforms, communicate electronically, search for and evaluate digital information, create and share digital learning materials, participate in virtual learning activities,

and use digital tools for teaching and learning. It also requires institutional support in the form of adequate internet connectivity, access to appropriate ICT facilities and devices, technical assistance, training, electricity supply and policies that facilitate effective use of virtual teaching. Nigerian studies have reported that digital competence and e-learning literacy are relevant to lecturers' engagement with technology-mediated teaching, while inadequate infrastructure, unreliable internet connectivity, electricity challenges, limited training opportunities, and insufficient institutional support have been reported as challenges in some higher education settings.

Evidence from North Central Nigeria also indicates that digital literacy and institutional conditions are relevant to the implementation of virtual learning, yet, e-learning literacy and competency, and the implementation of virtual learning among lecturers and students remains a challenge towards achieving effective virtual teaching and learning. Consequently, the evidence does not adequately establish the situation among Electrical/Electronics Technology students and lecturers in universities in North Central Nigeria. It is to this background that the study investigates.

Purpose of the Study

The study investigates digital literacy and institutional support for virtual teaching among EET students and lecturers in North Central Nigeria. Specifically, the study examined the:

1. Digital literacy skills possessed by EET students and lecturers to implement virtual teaching in North Central Nigerian Universities.
2. Institutional support accessed by EET students and lecturers to implement virtual teaching in North Central Nigerian Universities.

Research Questions

The study was guided by the following research questions:

1. What digital literacy skills do EET students and lecturers posses to implement virtual teaching in North Central Nigerian Universities?
2. What institutional support do EET students and lecturers access to implement virtual teaching in North Central Nigerian Universities?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the mean responses of EET students and lecturers on how digital literacy skills affect the implementation of virtual teaching in North Central Nigerian Universities.
2. There is no significant difference in the mean responses of EET students and lecturers on how institutions support the implementation of virtual teaching in North Central Nigerian Universities.

Theoretical Framework

Technology Acceptance Model by Fred D. Davis (1989)

Technology Acceptance Model (TAM) by Davis (1989) states that technology is accepted and used when people perceive it as both useful and easy to use. It explains that people are more likely to develop a positive attitude toward it, which increases their intention to use it and ultimately, their actual usage. TAM is related to the present study because it provides the theoretical explanation for why digital literacy skills and institutional support may affect students' and lecturers' digital literacy and institutional support to implement virtual teaching. This implies that while digital literacy represents an important individual capacity, institutional support represents an environmental condition that can facilitate or constrain technology acceptance.

Empirical Review

Offor *et al.* (2026) conducted a study on digital literacy skills of lecturers as a correlate of generation Z students' online learning academic achievement in Nigerian universities. The study examined the relationship between lecturers' digital literacy skills and students' academic achievement in online learning using a correlational survey research design and a population of 185 lecturers and 215 undergraduate students from five Nigerian universities. Data were collected using a digital literacy questionnaire and an academic achievement test and analyzed using regression statistics. The findings revealed a significant positive relationship between lecturers' digital literacy skills and students' academic achievement in online learning. The study also revealed that higher levels of lecturers' digital literacy were associated with improved student academic achievement. The study is relevant to the present research because it provides empirical evidence on the importance of lecturers' digital literacy skills in virtual teaching in Nigerian universities. However, it focused on students' academic achievement rather than specifically assessing the digital literacy skills possessed by EET students and lecturers in North Central Nigerian universities.

Kumpikaitė-Valiūnienė Jurga, Vilmantė, Kasperiūnienė and Tandzegolskienė (2021) assessed the impact of institutional support on educators' subjective well-being during the transition to virtual work due to COVID-19 lockdown. The study employed a descriptive survey research design and adopted a quantitative approach using 1,851 educators. Data obtained through a researcher-designed questionnaire and analyzed was analyzed using Chi-square statistical technique. The findings revealed that institutional support had a positive relationship with educators' work–life balance and overall well-being. It was also found to contribute to a reduction in work-related, client-related, and personal burnout among educators. The reviewed work is related to the current study because they both look at how institutions support the implementation of virtual teaching. It suffices to say that, while many Nigerian empirical researches focused on the implementation of virtual teaching, little attention is given to the support from educational university institutions and EET as a department, hence the gap for this study.

