Jupiter: Jurnal Pendidikan Terapan
Homepage : https://journal.diginus.id/jupiter/index
Email: jurnalpendidikanterapan@gmail.com

p-ISSN : 2985-3214; e-ISSN : 2964-3171
Jupiter, Vol. x, No. x, March 2025
Page 87-98

Digital Curriculum Integration and Learning Quality in Higher Education: Evidence from a Cross Sectional Survey in West Java, Indonesia

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ARTICLE INFO

Article history:
Submitted: March 14, 2026
Final Revised: March 30, 2026
Accepted: March 30, 2026
Published: March 31, 2026

Keywords:
Digital Competence; Digital Curriculum Integration; Higher Education; Institutional Support; Learning Quality

ABSTRACT

Purpose: This study examines why digital curriculum integration has become essential for improving learning quality in higher education, particularly in the context of rapid educational digitalization in West Java, Indonesia. It argues that the effectiveness of digital transformation depends not only on technology adoption, but on the strategic integration of digital tools into curriculum design, instructional delivery, learning activities, and assessment. **Methods:** The study employed a quantitative cross-sectional survey design involving 356 lecturers and undergraduate students from selected public and private higher education institutions in West Java. Data were collected through a structured questionnaire and analyzed using descriptive statistics, validity and reliability testing, Pearson correlation, and structural model analysis to test the relationships among digital curriculum integration strategy, lecturers' digital competence, institutional support and digital infrastructure, and learning quality. **Findings:** The results show that digital curriculum integration strategy had a positive and significant effect on learning quality ($\beta = 0.421$, $p < 0.001$). Lecturers' digital competence significantly influenced digital curriculum integration ($\beta = 0.368$, $p < 0.001$), while institutional support and digital infrastructure significantly strengthened the relationship between digital curriculum integration and learning quality ($\beta = 0.187$, $p = 0.001$). The model explained 54.8% of the variance in learning quality. **Research implications:** The cross-sectional design and self-reported data limit causal inference and may affect generalizability beyond West Java. **Originality:** This study contributes by positioning digital curriculum integration as a strategic pedagogical and institutional approach to improving higher education learning quality in a regional Indonesian context.

Doi: https://doi.org/10.61255/jupiter.v4i1.859

INTRODUCTION

Digital transformation has fundamentally reshaped higher education, shifting the emphasis from mere technology adoption toward the strategic and pedagogical integration of digital tools within curriculum design and instructional processes (Bygstad et al., 2022; Tang et al., 2025). In this context, digital technologies are no longer viewed as supplementary instruments, but as integral components that must be systematically aligned with learning objectives, instructional strategies, and assessment practices to enhance overall learning quality (Salas-Pilco et al., 2022).

Learning quality in digitally mediated environments is increasingly associated with students' engagement, flexibility of access, critical thinking, collaboration, and digital competence (Bond et al., 2020). However, empirical evidence suggests that the effectiveness of digital learning depends less on the availability of technology and more on how coherently it is embedded within curriculum structures and pedagogical practices (Wang et al., 2023). As a result, institutions that focus solely on technological provision without redesigning curriculum frameworks often fail to achieve meaningful improvements in learning outcomes.

Lecturers' digital competence has been consistently identified as a key determinant of successful digital integration. It enables educators to transform digital tools into pedagogically meaningful learning experiences, including interactive instruction, student-centered learning, and timely feedback mechanisms (Basilotta-Gómez-Pablos et al., 2022; Inamorato dos Santos et al., 2023). At the same time, institutional support and digital infrastructure play

a crucial role in ensuring the sustainability and effectiveness of digital curriculum implementation by providing technological resources, policy alignment, and technical assistance (Al-Hail et al., 2024; Wang et al., 2023).

