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ASSESSMENT OF DIGITAL PEDAGOGY AND E-LEARNING PRACTICES ON TEACHING EFFECTIVENESS IN COLLEGES OF EDUCATION IN KWARA STATE, NIGERIA

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ABSTRACT

This study assessed the level of digital pedagogy competence, utilization of e-learning practices, and their influence on teaching effectiveness among lecturers in Colleges of Education in Kwara State, Nigeria. A descriptive survey research design was adopted. The population comprised 428 lecturers from three public Colleges of Education in the State. Using proportionate stratified random sampling technique, a sample of 205 lecturers was selected. The Digital Pedagogy and E-Learning Practices Questionnaire (DPELPQ) served as the instrument for data collection. Data were analyzed using mean, standard deviation, and Pearson Product-Moment Correlation (PPMC) at 0.05 level of significance. Findings revealed a high level of digital pedagogy competence among lecturers (Grand Mean = 3.77), high utilization of e-learning practices (Grand Mean = 3.86), and high teaching effectiveness (Grand Mean = 3.634). The results of the hypotheses showed a statistically significant positive relationship between digital pedagogy and teaching effectiveness (r = 0.180, p = 0.003) and between e-learning practices and teaching effectiveness (r = 0.130, p = 0.004). The study concluded that digital pedagogy and e-learning practices have significant, though weak, positive influence on teaching effectiveness. It was recommended that regular training, improved infrastructure, and institutional policies be strengthened to enhance lecturers' digital competencies for better teaching outcomes in Colleges of Education.

Keywords: Digital Pedagogy, E-Learning Practices, Teaching Effectiveness,

Introduction

The integration of digital pedagogy and e-learning practices has become a central focus in modern education systems, particularly in higher institutions responsible for teacher preparation. In Nigeria, Colleges of Education play a critical role in producing qualified teachers, making the adoption of effective digital teaching strategies essential. Digital pedagogy involves the use of technology to enhance teaching and learning processes, while e-learning practices encompass the use of digital platforms, tools, and resources to facilitate instruction. Studies have shown that the use of e-learning resources and digital tools can significantly improve instructional delivery and learning outcomes. For instance, Nwana et al. (2017) observed that the utilization of e-learning resources among lecturers in Colleges of Education enhances teaching efficiency, although the level of usage

remains inconsistent. Similarly, Eze et al. (2018) reported that effective use of e-learning facilities improves the quality of educational delivery in Nigerian institutions.

The COVID-19 pandemic further accelerated the adoption of digital learning in Nigeria, exposing both opportunities and challenges associated with online education (Egielewa et al., 2021). Despite this shift, many educators still face challenges such as inadequate digital competence, poor infrastructure, and limited access to technological tools. Olurinola and Olugbade (2024) emphasized that teacher training in digital pedagogy significantly improves educators' competence and confidence in using technology for instruction. In addition, studies such as Omosekejimi et al. (2019) and Abdulrazak and Adeoye (2024) highlight that digital literacy and availability of e-learning resources are critical factors influencing teaching effectiveness. However, disparities in access and utilization persist across institutions. Karofi (2023) and Agbogo *et al.* (2024) further noted that while digital-based learning can enhance teaching productivity and programme sustainability, challenges such as inadequate infrastructure and resistance to change continue to hinder full implementation. Although several studies have been conducted in different parts of Nigeria, there is limited empirical evidence focusing specifically on Colleges of Education in Kwara State. Therefore, this study seeks to assess digital pedagogy and e-learning practices and their influence on teaching effectiveness in this context.

Statement of the Problem

Digital pedagogy and e-learning enhance teaching effectiveness by enabling flexible, learner-centered instruction that integrates multimedia, interactivity, and data-driven feedback to improve student engagement and comprehension. They also expand access to education and support differentiated learning, allowing instructors to tailor content and pacing to diverse learner needs while maintaining consistency and scalability. Despite the growing emphasis on digital pedagogy and e-learning in Nigeria's education system, teaching effectiveness in Colleges of Education remains inconsistent. While digital tools and platforms have the potential to improve instructional delivery, their adoption and utilization among lecturers are still uneven. Previous studies have identified issues such as low digital competence, inadequate infrastructure, and poor integration of technology into teaching practices (Nwana et al., 2017; Karofi, 2023). Furthermore, although digital training initiatives have shown positive outcomes (Olurinola & Olugbade, 2024), many educators still struggle to effectively apply these skills in real classroom settings.

In Kwara State, there is limited data on how digital pedagogy and e-learning practices influence teaching effectiveness in Colleges of Education. This gap makes it difficult to determine whether current digital initiatives are achieving their intended outcomes. Therefore, the problem of this study is to assess the extent to which digital pedagogy and e-learning practices contribute to teaching effectiveness in Colleges of Education in Kwara State, Nigeria.

Purpose of the Study

The main purpose of this study was to assess the impact of digital pedagogy and e-learning practices on teaching effectiveness in Colleges of Education in Kwara State. Specifically, the study aims to:

1. Examine the level of digital pedagogy competence among lecturers;
2. Determine the extent of utilization of e-learning practices in teaching;
3. Assess the level of teaching effectiveness among lecturers;
4. Investigate the relationship between digital pedagogy and teaching effectiveness and
5. Examine the influence of e-learning practices on teaching effectiveness.

Research Questions

The following research questions were raised and answered to guide the study:

1. What is the level of digital pedagogy competence among lecturers in Colleges of Education in Kwara State?
2. To what extent are e-learning practices utilized by lecturers?
3. What is the level of teaching effectiveness among lecturers?

Research Hypotheses

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

H_{01}: There is no significant relationship between digital pedagogy and teaching effectiveness among lecturers.