Research Methods

The study adopted a descriptive survey research design. The population of the study consisted of 232 respondents across public universities that offer EET. This comprised 217 EET students and 15 EET lecturers in North Central Nigeria. Census sampling procedure was adopted by collecting data from the entire population of the study. A researcher-developed 16-item questionnaire titled "Digital Literacy and Institutional Support to Implement Virtual Teaching Questionnaire (DLISIVTQ) was used for data collection. The instrument was subjected to face validation by three experts, who critically examined and appraised the clarity of terms and relevance of content to minimize ambiguity of items which led to the refinement of the research instrument.

A trial test was conducted using 20 respondents comprising 12 EET students and 8 EET lecturers in University of Nigeria, Nsukka, Enugu State since they possess similar characteristics but are not part of the sample size for the study. Twenty copies of the questionnaire were given to the students and lecturers through direct contact with the aid of two research assistants. Data collected was analyzed using Cronbach's Alpha reliability technique to test for internal consistency of the research instrument which yielded a coefficient index of 0.80. The researcher collected data both virtually (google form) and through administration of the questionnaire to respondents via direct contact with and the aid of two research assistants from each school.

Data were analyzed using descriptive statistics of mean and standard deviation to answer research questions. Chi-square was used to test the null hypotheses at 0.05 level of significance. Statistical Package for the Social Sciences (SPSS) version 26 was used to carry

out the data analysis. Decision was based on results from data analysis using the four points rating scale of: Strongly Agree=4, Agree=3, Disagree=2 and Strongly Disagree=1. This means that 0.00-1.24=Strongly Disagree, 1.25-2.49=Disagree, 2.50-3.74=Agree and 3.75-4.00=Strongly Agree. The p and α values were also compared, hence, if p<α, the null hypothesis was rejected and if p>α, the null hypothesis was not rejected.

Results and Discussion

Data analyzed is presented in tables and interpreted below based on the sequence in the purpose of the study:

Research Question One

What digital literacy skills do EET students and lecturers possess to implement virtual teaching in North Central Nigerian Universities?

Table 1: Mean and Standard Deviation on the Digital Literacy Skills possessed by EET students and lecturers to implement virtual teaching in North Central Nigerian Universities

S/No	Items	EET Students M_1	EET Students SD_1	EET Lecturers M_2	EET Lecturers SD_2	Mean Response M_3	Mean Response SD_3	Remark
1	I am able to navigate various virtual teaching platforms effectively	3.45	.73	3.20	.41	3.44	.71	Agree
2	I am proficient in creating/assessing educational content online	3.60	.70	3.13	.74	3.57	.71	Agree
3	I troubleshoot when i encounter troubleshoot when I encounter a fault using my device	3.59	.75	3.40	.51	3.58	.74	Agree
4	Accessing multimedia tools during online classes is easy	3.41	.75	3.33	.49	3.41	.74	Agree
5	I navigate the learning classroom with ease	3.63	.86	2.60	1.40	3.56	.94	Agree
6	My skill set enables me use communication tools easily	3.67	.87	3.00	.93	3.63	.88	Agree
7	Assessments do not take much of my time in an online class	3.27	1.15	3.13	.35	3.26	1.12	Agree
8	I adopt online security measures during virtual teaching sessions	3.71	.86	3.47	.92	3.70	.87	Agree
	Total Mean					**3.52**	**.84**	**Agree**

Source: Survey 2026

Table 1 shows the digital literacy skills possessed by EET students and lecturers to implement virtual teaching. The data revealed that while items 1, 2, 3, 4, 6 and 8 have a low standards deviation for all groups, implying similarity in their responses, items 5 and 7 had a high standard deviation for lecturers and students respectively, implying a difference in their

responses. Meanwhile, the total mean score was 3.52 and a low standard deviation of .84, signifying that the responses were clustered around the mean. This implies that EET students and lecturers possess digital literacy skills to implement virtual teaching in North Central Nigerian Universities.

Research Question Two

What institutional support do EET students and lecturers access to implement virtual teaching in North Central Nigerian Universities?