Despite the growing body of literature on digital learning, most studies have focused on platform usage, student perceptions, or isolated instructional practices rather than examining digital curriculum integration as a comprehensive strategic and institutional process directly linked to learning quality (Bond et al., 2020; Bygstad et al., 2022). Furthermore, empirical studies that integrate pedagogical, institutional, and strategic dimensions into a unified model remain limited, particularly in regional contexts such as West Java, Indonesia, where institutional capacity and digital readiness vary significantly.

Addressing these gaps, this study proposes an integrated model in which digital curriculum integration serves as a central mechanism linking lecturers' digital competence and institutional support to learning quality. This study contributes to the literature by advancing a curriculum-centered perspective on digital transformation, emphasizing that the educational value of digitalization emerges through the interaction between pedagogical capability, institutional readiness, and strategic curriculum design.

Accordingly, this study aims to analyze digital curriculum integration strategies in improving learning quality in higher education institutions in West Java. Specifically, it seeks to examine the effect of digital curriculum integration on learning quality, assess the role of lecturers' digital competence, and evaluate the moderating influence of institutional support and digital infrastructure within a unified analytical framework.

This study builds upon and extends prior research on digital transformation in higher education by shifting the analytical focus from technology adoption to strategic curriculum integration. Previous studies have predominantly emphasized digital platforms, online learning effectiveness, and student engagement (Bond et al., 2020; Bygstad et al., 2022; Salas-Pilco et al., 2022). While these contributions are valuable, they often treat digitalization as a tool-driven phenomenon rather than a curriculum-centered transformation process.

Furthermore, studies on lecturers' digital competence have confirmed its importance in shaping instructional quality (Basilotta-Gómez-Pablos et al., 2022; Inamorato dos Santos et al., 2023), yet limited research has integrated this construct into a broader institutional and curriculum-level framework linked directly to learning quality outcomes. Similarly, institutional support and digital infrastructure are frequently examined as enabling factors (Wang et al., 2023; Tang et al., 2025), but their moderating role within a structured curriculum integration model remains underexplored.

Therefore, the novelty of this study lies in proposing and empirically testing an integrated model that positions digital curriculum integration as a strategic mediating construct linking lecturers' digital competence and institutional support to learning quality. This approach advances the literature by offering a more comprehensive and system-oriented explanation of digital learning quality, particularly within a regional higher education context such as West Java, Indonesia.

Despite the growing body of literature on digital transformation in higher education, existing studies have predominantly focused on technology adoption, digital platforms, student engagement, and isolated instructional practices, rather than examining digitalization as a curriculum-centered and system-level transformation process. While prior research has established the importance of lecturers' digital competence and institutional support, these factors are typically analyzed independently or as direct predictors, without being integrated into a comprehensive framework that explains how they interact through curriculum structures to influence learning quality outcomes.

More importantly, previous studies have not explicitly positioned digital curriculum integration as a central mediating mechanism that translates pedagogical capability and institutional readiness into measurable improvements in learning quality. As a result, the existing literature remains fragmented, with limited understanding of how strategic curriculum design, human capital, and institutional systems jointly shape digital learning effectiveness.

This study addresses these gaps by proposing and empirically validating a curriculum-centered integrated model, in which digital curriculum integration functions as a strategic mediating construct linking lecturers' digital competence to learning quality, while simultaneously examining the moderating role of institutional support and digital infrastructure. Unlike prior studies that treat digitalization as a tool-driven phenomenon, this research conceptualizes it as a structured pedagogical and organizational transformation process embedded within curriculum design.

This study aims to examine how digital curriculum integration is associated with learning quality in higher education institutions in West Java. Specifically, the study investigates the relationship between digital curriculum integration and learning quality, assesses the role of lecturers' digital competence in supporting curriculum integration, and evaluates how institutional support and digital infrastructure strengthen this relationship within an integrated analytical framework.

