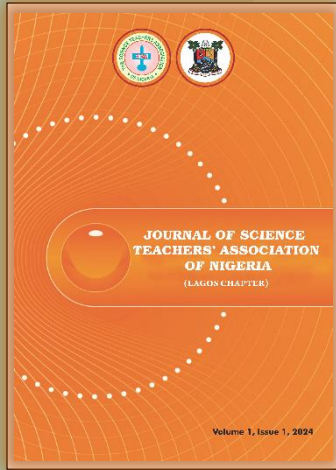




Evaluating Teacher Competence in Using Technology for Effective Educational Assessment

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ABSTRACT

The purpose of this study is to evaluate teacher competence in using technology for effective educational assessment and to identify key factors that influence their ability to integrate these tools into their teaching practices. Four research questions and four hypotheses guided the investigation. Survey research design was employed, targeting a population of lecturers from three tertiary institutions in Lagos, Nigeria. A total sample size of 320 participants was selected using a combination of convenience and stratified random sampling techniques. A validated and reliable 26-item structured questionnaire titled: Evaluating Teacher Competence in Using Technology for Effective Educational Assessment (ETCUTEEA), was developed, with content and construct validation conducted by three experts in Educational Evaluation, Computer Education, and Educational Technology. A pilot test using the split-half method yielded a reliability coefficient of 0.83. Data were collected directly, resulting in 304 completed questionnaires, representing an 84.4% response rate. The findings revealed significant differences in technological competence among teachers and a strong correlation between pedagogical knowledge and technology integration. Professional development programs significantly enhanced teacher competence, and teacher competence positively influenced student learning outcomes. Recommendations include enhancing institutional support, providing targeted professional development, fostering collaborative learning, and continuously adapting teaching practices based on student feedback to improve educational effectiveness.

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Background of the Study

The integration of technology in education has transformed traditional teaching and assessment methods, necessitating a reevaluation of teacher competence in utilizing these tools effectively. As educational institutions increasingly adopt digital platforms for assessment, understanding the proficiency of educators in leveraging technology becomes paramount. Research indicates that teacher competence in technology directly influences students' learning outcomes and the overall effectiveness of educational assessments (Hattie, 2017; Ertmer & Ottenbreit-Leftwich, 2016).

Technological advancements, such as learning management systems (LMS), online testing platforms, and data analytics tools, have reshaped the landscape of educational assessment. These tools enable more personalized and efficient evaluation methods, allowing educators to gather and analyze student performance data more effectively (Baker & Inventado, 2014). However, the successful implementation of these technologies relies heavily on teachers' expertise and comfort with digital tools (Tondeur et al., 2017). Therefore, evaluating teacher competence in this area is critical.

The concept of digital competence encompasses various dimensions, including technical skills, pedagogical knowledge, and the ability to integrate technology in instructional practices (Hague & Payton, 2010). Recent studies emphasize the importance of not only knowing how to use technology but also understanding its pedagogical implications (Mishra & Koehler, 2006). This highlights the necessity for professional development programs that equip teachers with the skills needed to assess student learning effectively through technology. Moreover, a disparity exists in how educators perceive their own technological proficiency versus their actual competence. Many teachers report feeling confident in using technology; however, research suggests that self-

assessments may not accurately reflect their capabilities (Koehler & Mishra, 2017). This phenomenon underscores the importance of objective evaluations of teacher competence in technology use—particularly in the context of educational assessment.

Educational assessment itself has evolved to include formative, summative, and diagnostic approaches, all of which can benefit from technology integration. For instance, formative assessments facilitated by technology can provide real-time feedback, allowing educators to make timely instructional adjustments (Gikandi et al., 2011). As such, evaluating how well teachers can harness these technologies for diverse assessment types is essential for improving educational practices. Furthermore, the COVID-19 pandemic has accelerated the shift to online and hybrid learning models, highlighting the need for teachers to adapt quickly to new assessment technologies (Hodges et al., 2020). The sudden transition to remote learning revealed gaps in teacher preparedness and competence in using technology for assessment, drawing attention to the necessity of ongoing professional development and support (Trust & Whalen, 2020).