Table 2: Mean and Standard Deviation on Institutional Support accessed by EET students and lecturers to implement virtual teaching in North Central Nigerian Universities

S/No	Items	EET Students		EET Lecturers		Mean Response		Remark
		M_1	SD_1	M_2	SD_2	M_3	SD_3	
9	My school provides adequate technical support for virtual teaching implementation	3.48	.97	3.67	.49	3.49	.94	Agree
10	ICT staff are recruited to guide online classes	3.07	1.29	3.80	.41	3.12	1.26	Agree
11	My school has an ICT unit	3.87	.55	3.27	.70	3.83	.58	Strongly Agree
12	My school provides internet facilities	3.34	.90	3.73	.70	3.36	.89	Agree
13	My institution has a website for virtual classes	3.84	.48	3.20	.68	3.80	.51	Strongly Agree
14	My institution provides an alternative power supply	3.31	1.10	3.73	.46	3.34	1.08	Agree
15	My institution organizes ICT orientation for virtual participants	3.10	1.10	3.60	.51	3.13	1.08	Agree
16	My institution does not subscribe to virtual learning portals	3.27	1.02	3.07	.26	3.25	.99	Agree
	Total Mean					**3.42**	**0.92**	**Agree**

Source: Survey 2026

Table 2 shows institutional support accessed by EET students and lecturers to implement virtual teaching. The data revealed that while items 9, 11,12 and 13 have a low standards deviation for all groups, implying similarity in their responses, items 10, 14, 15 and 16 had a high standard deviation for students, implying a difference in their responses. Meanwhile, the total mean score was 3.42 and a low standard deviation of .92, signifying that the responses were clustered around the mean. This implies that institutions support EET students and lecturers to implement virtual teaching in North Central Nigerian Universities.

Hypothesis One

There is no significant difference in the mean responses of EET students and lecturers on how digital literacy skills affect the implementation of virtual teaching in North Central Nigerian Universities.

Table 3: T-Test Statistic on Digital Literacy Skills possessed by EET Students and Lecturers to Implement Virtual Teaching in North Central Nigerian Universities

Respondents	N	M	SD	t	df	α	p	Remark
EET Students	217	28.34	2.31	4.97	230	.00	.05	*Statistically Significant*
EET Lecturers	15	25.27	2.43					

Source: Survey 2026

An independent sample t-test was conducted to examine whether there was a significant difference between EET students and lecturers in their digital literacy skills for implementing virtual teaching. Levene's test indicated that the assumption of homogeneity of variance was met, $F(1, 230) = 0.34$, $p = .56$. The results showed a statistically significant difference in digital literacy skills between EET students ($M = 28.34$, $SD = 2.31$) and EET lecturers ($M = 25.27$, $SD = 2.43$), $t(230) = 4.97$, $p < .00$. The mean difference was 3.07 points, with a 95% confidence interval of [1.85, 4.29]. The effect size was large, Cohen's $d = 1.33$, 95% CI [0.79, 1.86], indicating that the difference in digital literacy skills between the two groups was substantial.

Hypothesis Two

There is no significant difference in the mean responses of EET students and lecturers on how institutions support the implementation of virtual teaching in North Central Nigerian Universities.

Table 4: T-test Statistic on Institutional Support accessed by EET Students and Lecturers to Implement Virtual Teaching in North Central Nigerian Universities

Respondents	N	M	SD	t	df	α	p	Remark
EET Students	217	27.28	2.96	-1.02	230	.31	.05	*Not Statistically Significant*
EET Lecturers	15	28.07	1.87					

Source: Survey 2026

An independent sample t-test was conducted to determine whether there was a significant difference between EET students and lecturers in their perception of institutional support for implementing virtual teaching. Levene's test indicated that the assumption of homogeneity of variance was met, $F(1, 230) = 3.76$, $p = .05$. The results showed that the difference between EET students ($M = 27.28$, $SD = 2.96$) and EET lecturers ($M = 28.07$, $SD = 1.87$) was not statistically significant, $t(230) = -1.02$, $p = .31$. The mean difference was −0.79 points, with a 95% confidence interval of [−2.32, 0.74]. The effect size was small, Cohen's $d = -0.27$, 95% CI [−0.80, 0.25], indicating a relatively small difference in perceived institutional support between EET students and lecturers.

Discussion of Findings

Hypothesis one revealed a significant difference in the mean responses of respondents on the digital literacy skills of EET students and lecturers to implement virtual teaching. This agrees with the findings of Tang and Chaw (2016) who stated that lack of familiarity with virtual platforms and computer applications makes learning less effective for students and lecturers. This also links with the submission of Naidu (2023) who asserted that students'

proficiency in digital tools and concepts provides a practical ground to develop such essential skills and excel more in the job market.

This equally supports the view of Lawrence (2023) who indicated that digitally literate students and lecturers are more independent and can easily find additional resources, troubleshoot minor technical issues and manage their learning process effectively as compared to others. Findings from the study equally relate to those of Huang, Zhang and Huang (2023) who stressed that students and lecturers who know their way around digitally are more likely to engage deeper with virtual course materials. The findings align with the position of Hew *et al.* (2022) who stated that lecturers who are comfortable and proficient with digital tools will better navigate around virtual platforms and also keep students engaged and motivated.