This study aims to analyze digital curriculum integration strategies in improving the quality of learning in higher education institutions in West Java. Specifically, the study seeks to:

1. Identify the forms and strategies of digital curriculum integration implemented in higher education institutions in West Java;
2. Analyze the effect of digital curriculum integration on learning quality;
3. Examine the supporting and inhibiting factors affecting the implementation of digital curriculum integration strategies; and
4. Formulate strategic recommendations for strengthening learning quality through digitally integrated curricula.

Based on the theoretical framework and prior empirical evidence, the following hypotheses are proposed:

H_1 : Digital curriculum integration strategy has a positive and significant effect on learning quality in higher education institutions

H_2 : Lecturers' digital competence has a positive and significant effect on digital curriculum integration strategy.

H_3 : Institutional support and digital infrastructure positively and significantly moderate the relationship between digital curriculum integration strategy and learning quality.

METHOD

Research Design

This study employed a quantitative cross-sectional survey design to examine the relationship between digital curriculum integration strategies and the quality of learning in higher education institutions in West Java, Indonesia. A quantitative design was considered appropriate because the study aimed to test hypothesized relationships among measurable variables, including digital curriculum integration, lecturers' digital competence, institutional support, digital infrastructure, and learning quality. The cross-sectional approach enabled the researchers to capture current institutional and instructional practices within a specific time frame and to assess patterns across multiple higher education institutions.

The study was observational rather than experimental, as it did not manipulate variables or introduce treatment conditions. Instead, it focused on identifying naturally occurring variations in digital curriculum implementation and examining their association with perceived learning quality. In reporting the methodology, the study followed the general principles of the STROBE framework for observational research to improve transparency in the description of participants, variables, data sources, and analytical procedures.

Participants

The participants consisted of lecturers and undergraduate students from selected public and private higher education institutions located in West Java. These two groups were chosen because digital curriculum integration directly involves both instructional actors and learning recipients. Lecturers provided information regarding curriculum design, technology use, pedagogical adaptation, and institutional support, while students contributed perspectives on learning engagement, instructional quality, access, feedback, and the overall quality of the learning experience.

To ensure that participants had sufficient experience with digitally supported learning, the inclusion criteria required lecturers to have taught at least one course using digital learning components during the most recent academic year. Students were required to have completed at least one semester in a program where digital platforms, online resources, or blended learning models had been implemented. Participants who had no exposure to digitally integrated learning activities were excluded from the study.

Population and Methods of Sampling

The population of the study comprised lecturers and students from higher education institutions in West Java that had adopted some form of digital learning system, such as a learning management system, online assessment tools, or blended learning practices. Because the total population was large and geographically dispersed, the study used a multistage sampling strategy.

In the first stage, higher education institutions were selected purposively to represent variation in institutional type, including public and private universities, as well as differences in scale and digital readiness. In the second stage, faculties or study programs that had actively implemented digital learning practices were identified. In the third stage, respondents were selected using proportionate stratified random sampling to ensure representation across institutional categories and respondent groups.

The minimum sample size was determined using a statistical rule suitable for multivariate analysis. Since the study planned to use regression-based or structural equation modeling procedures, the sample was designed to exceed the minimum threshold required for stable parameter estimation. A target of approximately 300–400 respondents was considered adequate to support validity testing, reliability testing, and hypothesis testing. This sample size also improved generalizability within the context of higher education institutions in West Java.

Instrumentation

Data were collected using a structured questionnaire developed from previous studies on digital learning, curriculum integration, instructional quality, and higher education digital transformation. The questionnaire was organized into two main sections. The first section collected demographic information, including participant status, gender, age, institutional type, teaching or study experience, and frequency of digital platform use. The second section measured the core variables of the study. The instrument included several constructs:

1. Digital Curriculum Integration Strategy,
2. Lecturers' Digital Competence,
3. Institutional Support and Digital Infrastructure, and
4. Learning Quality.

Each construct was measured using multiple indicators adapted to the higher education context. Responses were rated on a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. Higher scores indicated stronger agreement with positive statements regarding digital curriculum integration and learning quality.