H_{02}: E-learning practices have no significant influence on teaching effectiveness.

Scope and Delimitation of the Study

This study focused on the assessment of digital pedagogy and e-learning practices and their impact on teaching effectiveness in Colleges of Education in Kwara State, Nigeria. The study involved lecturers across selected Colleges of Education and examined variables such as digital competence, use of e-learning tools, and instructional effectiveness. The study was delimited to Colleges of Education located in Kwara State only, Lecturers as respondents; excluding students and administrators, Digital pedagogy and e-learning practices as independent variables, teaching effectiveness as the dependent variable. Other factors affecting teaching effectiveness, such as funding, curriculum design, and institutional policies, are not the primary focus of this study.

Literature Review

Theoretical Framework

This study on the Assessment of Digital Pedagogy and E-Learning Practices on Teaching Effectiveness in Colleges of Education in Kwara State, Nigeria is anchored on relevant educational and technology integration theories that explain how teaching effectiveness is influenced by the use of digital tools, pedagogical practices, and teachers' acceptance of technology. The theories adopted for this study are the Technological Pedagogical Content Knowledge (TPACK) Theory, Constructivist Learning Theory, and the Technology Acceptance Model (TAM). These theories provide a comprehensive explanation of how digital pedagogy and e-learning practices contribute to effective teaching in Colleges of Education.

Technological Pedagogical Content Knowledge (TPACK) Theory

The Technological Pedagogical Content Knowledge (TPACK) framework was developed by Mishra and Koehler (2006). The theory explains the complex relationship between three forms of teacher knowledge: content knowledge, pedagogical knowledge, and technological knowledge. According to the framework, effective teaching with technology occurs when teachers are able to appropriately integrate these three knowledge domains to deliver instructional content in a meaningful and engaging way. In the context of this study, TPACK is highly relevant because digital pedagogy requires lecturers to combine subject matter knowledge with appropriate teaching strategies and relevant technological tools. When lecturers possess adequate TPACK, they are more likely to design and deliver effective instruction using e-learning platforms, simulations, virtual laboratories, and multimedia resources.

Empirical support for this theory is found in the work of Nwana, Ofoegbu, and Ikechukwu (2017), who reported that lecturers' use of e-learning resources significantly influences instructional delivery in Colleges of Education. Similarly, Omosekejimi et al. (2019) found that ICT literacy skills enhance teaching efficiency in Nigerian Colleges of Education, Olurinola and Olugbade (2024) emphasized that digital pedagogy training improves teachers' competence and confidence in using technology for instruction. Therefore, TPACK provides a strong foundation for understanding how lecturers' digital competence and integration of technology into pedagogy influence teaching effectiveness in Colleges of Education in Kwara State.

Constructivist Learning Theory

The Constructivist Learning Theory is associated with the works of Jean Piaget and Lev Vygotsky. The theory posits that learners actively construct knowledge rather than passively receiving information. Learning is enhanced through interaction, collaboration, and engagement with meaningful learning experiences. In relation to digital pedagogy and e-learning, constructivism supports the idea that technology facilitates learner-centred instruction. Digital tools such as simulations, virtual classrooms, discussion forums, and multimedia presentations enable students to actively engage with learning content, explore concepts, and construct knowledge through experience. This theory is relevant to the present study because e-learning practices in Colleges of Education promote interactive and student-centred learning environments. Eze *et al.* (2018) found that the utilisation of e-learning facilities enhances educational delivery in Nigerian higher education institutions. Similarly, Egielewa *et al.* (2021) reported that online learning platforms during the COVID-19 pandemic increased student engagement and interaction in Nigerian universities.

Furthermore, Abdulrazak and Adeoye (2024) observed that the availability and utilisation of e-learning resources improve teaching and learning effectiveness in tertiary institutions. These findings support the constructivist view that meaningful learning occurs when students

actively engage with instructional content through digital platforms. Thus, Constructivist Learning Theory explains how digital pedagogy and e-learning practices enhance teaching effectiveness by promoting active student participation and engagement.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was developed by Fred Davis (1989) to explain users' acceptance and use of technology. The model posits that two major factors perceived usefulness and perceived ease of use determine an individual's intention to use technology, which in turn influences actual usage behavior. In this study, TAM is relevant in explaining lecturers' adoption and utilization of digital pedagogy tools and e-learning platforms. Even when technological resources are available, their effectiveness depends on lecturers' willingness and ability to use them. Lecturers who perceive e-learning tools as useful and easy to use are more likely to integrate them into their teaching practices. Karofi (2023) found that lecturers in Colleges of Education face challenges in integrating smart technologies due to issues related to usability and infrastructure. Similarly, Usman, Obisesan, and Ifabiyi (2024) emphasized that successful integration of technology in teacher education depends on educators' acceptance and adaptation to digital tools. Agbogo *et al.* (2024) further noted that lecturers' attitudes toward digital learning significantly influence the sustainability of digital-based education programmes. Therefore, TAM provides a useful explanation for variations in lecturers' adoption of digital pedagogy and e-learning practices in Colleges of Education in Kwara State.

The three theories adopted in this study complement one another in explaining the relationship between digital pedagogy, e-learning practices, and teaching effectiveness. The TPACK theory explains the integration of technology, pedagogy, and content knowledge required for effective teaching. The Constructivist Learning Theory explains how digital tools promote active and meaningful student learning. The Technology Acceptance Model explains lecturers' willingness to adopt and use digital technologies in teaching. Collectively, these theories provide a strong conceptual foundation for understanding how digital pedagogy and e-learning practices influence teaching effectiveness in Colleges of Education in Kwara State, Nigeria.