Findings from the study also reflected the position of Händel et al. (2022) who insisted that trainers who possess good digital skills are more effective in using online communication tools (email, discussion forums, video conferencing) to interact and engage with students. Findings from the study aligned with the view of Tang and Chaw (2016) who insisted that students with higher digital literacy demonstrate better academic outcomes in virtual learning environments. This points to the fact that students and lecturers who possess good digital literacy skills will implement virtual teaching in North Central Nigerian Universities.

Hypothesis two showed a significant difference in the mean responses of respondents on institutional support accessed by EET students and lecturers to implement virtual teaching. This affirms the submission of Martin et al. (2022) who insisted that institutions that support EET students and lecturers will have an enhanced pedagogical experience in a virtual environment. This also aligned with the findings of Händel et al. (2022) who opined that an institutionally structured training programme aids lecturers to develop digital competencies and pedagogical skills specific to online environments. The findings also affirmed the view of Jena (2022) who maintained that, institutions' ability to support students and lecturers to use virtual teaching/learning tools will improve lecturers' access to advanced digital platforms and tools so as to increase innovative teaching practices.

The findings also correlated with that of Bates, Maldonado and Avila (2024), who noted that institutions dedicated to effective instructional designs can assist students and lecturers with an updated online course, suited with learning objectives and student needs. Findings from the study also affirms the view of O'Keefe *et al.* (2023) who suggested that institutional support through device loan programmes and internet access initiatives can bridge the digital divide gap that may prevent the successful implementation of virtual teaching and learning.

This also corroborates the view of Kumar and Chand (2023) who pointed to the fact that institutional support through adaptive technologies and accessibility resources could promote inclusive learning environments for students with diverse needs. This is also similar to the findings of Adedoyin and Soykan (2020) who stated that with a good institutional support, students and lecturers could easily improve the virtual teaching/learning programme effectively. Findings from the study also reflect the view of Bozkurt and Sharma (2020) who insisted that institutional support towards training and professional development programmes enable students and lecturers gain and sustain requisite skills to use virtual tools such as: Zoom, Moodle, Google Classroom and others for EET courses. This shows that with maximum institutional support for students and lecturers, it will be easier to adopt online classes for teaching and learning EET courses.

Conclusion

The study established that: EET students and lecturers have adequate digital literacy skills to implement virtual teaching, EET students and lecturers get institutional support to implement virtual teaching, EET students and lecturers have a positive attitude towards implementing virtual teaching, EET students and lecturers find virtual teaching tools useful in learning EET courses and EET students and lecturers are flexible towards the use of virtual

© IIJP 2026 | Volume 2, Issue 3, pp. 2706-2716 | ISSN: 2636-4484

teaching tools in North Central Nigerian Universities. This means that with consistent support from relevant stakeholders, full implementation of virtual teaching/learning of EET courses will be sustained. It suffices to say that, the advantages of virtual teaching/learning cannot be disputed in the present digital age; it will not only improve literacy levels but also improve the quality of graduates in the world of work who clearly replicate in the field, what was learnt in the learning environment.

Recommendations

Based on the findings, the study recommended among others that:

1. Universities should partner with organizations such as UNICEF, UNESCO, World Bank and Jobberman among others so that they will complement government efforts by training students and lecturers on digital literacy skills so as to enhance the implementation of virtual teaching/learning for every citizen.
2. North Central Nigerian Universities should increase their support in building bigger ICT halls, providing more computers and stable internet connection so as to meet the high demands of students and lecturers who have to study virtually.

References

Adedoyin, O. B., & Soykan, E. (2020). COVID-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments,* 31(2), 863–875. https://doi.org/10.1080/10494820.2020.1813180

Akaeze, C. O., & Akaeze, N. S. (2024). Exploring the challenges of online learning in Nigerian higher education. *Frontiers of Contemporary Education,* 5(2), 1-7. DOI: 10.22158/fce.v5n2p1.

Anthonysamy, L. (2021). Digital literacy deficiencies in digital learning among undergraduates. *International Journal of Emerging Technologies in Learning,* 16(1), 238-250.