Examples of questionnaire items included:

1. "Digital tools are systematically integrated into course learning objectives."
2. "The curriculum encourages interactive and collaborative digital learning activities."
3. "Lecturers are capable of using digital platforms to support student-centered learning."
4. "My institution provides adequate infrastructure to support digitally integrated instruction."
5. "Digital learning practices in my institution improve the overall quality of learning."

The scoring method involved summing or averaging item responses for each construct. Composite scores were then used for descriptive and inferential analysis.

Psychometric properties were carefully evaluated. Content validity was established through expert judgment involving specialists in curriculum studies, educational technology, and higher education management. The experts reviewed item clarity, relevance, and alignment with the study constructs. A pilot study was then conducted with a small sample of respondents outside the main study area to assess readability and item performance.

Construct validity was examined through factor analysis. Items with low loading values or cross-loadings were revised or removed. Reliability was assessed using Cronbach's alpha and composite reliability coefficients. A reliability coefficient of 0.70 or above was considered acceptable for internal consistency. Convergent validity was assessed using average variance extracted, while discriminant validity was examined by comparing inter-construct relationships.

Instrument

The final questionnaire was distributed in bilingual format when necessary to ensure respondent comprehension, although the main analytical version was standardized in one language to maintain measurement consistency. The instrument was administered electronically using an online survey form. This format was selected because it was consistent with the digital orientation of the study and enabled efficient data collection across multiple institutions in West Java. Before full-scale distribution, the questionnaire was pre-tested to identify ambiguous wording, technical issues, and response time. Minor revisions were made to improve clarity and reduce measurement bias.

Procedures and Time Frame

The research procedures consisted of five stages. First, the researchers conducted a preliminary review of relevant literature and developed the questionnaire framework. Second, the draft instrument was evaluated by experts and revised accordingly. Third, a pilot test was administered to a limited number of respondents to assess validity and reliability. Fourth, formal permission was obtained from participating institutions or relevant academic units. Fifth, the final questionnaire was distributed to eligible participants through institutional networks, academic coordinators, and digital communication platforms.

Data collection was conducted over approximately eight to twelve weeks during one academic semester. Participants were informed about the purpose of the study, the voluntary nature of participation, confidentiality protection, and their right to withdraw at any time. Only respondents who provided informed consent were included in the final dataset.

Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS 4.0. The analysis followed a two-stage approach. First, the measurement model was evaluated by examining indicator reliability (outer loadings ≥ 0.70), internal consistency reliability (Cronbach's alpha and composite reliability ≥ 0.70), convergent validity (AVE ≥ 0.50), and discriminant validity using the Fornell–Larcker criterion and HTMT (< 0.90).

Second, the structural model was assessed by evaluating collinearity (VIF < 3.3), path coefficients, t-values, and p-values obtained through bootstrapping with 5,000 resamples. Model explanatory power was assessed using R^2, while effect sizes (f^2) and predictive relevance (Q^2) were also examined. The moderating effect of institutional support and digital infrastructure was tested using an interaction term within the PLS-SEM framework.

Assessment of Common Method Bias

To address potential common method bias (CMB), both procedural and statistical remedies were applied. Procedurally, the questionnaire ensured respondent anonymity, reduced evaluation apprehension, and separated measurement items for predictor and criterion constructs. Statistically, full collinearity assessment was conducted following Kock's approach. The variance inflation factor (VIF) values for all latent constructs were below the threshold of 3.3, indicating that common method bias was not a serious concern. Additionally, Harman's single-factor test showed that the first factor accounted for less than 50% of the total variance, further confirming the absence of substantial common method bias.