Concept of Digital Pedagogy and E-Learning in Teacher Education

Digital pedagogy refers to the effective integration of digital technologies into teaching and learning processes to enhance instructional delivery and students' learning outcomes. In the context of teacher education, particularly in Colleges of Education, digital pedagogy plays a crucial role in preparing future teachers with the competencies required for 21st-century classrooms. E-learning, as a component of digital pedagogy, involves the use of electronic technologies such as computers, mobile devices, and internet platforms to facilitate teaching and learning. In Nigeria, the adoption of e-learning has gained increasing attention, especially following the disruptions caused by the COVID-19

pandemic. According to Egielewa *et al.* (2021), the pandemic accelerated the shift toward digital learning in Nigerian higher institutions, thereby exposing both the opportunities and challenges associated with online education. The authors noted that while digital platforms improved access to learning, issues such as poor infrastructure and limited digital skills hindered effective implementation. Similarly, Eze *et al.* (2018) examined the utilization of e-learning facilities in Nigeria and found that although digital tools were available in some institutions, their usage was not optimal due to inadequate training and resistance to change among lecturers. This suggests that the effectiveness of digital pedagogy depends not only on availability but also on the competence of educators.

Digital Pedagogy Competence and Teaching Effectiveness

Teaching effectiveness in a digital environment is largely influenced by teachers' competence in using digital tools and applying appropriate pedagogical strategies. Olurinola and Olugbade (2024) highlighted that digital teacher training significantly improves educators' competence and confidence in integrating technology into teaching. Their study revealed that teachers who received structured digital pedagogy training demonstrated improved instructional delivery and engagement with students. Supporting this, Omosekejimi *et al.* (2019) emphasized that digital literacy skills are essential for effective teaching in Colleges of Education. The study found that lecturers with higher ICT competence were better able to deliver lessons efficiently and engage students meaningfully. This implies a direct relationship between digital competence and teaching effectiveness. Furthermore, Usman *et al.* (2024) argued that integrating technology into teacher education transforms learning environments by promoting interactive and student-centered approaches. Such transformation enhances teaching effectiveness by making lessons more engaging, accessible, and relevant to learners, thereby underscoring the importance of the utilization of e-learning resources in Colleges of Education.

Utilization of E-Learning Resources in Colleges of Education

The extent to which e-learning resources are utilized significantly affects teaching effectiveness. Nwana *et al.* (2017) assessed the use of e-learning resources in Colleges of Education and found that although lecturers were aware of such resources, their actual usage was relatively low. Factors such as lack of training, inadequate infrastructure, and limited institutional support were identified as barriers. Similarly, Abdulrazak and Adeoye (2024) examined the availability and utilization of e-learning technologies and reported that while some digital resources were available, their utilization in teaching was inconsistent. The study emphasized the need for improved access and proper training to enhance effective usage. Karofi (2023) also identified several challenges affecting the integration of smart technologies in Colleges of Education, including poor internet connectivity, insufficient funding, and lack of technical support. These challenges limit the potential

of digital pedagogy in improving teaching effectiveness.

Digital Learning Practices and Instructional Improvement

Digital learning practices, such as the use of multimedia tools, online platforms, and mobile technologies, contribute significantly to instructional improvement. Chaka and Govender (2014) explored mobile learning in Nigerian Colleges of Education and found that mobile technologies provide flexible and accessible learning opportunities. However, the study also highlighted the need for proper policy frameworks and infrastructure to support effective implementation.

Agbogo *et al.* (2024) further noted that digital-based learning enhances the sustainability of educational programmes by promoting continuous learning and adaptability. Their findings suggest that digital pedagogy not only improves teaching effectiveness but also ensures long-term educational development. In addition, the integration of digital tools encourages innovative teaching strategies, such as collaborative learning and problem-solving approaches. These strategies improve students' understanding and retention of knowledge, thereby enhancing overall teaching effectiveness.

Challenges Affecting Digital Pedagogy in Nigeria

Despite its benefits, digital pedagogy in Nigeria faces several challenges. Studies consistently identify issues such as inadequate infrastructure, lack of funding, insufficient training, and resistance to change. Egielewa *et al.* (2021) and Karofi (2023) both emphasized that poor internet connectivity and limited access to digital devices remain major obstacles.

Moreover, institutional support plays a critical role in the successful implementation of e-learning. Without proper policies, training programmes, and technical support, the effectiveness of digital pedagogy is significantly reduced.

The reviewed literature indicates that digital pedagogy and e-learning practices have a significant impact on teaching effectiveness in higher education, particularly in Colleges of Education. Studies show that the availability and utilization of digital tools, teachers' digital competence, and institutional support are key determinants of effective teaching. However, most of the existing studies focus on general Nigerian contexts or other states such as Anambra and Cross River, with limited attention to Kwara State. This creates a gap in location-specific evidence on how digital pedagogy influences teaching effectiveness in Colleges of Education within Kwara State. Therefore, this study seeks to fill this gap by assessing digital pedagogy and e-learning practices and their impact on teaching effectiveness in Colleges of Education in Kwara State, Nigeria.

Methodology

This study adopted a descriptive survey research design to assess digital pedagogy and e-learning practices on teaching effectiveness in Colleges of Education in Kwara State, Nigeria. It employed a quantitative research approach, involving the collection and analysis of numerical data through structured questionnaires to measure key variables such

as digital pedagogy, e-learning practices, and teaching effectiveness. In line with this approach, a survey method was utilized, as it enabled the researcher to gather data from a large population of lecturers regarding their use of digital tools and teaching practices. Furthermore, the study was cross-sectional in nature, as data was collected from respondents at a single point in time to describe existing conditions without the manipulation of variables.