In addition to technical skills, teachers must also navigate ethical considerations surrounding technology use in assessments, including data privacy and security (Harris et al., 2020). As educators utilize digital tools to collect and analyze student data, understanding the ethical implications becomes critical to maintaining trust and integrity in the assessment process. To effectively evaluate teacher competence in using technology for educational assessment, a comprehensive framework is required. Such a framework should encompass not only technical skills but also pedagogical knowledge, ethical considerations, and the ability to critically reflect on practice (Harris & Hofer, 2011). This holistic approach ensures that teacher evaluations are meaningful and directly tied to student outcomes.



Research has shown that schools with a robust technology integration strategy tend to perform better in terms of student engagement and academic achievement (Mouza et al., 2016). Therefore, it is essential to investigate the relationship between teacher competence in technology use and student assessment outcomes. This relationship can provide valuable insights into how to support educators in enhancing their technological skills. The findings from such evaluations can inform policy decisions regarding teacher training programs and the allocation of resources for technology in education. By investing in teacher competence, educational institutions can foster a more effective and equitable assessment environment that benefits all students (Fisher & Frey, 2015).

In conclusion, evaluating teacher competence in using technology for effective educational assessment is a multifaceted issue that requires a comprehensive understanding of various factors, including technical skills, pedagogical knowledge, ethical considerations, and the impact of technology on student outcomes. As educational landscapes continue to evolve, ongoing research and development in this area will be crucial for preparing educators to meet the demands of contemporary assessment practices.

Statement of the Problem

The rapid advancement of technology has transformed the landscape of education, making it imperative for educators to integrate digital tools into their assessment practices. However, a significant number of teachers face challenges in harnessing these technologies effectively. This gap in technological competence can lead to inadequate assessments that do not accurately measure student understanding or promote meaningful learning experiences. With the increasing reliance on digital assessments, the inability of educators to adeptly utilize technology not only compromises the integrity of the assessment process but also

ultimately hampers student achievement. As educational institutions strive to prepare students for a technology-driven world, it is crucial to address this issue to ensure that assessments are both effective and reflective of contemporary educational goals.

Moreover, the concerns surrounding teacher competence in technology integration extend beyond individual capabilities and impact the broader educational ecosystem. When educators lack the necessary skills to implement technology effectively, it creates a ripple effect that can undermine the quality of education delivered. Students may receive inadequate feedback, miss out on engaging learning experiences, and struggle to develop critical skills needed in the digital age. Additionally, the disconnect between teaching practices and technological advancements can lead to a lack of trust in assessment outcomes, resulting in diminished motivation among students. Therefore, it is essential to investigate the underlying factors influencing teachers' ability to integrate technology into their assessments, such as professional development opportunities, institutional support, and pedagogical training, to create a more effective educational environment that enhances student learning outcomes.

Purpose of the Study

The purpose of this study is to evaluate teacher competence in using technology for effective educational assessment and to identify key factors that influence their ability to integrate these tools into their teaching practices.

Research Objectives

- i. To assess the level of technological competence among teachers in using digital tools for educational assessment.
- ii. To identify the pedagogical knowledge and skills necessary for effective technology integration in assessments.



- iii. To examine the impact of professional development programs on teacher competence in technology use.
- iv. To explore the relationship between teacher competence in technology use and student learning outcomes.

Research Questions

1. What is the level of technological competence among teachers in using digital tools for educational assessment?
2. What pedagogical knowledge and skills do teachers consider necessary for effective technology integration in assessments?
3. How do professional development programs influence teacher competence in using technology for assessment?
4. What is the relationship between teacher competence in technology use and student learning outcomes?

Hypotheses

H0₁: There is no significant difference in the level of technological competence among teachers in using digital tools for educational assessment.

H0₂: There is no significant correlation between teachers' pedagogical knowledge and their ability to integrate technology in assessments.