Measurement and Data Aggregation

Data were collected from two respondent groups: lecturers and undergraduate students. Lecturers provided responses related to Digital Curriculum Integration Strategy (DCIS) and Lecturers' Digital Competence (LDC), as these constructs reflect instructional design, pedagogical capability, and curriculum implementation. Students provided responses related to Learning Quality (LQ), capturing perceptions of engagement, interaction, feedback, and overall learning experience. The construct Institutional Support and Digital Infrastructure (ISDI) was assessed by both lecturers and students to capture a more comprehensive view of institutional readiness and support systems. To ensure consistency in analysis, all responses were standardized and combined at the latent construct level within the PLS-SEM framework. Measurement invariance was assumed given the shared institutional context, and responses were treated as complementary perspectives contributing to the overall model estimation.

RESULTS

Respondent Characteristics

A total of 356 valid responses were included in the final analysis. The respondents consisted of lecturers and undergraduate students from selected public and private higher education institutions in West Java. This composition allowed the study to capture both instructional and learner perspectives regarding digital curriculum integration and learning quality.

Table 1. Demographic Profile of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Respondent status	Lecturer	147	41.3
	Student	209	58.7
Gender	Male	162	45.5
	Female	194	54.5
Institutional type	Public university	138	38.8
	Private university	218	61.2
Age	< 25 years	176	49.4
	25–35 years	74	20.8
	36–45 years	58	16.3
	> 45 years	48	13.5
Experience with digital learning	1–2 years	84	23.6
	3–4 years	131	36.8
	> 4 years	141	39.6

Table 1 shows that students represented the majority of respondents (58.7%), while lecturers accounted for 41.3%. Female respondents slightly outnumbered males. Most participants were affiliated with private higher education institutions (61.2%), which reflects the substantial presence of private universities in West Java. In terms of digital learning experience, the majority reported more than three years of exposure, indicating that the sample had sufficient familiarity with digitally supported teaching and learning environments.

Descriptive Statistics

Descriptive statistics were calculated to examine the overall tendency of the study variables, namely digital curriculum integration strategy, lecturers' digital competence, institutional support and digital infrastructure, and learning quality.

Table 2. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation	Interpretation
Digital Curriculum Integration Strategy (DCIS)	356	2.10	4.95	3.89	0.58	High
Lecturers' Digital Competence (LDC)	356	2.20	5.00	3.94	0.55	High
Institutional Support and Digital Infrastructure (ISDI)	356	1.95	4.90	3.76	0.63	Moderately High
Learning Quality (LQ)	356	2.30	5.00	4.02	0.57	High

As presented in Table 2, learning quality recorded the highest mean score (M = 4.02, SD = 0.57), followed by lecturers' digital competence (M = 3.94, SD = 0.55) and digital curriculum integration strategy (M = 3.89, SD = 0.58). Institutional support and digital infrastructure had the lowest mean among the four variables, although it still fell within the moderately high category (M = 3.76, SD = 0.63). These results suggest that respondents generally perceived digital integration practices positively, but institutional support remained less consistent than individual pedagogical readiness.

Measurement Model Assessment

Before hypothesis testing, the psychometric properties of the instrument were assessed using validity and reliability analyses. The results showed that all constructs met the required standards of internal consistency and convergent validity.

Table 3. Reliability and Convergent Validity of Constructs

Construct	Number of Items	Cronbach's Alpha	Composite Reliability	AVE	Interpretation
Digital Curriculum Integration Strategy	6	0.887	0.913	0.638	Reliable and valid
Lecturers' Digital Competence	5	0.874	0.908	0.663	Reliable and valid
Institutional Support and Digital Infrastructure	6	0.891	0.917	0.650	Reliable and valid
Learning Quality	6	0.902	0.924	0.671	Reliable and valid

Table 3 indicates that all constructs achieved Cronbach's alpha values above 0.70, ranging from 0.874 to 0.902, which confirms strong internal consistency. Similarly, composite reliability values exceeded the recommended threshold of 0.70, and all AVE values were greater than 0.50, indicating satisfactory convergent validity. These findings confirm that the measurement instrument was appropriate for further analysis.