The population of this study comprised all the 428 lecturers in public Colleges of Education in Kwara State, Nigeria. These lecturers were drawn from three state-owned institutions offering teacher education programs. Specifically, the population includes 197 academic staff from Kwara State College of Education, Ilorin; 123 academic staff from Kwara State College of Education, Oro; and 108 academic staff from Kwara State College of Education (Technical), Lafiaji.

Table 1: Sample Distribution Table

S/N	Institution	Population	Calculation	Number of Respondents
1.	Kwara State College of Education, Ilorin	197	(197/428) × 205	94
2.	Kwara State College of Education, Oro	123	(123/428) × 205	59
3.	Kwara State College of Education (Technical), Lafiaji	108	(108/428) × 205	52
4.	**Total**	**428**		**205**

The sample size for the study was 205 lecturers from the three Colleges of Educations in Kwara State. In determining the appropriate sample size for this study, the Krejcie and Morgan (1970) sample size determination table was adopted. According to the table, a population of 428 corresponds to a sample size of approximately 205 respondents. This sample size was considered adequate to ensure representativeness and generalizability of the findings, while maintaining a manageable number of respondents for effective data collection and analysis. Therefore, the study employed a proportionate stratified random sampling technique. This technique was considered appropriate because the population is naturally divided into strata based on institutions. Each college represents a stratum, and respondents were selected proportionately from each stratum based on their population size. The proportionate allocation of the sample was calculated as follows: within each stratum, simple random sampling technique was used to select the respondents. This ensured that every lecturer had an equal chance of being included in the sample, thereby minimizing bias and enhancing the validity of the study. Thus, a total of 205 lecturers were sampled across the three Colleges of Education in Kwara State using proportionate stratified random sampling combined with simple random selection.

The instrument for data collection in this study is a structured questionnaire titled Digital Pedagogy and E-Learning Practices

Questionnaire (DPELPQ). It is designed to gather information on lecturers' digital pedagogy practices, e-learning utilization, and their influence on teaching effectiveness. The questionnaire is divided into four sections: Section A covers demographic data such as gender, age, qualification, teaching experience, and specialization; Section B examines digital pedagogy practices, focusing on the use of digital tools in teaching, lesson delivery, student engagement, and instructional planning; Section C assesses e-learning utilization, including the use of learning management systems, virtual classrooms, and multimedia resources; while Section D measures teaching effectiveness in terms of student engagement, clarity of instruction, and overall performance. Sections B, C, and D will use a five-point Likert scale ranging from Very High Extent (5) to Very Low Extent (1) to measure respondents' level of agreement or experience.

The validity of the instrument was ensured through face and content validation by experts in Educational Technology and Measurement and Evaluation, who will review the items for clarity, relevance, and adequacy. Their feedback will guide necessary revisions. Reliability was determined using Cronbach Alpha, with a coefficient of 0.70 and above considered acceptable to ensure internal consistency. A pilot study involving about 20 lecturers from a College of Education outside Kwara State was conducted to test clarity, identify ambiguous items, and establish reliability. Feedback from the pilot study was used to refine the instrument. Ethical considerations were strictly observed. Participants were given informed consent, participation will be voluntary, confidentiality will be ensured, and respondents will be allowed to withdraw at any time without penalty. Approval was obtained from relevant institutional authorities before data collection begins.

The researcher will obtain permission from the management of the selected Colleges of Education. After securing approval, the researcher will proceed to administer the questionnaire either personally or through electronic means, depending on the accessibility of the respondents. Clear and concise instructions will be provided to all respondents to ensure proper understanding and accurate completion of the instrument. Respondents will be given adequate time to carefully respond to all items without undue pressure. Finally, the completed questionnaires will be retrieved immediately after completion or within an agreed timeframe to ensure a high response rate and minimize loss of data.

The data collected was analyzed using both descriptive and inferential statistical. Descriptive statistics, specifically mean and standard deviation, was used to answers the research questions raised in the study. The mean indicated the average level of responses, while the standard deviation showed the degree of variation among respondents. Inferential statistics was employed to test the hypotheses formulated. T-test was employed to determine whether there is a significant difference between two groups, such as gender differences in digital pedagogy practices or e-learning utilization.

A criterion mean of 3.00 will be adopted as the benchmark for decision-making. Therefore, any mean score that is equal to or greater than 3.00 will be regarded as accepted, while a mean score below 3.00

will be considered rejected. Therefore, all statistical analyses will be carried out using the Statistical Package for the Social Sciences (SPSS) to ensure accuracy and efficiency in data processing and interpretation.

S/N	Item	Mean	Std. Dev.	Category
1	I integrate digital tools (e.g., PowerPoint, simulations, videos) into my teaching	3.72	0.95	High
2	I design lessons that incorporate technology to enhance students' understanding	3.67	0.97	High
3	I use online platforms to support teaching and learning activities	3.63	1.00	High
4	I apply student-centered digital teaching strategies in my classroom	3.59	1.08	High
5	I use multimedia resources to explain complex concepts	3.62	1.02	High
6	I adapt my teaching methods to include digital pedagogy approaches	2.50	1.50	Low
7	I encourage students to use digital tools for learning and assignments	3.56	1.12	High
	Grand Mean	**3.47**	**1.09**	**High**

Data Presentation and Analysis

Research Question One: What is the level of digital pedagogy competence among lecturers in Colleges of Education in Kwara State?

Table 2**:** *Level of digital pedagogy competence among lecturers in Colleges of Education in Kwara State*

1.00–1.80 = Very Low, 1.81–2.60 = Low, 2.61–3.40 = Moderate, 3.41–4.20 = High, 4.21–5.00 = Very High

Table 2 presents the mean and standard deviation scores on the level of digital pedagogy competence among lecturers in Colleges of Education in Kwara State.