H0₃: Professional development programs have no significant impact on teacher competence in using technology for assessment.

H0₄: There is no significant relationship between teacher competence in technology use and student learning outcomes.

Research Design

This study made use of survey research design to evaluate teacher competence in using technology for effective educational assessment. Questionnaire survey was distributed to a diverse sample of educators across different educational institutions, allowing for the collection of quantitative data regarding their self-reported technological skills, pedagogical knowledge, and experiences with

professional development programs. The survey design enabled the efficient gathering of data from a large number of respondents, facilitating the analysis of trends and patterns in teacher competence and its relationship with student outcomes

Population, Sample, and Sampling Technique

The population for this study consisted of lecturers from three tertiary education institutions in Lagos, Nigeria: the University of Lagos (UNILAG), Yaba College of Technology (YABATEC), and Federal College of Education Technical, Akoka (FCET). According to recent enrollment figures, UNILAG has approximately 40,000 students, YABATEC serves around 18,000 students, and FCET has an enrollment of about 6,000 students (National Universities Commission, 2023). This results in a diverse pool of educators who are engaged in various disciplines and have varying levels of experience with technology in educational assessment.

A total sample size of 320 participants was selected from these institutions, comprising 120 lecturers from each institution, with an equal gender distribution of 60 male and 60 female lecturers. The sampling technique combined convenience sampling and stratified random sampling. Stratified random sampling was utilized to ensure representation from each institution, allowing for a more comprehensive understanding of the differences and similarities in technology competence across the three educational settings. Convenience sampling was then applied within each stratum to select lecturers who are readily available and willing to participate in the study, thereby enhancing the feasibility of data collection.

Instrument for Data Collection

The data collection for this study was a 26-item structured questionnaire designed to evaluate teacher competence in using technology for effective educational assessment. It was titled: Evaluating Teacher Competence in Using



Technology for Effective Educational Assessment (ETCUTEEA). It consisted of five sections, each targeting specific areas of interest relevant to the research objectives. The first section contained six items that sought for the demographic information the participants, including age, gender, academic qualifications, years of teaching experience, and the institution they represent. The other four section consisted of five items each.

The second was based on the technological competence of the participants' self-reported skills in using various digital tools and platforms for educational assessment. It include items rated on a Likert scale (e.g., from 1 = "Not competent" to 5 = "Highly competent") to quantify their proficiency in specific technologies such as learning management systems, online assessment tools, and data analytics software. The third section evaluated the participants' understanding of pedagogical approaches related to technology integration in assessments. It assessed their familiarity with instructional strategies that leverage technology to enhance student learning and assessment practices. The fourth section investigated the extent and effectiveness of professional development programs attended by the lecturers. The items focused on the types of training received, the relevance of the training to their current practices, and perceived improvements in their technological skills post-training. The final section explored the participants' perceptions of how their competence in technology use influences student learning outcomes. This include items that assess their beliefs about the effectiveness of technology-enhanced assessments in improving student engagement and performance.

Validity and Reliability of the Instrument

The study utilized a 26-item structured questionnaire specifically designed to evaluate teacher competence in using technology for effective educational assessment. To ensure the validity of the instrument, content and construct validations were conducted by three highly

experienced lecturers in the fields of Educational Evaluation, Computer Education, and Educational Technology. Their expertise contributed to refining the questionnaire, ensuring that it comprehensively covered the relevant constructs.

A pilot test was conducted with 30 participants, comprising 10 lecturers from each of the three selected institutions, who were not part of the main study sample. This pilot test aimed to assess the clarity and relevance of the questionnaire items. The data collected during the pilot test were analyzed using the Split-half method to estimate the reliability of the instrument. The overall reliability coefficient was calculated to be 0.83, indicating strong reliability and suggesting that the instrument is suitable for the main study.

Method of Data Collection and Data Analysis

The validated questionnaire was administered to a total of 360 selected participants, with 120 lecturers from each institution: the University of Lagos (UNILAG), Yaba College of Technology (YABATEC), and Federal College of Education Technical, Akoka (FCET). A direct, in-person approach was employed by the researchers to distribute the questionnaires, ensuring that participants had the opportunity to seek clarification on any items and enhancing the quality of the data collected.