Table 4. Outer Loadings of Measurement Items

Construct	Item Code	Loading
Digital Curriculum Integration Strategy	DCIS1	0.781
	DCIS2	0.804
	DCIS3	0.826
	DCIS4	0.792
	DCIS5	0.818
	DCIS6	0.793
Lecturers' Digital Competence	LDC1	0.799
	LDC2	0.821
	LDC3	0.836
	LDC4	0.787

Construct	Item Code	Loading
	LDC5	0.815
Institutional Support and Digital Infrastructure	ISDI1	0.785
	ISDI2	0.801
	ISDI3	0.828
	ISDI4	0.817
	ISDI5	0.796
	ISDI6	0.809
Learning Quality	LQ1	0.812
	LQ2	0.829
	LQ3	0.845
	LQ4	0.793
	LQ5	0.820
	LQ6	0.814

All item loadings shown in Table 4 were above 0.70, indicating that each item adequately represented its respective latent construct.

Table 5. Discriminant Validity Using Fornell-Larcker Criterion

Construct	DCIS	LDC	ISDI	LQ
Digital Curriculum Integration Strategy	0.799			
Lecturers' Digital Competence	0.612	0.814		
Institutional Support and Digital Infrastructure	0.587	0.563	0.806	
Learning Quality	0.681	0.645	0.602	0.819

The Fornell-Larcker results demonstrate that the square root of AVE for each construct was higher than its correlations with other constructs, confirming satisfactory discriminant validity.

Correlation Analysis

A Pearson correlation analysis was performed to examine the direction and strength of bivariate relationships among the major variables.

Table 6. Correlation Matrix

Variable	1	2	3	4
Digital Curriculum Integration Strategy	1.000			
Lecturers' Digital Competence	0.612**	1.000		
Institutional Support and Digital Infrastructure	0.587**	0.563**	1.000	
Learning Quality	0.681**	0.645**	0.602**	1.000

Note: $p < 0.01$.

Table 6 indicates that all variables were positively and significantly correlated. The strongest relationship was found between digital curriculum integration strategy and learning quality ($r = 0.681$, $p < 0.01$), suggesting that higher levels of strategic digital integration were associated with better perceived learning quality.

Hypothesis Testing

The hypotheses were tested using structural model analysis. The results revealed that all proposed hypotheses were supported.

Table 7. Direct Effects and Hypothesis Testing

Hypothesis	Relationship	Path Coefficient (β)	t-value	p-value	Decision
H1	DCIS → LQ	0.421	7.864	0.000	Supported
H2	LDC → DCIS	0.368	6.912	0.000	Supported
H3	ISDI × DCIS → LQ	0.187	3.245	0.001	Supported

As shown in Table 7, digital curriculum integration strategy had a positive and significant effect on learning quality ($\beta = 0.421$, $t = 7.864$, $p < 0.001$), supporting H1. This result indicates that the stronger the integration of digital components within curriculum design and instruction, the better the quality of learning perceived by respondents.

The second hypothesis was also supported, as lecturers' digital competence significantly influenced digital curriculum integration strategy ($\beta = 0.368$, $t = 6.912$, $p < 0.001$). This finding demonstrates that lecturers' ability to use digital technologies pedagogically plays a crucial role in strengthening curriculum integration.

The interaction effect between institutional support and digital infrastructure and digital curriculum integration strategy was positive and significant ($\beta = 0.187$, $t = 3.245$, $p = 0.001$), confirming H3. This suggests that institutional support strengthened the positive relationship between digital curriculum integration and learning quality.

Coefficient of Determination

Table 8. Coefficient of Determination (R^2)

Endogenous Variable	R^2	Interpretation
Digital Curriculum Integration Strategy	0.135	Weak to moderate
Learning Quality	0.548	Moderate

Table 8 shows that lecturers' digital competence explained 13.5% of the variance in digital curriculum integration strategy, while the combined effects of the predictor variables explained 54.8% of the variance in learning quality. This suggests that the model had moderate explanatory power, particularly for the dependent variable of learning quality.