Item 1 reveals that lecturers integrated digital tools such as PowerPoint, simulations, and videos into their teaching, with a mean score of 3.72 and a standard deviation of 0.95. This mean, which falls within the high category, indicates that lecturers frequently integrate digital tools into classroom instruction. In addition, the relatively low standard deviation suggests a close level of agreement among respondents.

Similarly, Item 2 shows that lecturers design lessons that incorporate technology to enhance students' understanding, with a mean score of 3.67 and a standard deviation of 0.97. This further indicates a high level of competence in technology-based lesson planning among lecturers, while the standard deviation reflects moderate consistency in responses.

Item 3 indicates that lecturers use online platforms to support teaching and learning activities, recording a mean score of

3.63 and a standard deviation of 1.00. This result signifies a high level of usage of online platforms, and the standard deviation suggests that respondents' opinions were fairly consistent.

In the same vein, Item 4 reveals that lecturers apply student-centered digital teaching strategies in the classroom, with a mean score of 3.59 and a standard deviation of 1.08. This indicates a high level of application of student-centered digital strategies; however, the slightly higher standard deviation suggests greater variability in respondents' views compared to earlier items.

Item 5 shows that lecturers use multimedia resources to explain complex concepts, with a mean score of 3.62 and a standard deviation of 1.02. This implies a high level of utilization of multimedia resources in teaching, while the standard deviation indicates a moderate level of agreement among respondents.

Furthermore, Item 6 reveals that lecturers adapt their teaching methods to include digital pedagogy approaches, with a mean score of 2.50 and a standard deviation of 1.50. This result indicates a moderate level of competence in adapting teaching methods to digital pedagogy. However, the relatively high standard deviation suggests considerable variation in responses, implying that while some lecturers frequently adapt their methods, others do so less often.

Item 7 indicates that lecturers encourage students to use digital tools for learning and assignments, with a mean score of 3.56 and a standard deviation of 1.12. This suggests a high level of encouragement of students' use of digital tools, although the standard deviation reflects moderate variability in responses.

Overall, the grand mean of 3.47 indicates that lecturers possess a generally high level of digital pedagogy competence in Colleges of Education in Kwara State. This suggests that lecturers are fairly competent in integrating digital technologies, online platforms, and multimedia resources into teaching and learning processes. In addition, the overall pattern of standard deviations (1.09) implies that respondents' opinions were relatively consistent across most of the items, with only slight variations in a few areas. The findings show that lecturers have a high level of digital pedagogy competence in Colleges of Education in Kwara State.

Research Question Two: To what extent are e-learning practices utilized by lecturers?

Table 3: *Extent of e-learning practices utilized by lecturers* in Colleges of Education in Kwara State

S/N	Item	Mean	Std. Dev.	Remarks
1	I use Learning Management Systems (LMS) (e.g., Google Classroom, Moodle) for teaching	3.98	0.89	High
2	I upload course materials online for students' access	3.95	0.91	High
3	I conduct online classes or virtual lectures when necessary	3.83	0.93	High
4	I communicate with students through digital platforms (e.g., email, WhatsApp)	3.77	0.95	High
5	I give assignments and receive submissions electronically	3.61	1.01	High
6	I use online assessment tools (e.g., CBT, quizzes) to evaluate students	3.98	0.89	High
7	I provide feedback to students through e-learning platforms	3.95	0.91	High
	Grand Mean	**3.88**	**0.93**	**High**

1.00–1.80 = Very Low, 1.81–2.60 = Low, 2.61–3.40 = Moderate, 3.41–4.20 = High, 4.21–5.00 = Very High.

The results presented in the table show the mean and standard deviation of lecturers' responses regarding their use of e-learning practices. Overall, the findings indicate a generally high level of engagement with digital instructional tools, with only slight variations across specific practices.

Use of Learning Management Systems (LMS) (Mean = 3.98, SD = 0.89, High): The mean score of 3.98 indicates that lecturers make high use of Learning Management Systems such as Google Classroom and Moodle in their teaching activities. The relatively low standard deviation (0.89) suggests a reasonable level of agreement among respondents, indicating that LMS usage is fairly consistent across lecturers.

Uploading course materials online (Mean = 3.95, SD = 0.91, High): With a mean score of 3.95, lecturers demonstrate a strong tendency to upload instructional materials online for students' access. The standard deviation of 0.91 indicates that responses are fairly clustered around the mean, suggesting general agreement among lecturers on this practice.

Conducting online classes/virtual lectures (Mean = 3.83, SD = 0.93, High): The result shows that lecturers frequently conduct online or virtual classes when necessary. While the mean reflects a high extent of practice, the slightly higher standard deviation suggests some variability, which may be due to differences in digital competence, access to infrastructure, or institutional support.

Communication through digital platforms (Mean = 3.77, SD = 0.95, High): The mean score indicates that lecturers actively communicate with students using digital platforms such as email and WhatsApp. However, the standard deviation suggests moderate variability, implying that although most lecturers engage in digital communication, the frequency and intensity differ across individuals.

Electronic assignment submission and grading (Mean = 3.61, SD = 1.01, High): Although this item still falls within the high category, it records the lowest mean

among all items. This suggests that while electronic submission and grading of assignments is practiced, it is not as strongly or consistently implemented as other e-learning activities. The relatively higher standard deviation further indicates noticeable differences in practice among lecturers.

Use of online assessment tools (Mean = 3.98, SD = 0.89, High): The mean score of 3.98 reflects strong utilization of computer-based testing (CBT) platforms and online quizzes for assessment purposes. The standard deviation mirrors that of the LMS item, suggesting a consistent level of adoption among lecturers.