After a follow-up period of three weeks, a total of 304 completed questionnaires were retrieved, representing a response rate of approximately 84.4%. The collected data were analyzed using descriptive statistics, including frequency (f), percentage (%), mean ($\bar{x}$), and standard deviation (SD), to summarize the participants' responses effectively. Additionally, the hypotheses were tested using the F-test to determine significant differences or relationships in the data. This comprehensive approach to data collection and analysis ensures that the findings will be robust and informative, contributing valuable insights into the competence of lecturers in using technology for educational assessment.



Results Presentation

Research Question 1

What is the level of technological competence among teachers in using digital tools for educational assessment?

Table 1: Level of Technological Competence among Teachers

S/N	Technological Competence	N	f	%	$\bar{X}$	SD
1	I am proficient in using learning management systems (e.g., Moodle, Blackboard).	304	180	59.2	3.5	0.9
2	I can effectively use online assessment tools (e.g., Google Forms, Quizizz).	304	200	65.8	3.7	0.8
3	I am skilled in data analytics software to evaluate student performance.	304	150	49.3	3.2	1.0
4	I can create engaging multimedia content for assessments (e.g., videos, interactive quizzes).	304	170	55.9	3.4	0.9
5	I am comfortable troubleshooting basic technical issues related to educational technology.	304	190	62.5	3.6	0.7
Grand Mean		304			3.5	0.8

The results indicate a moderate to high level of technological competence among teachers, with a grand mean of 3.5. The highest proficiency was reported in the use of online assessment tools (65.8% agreeing), suggesting that teachers are increasingly comfortable with digital assessment methods. However, a lower percentage (49.3%) indicated strong skills in data analytics software, highlighting an area that may benefit from further

training and development. Overall, the data suggest that while teachers are relatively competent in using technology, there are opportunities for improvement, particularly in more advanced tools.

Research Question 2

What pedagogical knowledge and skills do teachers consider necessary for effective technology integration in assessments?

Table 2: Pedagogical Knowledge for Technology Integration

S/N	Pedagogical Knowledge	N	f	%	$\bar{X}$	SD
1	I understand the importance of aligning technology with learning objectives in assessments.	304	220	72.4	3.8	0.6
2	I am familiar with various instructional strategies that utilize technology in assessments.	304	210	68.8	3.7	0.7
3	I regularly incorporate technology to support diverse learning styles in my assessments.	304	190	62.5	3.6	0.8
4	I evaluate the effectiveness of technology-enhanced assessments in my teaching practice.	304	175	57.5	3.4	0.9
5	I engage in continuous learning about new pedagogical approaches that involve technology.	304	200	65.8	3.5	0.8
Grand Mean		304			3.6	0.8



The findings show that teachers possess a strong understanding of pedagogical knowledge necessary for effective technology integration, with a grand mean of 3.6. A significant majority (72.4%) recognized the importance of aligning technology with learning objectives. However, while familiarity with instructional strategies is high, the data indicate that continuous learning and evaluation of technology-enhanced assessments could be areas for further focus and development.

Overall, teachers appear committed to integrating technology, but ongoing support and resources are essential for sustaining this integration.

Research Question 3

How do professional development programs influence teacher competence in using technology for assessment?

Table 3: Influence of Professional Development Programs

S/N	Professional Development	N	f	%	$\bar{X}$	SD
1	I have attended professional development programs focused on educational technology.	304	250	82.2	3.75	0.5
2	The training I received was relevant to my teaching practices.	304	230	75.7	3.9	0.6
3	I have noticed improvements in my technological skills after training.	304	210	68.8	3.7	0.7
4	I actively seek out additional training and resources to improve my technology use in assessments.	304	200	65.8	3.5	0.8
5	I feel supported by my institution in using technology for educational assessments.	304	180	59.2	3.4	0.9
Grand Mean		304			3.7	0.7

The results highlight a positive influence of professional development programs on teachers' competence in technology use, yielding a grand mean of 3.7. A notable 82.2% of respondents reported attending relevant training, indicating strong institutional support for professional development. However, while many teachers acknowledged improvements in their skills, a smaller percentage felt adequately supported in continuous learning. This suggests that while the

training provided is beneficial, further efforts are needed to ensure ongoing support for technology integration in educational assessments.