Bates, R., Maldonado, C., & Avila, K. (2024). Digital resilience in higher education: Adaptability skills development through virtual learning environments. *Journal of Educational Technology Systems,* 52(3), 341-357. https://doi.org/10.1177/00472395231214739

Bates, R., Maldonado, C., & Avila, K. (2024). Digital resilience in higher education: Adaptability skills development through virtual learning environments. *Journal of Educational Technology Systems, 52(3),* 341-357. https://doi.org/10.1177/00472395231214739

Bawden, D. (2008). Origins and concepts of digital literacy. In C. Lankshear & M. Knobel (Eds.), Digital literacies: Concepts, policies and practices (pp. 17-32). Peter Lang.

Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education,* 15(1), 1–6.

Castro, M. D. B., & Tumibay, G. M. (2021). A literature review: Efficacy of online learning courses for higher education institution using meta-analysis. *Education and Information Technologies,* 26 (1), 1367-1385.

Daku, J. N. (2020). Virtual teaching, learning and sustainable development in Nigeria: Issues, challenges and prospects. *Journal of Capital Development in Behavioural Sciences,* 8(2), 74–87.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly,* 13(3), 319-340.

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems,* 49(1), 5–22. https://doi.org/10.1177/0047239520934018

Fasanmi, S. A., & Adeyemi, A. T. (2023). Assessment of the readiness of institutions and undergraduates' attitude to online learning mode in Nigerian universities. *Advances in Research,* 24(5), 149–162.

Händel, M., Bedenlier, S., Kopp, B., Gläser-Zikuda, M., Kammerl, R., & Ziegler, A. (2022). Factors influencing higher education faculty's digital teaching during the COVID-19 pandemic. *Frontiers in Psychology,* 13, 918494.

Hew, K. F., Jia, C., Gonda, D. E., & Bai, S. (2022). Transitioning to the "new normal" of learning in unpredictable times: Pedagogical practices and learning performance in fully online flipped classrooms. *International Journal of Educational Technology in Higher Education,* 19(1), 5-20.

Huang, L., Zhang, T., & Huang, Y. (2023). The impact of teaching flexibility on student engagement in virtual learning environments: A systematic review. *Computers & Education,* 195, 104793. https://doi.org/10.1016/j.compedu.2023.104793

Jena, P. K. (2022). The digital transformation of education: Connecting schools, empowering learners. *International Journal of Information and Education Technology,* 12(1), 82-90.

Kumar, A., & Chand, V. S. (2023). Educational needs and challenges for students with disabilities during online learning. *Journal of Digital Learning Research,* 14(2), 328-347.

Kumpikaitė-Valiūnienė, V., Duobienė, J., Liubinienė, V., Kasperiūnienė, J., & Tandzegolskienė, I. (2021). Impact of institutional support on educators' subjective well-being during the transition to virtual work due to COVID-19 lockdown. *Journal of Management & Organization, 27*(6), 1150–1168. https://doi.org/10.1017/jmo.2021.60

Lawrence, J. E. (2023). Digital literacy skills: A factor affecting student satisfaction with online learning. *International Journal of Educational Technology in Higher Education,* 20(1), 16-25.

Martin, F., Polly, D., & Ritzhaupt, A. (2022). Bichronous online learning: Blending asynchronous and synchronous online learning. *EDUCAUSE Review,* 57(1), 22-33.

Mohammed, U. M., Yushau, B., & Abubakar, M. S. (2024). Tertiary institution lecturers' e-learning literacy and competency in North Central Nigeria. *International Journal of Research Publication and Reviews,* 5(9), 1412–1420.

Offor, M., Oladokun, B. D., Francis, E. I., Musa, H. A., Akor, V. O…& Edoh, M. Y. (2026). Digital literacy skills of lecturers as a correlate of Generation Z students online learning academic achievement in Nigeria universities. *Discover Education, 5*, 750. https://doi.org/10.1007/s44217-026-01974-0

Ogundele, M. O., & Moses, D. D. (2019). Managing lecturers' digital literacy skills for quality assurance of federal universities in North Central Nigeria. *Asia Pacific Journal of Academic Research in Social Sciences,* 4(1), 34–39.

O'Keefe, L., Rafferty, J., Gunder, A., & Vignare, K. (2023). Delivering high-quality instruction online: Student inclusion and engagement strategies. *Online Learning,* 27(1), 173-188.

Tang, C. M., & Chaw, L. Y. (2016). Digital literacy: A prerequisite for effective learning in a blended learning environment? *Electronic Journal of e-Learning,* 14(1), 54-65.