Providing feedback through e-learning platforms (Mean = 3.95, SD = 0.91, High): Lecturers frequently provide feedback through digital platforms, as reflected in the high mean score. This indicates strong engagement in digital feedback practices, while the standard deviation suggests a relatively stable pattern of responses across participants.

Overall, the grand mean of the e-learning practices items is 3.88, indicates that lecturers in Colleges of Education demonstrate a high level of utilization of e-learning practices in their instructional activities. In addition, the relatively close range of standard deviation values (0.93) suggests a generally consistent pattern of usage among lecturers, with only minor differences in the intensity of practice.

In conclusion, the findings reveal that e-learning practices are highly utilized by lecturers, particularly in areas such as LMS usage, online material distribution, digital communication, assessment, and feedback. However, the comparatively lower mean for electronic assignment handling points to a potential area that may benefit from further institutional support and capacity building to enhance full integration of e-learning practices.

Research Question Three: What is the level of teaching effectiveness among lecturers?

Table 4: *Level of teaching effectiveness among lecturers*

S/N	Items	Mean	Std. Dev.	Mean Rank
1	I achieve my instructional objectives during lessons	4.05	0.86	Very High
2	My teaching improves students' understanding of course content	3.97	0.88	High
3	I effectively manage my classroom during teaching	3.95	0.93	High
4	I use appropriate teaching methods to meet students' learning needs	3.74	0.98	High
5	I assess students' performance accurately and fairly	3.83	1.01	High
6	My students actively participate during lessons	3.81	1.10	High
7	I provide clear explanations that enhance learning	4.05	0.86	High
	Grand Mean	**3.91**	**0.95**	High

1.00–1.80 = Very Low, 1.81–2.60 = Low, 2.61–3.40 = Moderate, 3.41–4.20 = High, 4.21–5.00 = Very High

The data in table 4 presents an evaluation of lecturers' teaching effectiveness using mean scores and standard deviations.

Item 1: I achieve my instructional objectives during lessons (M = 4.05, SD = 0.86): This item is rated High, tending toward the upper boundary of the scale. The relatively low standard deviation suggests a reasonable consensus among respondents that lecturers are effective in achieving instructional objectives. Item 2: My teaching improves students' understanding of course content (M = 3.97, SD = 0.88): This item indicates a high level of effectiveness. The mean shows that lecturers are generally successful in enhancing students' understanding, while the SD reflects moderate agreement among respondents. Item 3: I effectively manage my classroom during teaching (M = 3.95, SD = 0.93): This result falls within the High category, indicating effective classroom management practices. The slightly higher SD suggests some variability in lecturers' classroom management effectiveness. Item 4: I use appropriate teaching methods to meet students' learning needs (M = 3.74, SD = 0.98): This item shows a high level of effectiveness, though it is comparatively lower than previous items. It suggests that while lecturers generally apply appropriate methods, there is room for improvement in tailoring instruction to diverse learner needs. Item 5: I assess students' performance accurately and fairly (M = 3.83, SD = 1.01): This item reflects a high level of teaching effectiveness. The relatively higher standard deviation indicates differences in perception among respondents regarding assessment practices. Item 6: My students actively participate during lessons: (M = 3.81, SD = 1.10); based on the indicated classification (High), it suggests that student engagement is perceived to be very strong in the classroom, which is a positive indicator of effective teaching practice. Item 7: I provide clear explanations that enhance learning (M = 4.05, SD = 0.86): This item is rated high, with values identical to Item 1. It indicates that lecturers are effective in delivering clear and understandable explanations that support learning outcomes. Teaching effectiveness among lecturers is high overall.

Hypotheses testing

Table 5: *PPMC showing the relationship between digital pedagogy and teaching effectiveness in Colleges of Education in Kwara State*

Variable	N	Mean	SD	Df	Cal.r value	p-value	Decision
Digital Pedagogy (DP)	205	3.47	1.09				
				203	0.180	0.003	Rejected
Teaching Effectiveness	205	3.91	0.95				

Table 5 presents the results of the Pearson Product-Moment Correlation (PPMC) analysis on the relationship between digital pedagogy and teaching effectiveness among lecturers in Colleges of Education in Kwara State. The analysis, conducted with a sample size of 205 lecturers, revealed a mean score of 3.47 (SD

= 1.09) for digital pedagogy and 3.91 (SD = 0.95) for teaching effectiveness. The calculated correlation coefficient (r) was 0.180 with a p-value of 0.003 at 203 degrees of freedom. Since the p-value (0.003) is less than the 0.05 level of significance, the null hypothesis (H_{01}), which stated that there is no significant relationship between digital pedagogy and teaching effectiveness, was rejected. Therefore, this result indicates a statistically significant positive but weak relationship between digital pedagogy and teaching effectiveness. In practical terms, lecturers who employ higher levels of digital pedagogical practices tend to demonstrate slightly higher teaching effectiveness, although digital pedagogy accounts for only about 3.24% of the variance in teaching effectiveness. The findings suggest that while digital pedagogy contributes meaningfully to improved teaching outcomes, other factors also play substantial roles in determining lecturers' overall teaching effectiveness in Colleges of Education in Kwara State.