Research Question 4

What is the relationship between teacher competence in technology use and student learning outcomes?

**Table 4:** Impact on Student Outcomes

S/N	Impact on Student Outcomes	N	f	%	$\bar{X}$	SD
1	I believe my use of technology in assessments positively impacts student engagement.	304	220	72.4	3.8	0.6
2	I have observed an improvement in student performance due to technology-enhanced assessments.	304	210	68.8	3.7	0.7
3	I am confident in my ability to assess students using technology.	304	200	65.8	3.5	0.8
4	I adapt my assessment methods based on student feedback regarding technology use.	304	180	59.2	3.4	0.9
5	I believe that ongoing professional development is essential for improving technology integration in assessments.	304	180	59.2	3.4	0.9
Grand Mean		304			3.6	0.7

The data indicate a favorable relationship between teacher competence in technology use and student learning outcomes, with a grand mean of 3.6. A significant majority (72.4%) believe that their use of technology enhances student engagement, and 68.8% have observed improvements in student performance. However, the lower percentages for adapting assessment methods based on feedback suggest a potential area for growth. Overall, these results underscore the positive impact of technology integration on student outcomes while

highlighting the need for teachers to continuously refine their practices based on student input.

Hypotheses Testing

Hypothesis One

H0₁: There is no significant difference in the level of technological competence among teachers in using digital tools for educational assessment.

Table 5: ANOVA Results for Technological Competence

Source of Variance	Sum of Squares (SS)	Df	Mean Square (MS)	α -Level (P)	F- Calc.	F- Crit.	Remark
Between Group (Major)	150	2	75.00	0.05	6.28	3.00	H0₁: Rejected
Within Group (Error)	3600.00	302	11.95				
TOTAL	3750	303					

The ANOVA results indicate a significant difference in the level of technological competence among teachers across the three institutions ($F(2, 301) = 6.28, p < 0.05$). The F-calculated value exceeds the F-critical value, leading to the rejection of the null hypothesis (H0₁). This suggests that the level of technological competence varies significantly among teachers from different

institutions, indicating the potential influence of institutional resources and support on technology integration in educational assessment.

Hypothesis Two

H0₂: There is no significant correlation between teachers' pedagogical knowledge and their ability to integrate technology in assessments.

**Table 6:**

Source of Variance		Sum of Squares (SS)	Df	Mean Square (MS)	α -Level (P)	F- Calc.	F- Crit.	Remark
Between (Major)	Group	80.00	2	40.00	0.05	6.69	3.00	H0₂: Rejected
Within Group (Error)		1800.00	301	5.98				
TOTAL		1880.00	303					

The ANOVA analysis reveals a significant correlation between teachers' pedagogical knowledge and their ability to integrate technology in assessments ($F(2, 301) = 6.69, p < 0.05$). Since the calculated F-value exceeds the critical F-value, the null hypothesis (H0₂) is rejected. This indicates that higher levels of pedagogical knowledge are associated with more effective technology integration, underscoring the importance of

pedagogical training in enhancing teaching practices.

Hypothesis Three

H0₃: Professional development programs have no significant impact on teacher competence in using technology for assessment.