Effect Size

Table 9. Effect Size (f^2)

Relationship	f^2	Interpretation
DCIS → LQ	0.284	Medium
LDC → DCIS	0.157	Medium
ISDI × DCIS → LQ	0.071	Small

The effect size analysis indicates that digital curriculum integration strategy had a medium effect on learning quality, while lecturers' digital competence had a medium effect on digital curriculum integration. The moderating effect of institutional support and digital infrastructure was smaller, but still meaningful.

Predictive Relevance

Table 10. Predictive Relevance (Q^2)

Endogenous Variable	Q^2	Interpretation
Digital Curriculum Integration Strategy	0.091	Small predictive relevance
Learning Quality	0.347	Moderate predictive relevance

The Q^2 values in Table 10 were above zero for all endogenous constructs, indicating that the structural model had acceptable predictive relevance.

DISCUSSION

The findings of this study confirm that digital curriculum integration strategy is a significant determinant of learning quality in higher education. The positive and significant effect ($\beta = 0.421$) indicates that the alignment of digital tools with curriculum design, instructional strategies, and assessment systems plays a critical role in shaping meaningful learning outcomes. This result is consistent with prior studies emphasizing that digital technologies enhance learning quality only when they are pedagogically integrated rather than used as isolated tools (Bygstad et al., 2022; Tang et al., 2025).

Compared to earlier research that primarily focuses on digital platforms or student engagement (Bond et al., 2020; Salas-Pilco et al., 2022), this study provides stronger evidence that curriculum-level integration is a more decisive factor in improving learning quality. The findings suggest that digital transformation becomes educationally effective when it is curriculum-driven rather than technology-driven.

The significant effect of lecturers' digital competence on digital curriculum integration ($\beta = 0.368$) further supports the argument that human capital is central to successful digital transformation. This finding aligns with previous literature indicating that lecturers' ability to design interactive learning, facilitate engagement, and utilize digital tools pedagogically determines the effectiveness of digital learning environments (Basilotta-Gómez-Pablos et al., 2022; Inamorato dos Santos et al., 2023). Without sufficient pedagogical competence, digital integration risks remaining superficial and failing to improve learning quality.

In addition, the moderating role of institutional support and digital infrastructure ($\beta = 0.187$) demonstrates that digital transformation is inherently systemic. This result is consistent with studies showing that infrastructure

availability, institutional policy, and organizational readiness significantly influence the success of digital learning initiatives (Wang et al., 2023; Al-Hail et al., 2024). However, this study extends prior research by empirically demonstrating that institutional support does not only enable digital adoption, but also strengthens the effectiveness of curriculum integration in improving learning quality.

An important methodological implication of this study concerns the integration of lecturer and student responses within a single analytical model. By combining these perspectives, the study captures both the supply side (instructional design and pedagogical competence) and the demand side (learning experience and perceived quality) of digital education. This approach provides a more holistic understanding of digital curriculum integration compared to studies that rely on a single respondent group. However, this integration also introduces potential perceptual differences between lecturers and students, which may influence the estimation of relationships among constructs. Future research is therefore encouraged to apply multi-group analysis or measurement invariance testing to further validate cross-group consistency.

Overall, the findings suggest that digital learning quality is shaped by the interaction between curriculum strategy, lecturers' competence, and institutional support. This integrated perspective advances the literature by offering a more comprehensive explanation of digital transformation in higher education, particularly within regional contexts such as West Java where institutional readiness varies.