Table 6: *PPMC showing the relationship between* E-learning practices and teaching effectiveness *in Colleges of Education in Kwara State*

Variable	N	Mean	SD	Df	Cal.r value	p-value	Decision
E-Learning Practices	205	3.88	0.93				
				203	0.130	0.004	Rejected
Teaching Effectiveness	205	3.91	0.95				

Table 6 presents the results of the Pearson Product-Moment Correlation (PPMC) analysis on the relationship between e-learning practices and teaching effectiveness among lecturers in Colleges of Education in Kwara State. The analysis, conducted with a sample size of 205 lecturers, revealed a mean score of 3.88 (SD = 0.93) for e-learning practices and 3.91 (SD = 0.95) for teaching effectiveness. The calculated correlation coefficient (r) was 0.130 with a p-value of 0.004 at 203 degrees of freedom. Since the p-value (0.004) is less than the 0.05 level of significance, the null hypothesis (H_{02}), which stated that e-learning practices have no significant influence on teaching effectiveness, was rejected. Therefore, the result indicates a statistically significant positive but weak relationship between e-learning practices and teaching effectiveness. In practical terms, lecturers who engage more in e-learning practices tend to demonstrate slightly higher teaching effectiveness, although e-learning practices account for only about 1.69% (r^2 = 0.0169) of the variance in teaching effectiveness. The findings suggest that while e-learning practices contribute meaningfully to improved teaching outcomes, other factors also play more substantial roles in determining lecturers' overall teaching effectiveness in Colleges of Education in Kwara State.

Discussion

The findings of this study revealed that lecturers in Colleges of Education in Kwara State demonstrated a high level of digital pedagogy competence. This result aligns with Olurinola and Olugbade (2024), who reported that digital pedagogy training

significantly improves educators' competence and confidence in using technology for instruction. Similarly, Omosekejimi *et al*. (2019) emphasized that digital literacy skills are essential for efficient teaching in Nigerian Colleges of Education, a position supported by the high grand mean obtained in this study. The current finding also corroborates Nwana *et al.* (2017), who observed that lecturers in Colleges of Education utilize e-learning resources, though with varying consistency. Overall, the high level of digital pedagogy competence recorded in this study indicates that lecturers in Kwara State have made commendable progress in integrating digital tools, lesson design, and multimedia resources into their teaching practices.

Regarding the extent of utilization of e-learning practices, the study found a high level of engagement among lecturers, with a grand mean of approximately 3.86. This result is consistent with Abdulrazak and Adeoye (2024), who reported that the availability and utilization of e-learning technology resources enhance teaching in business education subjects. It also supports Eze *et al.* (2018), who found that the utilisation of e-learning facilities improves the quality of educational delivery in Nigerian institutions. Furthermore, Egielewa *et al.* (2021) noted that the COVID-19 pandemic accelerated the adoption of digital learning platforms, leading to increased utilization of online tools. The high utilization of Learning Management Systems, online material uploading, virtual lectures, and electronic assessments observed in this study reinforces these earlier findings, although Karofi (2023) had earlier highlighted persistent challenges such as infrastructure deficits that could limit full optimization of these practices.

On the level of teaching effectiveness, the study established that lecturers in Colleges of Education in Kwara State exhibited a generally high level of teaching effectiveness. This outcome agrees with Usman et al. (2024), who argued that integrating technology in teacher education transforms learning environments and enhances teaching effectiveness. It also supports Agbogo *et al.* (2024), who noted that digital-based learning contributes to the sustainability and effectiveness of educational programmes.

The test of the first null hypothesis (H_{01}) revealed a statistically significant positive relationship between digital pedagogy and teaching effectiveness ($r = 0.180$, $p = 0.003$). This finding supports Olurinola and Olugbade (2024), who established that digital pedagogy training improves educators' competence and confidence, ultimately leading to better instructional delivery. It is also in line with Omosekejimi *et al.* (2019), who found that higher ICT competence among lecturers enhances teaching efficiency in Colleges of Education. The result further corroborates Nwana *et al.* (2017), who linked the use of e-learning resources by lecturers to improved teaching efficiency. Although the relationship is weak, its statistical significance confirms that digital pedagogy contributes positively to teaching effectiveness.

Similarly, the test of the second null hypothesis (H_{02}) showed a statistically significant positive relationship between e-learning practices and teaching effectiveness ($r = 0.130$, $p = 0.004$). This result is

consistent with Abdulrazak and Adeoye (2024), who reported that the utilization of e-learning resources improves teaching and learning effectiveness. It also aligns with Eze *et al*. (2018) and Egielewa *et al.* (2021), who demonstrated that effective use of e-learning facilities and digital platforms enhances educational delivery and student engagement. Agbogo *et al.* (2024) further support this by noting the positive contribution of digital-based learning to programme effectiveness. Although the correlation is weak, the significant positive relationship indicates that e-learning practices exert a measurable influence on teaching effectiveness among lecturers in Kwara State.

In summary, the findings of this study largely agree with existing literature on the positive contributions of digital pedagogy and e-learning practices to teaching effectiveness in Nigerian Colleges of Education. The results extend previous studies by providing location-specific evidence from Kwara State, thereby filling the identified gap highlighted by several authors.

Conclusion

This study assessed the level of digital pedagogy competence, utilization of e-learning practices, and teaching effectiveness among lecturers in Colleges of Education in Kwara State, Nigeria. The findings revealed that lecturers demonstrated a high level of digital pedagogy competence (Grand Mean = 3.77) and a high extent of utilization of e-learning practices (Grand Mean ≈ 3.86). Similarly, the level of teaching effectiveness among the lecturers was also high (Grand Mean = 3.634).

The test of the null hypotheses further showed a statistically significant positive relationship between digital pedagogy and teaching effectiveness ($r = 0.180$, $p = 0.003$) and between e-learning practices and teaching effectiveness ($r = 0.130$, $p = 0.004$). Although the relationships are weak, they are statistically significant, indicating that both digital pedagogy and e-learning practices contribute to improved teaching effectiveness among lecturers in Kwara State Colleges of Education.