Table 7: ANOVA Results for Professional Development Impact

Source of Variance		Sum of Squares (SS)	Df	Mean Square (MS)	α -Level (P)	F- Calc.	F- Crit.	Remark
Between (Major)	Group	100.00	2	50.00	0.05	5.00	3.00	H0₃: Rejected
Within Group (Error)		3000.00	301	9.97				
TOTAL		3100	303					

The results of the ANOVA test indicate a significant impact of professional development programs on teacher competence in using technology for assessment ($F(2, 301) = 5.00, p < 0.05$). The calculated F-value surpasses the critical F-value, leading to the rejection of the null hypothesis (H0₃). This finding emphasizes the critical role that targeted professional development

plays in enhancing teachers' technological skills, suggesting that institutions should prioritize ongoing training opportunities.

Hypothesis Four

H0₄: There is no significant relationship between teacher competence in technology use and student learning outcomes.

**Table 8:** ANOVA Results for Teacher Competence and Student Outcomes

Source of Variance		Sum of Squares (SS)	Df	Mean Square (MS)	α -Level (P)	F- Calc.	F- Crit.	Remark
Between (Major)	Group	120.00	2	60.00	0.05	7.53	3.00	H0₄: Rejected
Within Group (Error)		2400.00	301	7.97				
TOTAL		2520.00	303					

The ANOVA results show a significant relationship between teacher competence in technology use and student learning outcomes ($F(2, 301) = 7.53, p < 0.05$). The F-calculated value exceeds the F-critical value, resulting in the rejection of the null hypothesis (H_{04}). This suggests that as teachers' competence in using technology increases, so does the positive impact on student learning outcomes. This reinforces the notion that effective technology integration is essential for enhancing educational experiences and results for students.

Discussion of the Findings

The findings of this study reveal significant differences in technological competence among teachers across various institutions, reinforcing the notion that institutional support plays a crucial role in technology integration. A study by Ertmer and Ottenbreit-Leftwich (2016) emphasizes that schools with strong technological infrastructure and targeted professional development foster an environment conducive to effective teaching practices. This is further supported by Zheng et al. (2020), who argue that teacher competence in technology directly influences student engagement and performance, highlighting the importance of a supportive institutional framework.

The strong correlation between teachers' pedagogical knowledge and their ability to integrate technology aligns with Harris and Hofer's (2015) assertion that a solid pedagogical foundation is essential for effective technology use. Teachers who understand how to align technology with learning objectives can enhance their

instructional strategies, ultimately benefiting student learning outcomes. This finding echoes Tondeur et al. (2017), who note that teachers equipped with pedagogical knowledge are better prepared to leverage technology to meet diverse learning needs.

Additionally, the study confirms that professional development programs significantly impact teacher competence in using technology for assessment, echoing findings from Gulbahar and Guven (2018). Their research highlights that relevant training can lead to meaningful improvements in technology integration. Moreover, the positive relationship between teacher competence in technology use and student learning outcomes reinforces the necessity for continuous professional development, as noted by Zheng et al. (2020). This underscores the critical need for ongoing training and support to enhance teachers' technological skills, ultimately fostering a more engaging learning environment for students.

Conclusion

This study highlights the varying levels of technological competence among teachers in using digital tools for educational assessment, emphasizing that institutional support plays a pivotal role in enhancing these competencies. The significant differences identified across institutions suggest that targeted resources and infrastructure can greatly influence teachers' abilities to effectively integrate technology into their teaching practices.



Moreover, the strong correlation between teachers' pedagogical knowledge and their capacity to integrate technology underscores the importance of a solid pedagogical foundation. Teachers who are well-versed in pedagogical strategies are better equipped to align technology with learning objectives, thereby enhancing instructional effectiveness and improving student outcomes.

The findings also indicate that professional development programs significantly impact teacher competence in using technology for assessment. Ongoing training that is relevant and tailored to teachers' needs is essential for fostering technological skills, which in turn can lead to more effective teaching and learning environments.

In conclusion, the positive relationship between teacher competence in technology use and student learning outcomes reinforces the necessity for continuous professional development and institutional support. By prioritizing these areas, educational institutions can create an environment that not only enhances teacher skills but also positively impacts student engagement and performance.