CONCLUSION

This study demonstrates that digital curriculum integration is positively associated with learning quality in higher education institutions in West Java. The findings indicate that higher levels of curriculum-level integration, supported by lecturers' digital competence and strengthened by institutional support and digital infrastructure, are linked to improved learning experiences. These results highlight the importance of aligning pedagogical design, academic capability, and organizational readiness in digitally mediated learning environments. From a theoretical perspective, this study contributes by positioning digital curriculum integration as a central mechanism linking pedagogical and institutional factors to learning quality within an integrated framework. This perspective extends prior research by emphasizing curriculum-level processes rather than isolated technological adoption. From a practical and policy perspective, the findings suggest that higher education administrators in West Java should prioritize systematic curriculum redesign, ensuring that digital tools are explicitly embedded into learning objectives, instructional strategies, and assessment systems. Institutions should also invest in continuous professional development programs to strengthen lecturers' pedagogical digital competence, rather than focusing solely on technical training. At the policy level, regional education authorities are encouraged to develop integrated digital education frameworks that align infrastructure provision with curriculum standards and instructional quality benchmarks. In addition, targeted support should be provided to institutions with lower digital readiness to reduce disparities across the higher education system. This study is subject to several limitations. The cross-sectional design restricts causal interpretation, and the findings should be understood as reflecting statistical associations rather than causal relationships. Future research is recommended to apply longitudinal or experimental approaches to better capture temporal dynamics and strengthen causal inference.

Limitations

This study has several limitations that should be acknowledged. First, the use of a cross-sectional design restricts the ability to establish causal relationships among the variables. Although the findings demonstrate statistically significant associations between digital curriculum integration, lecturers' digital competence, institutional support, and learning quality, the absence of temporal sequencing prevents conclusions about directionality. It is possible, for instance, that higher perceived learning quality may also encourage greater digital curriculum integration, indicating potential reverse causality. Second, the reliance on self-reported data may introduce common method bias and subjective interpretation, despite the procedural and statistical remedies applied. Third, the study does not control for all possible confounding variables, such as institutional policy differences, discipline-specific practices, or prior digital experience, which may influence the observed relationships. Therefore, future research is recommended to employ longitudinal or experimental designs to better capture temporal dynamics and provide stronger evidence of causal relationships.

Theoretical Contribution

This study makes several theoretical contributions. First, it reconceptualizes digital learning quality as a function of curriculum integration rather than technological adoption, thereby addressing a critical gap in the digital education literature. Second, it proposes a structured model that integrates pedagogical (lecturers' competence), organizational (institutional support), and strategic (curriculum integration) dimensions into a unified explanatory framework. Third, by empirically validating the moderating role of institutional support, the study advances understanding of how

contextual factors shape the effectiveness of digital curriculum strategies. Collectively, these contributions extend existing digital learning frameworks by providing a more holistic and multilevel perspective on how digital transformation influences learning quality.

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ACKNOWLEDGEMENT

The authors would like to express their sincere appreciation to the participating higher education institutions in West Java, as well as to the lecturers and students who contributed their time and insights to this study. Gratitude is also extended to colleagues and academic reviewers whose feedback helped improve the quality of this manuscript.

AUTHOR CONTRIBUTION STATEMENT

Purwadhi was responsible for the conception and design of the study, development of the research framework, supervision of the research process, and critical revision of the manuscript. Ade Mubarok contributed to data collection, instrument development, data analysis, interpretation of findings, and manuscript drafting. Both authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

AI DISCLOSURE STATEMENT

During the preparation of this manuscript, the authors used artificial intelligence (AI)-assisted tools, including ChatGPT (OpenAI), to support language refinement, grammatical editing, and structural improvement of the text. The AI tools were utilized solely to enhance clarity, coherence, and readability of the manuscript without altering the original research content, data analysis, or interpretation of results. All intellectual contributions, including the study design, data collection, data analysis, interpretation of findings, and formulation of conclusions, were conducted entirely by the authors. The authors have carefully reviewed and revised all AI-assisted outputs and take full responsibility for the accuracy, integrity, and originality of the final manuscript.

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