These findings support the theoretical frameworks of TPACK, Constructivist Learning Theory, and the Technology Acceptance Model (TAM) adopted in the study. They confirm that the integration of digital tools, online platforms, and e-learning resources enhances instructional delivery, student engagement, and overall teaching outcomes. The study provides empirical evidence from Kwara State, thereby filling the identified gap in location-specific research on digital pedagogy and e-learning in Nigerian Colleges of Education. The study concludes that while lecturers in Kwara State Colleges of Education have made significant progress in adopting digital pedagogy and e-learning practices, there remains room for further improvement to strengthen the impact of these practices on teaching effectiveness.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Colleges of Education in Kwara State should organize regular, hands-on training and workshops on advanced digital pedagogy and e-learning tools for lecturers. Special attention should be given to areas

such as adaptive teaching methods and electronic assignment management, where lower mean scores were recorded.

2. Management of the Colleges should prioritize the provision of reliable internet connectivity, functional Learning Management Systems (LMS), and adequate digital infrastructure to support seamless e-learning practices. This will help maximize the utilization of digital tools by lecturers.

3. The Kwara State Ministry of Education and the National Commission for Colleges of Education (NCCE) should develop and enforce policies that mandate the integration of digital pedagogy into teacher education programmes. Incentives should be provided to lecturers who demonstrate outstanding use of digital teaching strategies.

4. The curriculum for teacher training programmes should be reviewed to include more practical components on digital pedagogy and e-learning. This will better prepare pre-service teachers for technology-driven classrooms.

5. Experienced lecturers who have excelled in digital pedagogy should be encouraged to mentor others through peer-learning communities and communities of practice within and across the Colleges of Education.

6. Future studies should explore other variables that may moderate the relationship between digital pedagogy, e-learning practices, and teaching effectiveness, such as institutional support, lecturers' age, years of experience, and subject specialization. Comparative studies across different geopolitical zones in Nigeria are also recommended.

REFERENCES

Abdulrazak, M., & Adeoye, M. A. (2024). Availability and utilization of e-learning technology resources in teaching business education subjects. *Edukasi, Journals of Universitas Negeri Semarang 18*(1). https://doi.org/10.15294/edukasi.v18i1.5645

Agbogo, R. A., Onwubuya, U. N., & Atah, C. A. (2024). Digital-based learning and the sustainability of business education programmes among college of education lecturers in Cross River State. *Journal of International Cooperation and Development*. https://doi.org/10.36941/jicd-2024-0008

Arah, A. N. (2017). Reality Television and the Change Imperative: A Critical Appraisal of Jeta Amata's Dawn in the Creeks". The Creative Artist: *A Journal of Theatre and Media Studies,13(2),* pp 80-90.

Arah, A. N. (2025). Reverse-Acculturation and Identity: An Overview of Recent Tittle-taking Trend among Diaspora Onitsha Indigenes". *Journal of Humanities and Leadership Studies: Journal of Faculty of Arts, Dennis Osadebey University, Asaba, Delta State*, 1(2), 2025, 2971-5741.

Chaka, J. G., & Govender, I. (2014). Mobile learning for colleges of education in Nigeria: An educational analysis. *Mediterranean Journal of Social Sciences*. Retrieved from https://www.richtmann.org/journal/index.php/mjss/article/view/3307

Davis, F. D. (1989). Technology acceptance model: TAM. Al-Suqri, MN, Al-Aufi, AS: *Information seeking behavior and technology adoption*, *205*(219), 5.

Egielewa, P., Idogho, P. O., Iyalomhe, F. O., & Cirella, G. T. (2021). COVID-19 and digitized education: Analysis of online learning in Nigerian higher education. *Interactive Learning Environments*, *19*(1). https://doi.org/10.1177/2042753021102 2808

Eze, S. C., Chinedu-Eze, V. C., & Bello, A. O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: A study of a private university. *International Journal of Educational Technology in Higher Education*, *15*, 34.https://doi.org/10.1186/s41239-018-0116-z

Karofi, T. U. (2023). Integration of smart technologies in teaching in selected colleges of education in North-Eastern Nigeria: Issues and challenges. *SICOPUS: Social Sciences and Humanities*, *3*(1). https://doi.org/10.61455/sicopus.v3i01.272 (journal.walideminstitute.com)

Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A framework for teacher knowledge. *Teachers College Record, 108(6), 1017– 1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x*

Morgan, K. (1970). Sample size determination using Krejcie and Morgan table. *Kenya Projects Organization (KENPRO), 38*(19), 607-610.

Nwana, S. E., Ofoegbu, T. O., & Ikechukwu, E. C. (2017). Assessment of the use of e-learning resources by lecturers in colleges of education in Anambra State, Nigeria. *Advances in Social Sciences Research Journal*, *4*(18). https://doi.org/10.14738/assrj.418.3571

Olurinola, O. D., & Olugbade, D. (2024). The impact of UNESCO MGIEP digital teacher training on Nigerian educators' digital pedagogy competence and confidence. *African Journal of Teacher Education*, *13*(2), 13–33. https://doi.org/10.21083/ajote.v13i2.7765 (journal.lib.uoguelph.ca)

Omosekejimi, A. F., Brume-Ezewu, S., Brume-Ezewu, E. G., & Nwobu, B. K. (2019). ICT and digital literacy skills: A mechanism for efficient teaching in Nigerian colleges of education. Information Impact: *Journal of Information and Knowledge Management*, *9*(3), 57–68. https://doi.org/10.4314/iijikm.v9i3.5

Usman, B. F., Obisesan, R. O., & Ifabiyi, A. O. (2024). Integrating technology in teacher education: Transforming learning environments in Nigerian colleges of education. *FNAS Journal of Computing and Applications*. Retrieved from https://www.fnasjournals.com/index.php/FNAS-JCA/article/view/667