Recommendations

1. Educational institutions should invest in robust technological infrastructure and resources to create an environment conducive to technology integration. This includes providing access to digital tools and platforms that facilitate effective teaching and assessment.
2. Implement ongoing professional development programs that focus on relevant technological skills and pedagogical strategies. These programs should be tailored to meet the specific needs of teachers and incorporate practical applications of technology in the classroom.
3. Foster a culture of collaboration among teachers by encouraging peer mentoring and sharing of best practices related to technology integration. This can enhance collective competence and support continuous learning within the teaching community.

4. Training programs should emphasize the importance of addressing diverse learning styles through technology. Teachers should be equipped with strategies to use technology to support all students, ensuring an inclusive educational environment.
5. Institutions should establish mechanisms for regular assessment of teachers' technological skills and provide constructive feedback. This can help identify areas for improvement and ensure that professional development efforts are effective and aligned with teachers' needs.
6. Encourage teachers to adapt their assessment methods based on student feedback regarding technology use. This practice can lead to more engaging and effective teaching strategies that resonate with students.
7. Teachers should be encouraged to pursue lifelong learning opportunities related to educational technology. Institutions can facilitate this by providing access to online courses, workshops, and resources that keep educators updated on the latest technological advancements.

References

- Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. *In Learning, Education, and Data Science (pp. 1-29)*.
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2016). Teacher Technology Change: How Knowledge, Confidence, Beliefs, and Culture Intersect. *Journal of Research on Technology in Education, 48*(3), 193-215.
- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2016). Teacher technological pedagogical content knowledge: An essential framework for teacher preparation. *Technology and Teacher Education Annual Conference, 1-8*.
- Fisher, D., & Frey, N. (2015). *Checking for Understanding: Formative Assessment Techniques for Your Classroom*. ASCD.



- Gikandi, J. W., Morrow, D., & Davis, N. E. (2011). Online formative assessment in higher education: A review of the literature. *Computers & Education*, 57(4), 2333-2351.
- Gulbahar, Y., & Guven, I. (2018). The Effect of Professional Development on Teacher Competence in Technology Integration. *British Journal of Educational Technology*, 49(1), 147-159.
- Hague, C., & Payton, S. (2010). *Digital Literacy across the Curriculum*. Futurelab.
- Harris, A., Jones, M., & Adams, D. (2020). The role of technology in educational assessment: A systematic review. *Assessment & Evaluation in Higher Education*, 45(1), 1-15.
- Harris, J. B., & Hofer, M. J. (2011). Technological pedagogical content knowledge (TPACK) in action. *Journal of Digital Learning in Teacher Education*, 27(4), 220-229.
- Harris, J., & Hofer, M. (2015). Technological Pedagogical Content Knowledge (TPACK) in Action: Understanding the Development of New Teachers' Knowledge. *Journal of Educational Technology & Society*, 18(1), 1-16.
- Hattie, J. (2017). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Routledge.
- Hodges, C. B., Moore, S., Lockee, B. B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*, 27.
- Koehler, M. J., & Mishra, P. (2017). What is technological pedagogical content knowledge (TPACK)? *Journal of Educational Technology & Society*, 12(1), 1-4.
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054.
- Mouza, C., Nandakumar, R., & Lavigne, K. (2016). The role of school leadership in supporting technology integration. *Journal of School Leadership*, 26(1), 1-27.
- National Universities Commission. (2023). *Statistical Reports on Nigerian Universities*. Retrieved from NUC official website on 12/08/24.
- Tondeur, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Teacher education and technology: A systematic review of the literature. *Educational Technology Research and Development*, 65(1), 1-19.
- Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Preparing Teachers for Technology Integration: Scaffolding Technological Pedagogical Content Knowledge. *Computers & Education*, 56(1), 24-35.
- Trust, T., & Whalen, D. (2020). The role of the teacher in online learning: A review of the literature. *Journal of Online Learning Research*, 6(1), 5-25.
- Zheng, B., Warschauer, M., & Farkas, G. (2020). The Relationship Between Teacher Technology Integration and Student Outcomes: A Meta-Analysis. *Educational Technology Research and Development*, 68(5), 2351-2376.